



Updated edition with moon-planting notes from 2012 to 2017

EASY ORGANIC GARDENING

and Moon Planting



LYN BAGNALL

'This book is a fabulous resource both for the beginner
and the more experienced gardener.' *Earth Garden*

Scribe Publications
EASY ORGANIC GARDENING
AND MOON PLANTING

Lyn Bagnall has been actively involved in professional horticulture and garden design for more than 30 years, including working for two major retail nurseries in Sydney.

Lyn and her husband are certified-organic farmers on a small property in the mid-north coast of New South Wales, where they grow fresh culinary herbs for market, wine grapes, and fruit and vegetables.

Lyn has also written the Biological Farmers of Australia's Organic School Gardens program for Australian primary schools, and regular articles on gardening and moon planting for a range of Australian magazines. Her magazine articles, as well as her blog at www.aussieorganicgardening.com, have been popular with both amateur gardeners and commercial growers.

EASY ORGANIC GARDENING

and Moon Planting



LYN BAGNALL



Scribe Publications Pty Ltd
18–20 Edward St, Brunswick, Victoria, Australia 3056
Email: info@scribepub.com.au

First published by Scribe 2006
New edition (with revisions) published 2009
This updated edition published 2012

Text and illustrations copyright © Lyn Bagnall 2006, 2009,
2012

All rights reserved. Without limiting the rights under copyright reserved above, no part of this publication may be reproduced, stored in or introduced into a retrieval system, or transmitted, in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of the publisher of this book.

National Library of Australia
Cataloguing-in-Publication data

Bagnall, Lyn.

Easy Organic Gardening and Moon Planting: updated edition
with moon-planting notes from 2012 to 2017.

New ed.

9781921942563 (e-book.)

Includes bibliographical references.

1. Organic gardening—Australia. 2. Organic gardening—New Zealand. 3. Astrology and gardening—Calendars. 4. Planting time.

635.0484

www.scribepublications.com.au

Contents

Preface

1. THE LOWDOWN ON DIRT

Why is your soil so important?

Soils and soil pH

Earthworms

Green manure and cover crops

Crop rotation

Companion planting

2. KEEPING SOIL HEALTHY

What not to use in your garden

Soil nutrients

Organic fertilisers

Making a compost factory

Compost worm farming

3. YOUR GARDENING DIARY

Gardening zones in Australia and New Zealand

Moon planting

Month-by-month planting and garden activity diary

4. BEDS, BOXES AND POTS

Planning or renovating your garden

Making an instant garden

Growing plants from seed

Planting shrubs, trees, vines, and herbaceous perennials

Container gardening

5. DROUGHT-PROOF YOUR GARDEN

Efficient watering

Drought conditions and water restrictions

Mulching your garden

Drought-tolerant plants

6. THE FOOD GARDEN

Summer sun protection

Shared or separate beds?

Culinary herbs

Popular fruits and vegetables

7. GARDEN FAVOURITES

Native trees and shrubs

Popular native plants

Foreign favourites

Plants for shady, dry areas

8. PRUNING AND PROPAGATION

Types of pruning

Pruning fruiting plants

Pruning shrubs and trees

Pruning roses

Propagating plants

Taking cuttings

Saving seed

9. SOLVING PROBLEMS NATURALLY

The organic approach

Friend or foe?

Organic pest control

Bushfire season

Protecting plants from frost

Repairing hail-damaged plants

Organic weed control

Summer and winter projects

10. MOON PHASES AND BEST GARDENING DAYS TO 2017

Glossary

Bibliography

Preface

ORGANIC GARDENING AND FARMING are particularly suited to Australia because our soils are fragile and our climate can be harsh. Australia has also been labelled ‘the driest continent on earth’. Organic cultivation repairs damaged soils by making them biologically active. As a result, soils become more moisture-retentive, resistant to erosion, able to eliminate organisms that cause plant disease, and provide, in natural form, all the nutrient minerals that plants, animals and humans require. Where soils are rich in minerals, as in New Zealand, biologically active soil gently releases essential nutrients that become locked up in soil when synthetic fertilisers have been used.

Organic cultivation is just as suitable for large and small gardens, with or without vegetable patches, and for growing plants in pots as it is for farming because all plants respond positively when grown as nature intended. Your organic garden will require less watering, be stronger and healthier, more adaptable to climate change, and more resistant to pests and disease. As you will see in this book, it is easy to convert a conventional garden to organic cultivation by starting with the most important element: your soil. Step-by-step guides will show you how to make your soil biologically active, and detailed information on growing pure foods and keeping decorative parts of your garden looking beautiful have been included. The gardening diary provides an easy-to-follow routine for all aspects of organic gardening. Although written for Australia, the organic cultivation methods and gardening diary are suitable for all parts of the Southern Hemisphere, where our growing seasons are entirely different to those in the Northern Hemisphere.

Organic gardeners and farmers do not use synthetic fertilisers or chemical pesticides, fungicides or herbicides because these chemicals destroy or inhibit beneficial organisms in soil. Research has shown that some popular pesticides increase the incidence of asthma, while others are neurotoxins, which affect humans and animals, and can accumulate in our bodies. The neurotoxic, systemic organophosphates are of particular concern, because these pesticides cannot be removed from produce. Eliminating the use of poisons will make your entire garden a healthier place for your family, pets, soil and the birds and other beneficial wildlife that visit.

Far from being old-fashioned or quaint, organic cultivation is gaining worldwide momentum as more people realise the effects that chemicals used in farming and gardening are having on our health, the quality of our food, and the environment. Although our demand for pure food has resulted in the growth of the Australian organic industry at the steady rate of 25 per cent per annum, Australia still lags far behind most developed countries in its adoption of organic cultivation. It saddens me to think that our children or grandchildren will not be able to choose pure food in future because inadequate separation distances determined by our governments for genetically engineered (GE) food crops will undoubtedly result in organic farmers losing their certification when seed, or stock and poultry feed become contaminated with GE pollen. Without certification, consumers will have no guarantee that their food is organic.

Easy Organic Gardening and Moon Planting has evolved from my observations as a horticulturist, working and gardening in different climate zones in Australia, and from my magazine and internet articles on gardening and moon

planting, a system of adjusting cultivation activities to various moon phases. Moon planting may be a new concept to some gardeners, but this ancient method of cultivation has endured because the moon's gravitational pull still influences many life forms on this planet.

Although I have been involved in horticulture for thirty years, it is only during the last eleven years that I have been experimenting with the various rules of moon planting on our certified-organic farm. We were surprised to find that seed sown in the correct phase germinates and grows faster than seed sown earlier in an incorrect phase. We found that parsley, for example, which is listed in various gardening guides as taking a long time to germinate, appears above ground within fourteen days when planted in the correct phase on a fertile day. Perennial cuttings developed a strong root system more quickly when taken during Full Moon phase than those taken in other phases. Strawberries made a lot of leafy growth and fruited well when transplanted during First Quarter phase, instead of Full Moon phase, but the runners did not develop strong roots which ensured the plant's future survival. Moon planting can be of assistance to organic gardeners because it uses the natural energy flows on our planet.

Coping with climate change is, by far, the greatest challenge for gardeners around the world, and it is occurring more quickly than predicted by many scientists. Across Australia, over the past three years alone, a developing pattern of longer, harsher winters or hotter summers has required a slight adjustment to sowing times of some species of plants. In the following chapters you will discover how, and why, organic cultivation provides the best protection for gardens and farms

against adverse conditions, and how to adapt your garden to changing weather patterns.

Writing this book has been a pleasure. Like other gardeners, I love sharing cultivation notes and I am very grateful to Scribe Publications for this opportunity. Occasionally, I have repeated information from chapter to chapter because procedures are advised for particular purposes and I, at least, always find it easier to remember to do something when I understand the reason for it. I am indebted to my husband Brian for his advice and support, including taking on a double workload on our farm to allow me time to write. A special thank you to our daughters Emma and Cara, and son-in-law Sam, for their valuable assistance with research and the tide diagram, and to Tamsin Wagner at Scribe for her infinite patience and good humour. I would also like to thank Kerrie Gammage at Greenpatch Seeds and Frances Michaels at Green Harvest for their very helpful information on legume inoculants, and all the people over the years who, intentionally or unintentionally, contributed to my education in the fascinating subject of organic gardening. In using this book, I am sure you will find, as we have, that organic gardening is not just a workable alternative, it's a better alternative.

Lyn Bagnall
Mondrook, NSW

CHAPTER 1

The Lowdown On Dirt

Why Is Your Soil So Important?

HEALTHY SOIL IS ESSENTIAL to sustained healthy growth. It is amazing how many gardeners spend a small fortune on healthy plants, another small fortune on synthetic fertilisers, pesticides and fungicide treatments, and then put in many hours trying to grow their plants in dead soil. Dead soil is water-repellent, difficult for plant roots to penetrate, and usually too acid or alkaline for plants to make use of all the nutrients provided in fertilisers, resulting in weakened growth that is prone to pests and disease.

Plants grown in healthy soil give off compounds called pheromones that deter pests. Healthy plants, like healthy humans and animals, have strong immune systems that resist disease. There is a huge industry out there happy to take your money to cure whatever ails your garden when the real answer to your problems is right under your feet — you are standing on it.

Healthy soil is a living organism teeming with earthworms and beneficial bacteria and fungi that break down soil nutrients into a form your plants can use. Healthy soil is rich in organic matter, and remains cooler in summer and warmer in winter. Mycorrhiza, beneficial fungi found in decomposed organic matter, hold soil particles together, and act as root hairs for many perennial plant families, extracting nutrients and water from soil and feeding them to host plants. Other friendly bacteria and fungi destroy soil pathogens that cause plant disease. These busy workers also improve the structure

and drainage of your soil better than any amount of spade work. Synthetic fertilisers not only do nothing to improve your soil, they discourage earthworm and soil micro-organism activity. Healthy soil provides your plants with all the major growth nutrients, a full spectrum of important trace elements, soil structure that is easily penetrated by roots, and access to the water that is essential to life.

Soil dies through lack of organic matter. Regular cultivation breaks down soil structure, accelerating the loss of organic matter and increasing salinity. Repeated removal of crops, monoculture, extensive logging and land clearing, taking prunings and lawn clippings to the tip, and careless removal of topsoil during building and earthworks all gradually deplete soil of life. As organic matter, or humus, decreases in soil, food becomes scarce for earthworms and micro-organisms, their numbers decline, and mycorrhiza-dependent plants struggle to survive. As soil structure deteriorates, topsoil becomes shallower. Root penetration and water drainage become limited in heavy soils. Regrowth is reduced, and soil salinity rises further. Lighter soils become wind- and water-eroded.

Synthetic sulphate fertilisers gradually increase soil acidity, making it harder for plants to extract major nutrients, and for beneficial micro-organisms to survive. Crop yields are reduced. Larger amounts of synthetic fertilisers are then used, compounding the problem, and increasing the emission of nitrous oxide, a major greenhouse gas. Susceptible crops extract more heavy metals from the depleted soil.

Stressed plants also attract pests, and are unable to resist disease. Weeds that thrive in nutrient-deficient soil begin to flourish, and more chemicals are used, leaving bare soil

vulnerable to further erosion. Pesticides and herbicides, or their surfactants, not only kill off beneficial insects and further deplete earthworms and soil micro-organisms, they can leach into water where they kill the fish and frogs that feed on mosquitoes. More pesticides are required; the vicious cycle continues.

Agriculture and horticulture took a serious wrong turn when scientists realised that plants fed on certain naturally occurring elements in soil, and decided that they only needed to supply these elements in concentrated chemical form to improve plant growth. In our rush to embrace modern technology, we forgot that the return of organic matter to the soil is part of Mother Nature's cycle of life, and is essential to sustainable agriculture, healthy gardens and a healthy environment. The chemist who made the original discovery later realised his mistake, but no one would listen. Many farmers work hard to care for their soils in harsh conditions but, generally, farming practices and government policies still reflect a state of denial in expecting more advanced chemicals, or plants that produce their own pesticides, to solve problems that can be traced back to dying soils.

In our first year of farming some eleven years ago, our culinary herb crops had continuing pest and disease problems. Our property had previously been used as a horse stud and the topsoil was shallow and very compacted. We resisted the temptation to resort to chemical solutions for these problems, and worked on gradually improving our soil using green manures, organic compost and manures, and organic mulches. Now it is difficult to find a spade or trowel full of soil in our growing areas that does not contain at least one fat earthworm. Despite the worst drought in a hundred years, we

have not needed to apply pest or disease treatments at all. Organic farming is not just an ideological rejection of synthetic fertilisers and pesticides, it is the basic belief that healthy soil = healthy plants = healthy people and animals, and a healthier environment.

It is largely a waste of effort to work on improving soil while continuing to use pesticides, fungicides, herbicides and synthetic fertilisers. Fungicides used to kill pathogens will also kill off mycorrhiza and other beneficial fungi that keep soil healthy. Fungicides and cabbage dust, in particular, are very toxic to earthworms. Synthetic fertilisers deter the activity of beneficial micro-organisms, as can be seen when adding these chemicals to a compost heap. The initiation of organic matter breakdown is delayed.

A wide range of commonly used pesticides are toxic to birds, bees, butterflies, natural pest predators, fish or frogs. Some also cause reproductive problems and tumours in animals and humans. It is downright cruel to plant shrubs to attract birds to your garden, and then spray for lawn grubs or fruit fly. Significant numbers of birds are killed by walking on sprayed lawns, or eating grubs which contain pesticides.

The use of herbicides has long been known to increase the incidence of plant diseases by affecting the soil ecosystem. Contrary to popular belief, Australia's favourite herbicide does not break down on contact with soil. Denmark's Environmental Minister restricted the use of glyphosate in 2003 after finding substantial levels of it in water 1 metre below the soil surface. Testing by glyphosate's manufacturer found the chemical in agricultural soils 140 days after application. In 1996, the Australian Pesticides and Veterinary

Medicines Authority (APVMA) recommended that glyphosate not be used near water sources.

Farming of genetically engineered (GE) crops that are resistant to glyphosate has led to an increase of over 70,000,000 more pounds of herbicide being used on GE acreage, according to the US Department of Agriculture. Several gene technology companies are now developing GE crops that resist diseases more commonly found where herbicides are used, and which can be eliminated by simply maintaining soil health. This approach to agriculture only encourages farmers to overwork fragile soils and ignore good farming practice. Further soil degradation is only one of the environmental problems promised by farming these types of GE crops in Australia.

If we continue to rely on chemicals and plant manipulation to treat our problems instead of addressing the root cause – our unhealthy soil – we will leave a very poor legacy for future generations. We can all help to repair our fragile environment by starting with our own gardens. As Dr David Suzuki once said, ‘If the people will lead, the leaders will follow’.

Start breathing life back into your soil now. Find out for yourself how good produce tastes and how your garden flourishes when soil is treated with respect. Time spent improving your soil will be richly rewarded. Grow a green manure crop. Make your own compost. Use organic mulch on your garden. Sure, organic mulch breaks down faster than other mulches but, like the green manure and compost, it is being converted into living soil.

Soils and Soil pH

Soil texture IS the proportion of sand, clay and silt particles in an area of soil. Soil textures are named after the dominant particle. Sandy soils feel very gritty when damp, and fall apart when rolled in the hand. These soils lose water and nutrients rapidly as they are leached far below plant roots. Clay soils contain very fine particles that feel sticky when damp, and are easy to mould. Clay soils swell when wet, reducing water drainage, and shrink when dry, forming a cracked soil surface and an almost impenetrable barrier for plant roots. Silty soils are dark and contain fine particles which reduce air and water movement. These soils feel silky-smooth when damp, and are powdery when dry.

Soil structure is the way the various particles of sand, clay, and silt form crumbs. Organic matter, or humus, bonds the particles into a mixture of crumbs which retain moisture, and creates spaces that allow air and excess water to move through the soil. A damp soil, rich in humus, will break into crumbs of various sizes when a spadeful is dropped onto a hard surface. This well-structured soil is called a friable loam.

Saline and sodic soils occur in various parts of Australia, and wet saline soils occur in a few low-lying areas of New Zealand. It has been estimated that over 50 per cent of Australia's cultivated soil is sodic, where salt attaches to the surface of clay particles causing them to fall apart. Soil surface crusts and water penetration is poor.

Water retention and fertility of sandy soils, and drainage and aeration of silty, clay, and saline soils can all be improved with the addition of organic matter. Saline soils can also be improved by planting deep-rooted trees, using minimum cultivation methods and avoiding the use of herbicides to produce bare soil. Some clay and sodic soils can be further

improved by the addition of mined gypsum (calcium sulphate). To test your soil for gypsum suitability, see [chapter 9](#).

Peaty soils are dark but more crumbly in texture than silty soils, and only occur in a few low-lying areas. These soils are high in organic matter but can become over-wet, and they will shrink when dry. Consequently, peaty soils require careful management to improve drainage.

Acidity or alkalinity of soil, is measured on a pH scale that rates the ‘potential Hydrogen’ in the soil from an extremely acid (or sour) 1 to an extremely alkaline (or sweet) 14, with 7 being considered neutral, neither acid or alkaline. The pH scale is expressed as a negative logarithm which explains why the more hydrogen ions in the soil, the lower the number on the scale. A soil pH of 6 is ten times more acid than 7, and a pH of 5 is a hundred times more acid than 7.

Soil pH is a important contributor to healthy growth because it controls both the availability of nutrients and the level of activity of earthworms and micro-organisms. Nutrient elements occur as electrically charged ions that attach to clay and humus particles which carry the opposite electrical charge. At some pH levels, nutrient ions become bound to other elements, or to soil, and become ‘locked out’ and unavailable to plants. As calcium ions replace hydrogen ions, soil pH rises.

All the major nutrients are only freely available to plants within a narrow pH range of 6.5 to 7.5, where essential trace elements are also available, and aluminium is locked out. Most vegetables and exotics will be healthy if grown in a pH range of 6 to 7, while so-called ‘acid-loving’ plants prefer a

pH of 5 to 6. Few plants will survive when pH is below 4.5, where major nutrients are bound up and trace elements become available in toxic quantities, or above 9, where calcium becomes insoluble. The only way to determine the exact pH of garden soil is to test it. Reasonably priced test kits for domestic use are available at most large nursery and hardware stores.

In adjusting soil pH, organic gardeners have a distinct advantage over 'chemical' gardeners because mature compost has a pH of about 6.5, which is why it is invaluable in supplying nutrients to plants. Adding a moderate amount of mature compost to garden beds will help adjust the pH in both acid and alkaline topsoil.

In all acidic soils, pH can be raised by the combined use of compost plus agricultural lime or dolomite, which supply calcium ions (see [chapter 2](#)). Hydrated lime cannot be applied to beds that contain plants or fertilisers. In soils with high magnesium content, including some in south-east Queensland, agricultural lime is the preferred way to raise soil pH.

The addition of organic matter as compost, green manures, and animal manures, without including lime or dolomite, can be enough to adjust the pH of slightly alkaline soils because organic matter releases hydrogen ions as it decomposes. Elemental sulphur, also known as flowers of sulphur, will assist organic matter in reducing soil pH in more alkaline soils. Test soil after six weeks to see if further applications are required.

As exudates from plant roots and the decomposition of organic matter release hydrogen ions into soil, all garden soils should be tested at least annually.

Earthworms

CHARLES DARWIN POINTED OUT the importance of the earthworm in keeping soil productive in the late 1800s, but this humble creature has been largely ignored during the past century. Earthworms are arguably the hardest workers in the garden. Each earthworm is capable of producing several kilos of rich fertiliser each year. They do this by pulling organic matter into soil, digesting it, and expelling it as gel-coated pellets or ‘castings’ which are easy for soil micro-organisms to break down and feed to plants. Worm castings are not only the best fertiliser of all, they also improve your soil’s water-holding capacity.

The soil tunnels created by earthworms improve drainage and provide oxygen for micro-organisms, allowing them to work deeper in the soil and improve the depth of your topsoil. These tiny tunnels reduce water run-off and soil erosion. The earthworm’s hard work saves you a lot of digging, and can turn clay or poor sandy soil into rich, friable, sweet-smelling loam in an amazingly short time. Ploughing and digging damages earthworm tunnels. Organic farming and gardening uses the least amount of digging possible.

It has been estimated that the average earthworm population is 50,000 per acre (4000 square metres). As earthworms are killed off by various fungicides, pesticides, herbicides, soil fumigants and unsuitable conditions created by synthetic fertilisers that acidify soil, earthworm numbers would be greatly reduced on most cultivated land today.

Earthworms can eat up to their own weight in organic matter in a day, and reproduce quickly with earthworm numbers doubling every few months. They prefer a close to neutral pH, so a dusting of dolomite or agricultural lime over garden beds on acid soils will help to keep them happy. You will not have to introduce earthworms to your property. Once you provide a workable pH and organic matter for them to consume, earthworms and other beneficial soil micro-organisms will appear in your soil. Earthworms work best in cool, moist soil with temperatures between 20°C and 24°C. You can get earthworms working for you by moistening soil and applying a layer of 5–7.5 cm of organic mulch over your garden beds.

Australia has the honour of having the world's largest earthworms. Gippsland earthworms can grow to over 2 metres in length, and Burleigh earthworms are almost as large. The common earthworm is a different species to worms used in compost worm farms. The cultivation of compost worms is described in [chapter 3](#).

Green Manures and Cover Crops

ALTHOUGH ONCE CONSIDERED of more use to farmers than home gardeners, green manures and cover crops are an excellent way to improve and protect your soil if you do not have easy access to large amounts of compost or organic mulch. They also form an important part of crop rotation in organic gardens.

Green manuring is the practice of growing legumes, grasses and grains for a short period before chopping them down and leaving them on the soil surface, or turning them into the top few centimetres of soil, if drainage is good. The green manure is then left for earthworms and soil micro-organisms to digest,

returning nitrogen, phosphorous, potassium and other plant nutrients to the soil in a form easily used by the next batch of plants. Burying green manure crops deeper in soil requires anaerobic decomposition, which lengthens the time before nitrogen will be available for future planting. Where soil drainage has not been improved, green manures are not dug into soil.

Cover crops are usually thickly sown annual grasses, grains or varieties of low-growing legumes, grown for a longer period than green manures to protect soil from wind or rain erosion, or to block out weeds that may harbour disease. Because cover crops are grown for longer than green manures, they are woodier and take longer to decompose. Mother Nature abhors bare soil, which is why weeds appear when vegetation is removed. Cover crops reduce fluctuations in soil temperature, and keep soil life active. If you intend planting in your cover crop area later, the crop must be slashed before it sets seed. The slashed foliage is left to lie on the ground as organic mulch, and the roots quickly add humus to the soil. All nutrients absorbed by the cover crop are slowly returned to the soil. If you improve your soil before sowing a cover crop, trees, shrubs and seedlings can be planted directly into the mulch several weeks after slashing, and weak liquid manure can be applied to overcome any temporary nitrogen deficiency as the mulch starts to decompose.

If your soil is very acidic or sodic, grow a green manure grain first, then a suitable legume, followed by a cover crop, because some legumes are not very competitive in mixed planting. Cereal rye (secale), barley, wheat, oats, millet, sorghum, buckwheat and triticale will all improve the condition of your soil and result in better future plant growth.

Legumes, including chickpea, field pea, cowpea, pigeon pea, lablab, navy beans, adzuki beans, faba beans, broad beans, soybeans, lentils, alfalfa (lucerne), lupins and red, white and strawberry clover have the ability to extract nitrogen from the air in soil, and store it in nodules on their roots, through the action of a friendly bacteria, *Rhizobium* spp. Legumes are an important source of organic nitrogen. They also improve soil structure and reduce disease in subsequent crops. Some inoculants are useful to several legumes, while others are suitable for only one species. Your legume seed will require a suitable rhizobium inoculant to ensure maximum nitrogen fixation, so check, before purchase, that the correct inoculant will be supplied with seed. Where synthetic fertilisers are used, inoculated seed requires a special coating to prevent those fertilisers killing the inoculant on the green manure crop. While coating seed may solve the problem initially, further applications of synthetic fertilisers will kill off nitrogen-fixing bacteria which have been introduced to the soil. This is not a problem when growers use organic fertilisers as these provide suitable conditions for the survival of beneficial bacteria in soil. The company Green Harvest supplies green manure seed in compatible legume/grain combinations with inoculant, and Greenpatch Seeds will order inoculants on request.

Millet and wheat can be sown if water is in short supply but alfalfa, adzuki beans, buckwheat, sorghum and red and white clover should only be sown as a green manure or cover crop in large areas when moisture is available. Alfalfa, faba beans or broad beans will not grow well as a first green manure for acid or shallow, stony soils, but barley performs fairly well in acid soils. Oats, barley, buckwheat and cereal rye can suppress weed growth. Wheat and buckwheat grow well on

heavier soils. Cereal rye and triticale are very versatile. Rye can be grown on acid and saline soils, and is useful for reclaiming eroded land. Triticale can be sown as a green manure crop on soil that is too poor to grow wheat or barley, or where there are rising water problems. Hullless oats do not provide a lot of fibre for soil conditioning, and strawberry clover can be difficult to eliminate from garden beds.

The above seed varieties are available in bulk and cheaper than commercial seed packets. Bulk seed is sold by weight, and the smaller the seed, the more you will receive per kilogram. One kilogram of most green manure seed is sufficient for 40 to 60 square metres, but a kilogram of alfalfa or clover will be sufficient for 200 to 260 square metres. In poor soils, work to the lowest coverage. As soil improves, you will require less seed.

If you have large areas of soil to improve, consider leaving one section of your crop to produce seed for later sowings of green manure. Legume and grain seeds are easy to collect (see chapter 8). Because green manures are only grown for a short period, sowing times can be quite flexible if irrigation is available, but if you are planning to save seed, more accurate sowing times will have to be followed because some crops require certain temperature or rainfall ranges to set viable seed. Your local produce store or Department of Agriculture will be able to advise suitable sowing times for your microclimate if you want to save seed.

There are other deep-rooted species that can be used for green manures on land which is known to be free of contamination. Deep-rooted plants such as amaranths, vetches, chicory, fenugreek and alfalfa can draw minerals from deep in the soil into their tissues; this can cause problems in your garden if

heavy metals or poisons have been used in the past. Some building blocks have all sorts of rubbish buried in the subsoil, and it is unwise to bring these heavy metals and chemicals back to the topsoil where food crops could be sown.

SOWING TIMES FOR GREEN MANURES AND COVER CROPS

[] = inoculant group required for maximum nitrogen fixation

LEGUMES (Cool Zones)	
Crop	Cool
Adzuki Bean [I]	Dec
Alfalfa (Lucerne) [AL]	Aug-Oct
Chickpea [N]	—
Clover, red [B]	Mar & Sep-Oct
Clover, strawberry [B]	Mar & Sep-Oct
Clover, white [B]	Mar & Sep-Oct
Cowpea [I]	—
Faba Bean [F]	Mar-Sep
Fenugreek [SU277]	Oct-Dec
Field Pea [E]	Mar-Sep
Lablab [J]	—

Lupin, annual [G]	Sep-Oct
Mung Bean [I]	Nov-Feb
Pigeon Pea (Dahl) [J]	—
Soybean [H]	Oct-Dec
Woolly Pod Vetch [E]	Feb-Apr & Sep

GRAINS (Cool Zones)	
Crop	Cool
Amaranth, leaf	Oct-Jan
Barley	Late Feb & Sep-Nov
Buckwheat	Oct-Dec
Cereal Rye (Secale)	Mar & Oct-Dec
Millet	Oct-Jan
Millet, Japanese	Nov-Dec
Oats	Feb-Apr & Sep
Sorghum	—
Triticale	Mar-Apr & Sep
Wheat	Mar & Sep-Oct

LEGUMES (Temperate Zones)	
Crop	Temperate
Adzuki Bean [I]	Mid Nov-Dec
Alfalfa (Lucerne) [AL]	Mar-May & Aug-Oct
Chickpea [N]	Mar-Apr & Sep
Clover, red [B]	Mar & Aug-Oct
Clover, strawberry [B]	Mar-Apr & Aug-Sep
Clover, white [B]	Aug-Oct
Cowpea [I]	Nov-Early Feb
Faba Bean [F]	Mar-Jul
Fenugreek [SU277]	Mar-Jun
Field Pea [E]	Mar-Aug
Lablab [J]	—
Lupin, annual [G]	Mar-May
Mung Bean [I]	Nov-Feb
Pigeon Pea (Dahl) [J]	Oct-Jan
Soybean [H]	Oct-Dec
Woolly Pod Vetch [E]	Mar-May

GRAINS (Temperate Zones)	
Crop	Temperate
Amaranth, leaf	Sep-Feb
Barley	Mar-May & Aug-Sep
Buckwheat	Sep-Oct
Cereal Rye (Secale)	Late Feb-May
Millet	Sep-Feb
Millet, Japanese	Oct-Feb
Oats	Feb-May
Sorghum	Late Oct-Jan
Triticale	Late Feb-Apr
Wheat	Mar-Apr & Aug

LEGUMES (Warm Zones)	
Crop	Warm
Adzuki Bean [I]	Mid Nov-Jan
Alfalfa (Lucerne) [AL]	May-Jul
Chickpea [N]	Apr-Jun & Late Aug
Clover, red [B]	May-Jul

Clover, strawberry [B]	Mar-Apr
Clover, white [B]	Mar-May
Cowpea [I]	Oct-Jan
Faba Bean [F]	Apr-Jun
Fenugreek [SU277]	Apr-Jun
Field Pea [E]	Mar-Jun
Lablab [J]	Oct-Jan
Lupin, annual [G]	Mar-June
Mung Bean [I]	Sep-Mar
Pigeon Pea (Dahl) [J]	Sep-Feb
Soybean [H]	Oct-Dec
Woolly Pod Vetch [E]	Mar-Jun

GRAINS (Warm Zones)	
Crop	Warm
Amaranth, leaf	Anytime
Barley	May-Jun
Buckwheat	Apr-May
Cereal Rye (Secale)	Apr-May

Millet	Sep-Feb
Millet, Japanese	Sep-Apr
Oats	Mar-May
Sorghum	Oct-Jan
Triticale	Mar-Jun
Wheat	Apr-May & Aug

LEGUMES	
Crop	Notes
Adzuki Bean [I]	Requires rain or irrigation. Fast. Drought sensitive. Not cold.
Alfalfa (Lucerne) [AL]	Requires rain or irrigation. Neutral pH. Must have moisture. Perennial. Deep rooted (not where subsoil is contaminated).
Chickpea [N]	Not for water-logged soils. Requires rain or irrigation. Not in cold conditions. Not tropics.
Clover, red [B]	Drought tolerant. Some water to start. Not tropics.
Clover, strawberry [B]	Drought tolerant. Hardy, salt and flood tolerant. Can be problem in garden beds. Perennial.

Clover, white [B]	Requires rain or irrigation. Not for cold or tropics. Perennial in Temp areas.
Cowpea [I]	Frost tender. Fast. Lighter soils. Tolerant of drought and rain.
Faba Bean [F]	Not for water-logged soils. Sow in low rainfall. Not first crop. Hardy. pH 5.5+
Fenugreek [SU277]	Can germinate in cold soil. Can break up heavy soils. Deep rooted (not where subsoil is contaminated).
Field Pea [E]	Not for water-logged soils. Best in cool conditions. Not tropics.
Lablab [J]	All year in tropics.
Lupin, annual [G]	Not for water-logged soils. Light soils. Accumulates phosphorus. Also poor soils. pH 5.5 Deep rooted (not where subsoil is contaminated).
Mung Bean [I]	Requires rain or irrigation. Frost tender. Fast. Not cold. During wet in tropics. Dry at seed set.
Pigeon Pea (Dahl) [J]	Frost tender. Not for water-logged soils. Not high pH. Perennial in Warm Zones.
Soybean [H]	Requires rain or irrigation. High rainfall for growth. Dry weather at seed harvest.

Woolly Pod Vetch [E)	Can combine with oats. Deep rooted (not where subsoil is contaminated).
----------------------------	---

GRAINS	
Crop	Notes
Amaranth, leaf	Requires rain or irrigation. Fast. Deep rooted (not where subsoil is contaminated).
Barley	Drought tolerant. Seed heads heat sensitive.
Buckwheat	Requires rain or irrigation. Fast. Deep rooted (not where subsoil is contaminated). Accumulates phosphorus. Heavy soils.
Cereal Rye (Secale)	Drought tolerant. Also acid, saline, eroded soils. Good organic matter. Better with rain or irrigation. Frost tender at seed set.
Millet	Drought tolerant. Fast. Good soil conditioner.
Millet, Japanese	Requires rain or irrigation. Wet season in tropics.
Oats	Requires rain or irrigation. Fast. Lots of organic matter.
Sorghum	Requires rain or irrigation. Wet season in tropics.
Triticale	Drought tolerant. For poor soil and rising water. Also better soils.

Wheat	Drought tolerant. Heavy soils. Semi-arid.
-------	---

First Green Manure Crop

SOWING PHASE: *New Moon and First Quarter*

- Before you begin, check your soil for drainage and gypsum suitability, and apply mined gypsum to an aerated soil surface if necessary.
- To grow a green manure crop for a new garden, mow or slash grass or weeds in the growing area. Do not worry about removing weeds or grass as they will form part of the soil conditioner. Do not use herbicides to kill weeds. Herbicides, including glyphosate, can deter nitrogen fixation for up to seventeen weeks after application. They also inhibit the mycorrhiza that you are trying to encourage.
- Loosen the soil surface by rocking a garden fork backwards and forwards in the soil. Or use a cultivator, offset disc or chisel plough, depending on the size of the planting area, to create slits in the topsoil without turning the soil over. In hot areas, furrows 6 cm deep and 50 cm apart, loosely part-filled, provide some moisture and heat protection for newly emerged seedlings. Over large areas, furrows can be part-filled by dragging a heavy chain behind a tractor. While repeated use of cultivators or ploughs will damage soil structure as well as earthworm and soil bacteria populations, compacted soil will benefit from an initial cultivation to break a hard soil surface. Rye, thickly sown, will choke out

most grasses. The exception to this is kikuyu grass, which will remain a persistent problem on poor, acid soil. (See [chapter 9](#) for removing kikuyu from garden beds.)

- Legumes need a less acid soil than some grains because molybdenum, a trace element required by rhizobium bacteria to fix nitrogen, has reduced availability in soils with a pH lower than 6. Unless the soils in your area are alkaline, a dusting of dolomite will be required, at least for your first green manure crop. A light application of good quality dolomite for all green manure crops may also be helpful on sandy, acid soils in high rainfall areas, where synthetic fertilisers have previously been used, or when turning a lawn area into a garden. If the proposed growing area contains moss, your soil is quite acid and will definitely benefit from an application of dolomite, or agricultural lime as a second choice. These products should be dusted over the growing area (before irrigation or light rain) about four weeks before planting to provide a more suitable soil pH for sowing.
- Because nutrients are not readily available in humus-poor soil, you will have to add some fertiliser to get your first green manure crop started. Fertilise a week or more before sowing. In home gardens, water the growing area, then sprinkle an organic complete fertiliser over the growing area, and water it into the soil surface. The cost of fertiliser will not be wasted, as any taken up by the green manure will be returned to the soil when the crop is cut down. Blood and bone

should not be used as a fertiliser where animals graze, but manures are plentiful in these areas, and they can be used by making a large batch of manure ‘tea’ (see [chapter 2](#) for the recipe) to apply to the growing area, or by spreading manure thinly using a heavy chain.

- To grow green manure in home gardens, moisten the growing area, then scatter suitable seed thickly over the bed. Sow between New Moon and Full Moon for faster germination. Rake lightly to cover the seed. For grain seed, water the growing area after sowing, but do not water legumes again until germination or the seed may rot. Farming areas are usually sown just before rain, and rain is used to cover and moisten the seed.
- To sow a large quantity of seed more evenly, divide the growing area into equal sections, and divide the seed by weight into the same number of portions, sowing one portion of seed in each section.
- Green manure grains are grown until knee-high before they are cut down. Legumes are cut down as they start to flower. A brush-cutter or whipper-snipper is perfect for this task in home gardens as plants can be chopped by removing about 10 cm of growth with each pass of the brush-cutter. Large areas can be chopped down with a mulcher, or several passes of a slasher at decreasing heights. The green manure crop can be left to break down on the soil surface, or be turned into the top 10 cm of soil after it has wilted. Perennial legumes such as alfalfa, clover, pigeon peas and some lupins will have to be

forked, or lightly ploughed in large areas, to uproot the plants, or they will keep growing. Chopping up legumes after they have cropped will not produce the same benefits because legumes have their highest nitrogen content just as they start flowering, before the pods form. Spent legumes provide 'pea straw' for mulching.

- In home gardens, turned-in green manure can be watered and covered with a layer of organic mulch to speed up decomposition. If you keep soil just damp, the bed will be ready to use four to six weeks after slashing, in warm conditions.

Crop Rotation

CROP ROTATION is the practice of allowing several years to elapse between the growing of certain types of vegetables, farm crops or flowering annuals in the same soil to break the cycle of pathogens and pests that spend part of their life cycle in soil. Alternating the same two crops repeatedly is not sufficient to break pathogen cycles, and is not good agricultural practice. A popular four-year European crop rotation involved growing legumes (peas, beans or lupins) in a bed first, followed by leafy greens and fruiting annuals, followed by root crops. The bed was then left to lie fallow for a period, to allow a three-year break between planting the same crop in that bed. Other garden beds used the same sequence, starting at different stages of the cycle so that a selection of vegetables could be grown at the same time in different beds. This crop rotation was based on theoretical fertiliser requirements and ignored the fact that families of plants that share diseases include leafy greens, or fruiting or

flowering annuals, as well as root crops. Gardeners then relied heavily on pesticides and fungicides to combat the problems caused by this type of crop rotation.

It is more important to use crop rotation to prevent disease and to avoid supplying a continuous food source for garden pests than it is to rotate crops according to fertiliser requirements. Potatoes should not follow tomatoes, capsicum or eggplant, because these plants are related, and similar soil diseases affect all of them. Strawberries also share certain diseases with these plants. Swedes, turnips, radish or kohlrabi should not follow other members of the brassica (cabbage) family because they are all cruciferous plants. Similarly, beetroot should not follow silver beet because they are two different versions of the same plant. Beetroot can follow English spinach because they are not as closely related.

The sequence of European crop rotation allowed legumes to fix nitrogen in soil for subsequent crops with a high nitrogen requirement. Unfortunately, the nitrogen-fixing bacteria required by European legumes are not usually present in Australian soils, and legumes grown without a suitable inoculant will not fix nitrogen efficiently. However, if you include woolly pod vetch or field pea as an inoculated green manure crop, you will find that garden peas will also fix nitrogen in your garden, and after growing an inoculated crop of cowpeas, adzuki beans or mung beans, snake beans will also be able to fix nitrogen. If you grow an inoculated crop of faba beans, broad beans and sweet peas will fix nitrogen efficiently provided you don't resort to using synthetic fertilisers, pesticides or fungicides. Nitrogen fixation is indicated by a dark pink or red colouring inside the nodules on legume roots.

In beds containing foreign trees, shrubs or flowering annuals, growing an inoculated crop of annual lupins or woolly pod vetch in autumn every three or four years, and slashing them to lie on soil as mulch, will improve these beds. Australian natives include quite a few perennial legumes that provide long-term nitrogen-fixing in more permanent parts of the garden. These do not require inoculants as the bacteria are already in our soils, and they are grown as shrubs instead of green manure.

Once you have restored your soil's health, a four-year crop rotation that allows a three-year break between growing related plants will keep soil pathogens at bay. Vigorous plant growth in humus-rich soil will also deter many garden pests from your crops. You will then be able to adapt a crop rotation to your personal requirements and still maintain soil health.

If, however, your soil has previously been treated with herbicides, synthetic fertilisers and fungicides, it is more likely that you will have soil pathogens that will undermine your efforts to create a healthy garden. In this case, it will help to start off with a longer crop rotation specifically targeted at breaking disease cycles that strike particular families of plants, including the long-lived pathogens that can affect brassicas, solanums or cucurbits. This rotation involves dividing your growing area into six parts instead of four. In the first section you can grow the aster and chenopod groups: lettuce, artichoke, endive, silver beet, beetroot and spinach. In the next section you can grow carrots, celery, parsley, parsnips (which are all related), and any of the onion family. The cucurbits, which include cucumbers, zucchinis, squash and melons, can be grown in section one or two according to

your requirements, but not both. Section three can be used to grow peas and beans, or an inoculated green manure legume. The fourth section can be used for the Solanum family which includes tomatoes, capsicum, chilli, eggplant and potatoes. The fifth section can contain cruciferous plants: broccoli, Brussels sprouts, European and Chinese cabbages, cauliflower, swedes, turnips, radish, rocket and horseradish. Corn can be grown with legumes or cucumbers, according to your climate zone. The last section can be used to grow a green manure grain or cover crop or, if you have a severe infestation of eel worm, cover this sector thickly with organic mulch and allow it to lie fallow. Once a crop is harvested, a crop from the following section can be sown in that area. It may sound complicated but, as you practice crop rotation, you will quickly become familiar with which crops you can combine or plant in sequence to suit your requirements and avoid diseases that are common in your climate zone.

Australian organic gardeners use the fallow period and unused beds to grow green manure or cover crops for several reasons. Fallow soil tends to leach nutrients to a level where they are not useful to future crops, and also allows an overgrowth of unwanted plants. If you don't use your soil, Mother Nature will do it for you. It is far better to grow green manure or cover crops to keep soil healthy than having to cope with areas of weeds that are often hosts to pests and disease.

The combination of crop rotation, green manures and organic fertilisers results in healthier, more pest-resistant plants, and you will be delighted with the improvement in your soil. Try to include faba beans or broad beans among your green manure crops because these beans have a reputation for

inhibiting fusarium wilt, a fungus that can remain in soil for many years, is spread by shoes and garden tools, and invades plant roots to damage their water-conducting tissue. Potatoes, tomatoes, passionfruit, carnations, strawberries, wheat and some melons can be damaged by this disease which is more common in gardens where herbicides are used. The above crop rotation (also see diagram), places legumes just before the solanums, which can be severely affected by this disease. Do not add dolomite or lime to soil for broad beans if you are planning to grow potatoes next. Green-manure legumes do not need trellising or planting in neat rows. Just scatter seed thickly after watering, and rake soil over the top.

Crop rotation is just as important with flowering annuals, which can be affected by bacterial and fungal diseases. For example, stock and wallflowers are brassicas and prone to similar diseases and pests as their vegetable relatives. Growing susceptible annuals in the same place each year to suit a desired colour scheme can cause a serious build-up of soil pathogens, resulting in weak, pest-prone plants that will spoil the effect, anyway. Improve your soil organically, and rotate your favourite annuals to maintain soil health throughout your garden.

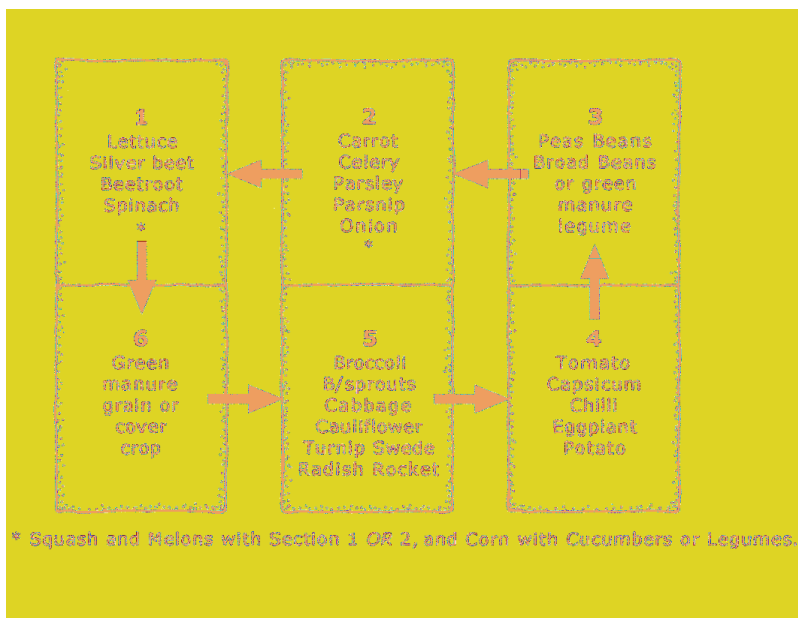


Fig. 1.1 A crop rotation suitable for repairing unhealthy soil.

Companion Planting

A SUBJECT MANY PEOPLE associate with organic gardening is companion planting. This practice, developed in the Northern Hemisphere, involves growing particular plants together to deter garden pests or improve plant growth. Methods include using plants with strong-smelling foliage to disguise the smell of a target crop, or using trap crops to divert pests to other areas of the garden. Trap crops can actually increase pest problems in your garden.

Some companion planting recommendations have met with mixed success in Australia, possibly because our plant pests are not as easily diverted as those which favour particular crops in Europe, or the remedies are not suited to Australian

conditions. Allowing a particular vegetable to run to flower to deter codling moth does not work in a climate where codling moth can produce three generations of pests in one year and the deterrent vegetable only flowers once for a short period. Planting climbing green beans with corn will not help satisfy corn's high nitrogen requirement in Australia, where green beans don't usually fix nitrogen. Growing peas with corn is only suitable in cooler areas. We tried planting potatoes and horseradish together as they are reputedly good companions. We had a good crop of potatoes but the horseradish died out very quickly because the best position for our potatoes was too hot and dry for the horseradish. Some companion planting remedies may be more effective in cool temperate and cool climate zones with higher rainfall.

We have all heard about basil and tomatoes being good companions, but you need a lot more basil than tomatoes to have any noticeable effect, and basil won't deter fruit fly from tomatoes. Similarly, you need to plant a lot of onions to protect your carrot crop. Having to plant hedges of lavender or lemon grass to protect crops is not practical in today's smaller gardens. Borage protects potatoes from potato moth by providing food for the wasp which lays its eggs in potato moth caterpillars. However, potato moth is less likely to occur where soil is rich in humus and soil moisture is maintained with mulch. Focusing on companion planting to protect gardens from pests overlooks the importance of healthy soil. Just adding organic matter to your soil, encouraging earthworms, applying organic mulch and using a suitable crop rotation eliminates most of the problems that repellent companion plants are recommended for.

Some of the best companion plants are those that provide nectar or pollen for pest predators in our gardens. These include nectar-producing Australian natives, vegetables allowed to flower so that you can save seed, some flowering annuals and fragrant herbs. These do not have to outnumber crops or be planted in vegetable beds, and some can be grown in pots where space is limited. Combined with healthy gardening methods, these companion plants attract regular beneficial visitors to your garden, providing a quick clean-up of pests should extended drought conditions make your garden more pest-prone.

Some companion plants keep gardens healthy by exuding compounds which reduce pathogens that cause disease, or which activate beneficial soil life. Garlic, Roman and German chamomile, marigold (*Tagetes* spp.), yarrow, nettle and nasturtium are beneficial in most parts of the garden. Deep-rooted chicory, comfrey, alfalfa and parsley draw nutrients from deep in the soil to the topsoil, and these benefit neighbouring plants when foliage and roots die off and decay. Dandelion also draws nutrients from deep soil, but it exudes ethylene. There is no doubt that some plants grow better in particular company, and some of these are combined in the crop rotation above. Survival of the herb eyebright and the native quandong depends on the roots of suitable adjoining plants or grasses. Other plants exude substances which can adversely affect plants growing nearby. Where this can cause problems I have included the information in the entry relating to particular plants.

Much of the information on companion planting does not explain why particular combinations work. A lot of it is accidental discovery rather than controlled experiment.

Nowhere could I find a reference to broccoli disliking leeks; yet when we planted them side by side, the broccoli closest to the leeks became weedy and pest-prone. I transplanted a nasturtium between the two vegetables and, a week later, the broccoli was visibly healthier, but I have no idea whether the broccoli benefited from compounds given off by the nasturtium, or the nasturtium just blocked compounds given off by the leeks.

The applied ecology department at University of Sydney's campus in Orange has begun studying companion planting under the title of Ecological Engineering in an attempt to separate fact from fiction and to establish which examples of companion planting used in Europe are useful in Australian conditions. In the meantime, experiment with various companion planting combinations if you wish, but don't forget that the best companion for your plants is mycorrhiza-rich soil.

CHAPTER 2

Keeping Soil Healthy

ONCE YOU HAVE STARTED your soil on the road to recovery, it is fairly easy to keep it healthy by using organic fertilisers which nourish soil micro-organisms. It may seem strange that plants are healthier when grown in a system teeming with bacteria and fungi rather than the almost sterile conditions produced by synthetic fertilisers and chemical additives, but it is true. Overall, synthetic fertilisers have created more problems than they have solved. Despite widespread use by farmers of synthetic nitrogen fertilisers, Australian research by Hamblin & Kyneur (1993) has shown that protein in wheat has greatly declined except where wheat is grown after legumes. Regular use of ammonium sulphate can increase manganese in plants to toxic levels. Concern has been expressed by various health authorities about a worldwide decline in zinc levels in food crops because zinc is essential for many processes in humans and animals, including healthy brain and reproductive system functioning, the production of insulin, and the healing of wounds. Super-phosphate restricts the availability of zinc and copper to plants. Zinc is rapidly lost in perspiration, which makes Australians more susceptible to zinc deficiency than those in cooler climates.

The two major ingredients in synthetic fertilisers, ammonium sulphate and super-phosphate, also kill or impair beneficial soil micro-organisms, contributing to the further degradation of our agricultural and garden soils, in turn making them more vulnerable to climate change. In contrast, organic fertilisers feed the soil, not the plant. The organic matter in these fertilisers feeds earthworms and the friendly bacteria

and fungi that keep soil well structured and moisture-retentive, while supplying plants with nutrients in a form that is easily absorbed. When soil is healthy, it follows that what you grow will also be healthy. Organic fertilisers are environmentally friendly, too. As the Department of Primary Industries points out, producers of synthetic fertilisers burn fossil fuel to convert nitrogen into a usable form, but legumes use only solar power.

Changing to organic fertilisers requires a certain mind shift because our society has been conditioned to destroy fungi and bacteria. We live in a world where even dishwashing liquid is considered sub-standard unless it contains ‘antibacterials’. We forget that many of the things we enjoy would not exist without the presence of certain bacteria and fungi – yoghurt, wine, beer, mushrooms, truffles, cheese and loaf bread are just a few examples. Our digestive systems, which provide us with the nutrients to live, grow, and repair damage, do not function properly without the presence of high levels of certain bacteria, and so it is in the garden.

What Not to Use in Your Garden

THESE PRODUCTS WILL UNDO your efforts to create healthy soil and produce by killing off earthworms and beneficial soil micro-organisms, or by leaching toxins that can be absorbed by plant roots and remain in the edible parts of plants.

Despite recommendations for their use by various gardening and permaculture experts, all these products are unacceptable under Australian Organic Standards and are not used by certified organic farmers in Australia.

Treated timbers with a green tint leach arsenic — a poison and carcinogen. Japan, Indonesia, Sweden, and Germany

have ceased using timber that is treated with copper, chromium and arsenic (CCA) to preserve the wood. The US withdrew CCA-treated timber, for all domestic use, at the end of 2003. The Australian Pesticide and Veterinary Medicines Authority (APVMA) has banned the use of CCA-treated timber for all children's play equipment, domestic decking and handrails, exterior seating and picnic tables after April 2006. In future, CCA-treated timber will be subject to new labelling requirements, and new legislation by Standards Australia and New Zealand will affect both countries. The APVMA decision follows US research which showed that regular exposure to treated timber play equipment greatly increased children's risk of developing cancer because young children tend to put their fingers in their mouths.

The APVMA advises that existing treated-timber structures be either coated with a penetrating sealant to prevent leaching of the preservative, or made inaccessible to children. Food is not to be placed on CCA-treated timber, and these timbers should never be burnt because the smoke is also toxic. When working with the timber, gloves, eye protection and dust masks are recommended, and work clothes should be washed separately. The US Environmental Protection Agency (EPA) advises lining existing CCA-treated timber vegetable beds with plastic. In place of CCA, alternative methods of preserving wood have been developed.

Carpet and underfelt are treated during manufacture with strong pesticides and other toxic chemicals to deter moths and silverfish from breeding in the product before and after purchase. These chemicals gradually leach into compost and soil when used in the garden. Interior carpets and underlays were not designed to be exposed to sun and rain.

Car tyres can leach cadmium and other heavy metals into the soil as they weather, and must never be used for garden or compost containers because cadmium is very harmful to human and animal health. Potatoes, lettuce, silver beet, carrots and subterranean clover can accumulate cadmium in edible parts of the plant. Large quantities of organic matter in soil help limit cadmium's availability to plants, but uptake is increased when soil or water have high chloride levels. Potatoes are particularly prone to cadmium uptake, and should never be grown in car tyres. Do not burn tyres either, or you will contaminate soil under the fire for years to come. An Australian company has announced that they will be selling shredded, recycled tyres as a growing medium for gardeners because 'burning tyres or using them in landfill is creating environmental problems'. Given the toxicity of this material, the logic behind this enterprise totally escapes me.

Cadmium has become a potential problem in some parts of the world because of the heavy use of synthetic phosphorus and potash fertilisers. Australia has set up a National Cadmium Minimisation Committee (NCMC) to oversee reduction of cadmium inputs in soil and crops. Food Standards Australia New Zealand (FSANZ) have set a maximum level for cadmium concentrations in food but FSANZ relies on health departments in New Zealand and each state of Australia to enforce the standard.

Phosphogypsum and **by-product gypsum** can contain considerable amounts of cadmium and NCMC advice is to avoid the use of these products (see Gypsum).

Because cadmium uptake by plants is affected by soil: texture, pH, and zinc and chlorine levels, cadmium

management strategies will vary from state to state. Contact your state Department of Agriculture for local advice.

Soil Nutrients

THE MAJOR SOURCE of plant energy is provided by carbon dioxide extracted from air; only a small percentage of plant nutrients are extracted from soil. For healthy growth, plants require soil containing a whole range of naturally occurring elements in quantities that can be supplied through organic fertilisers. All the elements needed by plants are also required by humans and animals, and we rely on the healthy growth of plants to supply these elements directly, or indirectly. Soils where produce is repeatedly removed, where shrubs require considerable pruning, and lawn areas, will require higher levels of fertiliser than the rest of the garden. Crops such as grains, fruit and vegetables, and foreign plants from more fertile lands have a higher requirement than Australian natives for nitrogen, phosphorus, potassium, calcium, magnesium and sulphur – the six major plant nutrients. The remaining nutrients are known as trace elements. Iron, copper, zinc, molybdenum, manganese, boron, cobalt, chlorine and sodium are all required by plants in minute quantities for healthy growth. Trace element deficiencies are very rare in soil that is rich in organic matter, and where synthetic fertilisers and chemical poisons are not used, because all animal and vegetable matter contains various combinations of the elements required for healthy soil.

The practice of trying to identify individual nutrient deficiencies and correcting them by applying particular elements can cause more problems than it solves. In some cases, it can produce toxicity of particular elements. It takes considerable experience to correctly identify some element

deficiencies before they become extreme. Several element deficiencies produce yellowing between veins on leaves, or the dying of growth tips. Environmental factors such as prolonged cold, wet weather or drought can produce deficiency symptoms because plants are unable to produce food from sunshine or extract nutrients from dry soil. Applying additional fertiliser at these times can be disastrous. Perennial plants withdraw nutrients for storage before discarding leaves. In some species, this process produces brilliant autumn colour but, in other species, leaf changes can be mistaken for element deficiency as the process begins.

As explained in chapter 1, soil acidity or alkalinity blocks or releases elements to plants. An unsuitable soil pH will limit a plant's ability to extract particular nutrients from soil and result in plants showing symptoms of nutrient deficiency where none exist. If plants are not growing vigorously or are looking unhealthy, first check that your soil pH is suitable for that particular species. When soil is within a suitable pH range, a combination of organic fertilisers will provide all the major nutrients and trace elements needed, plus humus, which allows mycorrhiza-dependent plants to extract nutrients from soil. Where species have a special requirement for particular trace elements, advice on an organic source and soil pH to ensure availability of the trace element is included in the cultivation notes for the species. If you suspect a serious element deficiency, despite a suitable soil pH and adequate applications of organic fertiliser, a soil analysis is recommended rather than applying individual elements.

Nitrogen (N) is required for new growth and is an essential part of chlorophyll, the green colouring in plants. Chlorophyll is important for photosynthesis, which is the conversion of

water and carbon dioxide in the presence of sunlight into plant carbohydrates and the release of oxygen into the atmosphere. Nitrogen also assists plants to use water efficiently, and plants will fail to thrive when there is insufficient nitrogen available in soil.

Air is 80 per cent nitrogen, and nitrogen is also present in rain. Free bacteria in soil, and the bacteria in legume roots, fix nitrogen from the air in soil. Nitrogen is in all animal and vegetable matter. Availability of nitrogen is limited when soil pH is lower than 5.5 or higher than 8.5. Sandy soils lacking humus can be low in nitrogen. Over-use of animal manures and high concentrations of nitrogen in synthetic fertilisers result in soft, sappy growth which encourages snails, slugs, aphids and fungal disease. Nitrogen fixation is low where soil is over-supplied with nitrogen. Urea, used in synthetic liquid fertilisers, can induce severe nutrient deficiency.

Phosphorus (P) is necessary for cell division in plants, and tips and root growth in particular. Seedlings require a good supply of phosphorus. Some Australian soils are low in phosphorus, while phosphorus is unavailable in other soils due to acidity or alkalinity. Availability is reduced when soil pH is lower than 6 or between 8 and 8.5, and becomes unavailable in soils lower than 5 because it binds to iron and aluminium in very acid soils. Phosphorus can leach from poor, sandy soils in heavy rainfall. Plants lacking phosphorus tend to be a duller green than normal, or have a blue-purple tinge to their leaves. Phosphorus is present in manures and all animal and vegetable matter. Organic matter in soil makes phosphorus more available to plants. Manures from grain-fed animals are a rich source of phosphorus. Superphosphate is made by treating rocks with sulphuric acid to release

phosphorus. Phosphorus in quantities supplied in synthetic fertiliser is toxic to mycorrhiza-dependent plants, including strawberries and pine trees. Super-phosphate also contains varying amounts of cadmium, a heavy metal that is detrimental to human and animal health. Excess phosphorus can make magnesium, sulphur and some trace elements unavailable to plants.

Potassium (K) is necessary for photosynthesis, stem growth, healthy sap flow, flower and fruit quality, healthy tuber growth, disease resistance and drought tolerance. Plants lacking potassium, or potash as it is often called in gardening, suffer from stunted growth, and small flowers and fruit. This nutrient can leach from poor, sandy soils. Leaching of potassium is unlikely when soil contains plenty of humus. Potassium is present in rock dust, animal manures, seaweed, natural wood ash and fish fertilisers. It may be present in your soil but unavailable due to soil acidity. Availability is reduced when soil pH is lower than 5.5 or between 7.5 and 8.5. Excess potassium in soil can result in magnesium becoming unavailable to plants.

Calcium (Ca) is required by cells at the tips of stems and roots, and for healthy fruit formation. It is also vital for cell wall structure, and is deficient in sandy, acid soils. Organic matter contains calcium in varying amounts. Calcium availability to plants is limited when soil pH is below 6. Bones, eggshells, sea shells and some rock dusts contain considerable amounts of calcium. Calcium is supplied when dolomite, agricultural lime, bentonite or gypsum are added to soil. Dolomite should be used in preference to lime, unless soil is known to be very high in magnesium, because calcium and magnesium interact and an excess of one can cause

further depletion of the other. Excess calcium can result in boron becoming unavailable to plants.

Magnesium (Mg) is an essential part of chlorophyll for photosynthesis, and is required for the activation of enzymes that help in the breakdown of organic matter into humus and the release of rock minerals. It is also necessary for seed germination, and in the control of some plant diseases. Magnesium is adequately supplied in Australian soils but is very soluble and may leach beyond plant roots in sandy, acid soils in heavy rainfall areas. Availability is poor when soil pH is below 6, or where excessive amounts of potassium fertilisers have been used. Magnesium deficiency in plants is unusual in soil rich in organic matter, as humus helps plants to absorb this element. Magnesium is present in green vegetable matter, dolomite and some rock dusts.

Sulphur (S) is essential for plant proteins and the formation of quality fruit and vegetables. Sulphur is also required for the formation of flavours and odours in plants. Some vegetables require ample amounts of sulphur and its availability to plants is reduced when soil pH is below 5.5. Make sure you add some plant waste from the cabbage family to your compost heap, as brassicas contain considerable amounts of sulphur. A shortage of sulphur won't occur in soil rich in a varied supply of organic matter. Gypsum also provides some sulphur.

Iron (Fe) is required in small amounts to regulate plant growth and is important for chlorophyll formation. Most soils contain adequate amounts of iron, but it may be unavailable when soils are cold and wet, or where potassium or copper are low. Iron is less available to plants when soil pH is above 6 and chlorosis, where leaves can become pale yellow or white,

can occur where soil is too alkaline for a particular species of plant.

Copper (Cu) is essential in small amounts to various plant enzymes, and necessary for iron uptake. Its availability to plants is reduced when soil pH exceeds 7.5, in red soils that are high in iron, or where too much molybdenum has been added to soil. Copper may also be unavailable where super-phosphate has been used. Seaweed contains a good supply of copper. Copper toxicity can occur in areas where copper oxychloride is regularly used to treat plant diseases.

Zinc (Zn) is essential in the production of the hormones that expand stem length and leaf growth. It has a reduced availability to plants when soil pH is above 7.5, or where heavy applications of phosphorus fertilisers are used because excess phosphorus blocks plants' absorption of zinc. Plants are more likely to absorb cadmium when soil zinc levels are low.

Molybdenum (Mo) helps with the formation of proteins in plants and the conversion of nitrogen from a gas to soluble nitrogen in soils. Legumes and brassicas require adequate molybdenum for healthy growth and do not thrive in acid soils because the availability of molybdenum is quite reduced in soils with a pH below 6. Plants that are unable to absorb molybdenum can show symptoms of nitrogen 'deficiency'. Adding sodium molybdate to soils can cause copper to become unavailable and will also kill rhizobia, thus limiting nitrogen fixation in soil.

Manganese (Mn) is essential in small amounts to assist photosynthesis and in the manufacture of various plant compounds. A suitable soil pH is important for this trace

element as availability is gradually reduced in soils with a pH above 6.5, and it can be available in toxic quantities in very acid soils.

Boron (B) is essential for the formation of cell walls and the uptake and use of calcium in plants. Because plants are unable to use calcium when boron is unavailable, plants may show symptoms of calcium ‘deficiency’, resulting in over-liming soils which will only make the problem worse. Boron has a reduced availability when soil pH is between 7 and 9.

Cobalt (Co) is an indirect trace element in that it is required by soil bacteria to convert nitrogen from a gas to a soluble form. Its availability is limited in acid soils, and in soils where manganese content is high. Adjusting soil pH to limit manganese will allow cobalt to help with nitrogen fixation.

Chlorine (Cl) and **Sodium (Na)** are required in plants in very small amounts. They are adequately supplied in Australian soils, and are present in excess amounts in some soils. Using unwashed seaweed can add unnecessary salt to soils. Some plants are very sensitive to high levels of salt in soils while others such as asparagus, beetroot, celery and globe artichoke originated in salty soils.

Organic Fertilisers

Organic gardeners use fertilisers in the form of compost, worm castings, manures, rock dusts, organic complete fertilisers, and organic fish and seaweed fertilisers. Use whichever organic fertilisers are available in your area. It is commonsense to wear gloves when working with fresh manures, compost materials and liquid fertilisers in case you have any cuts or scratches on your hands. Some manures are

also strong smelling when fresh, and marine-based or seaweed fertilisers tend to leave a lingering ‘fishy’ smell on skin.

Unlike European governments, the Australian government has not yet defined ‘organic’ in legislative terms and product labels can be quite misleading. Literally organic means ‘anything that once lived’ and domestic suppliers are allowed to label products as ‘Organic’ when the true organic content is quite small and the product contains ingredients that are unacceptable under the standards used by certified organic growers and manufacturers. This problem is not limited to fertilisers. Shampoos and skin care products, foods, and potting and seed-raising mixes are also affected by this lack of legislation. This situation has created a minefield for consumers who wish to use genuine organic products. Currently the logo of one of the organic certifying bodies, with an accompanying supplier’s certification number, is the only guarantee the public has of a product’s organic integrity. The Organic Federation of Australia (OFA) is planning to introduce a nationally recognised symbol to make it easier for consumers to identify certified-organic products.

All certified-organic products are made to an exacting standard. Purchasing only fertilisers labelled ‘Certified Organic’ ensures receipt of a product that is free of pesticide residues, chemical and industrial waste, and cadmium and other heavy metal contamination.

Compost

Compost is the result of a fermentation process that converts organic waste into an organic complete fertiliser and soil conditioner. Mature compost contains worm castings and

other particles that provide food for soil micro-organisms and, subsequently, plants. It also has the indigestible residue from organic matter, which aerates and insulates soil, while regulating its moisture capacity and providing a habitat for beneficial soil organisms. This product, known as humus, is a living organism full of beneficial micro-organisms, and has a very pleasant, earthy smell. It can be mixed through the top 10 cm of garden beds during preparation, or applied liberally to the soil surface as a mulch. When used as a mulch, don't forget to cover it with a thin layer of fibrous mulch to keep it damp.

Nature makes compost slowly, but constantly. All organic matter is broken down by bacteria and fungi to provide elements that nourish new life. In making compost, we accelerate this natural process to revitalise impoverished soil and maintain the health of our gardens where nutrients are regularly removed.

There are two basic methods of making compost: anaerobic, which excludes oxygen, and aerobic, which uses oxygen. Anaerobic composting requires a sealed container or pit. It takes a very long time to produce a usable product and during the process anaerobic bacteria produce gases that smell unpleasant if you have to remove the cover for any reason. Aerobic compost can be ready in two months or less in most parts of Australia. Aerobic bacteria use air and a little moisture to convert various organic wastes into mature compost.

Gardeners who are unable to use a shovel, or who only need to process a small amount of organic refuse, may find a compost worm farm or compost tumbler more suitable. Information on making an aerobic compost factory can be

found later in this chapter. Compost tumblers can convert small quantities of waste matter into compost in a very short time if you follow the manufacturer's instructions.

Worm castings

Worm castings are digested organic matter, and form part of mature compost. They are the best complete fertiliser for gardens, being safe to use, and provide good quantities of all the major nutrients and trace elements required by plants. The castings are in the form of small pellets of neutral colloidal humus, and the only form of fertiliser immediately available to plants. Earthworm castings are naturally present in soil that is rich in organic matter. Compost worm castings can be raked into the soil surface when preparing garden beds, or applied directly to the soil surface, and covered with mulch to prevent them drying out. Or they can be diluted in water and used as a fertiliser 'tea'. The liquid produced by compost worm farms is superb as a fertiliser for seedlings. Worm castings and worm liquid can be purchased to supplement other organic fertilisers and soil conditioners, or you can set up your own worm farm very easily. Information on setting up a compost worm farm is included at the end of this chapter. Compost worm farms are an excellent way to recycle weeds and waste. Worm farms can be virtually any size you choose.

Manures

Animal manures form a significant part of organic fertilisers but fresh manures are never placed on active garden beds because they can burn plants. Fresh manures are composted in heaps or sheet composted under organic mulch on unused

garden beds. Manures are an important source of nitrogen in compost heaps.

For faster breakdown, mince the segments of manure with the edge of a spade. Fresh manures can also be used to make fertiliser 'teas' or fed to compost worms. Manures left to decompose uncovered will lose considerable amounts of nitrogen as ammonia gas. Piles of manure or uncovered compost heaps containing large amounts of manure should not be positioned within 40 metres of waterways or wetlands.

Large quantities of manure on paddocks can be spread thinly using a mulcher or heavy chain before sowing a green manure. As farm soil is improved organically, dung beetles (scarabs) assist with continuous soil improvement by rolling manure into balls and dragging it into the topsoil for decomposition by other soil organisms. Dung beetles play an important role in the control of flies, including buffalo fly, and parasitic infections in grazing stock. Well-rotted manures can be worked into topsoil when preparing garden beds or can form part of the mulch around plants, gradually breaking down as a slow-release fertiliser.

Your choice of manures may be limited by what is available in your area. We use horse manure for composting and worm farms, plus some poultry manure for composting, but our neighbour keeps cattle, so he uses cow and poultry manure. The urine in fresh rabbit manure is incredibly strong and has a similar action to chlorine bleach, although rabbit farmers use the manure in the same quantities as poultry manure with good results. Manure from healthy herbivorous animals is usually safe, but manure from meat-eaters can cause problems. Cat, dog and human faeces can spread disease. Sewage sludge is not suitable for use on food crops, as it may

contain industrial chemical waste and heavy metals. All manures contain varying amounts of all the major soil nutrients, plus a range of trace elements that are present in grazing soil.

Only manures from animals that have not been treated for parasites are suitable for garden use; veterinary treatments that kill off parasitic worms in animals will also kill compost worms and micro-organisms. Manures of doubtful origin can be mixed with fibrous vegetable matter and composted separately. If you have a compost worm farm, you can test the safety of manures by putting some of the damp manure in a covered bucket in a cool spot and adding a few compost worms. You may sacrifice a few worms this way, but it is better than killing off your worm farm, or spoiling your compost heap. To collect some worms for testing, place a half rockmelon shell downwards on top of the castings in your worm farm, and leave it overnight.

Horse manure contains a good supply of nutrients, including boron, which is essential for healthy beetroot and brassicas. This manure can be easier to obtain close to metropolitan areas. Horse manure makes an excellent addition to the compost heap as it generates a lot of heat.

Cow manure is slightly lower in phosphorus, but is also excellent for garden use. It is considered to be a cold manure because it does not generate a lot of heat and, when dried and crumbly, is gentle enough to be used as a combination fertiliser and mulch for plants with low fertiliser requirements. Cow manure from dairy sheds can contain detergents that will adversely affect your soil, so check the source of manure before purchase.

Sheep manure is a nutritious, small-pelleted manure, but not as easy to collect because sheep spend the year outdoors in Australia. Easy-to-bag quantities can be found under shearing sheds and in holding yards if you live in a sheep-raising area. Check whether sheep have been ‘drenched’ for parasites before collecting manure.

Poultry manure is twice as strong as most animal manures, so only half the quantity is required. It is high in phosphorous, potassium, calcium and boron. It is unsuitable for some plants in an uncomposted state, although citrus trees usually grow well in poultry yards.

Pigeon manure is similar to poultry manure but higher in nitrogen. It must be composted before use.

Packaged complete fertilisers

These are commonly referred to as NPK fertilisers because many of them show the ratio of nitrogen (N), phosphorus (P) and potassium (K) in the mix, expressed as 4:3:2 or 4–3–2 on the front label. As gardeners have become aware of the importance of all the other elements necessary for healthy soils and plant growth, this custom is falling into disuse, with all the elements in the mix being listed on the back of the pack, although the NPK is still usually shown in bold type. The ingredient list should also show the source of the element, that is, ‘Nitrogen (N) as fish protein 2.4 per cent’. The ingredient list will give you a clue as to whether synthetic additives have been added to the mix despite the fertiliser being labelled ‘organic’. Fertilisers labelled ‘organic based’ will definitely contain unacceptable additives. Synthetic complete fertilisers are merely concentrations of chemical elements and do not supply important humus to feed the soil.

A variety of ‘Certified Organic’ complete fertilisers is available in packaged form for gardeners. Solid organic complete fertilisers can be incorporated into the top 10 cm of topsoil when preparing garden beds, placed under mulch on damp soil around trees and shrubs, added to compost heaps when fresh manures aren’t available, or used as a weak fertiliser tea.

Rock dusts

Dust from basalt and granite rock is rich in minerals and used to organically address element deficiencies in soils. Rock phosphate is used to correct phosphorus deficiency, but should not be confused with super-phosphate. Rock dusts are a very slow-acting fertiliser, as they rely on the gentle acids in organic matter to release elements from the rock dust, and the desired results will not be achieved on alkaline or very acidic soils. To provide rapid results, some manufacturers add synthetic fertilisers to their rock dust blends, but there is a range of ‘Certified Organic’ rock dust blends available to suit various soil deficiencies. Rock dust can be dusted through compost heaps to start releasing the nutrients. A soil analysis to identify actual deficiencies is advisable before you purchase rock dust for use; companies that supply rock dust can usually arrange soil testing and advise you on the most suitable blend for your conditions. In some areas, rock dusts are still only available in very large quantities.

Blood and bone

Genuine blood and bone is a by-product from abattoirs, and a good organic source of nitrogen, phosphorus and some calcium. Blood and bone should never be used where stock graze, as ingesting the fertiliser may cause disease. Because

of labelling laws, most of the blood and bone sold in Australia is organic in only the most literal sense because it can contain any parts of animals plus a lot of vegetable matter, including residue from GE canola. The actual blood and bone content can be quite small. Because animal and vegetable matter has to be broken down by micro-organisms before being available to plants, some of the blood and bone currently available has added synthetic fertilisers.

Blood and bone is very popular with some gardeners who scatter it generously when preparing beds and fertilising lawns. This fertiliser attracts foxes, and is unpopular in some rural areas although it has a reputation for deterring ants and rabbits. Buy only 'Certified Organic' blood and bone to ensure you get what you pay for, and add it to your compost heap instead of putting it directly onto garden beds.

Dolomite, lime, bentonite and gypsum

These products are used primarily to correct problems in soil but they also supply some major nutrients to soil and must be included when considering fertilisers.

Dolomite (calcium magnesium carbonate) is used to make soil less acid so that major elements are more readily available, and so that trace elements are not available in excess amounts. Earthworms and soil micro-organisms work best when soil is not extremely acid or alkaline. Dolomite adds both calcium and magnesium to soil.

Lime is used for the same purpose but supplies only calcium. Always use dolomite in preference to lime because in the garden, as in the human body, magnesium is required to properly absorb and use calcium. Use only agricultural lime (calcium carbonate) in the garden, and never quick lime.

Overuse of both dolomite and lime can cause yellowing of leaves.

Bentonite is a volcanic clay used to improve the water-holding capacity of very sandy soils. It also supplies some calcium and trace elements.

Gypsum (calcium sulphate) is often recommended to improve topsoil and/or subsoil structure in clay or sodic soils, allowing better drainage and easier root penetration. Unlike lime, gypsum does not affect soil pH because it contains calcium and sulphur. However, it is sometimes used in combination with dolomite or agricultural lime to reduce soil acidity. There are two types of gypsum available: mined gypsum and by-product gypsum. Use only mined gypsum in the garden. It tends to be the coarser of the two, and can be quite lumpy. It may also be less soluble in water.

By-product gypsum is produced either during the manufacture of phosphate fertilisers, called phosphogypsum, or made from waste plasterboard. By-product gypsums contain fluoride and should not be used in dairy cattle or grapevine areas as these are both sensitive to fluoride. By-product gypsums also contain the heavy metal, cadmium. Although a small amount of cadmium is present in all soils, it is more available to plants in acid and sandy soils. Cadmium can accumulate where by-product gypsum or phosphogypsum are used and be absorbed by carrot roots, lettuce leaves, potato tubers, silver beet leaves and subterranean clover foliage. The NCMC advises avoiding the use of products that contain cadmium, and restoring acid soils to a healthy pH using only high quality dolomite and lime products.

Not all soils respond to the application of gypsum. Before purchasing gypsum, it is advisable to determine if the expense is warranted by first testing soil (see [chapter 9](#)).

Seaweed fertiliser

Although not high in most major nutrients, seaweed contains a full range of trace elements essential for plant health, making it an excellent supplementary fertiliser in organic gardens. Some growers also use well-washed seaweed as part of their organic mulch. Sadly, seaweed can be contaminated with industrial waste or heavy metals that flow into the sea, so I do not recommend collecting seaweed to make your own fertiliser. If you do collect seaweed, avoid beaches near sewerage or industrial waste outfalls. Composting seaweed eliminates the problem of most contamination. Some councils are now restricting the removal of seaweed from beaches because they use it in their own gardening division.

Seaweed is available as a liquid fertiliser that can be applied as a weak fertiliser tea. This brew is wonderful for small seedlings and cuttings because seaweed contains naturally occurring growth promoters, as well as potassium and trace elements that improve plants' immunity to disease. Because it sometimes has a high potassium content, overdoing seaweed fertiliser can cause a magnesium deficiency in some plants. Some seaweed and fish liquid fertilisers can contain considerable amounts of cadmium. 'Certified Organic' liquid fertilisers are safe to use.

Fish fertilisers

These fertilisers contain similar nutrients to seaweed fertilisers plus more nitrogen. They are included in packaged complete fertilisers or sold as liquids. Although the liquids

contain all the elements required by soil and plants, they are not usually supplied in sufficient quantities to be used as the sole source of fertiliser, and they do not add humus to the soil. Fish fertilisers are very effective used as fertiliser teas for seedlings and pot plants. 'Certified Organic' fertilisers of this type are available.

Fertiliser 'teas'

While most plants will grow without additional fertiliser if beds were prepared with plenty of compost or other well-rotted organic matter and the incorporation of a suitable fertiliser before planting, some vegetables, fruits and flowering annuals will perform better if given weak liquid fertiliser at certain times.

Liquid fertilisers are useful for seedlings and potted plants. Organic liquid fertilisers can be made from a variety of nutrient-rich materials, including manure, worm castings, seaweed fertiliser, fish fertiliser, complete fertiliser, herbs, weeds or compost. They are usually applied as a 'weak black tea' strength solution, hence the name fertiliser tea. When diluting the fertiliser, always err on the side of weaker, rather than stronger. A second application can be made if prompt improvement in plant growth does not occur, but too strong a solution can burn tender roots. Apply the fertiliser tea to damp soil, then water gently to wash any fertiliser from the plant leaves so that you are feeding the soil, rather than the plants. Some plants, particularly those with hairy or woolly leaves, do not like foliage fertiliser. Foliar feeding also discourages healthy root growth because plants have no need to push their roots through soil in search of food.

To make a fertiliser tea, you need a large plastic bucket kept specifically for the purpose, with a loose cover to prevent nitrogen evaporating. You can use a large plant saucer or an old plastic tray as a cover if you wish. (A tight-fitting lid is not suitable because the fermentation that occurs will cause pressure on the lid.) If your only water supply is chlorinated, leave a bucket of water in the sun for a day or so before using it to make fertiliser tea. Chlorine is used to destroy micro-organisms in water, and may kill off the beneficial workers in your mix.

If using the fertiliser tea with a fine sprinkler bar, it will require straining before adding to the watering can. The top half of a plastic drink bottle makes an excellent funnel for this purpose. Tie a knot in one end of a 20-cm length of pantyhose and place it in the funnel, stretching the other end over the top. Weight it down with a small stone. The funnel is then placed into the hole at the top of the watering can, and the fertiliser slowly poured through it. Residue can be tipped back into the bucket, and the bucket repeatedly topped up with water, kept covered, and the liquid used without further fermentation until the solution has to be used full strength. Residue can then be added to the compost heap.

Please note that some plants, including orchids and tiny seedlings, are very sensitive to fertilisers, and fertiliser teas are applied to these plants at half normal strength.

Manure tea requires a quarter bucket of horse, cow or sheep manure, per batch. Fill the bucket with water almost to the top. Cover and leave for one week, stirring occasionally. If you prepare the mixture at the beginning of Last Quarter phase, it will be ready to use during New Moon phase when sap flow is more active. After one week in warm conditions,

stir the mixture thoroughly again, and add just enough liquid manure to an almost full watering can to make a weak black tea solution. The fermentation process makes manure tea far more effective as a fertiliser than its strength suggests. If manures are in short supply in your area, it is worth keeping a bag of manure to make manure tea as it is an extremely efficient way to fertilise vegetables, flowering annuals and seedlings.

Worm liquid tea, also called worm pee, is not as disgusting as it sounds. It is merely the moisture that slowly trickles down through the worm farm when you water it, and collects in a container below the farm. The liquid has a full range of nutrients for your garden, providing an instant liquid fertiliser. All you have to do is dilute it to weak black tea strength. If your worm farm is set up so that you can't collect the liquid, you can scrape a layer of worm castings from the top of the farm. Soak the castings overnight in a covered bucket of water before stirring, diluting and applying to your soil.

Nettle or comfrey tea is made from nutrient-rich herbs such as chamomile, yarrow, and chopped comfrey and nettles, steeped under water in a covered container for several weeks. This tea has a fetid odour that some, including me, find repulsive. I much prefer the smell of horse manure, but many gardeners are devotees of this variation of fertiliser tea.

Seaweed tea works extremely well as a supplementary fertiliser tea when applied to soil or a growing mix. Rinse it from foliage as some plants, such as lavender, do not like it on their leaves. For seedlings, use it at half weak black tea strength in the week after germination and just before planting out. The seedlings quickly develop strong, healthy root systems and are more resistant to transplant shock.

Compost tea can be made from mature compost. However, it is recommended that compost tea be continually aerated for 24 hours before use. An aquarium pump or something similar would be required for this method.

Quantities of fertiliser teas required by commercial growers can be made by placing several shovelfuls of the preferred fertiliser onto a piece of shade cloth, tying it up like a Christmas pudding, and allowing the bundle to ferment in a large covered drum full of water. Leave a long piece of twine attached to the bundle to allow for easy removal and stirring.

Application of fertilisers

APPLICATION PHASES: Liquid fertilisers: *New Moon, and First Quarter*

Solid fertilisers: *Full Moon, and Last Quarter*

Organic fertilisers are always applied to damp soil. In established gardens, fertilisers are applied to the soil surface. Solid fertilisers are then covered with 2–3 cm of organic mulch to keep them damp. This method of application overcomes disturbance of plant roots which can cause root injury, or suckers to form. Both liquid and solid fertilisers are applied at the outer edge of the foliage canopy, where they are accessible to feeder roots. After soil improvement, only apply fertiliser as necessary to maintain steady growth.

To avoid wasting fertiliser on sandy soils that leach nutrients more easily, apply half as much fertiliser twice as often. Sandy soils benefit from the application of manures, and the leaching of nutrients is reduced when composted manures are used. If using moon-planting guidelines, liquid fertilisers are applied during New Moon and First Quarter phases when sap

flow is higher and fertilisers are absorbed more quickly, while solid fertilisers are applied during Full Moon and Last Quarter phases.

Making a Compost Factory

THE INGREDIENTS FOR an aerobic compost factory are nitrogen and carbon, which are supplied by organic waste matter, oxygen, moisture and contact with soil. All organic matter contains bacteria. Aerobic bacteria, in the presence of oxygen and some moisture, use nitrogen as a fuel to decompose organic waste matter. This process should generate enough heat to destroy soil pathogens and weed seeds. As these bacteria complete their work, the composting matter starts to cool and earthworms and other soil micro-organisms continue the composting process. The nitrogen consumed by the bacteria remains in the compost and is available for use in the garden. Mature compost is sweet smelling, dark brown and fibrous, in which individual ingredients, except pieces of eggshell, are no longer identifiable. It can be dug into the garden, included in seedling and potting mixes, or placed on soil under organic mulch around trees and shrubs to maintain the health of your soil.

Aerobic compost can be made in wire hoops, compost bays with removable front panels, bottomless bins or open heaps. To set up a compost factory, you will need an area of soil three times the size of the base of your chosen container. One container is required for constructing the heap, the next space is used for turning the compost, and a second container on the third space can be filled with waste while the first container load is composting. Do not place your compost factory on a

concrete base as contact with soil is an important part of the process.

Wire hoops

You will require two hoops of 120 cm in diameter made from 90-cm wide small bird wire, plus two star stakes, and an extra area of soil 120 cm square. Hoops this size provide a cubic metre of storage, which is about the smallest mass required to generate sufficient heat. A hoop 120 cm in diameter with an overlap for securing the hoop will require 4 metres of bird wire. Drive a star stake into the ground, then join the hoop and secure it to the star stake with reusable garden ties (see figure 2.1). Small bird wire prevents animals pulling waste matter out of the heap. (Bird wire is also available 120 cm wide, but this is an awkward height for shovelling compost back into the hoop.)

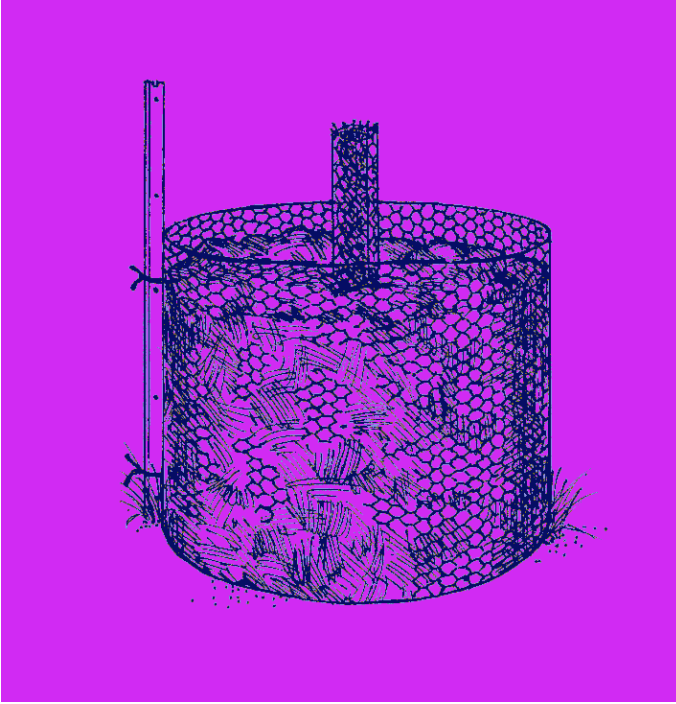


Fig. 2.1 A simple and inexpensive way to set up a factory for aerobic composting. Wire hoops without the chimney can also be used for producing leaf mould.

Plastic compost bins

Bottomless plastic bins with removable lids and small air holes in the sides are manufactured specifically for compost-making, and the bin is positioned so that the open base has contact with soil. When the compost requires turning, lift the bin off the compost, remove the lid, position the bin beside the heap, and shovel the waste matter back into the bin. You will require two bins for regular compost-making.

Fixed bays

More permanent three-sided bays of a cubic metre capacity can be made using timber posts for corners and the sides from small bird wire or wooden slats spaced at least 1 cm apart to allow good ventilation. Brick or solid-sided compost bays look very neat but do not allow good air circulation. Never use treated timber for garden structures or in compost. The front of the bay can be hidden behind a piece of corrugated roofing material that slides between wooden slats attached to the two front posts, if appearances are an issue to be considered. You will require three bays, each measuring 1 metre square and 1 metre high.

Where space and straw are plentiful, bay sides can be made from straw bales. Straw insulates the compost factory from extremes in temperature fluctuations. On large farms the compost factory is usually an open heap, and the turning of compost is done with a dozer blade fitted to a tractor.

I suggest that you use a wire hoop for your first batch of compost because it is inexpensive and easy to move if you find you have positioned it in the wrong spot for your conditions. Some warmth from the sun will help to keep your factory working. Gardeners in temperate areas can position their factory on soil where it will get some shade in the hottest part of the day. In hot areas a spot that receives some morning sun is a more suitable position. In very cool areas it will help to place the compost factory in a warm spot.

The factory is constructed by alternating layers of various materials that contain carbon (that is, carbohydrates or cellulose) with thinner layers of materials rich in nitrogen. All green organic matter contains some nitrogen, but manure

provides more efficient fuel. If layers contain plenty of green waste, a nitrogen source can be added every 20 cm, or every 10 cm if you are using dry, coarse materials. A list of suitable compost materials can be found in this chapter.

The perfect compost factory is constructed all in one go. After trying all the methods of compost-making over the years we have found that the ‘compost as you go’ method works well because organic matter starts to decay within days. While less than one cubic metre of materials will not generate as much initial heat, regularly turning materials in the compost heap keeps them aerated and gets the composting process underway. ‘Composting as you go’ also avoids the problem of accumulating separate piles of materials around the garden until you have enough to construct the factory. If compost materials are allowed to sit until the container is full, anaerobic composting commences.

As bacteria work on the surface area of compost materials, chopping materials into small pieces will allow them more surface area to work on at the same time, and hasten the composting process. A shredder is very helpful in breaking up prunings, autumn leaves and woody materials. Each layer of material should be just damp because the factory will not work efficiently if the mix is too dry.

The key to making aerobic compost quickly is religiously turning the mixture every two weeks; more often if you have time. This ensures that the mixture is well aerated, which allows aerobic bacteria to work more efficiently. Turning compost is not as daunting as it sounds because 1 cubic metre of organic waste materials is converted into a quarter of a cubic metre of compost in 5 to 8 weeks, or slightly longer in cooler areas. A chimney made from a 30 cm x 90 cm piece of

bird wire, crumpled into a tube, and inserted in the centre of the factory while filling, keeps the centre of the heap aerated. The chimney does not have to reach the base. An old poker or metal rod is helpful in testing the temperature in the centre of the compost heap, which is initially quite hot.

You may have to moisten the mixture occasionally, depending on the moisture content of materials, but this can be done with a watering can for a cubic-metre-sized factory. Rain is far better than chlorinated water for keeping compost damp, but compost factories left open to heavy rainfall can quickly become waterlogged. Compost production will then slow, and the mix will develop an unpleasant smell as anaerobic bacteria commence working. A waterproof covering, anchored at the corners only, will prevent waterlogging yet allow air access to your factory. The cover will also prevent nitrogen evaporating from the mix. A sheet of black plastic used as a cover will help the factory to absorb heat when conditions are cool. In warm conditions black plastic can overheat the compost and kill off beneficial micro-organisms, so white or clear plastic is more suitable. Always use a long-handled rake or shovel to flip back opaque compost covers as snakes enjoy the warmth generated by compost factories.

Your first compost factory

If you have never made compost before, probably the quickest way to understand how the various ingredients work together is to make your first batch of compost from straw (a good source of carbon) and horse manure (a good source of nitrogen). This method needs a higher proportion of manure than is required when using mixed compost materials.

MATERIALS

4 metres of 90 cm wide bird wire

1 star stake

some reusable garden ties

2 bales of straw

1 bag of horse manure

(Stable cleanings, if available, can be substituted for the straw and manure.)

METHOD

- Lightly scratch the soil surface with a garden fork where you will set up your factory and position the star stake in the soil.
- Form the wire into a hoop with a diameter of 120 cm; the overlap will be about 20 cm. Use the garden ties to secure the hoop to the correct size, and attach it to the star stake for support. You will probably not need the chimney for this method as you will be aerating the mixture often.
- Start stacking the hoop with alternating layers of straw and manure, chopping large clumps of manure with the edge of a spade for faster breakdown. As straw is very dry, moisten each layer as you go to just damp, but do not press it down. Fill the hoop to the top, finishing with a layer of straw. It does not matter if the top of the heap sits above the hoop.

- Position the cover, ensuring that air can circulate, and secure the corners. A piece of thick cardboard on top of the stake will prevent it piercing the plastic.
- After four days, push the poker into the centre of the heap and leave it for about ten minutes. It should feel quite hot when it is removed. If not, you need more nitrogen (see other nitrogen sources for compost in this chapter).
- Untie the hoop and set it up again on the other side of the star stake, then shovel the mixture into the hoop so that the straw that was on the top or outside is now in the base and centre of the new heap. Moisten lightly, if necessary, to keep the mixture just damp. If the manure looks grey, the heap is too dry. If the mixture has a sharp or acidic smell, sprinkle a little dolomite through the layers as you fill the heap.
- Turn the mixture in the same way every four days, moistening only as necessary because the mixture will become more moisture-retentive as it decomposes. If over-wet, it will appear almost black with an unpleasant smell. In this case, use the chimney in the centre of the hoop, and build the heap around it. Leave the factory uncovered for a couple of days if weather is dry.
- After three weeks the mixture will be mildly warm, reduced in volume, and brown in colour with an earthy smell. Earthworms and other organisms will be moving into the mixture to complete the composting process.

- Continue turning the heap every week and, in a little over two weeks in warm conditions, the compost should be greatly reduced in volume, dark brown, and sweet smelling, with a pleasant crumbly, fibrous texture. It is now ready to use in your garden. When you regularly make compost in the same spot, earthworms will breed in the area, providing more workers to speed up your compost-making.

Materials for aerobic composting

All organic matter, that is, anything that was once living, will eventually rot, but some materials are better than others for aerobic compost-making. Gardening ‘gurus’ still cannot agree on whether eucalyptus and pine needles should be added to compost piles, probably because some varieties of these trees contain more antiseptic oils than others. The leaves of Red River Gum, Lemon-scented Gum, Tasmanian Blue Gum and Scots Pine are strongly antiseptic and are harvested commercially for these properties. Anything that has antibacterial properties is going to slow down aerobic compost-making. A small quantity of shredded eucalyptus leaves may not make a noticeable difference, but mature leaves require fungus and less air to decompose the lignins that stiffen the mature parts of trees and shrubs. Why not allow these leaves, as nature intended, to lie as mulch under trees. You can use uncomposted pine needles as mulch for strawberry beds, as strawberries have an affinity with pine trees.

Large quantities of eucalyptus leaves can be composted, if necessary, in wire hoops in an out-of-the-way area where they will receive light. Shred leaves first for faster breakdown. Every 10-cm layer of leaves is dampened, and receives an

alternating light sprinkling of manure or soil from the trees' growing area. The completed pile does not require lime or turning, and is left to slowly decompose into leaf mould for mulching Australian bushland natives.

Suitable Materials

- **Animal manure** provides nitrogen to kickstart the composting process. Cow, horse, sheep and poultry manure are all suitable; other faeces may spread disease. A large amount of manure is not required when using mixed materials. Put a shallow layer of manure at the bottom of the pile and every 10–20 cm of waste material. Poultry manure is stronger than other types, so use half as much. A large pile of fresh horse manure can generate enough heat in hot weather to start a grass fire, but mixed with other waste matter, it is a good addition to the compost factory. Cow manure can be used more generously. If you do not have access to a regular supply of cow, horse or sheep or poultry manure, you can add a sprinkling of organic poultry-based fertiliser instead of manure. Or you can use a manure tea brew. Pour a whole bucketful over the compost factory instead of dampening materials.
- **Weeds** are a good ingredient in the compost factory but preferably those without seed heads in case your compost does not become hot enough to kill the seeds. It may take a couple of attempts to perfect the temperature in your factory. The small amounts of soil adhering to weed roots help to get the factory started. Fresh, limp weeds also supply some nitrogen

and moisture to the factory. Avoid adding kikuyu or couch grass runners, or weeds with bulbs to your compost mix.

- **Lawn clippings** should be allowed to wilt before adding to the compost factory. Fresh clippings tend to pack down into a dense mat, preventing penetration of moisture and air. Fluff grass clippings a bit and mix them with straw or shredded paper.
- **Garden waste** such as spent crops are good. These add carbon, some nitrogen and moisture. Thick stalks of corn or the cabbage family should be chopped first. Cabbage family stems and foliage add sulphur to the mix.
- **Prunings** can be composted if put through a garden shredder first; small pieces will hasten breakdown. Bark and wood contain lignin, which requires fungi for decomposition, and will not decompose completely in the aerobic compost factory. Do not add rose or bougainvillea prunings as thorns take forever to decompose, and do not add oleander or camphor laurel prunings.
- **Seaweed** is excellent in small quantities if it is well washed. The salt content of unwashed seaweed is not beneficial to the mix. Composted seaweed helps to bind soil particles together and adds a full range of trace elements. Alginates in seaweed are efficient in activating compost heaps.

- **Uncooked kitchen** waste is suitable, including tea-leaves and tea bags. Cooked matter tends to attract rats and mice, and will smell as it decays. Bones can be added but take a long time to decompose even when broken into small pieces. Large quantities of coffee grounds can go mouldy. Kitchen scraps add moisture. Use them to cover drier materials.
- **Eggshells** are an excellent material in compost factories as they add calcium to the mix, helping to keep the pH at a level that encourages vigorous aerobic decomposition, and keeps compost sweet smelling. Eggshells can be used cooked or raw, and should be crumbled first for better distribution through the mix.
- **Vegetables and fruit**, chopped into small pieces, break down more quickly and contribute nutrients and considerable moisture to the compost heap. Purchased produce can supply trace elements missing from your own soil. Avoid large pieces of citrus peel as they are slow to break down and earthworms are not fond of them.
- **Shredded newspaper** is suitable. Both black and coloured inks used to print newspapers are now made from vegetable-based dyes, and are safe to use in compost heaps. Unshredded paper packs into thick wads and slows the composting process.
- **Straw, chicken litter or stable cleanings** are helpful for mixing with layers of vegetable peelings, kitchen

waste, grass clippings, or for using as the base layer in your compost factory. Chicken litter adds nitrogen to the mix. Stable cleanings add quite a lot of nitrogen because they contain manure plus straw or wood shavings soaked with urine, another source of nitrogen.

- **Rock dust** can be added in small amounts if you are trying to address particular element deficiencies, but don't add too much or your heap will be very heavy to turn.
- **Wood ash** from untreated timber can be used in small quantities as it provides potassium and helps prevent the mixture becoming too acid, but excess can cause a magnesium deficiency in plants. Charcoal takes a long time to break down, but helps keep the mixture sweet smelling.
- **Blood and bone** will add nitrogen, phosphorus and calcium, but genuine blood and bone is not as efficient as some other nitrogen sources for kick-starting a compost factory.
- **Wood shavings and sawdust** from a chemical-free source can be added in small quantities as they are slow to decompose. Some wood shavings and sawdust are water-repellent, and sawdust packs down into a dense mat. If using these, you will have to increase high nitrogen ingredients in the mix. Red cedar, jarrah and Huon pine contain natural preservatives, and their sawdust and bark will take forever to decompose. The preservatives deter plant

growth. Large quantities of wood shavings or sawdust from untreated timber can be used as pathways in the vegetable garden if you have raised beds.

- **Wool, feathers and hair** are suitable. Fabrics made of pure cotton or wool will decompose slowly but many fabrics today are mixtures of natural and synthetic fibres, and may contain chemical dyes or fire retardants.
- **Herbs** can help if your compost heap still seems lazy. Add some yarrow, comfrey, nettles, horsetail or chamomile to help accelerate the breakdown process.
- **Dolomite** can be added if a sharp, acidic smell develops and the heap is not very active. Apply it only as a light dusting and do not use it out of habit.

Unsuitable Materials

- **Cat, dog or human faeces** should not be added to compost as various diseases can be spread through this matter.
- **Pesticides, fungicides, antibiotics or vermicides** will contaminate your compost. Do not add anything, including manure, that contains these products.
- **Plastic** wrappings, bags or disposable nappies.
- **Fruit fly-affected crops** contain maggots that can pupate in the compost if it does not reach the ideal temperature.

- **Diseased plant matter** contain spores that may survive if compost does not get hot enough. Spores of some diseases, including citrus brown rot, are spread in soil.
- **Synthetic fertilisers** are not beneficial in compost heaps as synthetic nitrogen delays or temporarily inhibits fermentation. Super-phosphate impairs the activity of various organisms in compost and deters earthworms from entering the mix.
- **Grey water** from bathrooms, kitchen or laundry should not be used to moisten your compost factory as it will upset the pH balance and slow the process.
- **Soil** does not need to be added to your compost factory. It only dilutes the mix, keeps it cooler and makes it heavier to turn. Soil contact at the base of the factory and small amounts of soil adhering to roots of weeds provide enough soil micro-organisms for the composting process to begin.
- **Earthworms or compost worms** must never be added to your compost heap. The initial heat will probably kill them if you have combined the materials correctly. Earthworms know when it is time to move into a compost heap.

Compost Worm Farming

WORM CASTINGS ARE 100 per cent top quality, organic fertiliser, providing a full range of plant nutrients. Compost worms convert manures and kitchen and garden waste into worm castings to place around plants, under mulch or to add

to your potting mixes. The liquid that collects in the bottom tray of commercial compost worm farms makes an excellent 'tea' for feeding seedlings and vegetables.

Compost worms are not earthworms. The varieties of compost worms available in Australia are Tigers, Reds and Blues. All compost worms prefer moister, more organically concentrated conditions than earthworms. They do not burrow through soil and if you regularly use worm castings in your garden, you will occasionally see a compost worm when moving aside mulch, but they do not last long in the garden in hot, dry weather. Earthworms do not like living on unprocessed food scraps but will enter aerobic compost heaps as the heap cools down. Compost worms require dark conditions, and prefer temperatures around 24°C, but will survive in temperatures from 10°C to 30°C. Compost worms will farm quite happily in a discreet, shady spot. A suitable spot for a compost heap would be too warm for compost worms.

Commercial, black plastic, worm-farm containers are flyproof, ideal for small gardens, and the containers come with complete instructions. The lower tray includes a tap for easy extraction of worm liquid tea. The container also includes a waterproof lid so you can leave your worm farm with a food supply in a cool, shady spot, and go on holidays for several weeks. Because these farms are easily portable, gardeners in Cool Zones can move the farm into a shed or garage, and cover it with an old blanket during winter months to keep the worms feeding and producing fertiliser. The worm farm is kept moist by watering every week or two, and covering the food supply with sheets of wet newspaper or damp hessian. Compost worms are effective barometers as

they will crawl to the top edges of their container when heavy rain is approaching.

Compost worms will recycle vegetable and fruit scraps, teabags, coffee grounds, crushed eggshells, lawn clippings, weeds, vacuum-cleaner contents, hair, shredded paper and cardboard. Apply a sprinkling of dolomite occasionally to maintain your farm's pleasant rainforest smell. Worms also enjoy animal manures, but a varied diet is important to supply a full range of nutrients for your garden. The higher the quality of food you feed your compost worms, the higher the quality of the fertiliser they will produce. Always test manure for safety before adding to your worm farm (see Manures). The smaller the particles of food you feed them, the faster they will convert it into fertiliser. Avoid feeding lots of onions or citrus, as these plants have been used as organic worming treatments; even if they are not strong enough to kill them, the worms don't seem to like them. Castings are harvested by removing the cover and exposing the farm to light. Give the worms time to move down through the castings away from the light, then start scraping layers of castings from the top of the farm.

If you require large quantities of worm castings, additional modules are available for worm farms. Larger timber units are not difficult for the average handyperson to build. Old fence palings or other untreated recycled timber can be used to make a box with sides 20–30 cm high. Palings as a base will allow liquid to drain through into a tapered piece of plastic sheet, and run into a collection bucket (see diagram, below). Loose palings or planks can also be used as a lid. All compost worm farms should be situated on legs so that you can collect the valuable liquid fertiliser produced by the farm.

You will need a minimum of a thousand compost worms to start your worm farm working efficiently. Worm growers are listed in the phone book. Well-fed worms multiply fairly quickly, so you can enlarge your worm farm or give some to friends. Compost worms also make great bait for freshwater fishing.

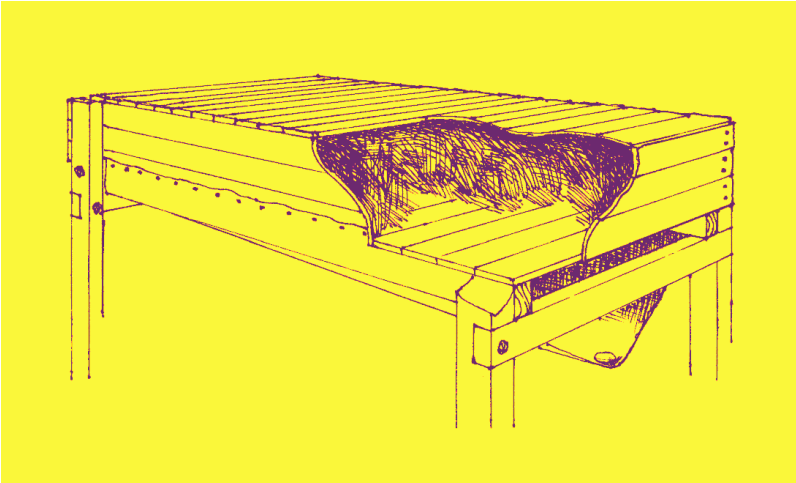


Fig. 2.2 An alternative compost worm farm for areas where large quantities of worm castings are required. Loose planks cover the feeding tray, allowing easy access to the farm. Joists measuring 50 x 100 mm are used to support planks at the bottom of the feeding tray.

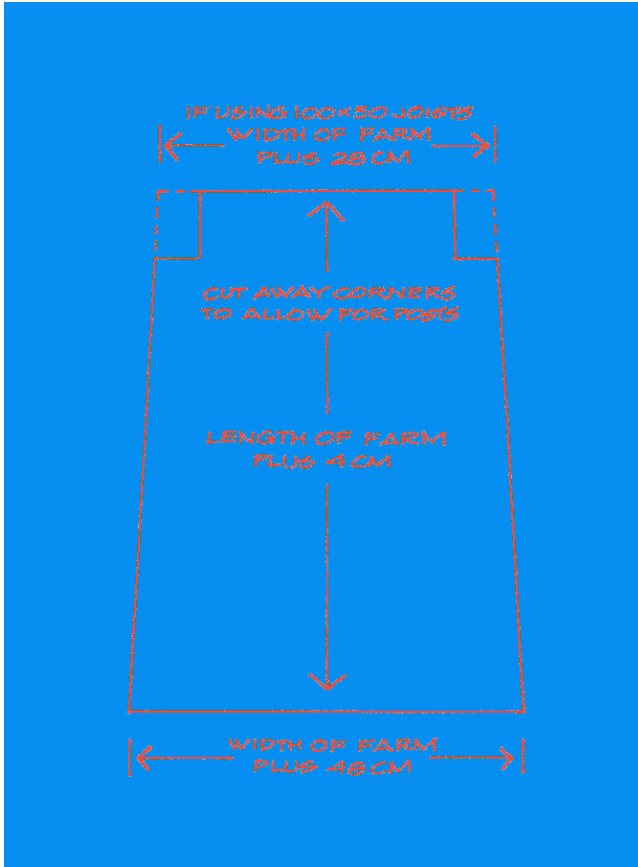


Fig. 2.3 Heavy-duty plastic sheeting can be attached to the base of the feeding tray to drain worm liquid into a bucket (or similar container) for use as a liquid fertiliser. Weighting the unsecured edge of the plastic with a stone helps to direct the flow of liquid.

CHAPTER 3

Your Gardening Diary

Gardening Zones in Australia and New Zealand

AUSTRALIANS LIVE ON the world's largest island with a land mass that is equivalent to 97 per cent of the US mainland. Consequently, Australia has a diverse range of climate conditions. Two-thirds of the country is arid, with less than 500 mm of rainfall annually, while other areas can have almost 500 mm of rain in a single month. Australia has both alpine and tropical regions. The Tropic of Capricorn runs through the northern states of Australia from Rockhampton and Longreach in Queensland, just above Alice Springs in the Northern Territory, and crosses the West Australia coast between Carnarvon and Exmouth. While the word 'tropical' conjures up thoughts of lush foliage and humidity-loving flowers, most of the Australian tropics are dry. Many Australian gardeners in other zones have to cope with icy winters and searing summer heat. January and February are too hot for a lot of gardening activity in many areas of Australia. Inland areas where humidity is low, and areas with saline water, are not conducive to sensitive plants in open garden soil in any growing zone.

Various authorities have divided our continent into as many as eight different gardening zones yet, within each of these zones, altitudes or geographical features will modify temperatures and rainfall patterns, breaking up the eight zones even further. Gardens at higher altitudes will be cooler than those at sea level in adjoining areas, which explains why cherries, which require a cold winter, can be grown at Stanthorpe on the Queensland border. Mountains that provide

protection from cold winds can modify growing conditions on the lee, or protected, side, and sea breezes can provide a milder climate for coastal areas than those a few kilometres inland.

Australia, like other parts of the world, is currently undergoing climate changes that will, if they continue at the present rate, see milder winter conditions in some areas, and many areas becoming drier while others will receive more rain. We have already seen changes in our area where, for the first time, we have been picking cucumbers in June, and zucchini all through winter. Weather patterns are also becoming more erratic within seasons, and monthly records of average temperatures and rainfall do not accurately reflect gardening conditions. On a single day in early February 2005, while temperatures crept towards 40°C in western New South Wales, Albury had a maximum temperature of 14°C, snow fell on the Central Tablelands, Melbourne recorded its coldest ever day, and severe storms deluged both Victoria and coastal New South Wales. The low-pressure system that caused this unusual February weather developed in the Tasman Sea and, contrary to normal weather patterns, moved westward. Part of the East Australian Current was also flowing in the opposite direction to normal.

For the purpose of this gardening diary, Australia is divided into three gardening or growing zones: Warm, Cool and Temperate. The zone divisions are based on the types of plants that will grow in a moderately irrigated garden in each zone. Within each of the three gardening zones there will be slightly warmer or cooler areas, and planting time variations will be given for these gardens. In non-irrigated areas of gardens, suitable drought-tolerant plants can be found in

chapter 5. Using hardy trees and shrubs will beneficially modify your garden climate and allow precious water to be used for vegetables or special favourites.

By contrast, New Zealand has a more constant climate. Frosts do occur, and snow falls on the mountains, but New Zealand is not subject to severe summer heat or hot winds from a parched inland. Auckland's latitude is similar to Merimbula and Bendigo on the east coast of Australia, and a large proportion of the North Island can be regarded as a Temperate Zone. Overall, the combination of a cool temperate to cool climate and mineral-enriched soils make New Zealand a suitable place for growing an extensive range of species from Europe, North America and the cooler parts of Asia.





Fig. 3.1 Gardening zones in Australia and New Zealand.

Warm Zones are frost-free, or experience only occasional, light frosts in inland areas. Warm Zones are very suited to warmth-loving Australian natives as well as plants, including fruits and vegetables, from warmer areas of the world. Winters are mild and short, covering only June and July, so these areas are not suitable for plants that require a defined period of low temperatures. Autumn-foliage trees, apples, pears and stone fruit do not perform well in Warm Zones.

Some Warm Zones experience distinct wet and dry periods with extremely high spring and summer temperatures, requiring conventional vegetables and some annuals to be grown at different times to other zones. Winter temperatures in areas above the Tropic of Capricorn can be higher than summer temperatures in some Cool Zones, and common vegetables from temperate areas can only be grown during winter months. Tropical temperatures produce unsuitable conditions for many conventional garden favourites. In coastal areas, tropical-foliage plants and fruits, and exotic

flowers which thrive in these conditions, allow an entirely different style of gardening, while in drier areas high temperatures and lower water availability make gardening quite a challenge. December, January and February can be too hot for gardening in many Warm Zones. Planting times for tropical areas are included in this planting guide.

Warm Zones include all of Queensland, except for the southern highlands; the north coast of NSW above Coffs Harbour; northern West and South Australia; and the Northern Territory.

Cool Zones are those where low temperatures occur for longer periods than in other parts of Australia. Frosts are common in winter and can continue into spring. Snow occurs in some areas. Cool zones are suitable areas for growing many European, Asian and North American plants that require a period of winter chilling. Deciduous trees that provide autumn colour and most conifers require cold winters, as do deciduous fruit trees and cane fruits. Many of the fruits and vegetables we are familiar with come from cooler climates. They, and frost-hardy Australian and New Zealand natives, grow well in Cool Zones.

Frost-tender plants, and plants that need a long period of warmth to flower or fruit are unsuitable for these areas. Open-pollinated seed is available for varieties of tomatoes and melons that have been developed in cooler conditions and require a shorter period to mature. Because summer temperatures may be lower in some Cool Zones, gardening can continue without interruption from October through April, and frost-tender seedlings can be started early in a cold frame or cloche.

Cool Zones include all of Tasmania; the southernmost part of South Australia including Mount Gambier; the area around Albany in Western Australia; most of Victoria; Canberra; the far south coast of NSW; and the NSW tablelands and highlands. In New Zealand, the interior of the North Island and the entire South Island are Cool Zones. Within these areas, protected, local microclimates along the coast as far south as Christchurch can be regarded as cool temperate areas.

Temperate Zones, strictly speaking, are all areas on earth between the polar regions and the Tropics of Cancer and Capricorn. The rest of Australia can be designated a Temperate Zone, because an extensive range of Australian natives and decorative plants, vegetables and fruits from temperate regions around the world can be grown in these areas. Although winter frosts occur in some Temperate Zones, soil warms quickly in spring, thus extending the growing season. In frost-free areas, spring planting can commence towards the end of August, with soil in frost areas warming by mid-September. Sowing seed early in cold frames, or cloches, allows annuals to become well established before hot, dry weather begins. January to late February can be too hot for a lot of gardening activity in some Australian Temperate Zones. Mild autumn weather extends from March through May.

Temperate Zones in Australia include some inland areas and the southern highlands of Queensland. Adelaide and Perth have similar minimum temperatures to Sydney, and Melbourne's temperatures are just slightly lower. Metropolitan temperatures tend to be one to two degrees higher than surrounding areas, and gardeners in Melbourne

may find that they can grow many temperate climate plants in protected gardens. The Murrumbidgee Irrigation Area and adjoining areas, and Benalla in Victoria, are all Temperate Zones. On the North Island of New Zealand, North and South Auckland areas, Hamilton, most of the west coast to just above Wellington, the Bay of Plenty area, and the east coast to Hastings are Temperate Zones.

Local microclimates

Within each growing zone, every garden also has its own microclimate. Gardens on ridges, plateaus and on valley floors are more likely to develop frost than those on sloping ground. If, however, hedges, trees or buildings block the slow, downward movement of cold air on clear winter nights, frost can form on the uphill side of the obstruction, while air on the downhill side will be relatively warmer. North-facing brick walls absorb heat during the day and slowly release it at night, warming the air slightly to benefit your plants. Soil rich in humus will further reduce soil temperature fluctuations. Strategically placed trees can protect gardens from cold or very hot winds, further modifying your garden's climate.

Take a stroll around your neighbourhood, looking at established gardens, particularly those in your street, to give you an idea of the type of plants that will grow well. If you are still confused about whether you live in a Warm, Cool or Temperate Zone, the best place to ask is at your local nursery. Reputable nurseries stock shrubs, trees and seedlings that are appropriate for your area, at a time suitable for planting. Staff at your local nursery will be able to advise you on how your particular site extends or limits your choice of garden plants. Try to resist the temptation to purchase plants from nurseries outside your gardening zone unless you know for sure that the

cultivar can survive summers or winters in your area. You may, in selected garden areas, be able to grow favourite plants from outside your zone. However, these plants will require extra care and attention. Such plants are more likely to suffer temperature or water stress, and stressed plants are more subject to pests and disease.

The planting diary is divided into monthly segments that include each gardening zone. This will allow gardeners living in very protected or exposed situations to refer to suitable plantings in adjacent zones, and adjust planting and garden routines to suit their microclimate. Advice in the diary to ‘sow after frost risk’ does not necessarily mean that a plant is frost-sensitive. Conditions may just be too cold for germination or root growth of that particular species.

Moon Planting

CENTURIES AGO, many diverse countries and cultures observed that planting at certain times of the lunar month affected the germination and growth of food crops, and plants in general. Consequently, farmers adapted their farming habits to the various moon phases and the periods of ‘fertile’ and ‘barren’ days within those phases. This form of farming became known as Moon Planting, Lunar Planting or Moon Lore, and some countries took their Moon Lore very seriously. Apparently, in medieval France, it was illegal to fell trees during certain moon phases because the wood tended to split when drying. In other cultures, animals were dehorned or gelded during Last Quarter and New Moon phases to minimise bleeding. The rules or principles of moon planting were handed down from generation to generation within each culture, and are still practised today by

biodynamic and organic farmers, and many gardeners around the world.

Some dismiss this aspect of agriculture as unscientific, even though scientists admit they do not fully understand some of the phenomena in our universe. Many customs have long been dismissed as unscientific folklore, yet the areas of companion planting and herbal medicine are now receiving serious scientific attention. While the original farmers who practised moon planting were not qualified scientists, and did not conduct laboratory-controlled experiments, they were keen observers of conditions that produced the best results in their crops because their very existence depended on getting it right.

How does the Moon affect Earth, and gardening endeavours? Although the full answer lies in the field of Celestial Mechanics (a combination of astronomy and applied mathematics), the simple explanation is that the regularly changing gravitational force of the Moon in relation to the Sun and Earth has an effect on many life forms on this planet, including plants. Because the Moon is closer to Earth than the Sun, the Moon's force has the more obvious effect. We can see an example of this energy daily in our ocean tides, when the gravitational attraction of the Moon creates high tides at the point on Earth closest to the Moon and the point on Earth exactly opposite, with corresponding low tides at right angles to these two points. In Earth's infancy, the Moon was much closer to Earth and the gravitational pull more pronounced, creating enormous differences between high and low tides, thus forming our oceans. Clearly, the Moon's gravitational pull has the strength to affect major bodies of water on our planet. Research by distinguished US endocrinologist, Dr

Frank Brown, proved that the opening and closing of oysters is initiated by the Moon's gravitational force and not by changes in water levels or variations in light, as some scientists believe. Diverse biological studies have confirmed that fluctuations of natural growth hormones in living plants coincide with daily tides.

In addition to the twice daily tidal patterns, solar spring tides are generated at the New and Full Moon phases when Sun, Earth and Moon are aligned, and the difference in high and low tides is exaggerated. Solar neap tides are generated when the Moon is at 90 degrees to the Sun and Earth. At First and Last Quarter Moon phases the Sun's gravitational pull is working against that of the Moon and the difference between high and low tides is reduced. The greatest effect of this phenomena occurs two days after the exact change of moon phase. This solar-lunar tidal cycle repeats every 29.531 days and is known as the lunation cycle or synodic period of the Moon (see figure 3.2). Reproductive cycles of mammals and marine creatures are all associated with the synodic period, and as some fishermen already know, fishing during particular moon phases can improve their catch.

Numerous scientists through the twentieth century confirmed subtle changes in both Earth's electromagnetic field and biological functions of plants that correspond to our tidal patterns. It is not stretching too long a bow to suggest that plants which contain a high proportion of water, and seeds which require a dramatic intake of water to initiate germination, would also be sensitive to the Moon's gravitational attraction. Each seed, no matter how tiny, contains a complete 'life program' that tells it what type of plant it is, how it will grow, how it will reproduce itself, and

conditions suitable for its germination. Do these conditions include a particular moon phase, or does a suitable arrangement of electrically charged particles in soil, at certain times of the lunar month, influence germination?

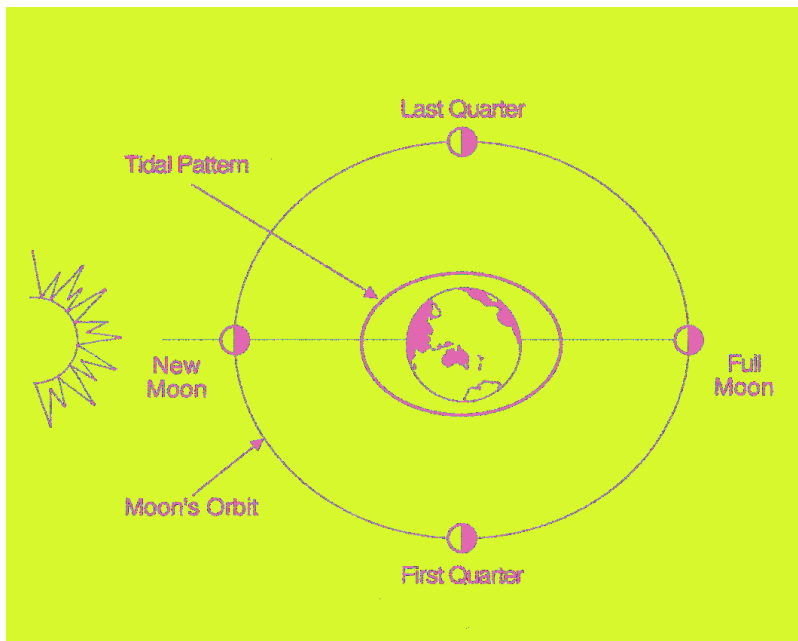


Fig. 3.2 Simplified diagram of solar-lunar tidal patterns.

Because the rules of moon planting were handed down by word of mouth for centuries before being committed to paper in the late eighteenth century they have, consequently, collected some distortions along the way. Comprehensive moon guides are available to Northern Hemisphere farmers and gardeners but the ones produced for the Australian public are abbreviated calendars. Apart from Thomas Zimmer's astrological calendar, I have found that these calendars show little understanding of moon-planting principles or gardening.

Their advice to plant everything except root crops on fertile days during the waxing moon, and to avoid all gardening activities on barren days is incorrect. Following this practice would have severely restricted agriculture, causing farmers to abandon moon planting many centuries ago. Restricting all pruning to periods of low sap flow encourages ‘dieback’ in some plants. Pruning is carried out in different moon phases for different purposes. Some calendars advise watering only on fertile days, while others advise watering only on barren days. As rainfall records show, Mother Nature follows neither of these rules. Pressure systems that bring rain can take three or more days to cross the continent, while the Moon occupies each sign for an average of two-and-a-quarter days. Consequently, it would only be possible for rain to fall in all areas of Australia during fertile or barren signs once a month when two signs of the same polarity are adjacent. Plants should be watered when necessary, regardless of fertile or barren days. However, the Moon does influence rainfall patterns, but in a far more complicated way than just fertile or barren days, and various lunar cycles are one of the tools used by long-range weather forecasters.

Some moon planting calendars available in Australia have been written for Northern Hemisphere gardeners, making them useless in our part of the world. Because of our distinctly different time zones, moon-phase changes occur in Australia at different times to those in the UK or US. For example, a New Moon at 5 p.m. on Sunday, New York time, occurs at 8 a.m. on Monday, Australian Eastern Standard Time. Seasons in Australia and New Zealand are opposite those in the Northern Hemisphere, and planting times are completely different. Overseas advice to plant deciduous fruit trees in January is a recipe for disaster here. The following

moon-planting principles are the ones that I have found effective.

Avoid planting 12 hours before and 12 hours after the exact change of moon phase

Germination is poor in seed sown during this period, and sowing or planting is not advised. With regard to this rule, I have found the increase and decrease in unfavourable energy is gradual during this time frame, and running an hour or so into this period, if you have a lot of sowing or transplanting to do, does not make an obvious difference.

New Moon (leafy annuals) and First Quarter (fruiting annuals) phases

The germination rate and vegetative growth of leafy and fruiting annuals, grasses and cereal crops increase on the waxing moon, the period when the Moon is visually increasing in size. This period occurs between the New Moon and Full Moon. It was also observed that some annuals, for which we use the seed-bearing part, require the First Quarter phase for germination. Because of increased sap activity during the waxing moon, liquid fertilisers are absorbed quickly by plants, grafting is more successful and pruning produces replacement growth faster than pruning conducted after Full Moon.

Although some plants germinate well in either waxing phase, as a general rule, annuals where we use the leaf or stem are sown or planted during New Moon phase, or First Quarter phase as second choice. Annuals where we use the seed-bearing part are sown or planted during First Quarter phase, or New Moon phase as second choice. Transplanting

of annual seedlings can be done in either phase, preferably on a fertile day.

Full Moon (root crops and perennials) phase

During Full Moon phase, plant energy is more concentrated in the root area of plants. Root crops germinate more quickly and make better growth if sown during this phase, which also favours striking cuttings, and the planting of shrubs, vines, and trees, including fruit trees. The root system is very important to the longevity of perennials. Before dormancy, deciduous perennials withdraw nutrients into their roots for storage. Root systems for annuals do not need this capability. Regrowth after pruning in this phase will be slower. Solid fertilisers are applied during this phase, and crops that would rot when sap flow is high can be harvested for storage.

Last Quarter phase

Plant activity and germination is at its lowest when the Moon's gravitational pull is weakest. Consequently, Last Quarter phase is not recommended for taking cuttings, sowing seed or any planting. As weed seeds are less likely to germinate during this phase, it is an excellent period for weeding, digging and preparing beds. Pruning at this time does not encourage new growth, so prune during this phase to limit the height of trees, remove unwanted limbs or to cut back shrubs that are rampant or crowding other shrubs. Mulching, composting and general garden maintenance can be carried out at any time during this phase. Manures used as mulch can be applied in Last Quarter phase because they have to be broken down by worms and bacteria before plants can use them.

Fertile and Barren Days

The system of ‘fertile’ and ‘barren’ days was taken from the zodiacal belt, a celestial circle that contains the orbits of all solar system bodies. Thousands of years ago, this circle was divided into twelve equal segments of 30 degrees and, instead of a numerical label, each segment was named after the constellation of stars that was closest to it at the time. The labels are symbolic because the actual constellations vary considerably in size, and originally the constellation of Libra formed part of Scorpius. Apart from rare occasions, each New Moon occurs in a different segment of the zodiacal belt. The segments commence from the point of the Northern Hemisphere’s spring equinox (Australia’s autumn equinox) and each segment (or sign) was given an alternate barren or fertile rating, except for halfway through the circle where two barren signs are followed by two fertile signs (see figure 3.3). This inclusion to moon planting has endured through the centuries, with the days the Moon is in a fertile sign being considered better days for sowing and planting. Pruning cuts heal more quickly on fertile days. I’ve found fertile days to be more important for germinating seed, pruning, taking cuttings and planting bare-rooted perennials than for transplanting from pots.

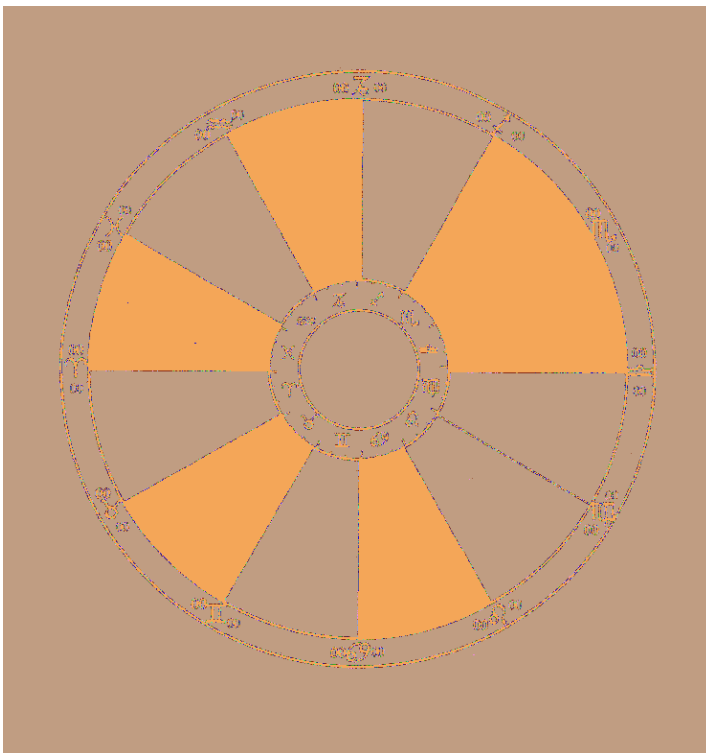


Fig. 3.3 Zodiac showing the pattern of fertile signs, which are the best periods for sowing and planting, and barren signs, which are less suitable for these activities. Fertile signs are indicated in black.

Weeding and harvesting crops for storage are performed on days when the Moon is in a barren sign, when possible, as it is considered to bring even better results. On barren days, mulching, composting and general garden maintenance can be carried out during any moon phase. If digging or ploughing is unavoidable outside Last Quarter phase, do it during barren days. As each barren sign was also designated as ‘positive’ or ‘yang’, and each fertile sign designated as ‘negative’ or ‘yin’,

except for the two segments opposite the starting point of the circle which reverse polarities where gardening and farming are concerned, perhaps the origins of this theory are related to the variations in Earth's electromagnetic field. Of the two signs that change polarities, Virgo (negative) has always been associated with harvest rather than planting, and Libra (positive) has always been associated with procreation. I must confess to not fully understanding the science behind this particular portion of moon-planting principles, but I do know that it works in practice.

Month-by-Month Planting and Garden Activity Diary

THE DIARY that follows includes a month-by-month checklist of various tasks for Southern Hemisphere gardens and organic farms, with planting options and their most suitable phase. Where tasks can be performed in two different phases, I have allocated a phase within moon-planting principles only to divide the tasks more evenly. The dates of various moon phases for coming years can be found in [chapter 10](#). The 'best sowing or planting days' listed for each phase indicate the days when the Moon is in a fertile sign.

Because each moon phase falls at different times of a calendar month over a period of years, when a suitable sowing or planting phase falls at the beginning or end of a month and it is too hot or cold for planting in your particular area, use the corresponding moon phase in an adjoining month. For example, if tomatoes can be sown in a cold frame in August in your zone, and First Quarter phase occurs in the first week of August, sow in September instead, because seedlings will have to stay in pots too long before soil warms enough for transplanting. If the species you want to plant or sow is not listed in the diary, just refer to the basic rules of moon

planting in this chapter. While the successful growth of plants is reliant on many factors including water, nutrients, soil temperature and light, and ignoring moon-planting principles will not doom your gardening efforts to failure, working with nature's energy flows can make your efforts more rewarding.

Please note that this diary also includes medicinal herbs for commercial growers. While medicinal herbs such as echinacea, meadowsweet, hyssop and Virginia scullcap are attractive additions to a cottage garden, I must advise you not to grow non-culinary medicinal herbs for self-medication. The potency of herbs varies with their seed source and growing conditions. Some herbs are poisonous at incorrect doses. Always consult a qualified herbalist or naturopath if you require herbal medication.

January

February

March

April

May

June

July

August

September

October

November

December

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

January

WARM ZONES



Sow or plant out: celosia.

In areas south of Rockhampton, *sow or plant out:* ageratum, French marigold, also leek in late January. *Sow direct:* silver beet (pre-soak seed) and sunflower.

Grow a green manure or cover crop of: adzuki bean, cowpea, lablab, mung bean, pigeon pea, Japanese millet or sorghum. In suitable soils, grow amaranth. South of Rockhampton, grow millet.

On damp soil, *apply fertiliser tea to:* melons sown in December, also cabbage, silver beet and young passionfruit, if necessary.

Apply seaweed tea to: asparagus seedlings and young crowns and potato bed for February planting. Water fruit trees and vines regularly after harvest.



Sow direct: sweet corn.

Sow or plant out: capsicum, tomato and celosia.

In areas south of Rockhampton, *also sow or plant out:* eggplant, rockmelon, summer squash, watermelon, zucchini, ageratum, French marigold and sunflower, also cucumber and leek in late January. *Sow direct:* bush and climbing beans.

Lightly prune: all established bush roses, except species, if FQ falls late this month. Clip diosma lightly.



Sow or plant out: lemon grass and mango. Take cuttings of hyssop, marjoram, mint, oregano, rosemary, sage, thyme, watercress, carnation and pelargonium.

In areas south of Rockhampton, *also sow or plant out:* pineapple, dandelion, watercress, carnation and gazania. *Sow direct:* beetroot (pre-soak seed), carrot, parsnip, potato (Brisbane and areas south) and radish.

Lightly fertilise: kangaroo paw, also natives not fertilised in spring.

Prune: ceratopetalum not cut at Christmas.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: strawberries and mulch. Also for leeks south of Rockhampton.

Mulch: top up mulch around bananas and where necessary.

TEMPERATE ZONES



Sow direct: cabbage, lettuce and silver beet (pre-soak seed).

Sow or plant out: Brussels sprouts, leek, spring onions, ageratum, French marigold, petunia and verbenas.

In warmer areas, *also sow direct:* nasturtium and sunflower.

In cooler areas, *also sow:* pansy and viola, phlox, stock and sweet pea.

Grow a green manure or cover crop of: cowpea, mung bean, pigeon pea, millet, Japanese millet or sorghum. In suitable soils, grow amaranth.

On damp soil, *apply fertiliser tea to:* melons sown in December, also cabbage, leek, lettuce, silver beet and young passionfruit, if necessary.

Apply seaweed tea to: asparagus seedlings and young crowns, also potato bed for February planting. Water fruit trees and vines regularly after harvest.



Sow direct: bush and climbing beans and sweet corn.

Sow or plant out: cauliflower, cucumber, leek, spring onions, ageratum, French marigold, petunia and verbenas.

In warmer areas, *also sow:* rockmelon, summer squash, tomato, watermelon and zucchini. *Sow direct:* nasturtium and sunflower.

In cooler areas, *also sow:* pansy and viola, phlox, stock and sweet pea.

Lightly prune: all established bush roses, except species, if FQ Moon falls late this month. Clip diosma lightly.



Sow direct: beetroot (pre-soak seed), carrot, parsnip and radish.

Sow or plant out: dandelion, lemon grass and watercress.

Plant: mint, gazania, bearded iris and pineapple.

Divide bearded iris and take cuttings of hyssop, lavender, mint, marjoram, oregano, rosemary, sage, thyme, watercress, carnation and pelargonium.

In warmer areas, *also sow or plant out:* potato and mango.

Lightly fertilise: kangaroo paw, also natives not fertilised in spring.

Prune: ceratopetalum not cut at Christmas.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: strawberries and mulch.

Mulch: top up mulch around bananas and where necessary, including around conifers.

COOL ZONES



Sow direct: cabbage, grain crops, lettuce, silver beet (pre-soak seed), dwarf sunflower and sweet pea.

Sow or plant out: Brussels sprouts, leek, lettuce, spring onions, sweet basil, parsley, ageratum, Iceland poppy, stock and verbenas.

In colder areas, *also sow:* dill, pansy and viola. *Sow direct:* bulb fennel, open Chinese cabbage, mizuna and tatsoi.

Grow a green manure or cover crop of: mung bean or millet. In suitable soils, grow amaranth.

On damp soil, *apply fertiliser tea to:* melons sown in December, Brussels sprouts transplanted two months ago, also cabbage, celery, leek, lettuce and silver beet, if necessary.

Apply seaweed tea to: asparagus seedlings and young crowns.

Water fruit trees and vines regularly after harvest.



Sow direct: bush beans, nasturtium, dwarf sunflower and sweet pea.

Sow or plant out: broccoli, cauliflower, leek, spring onions, zucchini, ageratum, Iceland poppy, stock and verbenas.

In colder areas, *also sow:* pansy and viola. *Sow direct:* grain crops and peas.

Lightly prune: all established bush roses, except species, if FQ Moon falls late this month.



Sow direct: beetroot (pre-soak seed), carrot, parsnip and radish.

Sow or plant out: dandelion, sage and watercress.

Plant: mint and bearded iris.

Divide bearded iris and take cuttings of hyssop, oregano, rosemary, thyme, watercress, carnation and pelargonium.

In cooler areas, *sow:* pyrethrum.

Take cuttings of carnation and pelargonium.

Lightly fertilise: kangaroo paw, also natives not fertilised in spring.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: strawberries and spring bulbs and mulch.

Mulch: top up mulch where necessary, including around conifers where summers are hot.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

February

WARM ZONES



Sow or plant out: celosia.

In areas south of Rockhampton, *also sow or plant out:* leek, sweet and purple basil, ageratum, French marigold. *Sow:* celery and spring onions in late February.

In areas south of Rockhampton, *sow direct:* cabbage, silver beet (pre-soak seed), also lettuce in late February.

Grow a green manure or cover crop of: mung bean, pigeon pea or Japanese millet. In suitable soils, grow amaranth. South of Rockhampton, grow millet. North of Rockhampton, grow lablab.

On damp soil, *apply fertiliser tea to:* young grapes, asparagus seedlings and young crowns, young bananas, mango and pawpaw, melons sown in January, also cabbage, leek, silver beet and young passionfruit, if necessary.

Apply seaweed tea to: banana trees and strawberry bed.



Sow or plant out: celosia.

In areas south of Rockhampton, *sow direct:* bush and climbing beans, sweet corn.

In areas south of Rockhampton, *sow or plant out:* capsicum, cucumber, leek, tomato, zucchini, ageratum and French marigold. Also sow broccoli, cauliflower and spring onions in late February.

In areas north of Rockhampton, *sow or plant out:* capsicum, sweet corn and tomato.

Lightly prune: established bush roses, except species, not pruned last month.



In areas south of Rockhampton, *sow direct:* beetroot (pre-soak seed), carrot, parsnip, potato (Brisbane and areas south), radish, swede and turnip.

In areas south of Rockhampton, *sow or plant out:* dandelion, watercress, avocado, mango and pineapple.

Take cuttings of carnation, pelargonium, marjoram, mint, oregano, rosemary, sage, thyme and watercress.

In areas north of Rockhampton, *sow or plant out:* lemon grass.

After watering, *fertilise:* mature banana trees, gerbera, also passionfruit and grapes after harvest. Treat magnesium deficiency in citrus, if necessary.

Lightly fertilise: fig, young citrus, Hawaiian hibiscus and all established roses. Apply cold, used tea-leaves to camellia.

Prune: alyogyne after flowering and mature passionfruit, if necessary. Remove berry-bearing foliage from female asparagus plants.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: potatoes in very warm areas. Check roses and citrus for ‘suckers’.

Mulch: top up compost/mulch around fig and macadamia.

TEMPERATE ZONES



Sow direct: cabbage, lettuce, radicchio, silver beet (pre-soak seed) and statice.

Sow or plant out: Brussels sprouts, leek, spring onions, ageratum, cornflower, nemesia, nigella, pansy and viola, Iceland poppy, stock and verbenas. Also sow bulb fennel, celery and dianthus in late February.

In warmer areas, *also sow:* sweet basil.

In cooler areas, *also sow:* sweet pea.

Grow a green manure or cover crop of: cowpea (early), mung bean, millet, Japanese millet, oats or triticale. Also cereal rye late in February. In suitable soils, grow amaranth.

On damp soil, *apply fertiliser tea to:* young grapes, asparagus seedlings and young crowns, young bananas, mango and

pawpaw, melons sown in January, bearded iris, also cabbage, leek, lettuce, silver beet and young passionfruit, if necessary.

Apply seaweed tea to: banana trees and strawberry bed.



Sow direct: bush beans.

Sow or plant out: broccoli, cauliflower, leek, spring onions, ageratum, cornflower, nemesia, nigella, pansy and viola, Iceland poppy, stock and verbena. Also dianthus in late February.

In warmer areas, *also sow direct:* sweet corn.

In cooler areas, *also sow or plant out:* sweet pea, also peas in late February.

Lightly prune: established bush roses, except species, not pruned last month.



Sow direct: beetroot (pre-soak seed), carrot, parsnip, radish, swede and turnip.

Sow or plant out: dandelion, mint and watercress.

Plant: bearded iris. Also avocado in late February.

Divide bearded iris and take cuttings of mint, marjoram, oregano, rosemary, sage, thyme, watercress, carnation and lavender.

In warmer areas, *also sow or plant out:* potato, mango and pineapple.

After watering, *fertilise*: mature bananas, gerbera, also passionfruit and grapes after harvest. Treat magnesium deficiency in citrus, if necessary.

Lightly fertilise: fig, young citrus, Hawaiian hibiscus, all established roses. Apply cold, used tea-leaves to camellia.

Prune: alyogyne, after flowering. Remove berry-bearing foliage from female asparagus plants.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: spring bulbs. Check roses and citrus for ‘suckers’.

Mulch: top up compost/mulch around fig and macadamia.

COOL ZONES



Sow direct: cabbage, lettuce, silver beet (pre-soak seed), calendula and sweet pea.

Sow or plant out: leek, lettuce, silver beet (pre-soak seed), spring onions, parsley, ageratum, aurora daisy, dianthus, nigella, pansy and viola, Iceland poppy and stock.

In warmer areas, *also sow or plant out*: Brussels sprouts (early) and radicchio.

In colder areas, *also sow or plant out*: open Chinese cabbage, mizuna, tatsoi and cornflower. Also spinach in late February.

Grow a green manure or cover crop of: mung bean or oats.
Also barley late in February. In suitable soils, grow vetch.

On damp soil, *apply fertiliser tea to:* young grapes, asparagus seedlings and young crowns, bearded iris, also cabbage, celery, leek, lettuce and silver beet, if necessary.

Apply seaweed tea to: strawberry bed and Brussels sprouts transplanted two months ago.



Sow direct: calendula and sweet pea.

Sow or plant out: broccoli, leek, spring onions, ageratum, aurora daisy, dianthus, nigella, pansy and viola, Iceland poppy and stock.

In warmer areas, *also sow direct:* cauliflower and peas.

In colder areas, *also sow or plant out:* cornflower.

Lightly prune: established bush roses, except species, not pruned last month.



Sow direct: beetroot (pre-soak seed), carrot, radish, swede and turnip.

Sow or plant out: watercress.

Plant: bearded iris.

In warmer areas, *also sow or plant out:* parsnip and dandelion.

In colder areas, *also sow:* garlic.

Divide bearded iris and take cuttings of mint, rosemary, sage, thyme, watercress and carnation.

Lightly fertilise: all established roses. Apply cold, used tea-leaves to camellia.

Prune: Remove berry-bearing foliage from female asparagus plants.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare: raspberry bed and trellis in cold areas. Check roses and citrus for ‘suckers’.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

March

WARM ZONES



South of Rockhampton, *sow direct*: bulb fennel, cabbage, headed and open Chinese cabbage, grain crops, lettuce, mizuna, radicchio, rocket, silver beet (pre-soak seed), tatsoi, coriander, annual lupins, nasturtium, sunflower and sweet pea.

Sow or plant out: celery, leek, spring onions, sweet basil, parsley, ageratum, aurora daisy, calendula, cornflower, nemesia, pansy and viola, Iceland poppy, snapdragon, statice, stock and verbena.

In areas north of Rockhampton, *sow or plant out*: cabbage, silver beet (pre-soak seed), spring onions, aurora daisy and French marigold. *Sow direct*: nasturtium and sunflower.

Grow a green manure or cover crop of: strawberry clover, Japanese millet, oats or triticale. In suitable soils, grow annual lupin, vetch or amaranth. South of Rockhampton, grow white clover or field pea. North of Rockhampton, grow lablab.

On damp soil, *apply fertiliser tea to*: asparagus seedlings in pots, melons sown in February and potato bed to be planted in

April, also cabbage, celery, leek, lettuce, silver beet and young passionfruit, if necessary.

Apply seaweed tea to: camellia at half-strength.



Sow direct: broccoli, bush and climbing beans, grain crops, nasturtium, sunflower and sweet pea.

Sow or plant out: leek, spring onions, tomato, zucchini, chamomile and aurora daisy.

In areas south of Rockhampton, *also sow or plant out:* cauliflower, peas, ageratum, calendula, cornflower, annual lupins, nemesia, pansy and viola, Iceland poppy, snapdragon, statice, stock and verbena.

In areas north of Rockhampton, *also sow or plant out:* capsicum, cucumber, eggplant, pumpkin, rockmelon, spring onions, summer squash, sweet corn, watermelon and French marigold.

Prune: short dead-head all roses from now until winter and tidy up camellia, if necessary.



Sow direct: beetroot (pre-soak seed), carrot, parsnip and radish. Also sow lawn seed or lay turf.

Sow or plant out: dandelion, lemon grass, oregano and gerbera.

Plant: strawberries, citrus and pineapple. Divide globe artichoke, Virginia scullcap and take cuttings of mint, rosemary and thyme.

In areas south of Rockhampton, *also sow or plant out*: early-season onion, swede, turnip, hyssop, lavender, lemon balm, marjoram, pyrethrum, rosemary, thyme, watercress, yarrow and shasta daisy. Plant globe artichoke suckers, avocado, olive, camellia, frangipani, herbaceous perennials, beardless iris, evergreen trees, shrubs and vines.

Lightly fertilise: peppermint. Apply cold, used tea-leaves to camellia.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: spring bulbs.

TEMPERATE ZONES



Sow direct: Brussels sprouts, bulb fennel, cabbage, headed and open Chinese cabbage, grain crops, lettuce, mizuna, radicchio, rocket, silver beet (pre-soak seed), tatsoi, coriander and annual lupins.

Sow or plant out: leek, silver beet (pre-soak seed), spring onions, chamomile, parsley, ageratum, aurora daisy, calendula, cornflower, dianthus, nemesia, nigella, pansy and viola, Iceland poppy, snapdragon, statice and stock.

In warmer areas, *also sow*: celery and sweet pea.

In colder areas, *also sow*: spinach.

Grow a green manure or cover crop of: red or strawberry clover, faba bean, field pea, barley, cereal rye, oats, triticale or wheat. In suitable soils, grow alfalfa, fenugreek, annual lupin or vetch. Sow chickpea in frost-free areas.

On damp soil, *apply manure tea to:* asparagus seedlings in pots, Brussels sprouts transplanted two months ago, cherry, also cabbage, celery, leek, lettuce and silver beet, if necessary. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: almond, cherry, nectarine, peach, pear trees, lemon grass, also azaleas which have been affected by petal blight. Apply to camellia at half-strength.



Sow direct: cauliflower, annual lupins and grain crops.

Sow or plant out: broccoli, leek, spring onions, chamomile, ageratum, aurora daisy, calendula, cornflower, dianthus, nemesia, nigella, pansy and viola, Iceland poppy, snapdragon, statice and stock.

In warmer areas, *also sow or plant out:* peas and sweet pea.



Sow direct: beetroot (pre-soak seed), carrot, radish, swede and turnip. Also sow lawn seed or lay turf.

Sow or plant out: early-season onion, globe artichoke, burdock, dandelion, hyssop, lemon balm, marjoram, rosemary, rue, thyme, watercress and yarrow.

Plant: globe artichoke suckers, strawberries, avocado, citrus, olive, carnation, gerbera crowns, herbaceous perennial

crowns, lavender, shasta daisy, bearded and beardless iris, camellia, potted roses and evergreen trees, shrubs and vines.

Divide globe artichoke, burdock, chives, lemon balm, meadowsweet, pyrethrum and gazania.

In warmer areas, *also sow or plant out*: parsnip, oregano, Virginia scullcap, mango and pineapple.

Lightly fertilise: peppermint. Apply cold, used tea-leaves to camellia.

Prune: short dead-head all roses from now until winter. Tidy up camellia and pelargonium, except for scented leaf, if necessary.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

COOL ZONES



Sow direct: headed and open Chinese cabbage, grain crops, lettuce, mizuna, spinach, tatsoi and calendula.

Sow or plant out: leek, spring onions, aurora daisy, cornflower, dianthus, pansy and viola and stock.

In warmer areas, *also sow*: cabbage, radicchio, rocket, coriander, calendula and Iceland poppy.

Grow a green manure or cover crop of: clover, faba bean, field pea, cereal rye, oats, triticale or wheat. In suitable soils, grow vetch.

On damp soil, *apply manure tea to*: cherry, asparagus seedlings in pots, Brussels sprouts transplanted two months ago, also cabbage, celery, leek, lettuce and silver beet, if necessary. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: almond, cherry, nectarine, peach, pear trees. Also azaleas which have been affected by petal blight. Apply to camellia at half-strength.



Sow direct: grain crops and calendula.

Sow or plant out: leek, spring onions, aurora daisy, cornflower, dianthus, pansy and viola and stock.

In warmer areas, *also sow or plant out*: suitable broccoli, calendula and Iceland poppy.



Sow direct: radish, swede, turnip and garlic.

Sow or plant out: echinacea, mint, watercress and Russell Lupin.

Plant: strawberries, herbaceous perennials, lavender, shasta daisy, anemone, ranuncula corms, bulbs and lilies, freesia, daylily, bearded and beardless iris, camellia and evergreen trees, shrubs and vines.

Divide meadowsweet, bearded iris, shasta daisy, globe artichoke, Virginia scullcap and gazania, in milder areas.

In warmer areas, *also sow or plant out*: hyssop, lavender, yarrow, carnation and potted roses.

After watering, *fertilise*: bulbs left in ground.

Lightly fertilise: globe artichoke and peppermint. Apply cold, used tea-leaves to camellia.

Prune: cut back globe artichoke. Remove unwanted suckers. Cut back herbaceous perennials as they die down and divide if necessary. Short dead-head all roses from now until winter. Tidy up camellia, if necessary.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: asparagus and bed and trellis for raspberry.

Mulch: globe artichoke and herbaceous perennial bed after aerating. Replace mulch after planting bulbs. Mulch prepared beds to prevent organic matter drying out. Remove mulch from carnations.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

April

WARM ZONES



Sow direct: cabbage, headed and open Chinese cabbage, grain crops, lettuce, mizuna, radicchio, rocket, silver beet (pre-soak seed), spinach, tatsoi, coriander and nasturtium.

Sow or plant out: celery, leek, spring onions, parsley, ageratum, aurora daisy, calendula, cornflower, nemesia, pansy and viola, Iceland poppy, snapdragon, statice and verberna.

In areas south of Rockhampton, *also sow or plant out:* bulb fennel, chamomile, annual lupins, nigella, stock and sweet pea.

In areas north of Rockhampton, *also sow or plant out:* everlasting daisy, French marigold, petunia, phlox and sunflower.

Grow a green manure or cover crop of: strawberry clover, cereal rye, Japanese millet, oats or triticale. In suitable soils, grow fenugreek, vetch, amaranth or buckwheat. South of Rockhampton, grow chickpea, faba bean, field pea, white clover or wheat. North of Rockhampton, grow lablab.

On damp soil, *apply fertiliser tea to*: young mango and pawpaw, also cabbage, celery, leek, lettuce and silver beet, if necessary. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: mango, lemon grass, also azaleas that have been affected by petal blight. Apply at half-strength to strawberries planted in March.



Sow direct: fast-maturing broccoli, grain crops, peas and nasturtium.

Sow or plant out: leek, spring onions, chamomile, ageratum, aurora daisy, calendula, cornflower, nemesia, pansy and viola, Iceland poppy, snapdragon, statice and verbena.

In areas south of Rockhampton, *also sow or plant out*: broad beans, chamomile, annual lupins, nigella, stock and sweet pea.

In areas north of Rockhampton, *also sow or plant out*: bush and climbing beans, cucumber, pumpkin, rockmelon, summer squash, sweet corn, tomato, watermelon, zucchini, everlasting daisy, French marigold, petunia, phlox and sunflower.



Sow direct: carrot, radish, swede. Also sow lawn seed or lay turf.

Sow or plant out: yarrow.

Plant: lemon grass, strawberries, pineapple, carnation, gerbera, frangipani and evergreen trees, shrubs and vines.

Divide chives, pyrethrum, gazania, shasta daisy and take cuttings of rosemary and thyme.

In areas south of Rockhampton, *also sow or plant out*: early-season onion, turnip, garlic, olive, lavender, lemon balm, mint, rosemary, Virginian scullcap, thyme, watercress, globe artichoke suckers, beardless iris, camellia, herbaceous perennials and potted roses.

In areas north of Rockhampton, *also sow or plant out*: beetroot (pre-soak seed), parsnip, potato, dandelion, oregano, avocado and citrus.

Lightly fertilise: globe artichoke, also Hawaiian hibiscus and mature pawpaw in the north.

Prune: cut back globe artichoke. Remove unwanted suckers. Cut back herbaceous perennials as they die down, and divide, if necessary. Tidy up pelargonium except for scented leaf, if necessary.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: asparagus and deciduous planting.

Mulch: globe artichoke and herbaceous perennial bed with compost and/or manure, after aerating. Remove mulch from carnations.

TEMPERATE ZONES



Sow direct: bulb fennel, cabbage, headed and open Chinese cabbage, grain crops, lettuce, mizuna, radicchio, rocket, spinach, tatsoi, coriander and annual lupins.

Sow or plant out: leek, spring onions, chamomile, parsley, ageratum, aurora daisy, calendula, cornflower, dianthus, nigella, pansy and viola, Iceland poppy, snapdragon and statice.

In frost-free areas, *also sow direct:* silver beet (pre-soak seed) and sweet pea. Transplant nemesia and stock.

Grow a green manure or cover crop of: strawberry clover, faba bean, field pea, barley, cereal rye, oats, triticale or wheat. In suitable soils, grow alfalfa, fenugreek, annual lupin or vetch. Sow chickpea in frost-free areas.

On damp soil, *apply fertiliser tea to:* Brussels sprouts two months after planting out. Also to cabbage, celery, leek, lettuce and silver beet, if necessary. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: mango. Apply at half-strength to strawberries planted in March.



Sow direct: broccoli, grain crops and annual lupins.

Sow or plant out: leek, spring onions, chamomile, ageratum, aurora daisy, calendula, cornflower, dianthus, nigella, pansy and viola, Iceland poppy, snapdragon and statice.

In frost-free areas, *also sow direct:* broad beans, peas and sweet pea and transplant nemesia and stock.



Sow direct: radish, swede, turnip and garlic.

Sow or plant out: early-season onion, burdock, lemon balm, carnation, valerian and yarrow.

Plant: globe artichoke suckers, strawberries, olive, lavender, anemone and ranuncula corms, bulbs and lilies, freesia, beardless iris, camellia and potted roses. Also evergreen trees, shrubs and vines during first half of April.

Divide burdock, chives, pyrethrum, bearded iris and shasta daisy.

In frost-free areas, *also sow or plant out:* rosemary and thyme.

In colder areas, *also sow or plant out:* daylily.

After watering, *fertilise:* bulbs which have remained in soil.

Lightly fertilise: globe artichoke.

Prune: cut back globe artichoke. Remove unwanted suckers. Cut back herbaceous perennials as they die down, and divide, if necessary.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: asparagus and deciduous plantings.

Mulch: globe artichoke and herbaceous perennial bed with compost and/or well-rotted manure, after aerating. Replace mulch after planting spring bulbs. Remove mulch from carnations.

COOL ZONES



Sow direct: grain crops, lettuce and spinach.

Sow or plant out: leek.

In warmer areas, *also sow:* spring onions, aurora daisy, cornflower, dianthus and nigella.

Grow a green manure or cover crop of: faba bean, field pea, oats or triticale. In suitable soils, grow vetch.

On damp soil, *apply fertiliser tea to:* Brussels sprouts two months after planting out and lettuce, if necessary. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: to asparagus bed. Apply at half-strength to strawberries planted in March.



Sow direct: grain crops.

Plant out: leek.

In warmer areas, *also sow or plant out:* spring onions, aurora daisy, cornflower, dianthus and nigella.



Sow direct: radish and turnip.

Sow or plant out: early-season onion and Russell Lupin.

Plant: strawberries, beardless iris and camellia. Plant raspberry and currants in cold areas.

Divide daylily and shasta daisy.

In warmer areas, *also sow or plant out*: swede, garlic and echinacea.

Prune: cut down asparagus when yellow. Tidy up perennial bed, cut back dahlia plants. Lift tubers if necessary.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: deciduous plantings. Also grapes in frost areas.

Mulch: top up compost on established asparagus bed.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

May

WARM ZONES



Sow direct: bulb fennel, cabbage, open Chinese cabbage, grain crops, lettuce, mizuna, radicchio, rocket, spinach, tatsoi, coriander and annual lupins.

Sow or plant out: leek, spring onions, chamomile, ageratum, aurora daisy, calendula, cornflower, dianthus, nemesia, nigella, pansy and viola, Iceland poppy, snapdragon, statice and verbenas.

In areas south of Rockhampton, *also sow or plant out:* stock and sweet pea.

In areas north of Rockhampton, *also sow or plant out:* fast-maturing celery, headed Chinese cabbage, silver beet (pre-soak seed), parsley, French marigold, petunia and phlox. *Sow direct:* everlasting daisy, nasturtium and sunflower.

Grow a green manure or cover crop of: barley, cereal rye, oats or triticale. In suitable soils, grow alfalfa, fenugreek, vetch, amaranth or buckwheat. South of Rockhampton, grow chickpea, red or white clover, faba bean, field pea or wheat. North of Rockhampton, grow lablab.

On damp soil, *apply fertiliser tea to*: cabbage, celery, leek, lettuce and silver beet, if necessary. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: asparagus bed.



Sow direct: grain crops, peas and annual lupins.

Sow or plant out: leek, spring onions, chamomile, ageratum, aurora daisy, calendula, cornflower, dianthus, nemesia, nigella, pansy and viola, Iceland poppy, snapdragon, statice and verbena.

In areas south of Rockhampton, *also sow or plant out*: broad beans, stock and sweet pea.

In areas north of Rockhampton, *also sow or plant out*: bush and climbing beans, pumpkin, rockmelon, summer squash, tomato, watermelon, zucchini, French marigold, petunia and phlox.

Sow direct: sweet corn, everlasting daisy, nasturtium and sunflower.



Sow direct: radish, turnip and yarrow. Also potato north of Brisbane.

Plant: olive, daylily and potted roses.

In areas south of Rockhampton, *also sow or plant out*: early-season onion, garlic, watercress, carnation, anemone, ranuncula, bulbs, lilies and freesia. Divide shasta daisy.

In areas north of Rockhampton, *also sow direct*: beetroot (pre-soak seed), carrot and swede. *Sow or plant*: dandelion, lemon balm and evergreen trees, shrubs and vines. Divide globe artichoke. Also sow lawn seed or lay turf.

After watering, fertilise: bulbs which have remained in soil.

Prune: lightly prune tall tibouchina after flowering. Tidy up perennial bed, cut back dahlia plants. Lift tubers, if necessary. Cut down asparagus when yellow.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: potatoes in Brisbane and areas south.

Mulch: top up compost on established asparagus bed. Replace mulch after planting bulbs. Mulch prepared beds to prevent organic matter drying out.

TEMPERATE ZONES



Sow direct: open Chinese cabbage, mizuna, spinach, tatsoi and annual lupins.

Sow or plant out: spring onions, pansy and viola.

In frost-free areas, *also sow*: grain crops, lettuce, radicchio, rocket, ageratum, aurora daisy, calendula, cornflower, dianthus, nemesia, nigella, statice and sweet pea.

In frost areas, *also sow*: sweet pea if New Moon falls in late May.

Grow a green manure or cover crop of: faba bean, field pea, barley or oats. Also cereal rye in frost-free areas. In suitable soils, grow alfalfa, fenugreek or vetch. Also annual lupin in frost-free areas.

On damp soil, *apply fertiliser tea to:* Brussels sprouts two months after planting, also lettuce, if necessary. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: asparagus bed.



Sow direct: broccoli, grain crops and annual lupins.

Sow or plant out: spring onions, pansy and viola.

In frost-free areas, *also sow:* broad beans, peas, chamomile, ageratum, aurora daisy, calendula, cornflower, dianthus, nemesia, nigella, statice and sweet pea.

In frost areas, *also sow:* broad beans, peas and sweet pea in late May.



Sow direct: radish, garlic, also turnip in early May.

Sow or plant out: early-season onion and daylily.

In frost-free areas, *plant:* strawberries and beardless iris.

Prune: lightly prune tall tibouchina after flowering. Tidy up perennial bed, cut back dahlia plants. Lift tubers, if necessary. Cut down asparagus when yellow.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: deciduous planting, also for potatoes in frost-free areas.

Mulch: top up compost on established asparagus bed. Mulch prepared beds to prevent organic matter drying out.

COOL ZONES



Sow direct: lettuce and spinach.

Sow or plant out: spring onions.

Grow a green manure or cover crop of: faba bean or field pea.

On damp soil, *apply fertiliser tea to:* Brussels sprouts 2 months after planting. Apply at half-strength fortnightly to spinach, until thinned.



Sow direct: broad beans and peas in late May.

Sow or plant out: spring onions.



Sow direct: radish.

Sow or plant out: early and mid-season onion, asparagus crowns, rhubarb crowns, kiwifruit, pistachio and deciduous trees, shrubs and vines in last half of May or next month. Plant raspberry and currants late this month or early June.

Divide echinacea.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: grapes, also for potatoes in very cold areas.

Mulch: cover strawberry bed with clean straw in very cold areas.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

June

WARM ZONES



Sow direct: cabbage, grain crops, lettuce, everlasting daisy, statice and annual lupins.

Sow or plant out: lettuce, spring onions, calendula and dianthus. Plant out pansy and viola.

In areas south of Rockhampton, *also sow or plant out:* radicchio and spinach.

In areas north of Rockhampton, *also sow direct:* open Chinese cabbage, mizuna, rocket, silver beet (pre-soak seed), tatsoi, chamomile, coriander, nasturtium and sunflower. *Sow or plant out:* ageratum, aurora daisy, cornflower, cosmos, African and French marigold, nemesia, nigella, petunia, phlox, snapdragon and verbena.

Grow a green manure or cover crop of: barley or triticale. In suitable soils, grow fenugreek, vetch or amaranth. South of Rockhampton, grow chickpea, red clover, faba bean or field pea. North of Rockhampton, grow lablab.

On damp soil, *apply fertiliser tea to*: cabbage, celery, leek, lettuce and silver beet, if necessary. Apply at half-strength fortnightly to spinach, until thinned. Treat bindii in lawns.



Sow direct: grain crops, dwarf peas, statice and annual lupins.

Sow or plant out: spring onions, calendula and dianthus. Plant out pansy and viola.

North of Rockhampton, *also sow direct*: bush and climbing beans, sweet corn, chamomile, cosmos, everlasting daisy, nasturtium and sunflower. *Sow or plant out*: pumpkin summer squash, tomato, watermelon, ageratum, aurora daisy, cornflower, African and French marigold, nemesia, nigella, petunia, phlox, snapdragon and verbena.



Sow direct: radish and turnip. Also potato north of Brisbane.

Plant: fig, kiwifruit, pecan and pistachio, daylily, bare-rooted roses and deciduous trees, shrubs and vines. Divide echinacea.

In areas south of Rockhampton, *also plant out*: asparagus crowns, rhubarb crowns and herbaceous perennials.

In areas north of Rockhampton, *also sow or plant out*: beetroot (pre-soak seed) and dandelion.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: grapes, also for dahlia tubers north of Rockhampton.

Mulch: potato bed for July planting. Mulch prepared beds to prevent compost drying.

TEMPERATE ZONES



Sow direct: spinach and sweet pea.

In frost-free areas, *also sow:* lettuce, spring onions, calendula, dianthus, statice and annual lupins.

Grow a green manure or cover crop of: faba bean or field pea. In suitable soils, grow fenugreek.

On damp soil, *apply fertiliser tea to:* lettuce, if necessary. Apply at half-strength fortnightly to spinach, until thinned. Treat bindii in lawns.

Apply seaweed tea to: potato bed for July planting.

In cooler areas, protect young avocado, fig, mango and pawpaw trees from frost.



Sow direct: broad beans, peas, statice and sweet pea.

In frost-free areas, *also sow:* spring onions, annual lupins, calendula and dianthus.



Sow direct: radish and garlic.

Plant: mid-season onion, asparagus crowns, rhubarb crowns, kiwifruit, pecan and pistachio, also bare-rooted roses and

deciduous trees, shrubs and vines at the end of June. Divide echinacea.

In frost-free areas, *also plant*: fig, daylily.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: potatoes in frost areas.

Mulch: prepared beds to prevent organic matter drying out. Start a compost heap for pumpkin and melons.

COOL ZONES



Sow direct: spinach and sweet pea.

Grow a green manure or cover crop of: faba bean or field pea.

On damp soil, *apply fertiliser tea*: at half-strength fortnightly to spinach, until thinned. Treat bindii in lawns.



Sow direct: broad beans, peas and sweet pea.



Sow or plant out: mid and late-season onion.

Plant: asparagus crowns, rhubarb crowns, kiwifruit, pecan, pistachio, bare-rooted roses and deciduous trees, shrubs and vines.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: potatoes.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

July

WARM ZONES



Sow direct: grain crops and statice.

Sow or plant out: cabbage, spring onions and dianthus. Plant out pansy and viola.

In areas south of Rockhampton, *also sow in a cold frame:* lettuce, silver beet (pre-soak seed), motherwort, African marigold, petunia and phlox.

In areas north of Rockhampton, *also sow direct:* open Chinese cabbage, lettuce, mizuna, rocket, silver beet (pre-soak seed), tatsoi, chamomile, coriander, nasturtium and sunflower. *Sow or plant out:* ageratum, aurora daisy, celosia, cosmos, everlasting daisy, livingstone daisy, African and French marigold, nemesia, petunia, phlox, snapdragon and verbena.

Grow a green manure or cover crop of: red clover, south of Rockhampton. North of Rockhampton, grow lablab. In suitable soils, grow amaranth or corn as a green manure, if irrigation is available.

On damp soil, *apply fertiliser tea to*: camellia (dilute by half for *C. reticulata*) and cabbage, celery, leek, lettuce and silver beet, if necessary.

Apply seaweed tea to: citrus and potato bed for August planting.



Sow direct: grain crops and statice.

Sow or plant out: spring onions and dianthus. Plant out pansy and viola.

In areas south of Rockhampton, *sow in a cold frame*: tomato, African marigold, petunia and phlox.

In areas north of Rockhampton, *also sow direct*: bush and climbing beans, sweet corn, cosmos, everlasting daisy, livingstone daisy, nasturtium and sunflower. *Sow or plant out*: pumpkin, tomato, watermelon, ageratum, aurora daisy, celosia, African and French marigold, nasturtium, nemesia, petunia, phlox, snapdragon and verbena. In a cold frame, *sow*: capsicum and eggplant.

Prune: bush and standard roses except species, hydrangea and crepe myrtle late this month or early August. Dead-head camellias after flowering.



Sow direct: radish and turnip.

Plant: fig, pistachio, daylily, bare-rooted roses and deciduous trees, shrubs and vines.

In areas south of Rockhampton, *also plant out*: Jerusalem artichoke, potato (Brisbane and areas south), asparagus

crowns, potted grapes, rhubarb crowns and herbaceous perennials. In a cold frame, *sow*: beetroot (pre-soak seed) and echinacea.

In areas north of Rockhampton, *also sow or plant out*: avocado, banana, beetroot (pre-soak seed) and dandelion. In a cold frame, *sow*: gerbera.

After watering, *fertilise*: daylily, all established roses, crepe myrtle and rhubarb.

Prune: frangipani. Take frangipani cuttings. Grape pruning should be completed this month.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: grapes, chrysanthemum and dahlia, also gerbera south of Rockhampton.

Mulch: prepared beds. Stock up on baled mulch, as soon as available.

TEMPERATE ZONES



Sow direct: statice.

In frost-free areas, *also sow*: lettuce, spring onions and dianthus.

In a cold frame, *sow*: celery.

In colder areas, *also sow*: spinach.

Grow a green manure or cover crop of: faba bean or field pea.

On damp soil, *apply fertiliser tea to:* lettuce, if necessary. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: citrus, apricot and potato bed for August planting.



Sow direct: dwarf broad beans, peas, also statice.

In frost-free areas, *also sow:* spring onions and dianthus.

Prune (in frost-free areas): bush and standard roses except species and crepe myrtle late this month or early August.



Sow direct: Jerusalem artichoke, potato and garlic.

Sow or plant out: mid-season onion.

Plant: asparagus crowns, rhubarb crowns, pistachio, also bare-rooted roses and deciduous trees, shrubs and vines.

In frost-free areas, *also plant:* fig, daylily and shasta daisy crowns.

In a cold frame, *sow:* echinacea.

After watering, *fertilise:* all established roses and crepe myrtle in frost-free areas.

Prune: grape pruning should be completed this month.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: grapes, gerbera, dahlia tubers and chrysanthemum.

Mulch: prepared beds. Stock up on baled mulch, as soon as available.

COOL ZONES



Sow direct: spinach and sweet pea.

Grow a green manure or cover crop of: faba bean or field pea.

On damp soil, *apply fertiliser tea:* at half-strength fortnightly to spinach, until thinned.

Apply seaweed to: potato bed for August planting.



Sow direct: dwarf broad beans, peas and sweet pea.



Sow or plant out: late-season onion.

Plant: herbaceous perennials, bare-rooted roses and deciduous trees, shrubs and vines.

In a cold frame, *sow:* echinacea.

Prune: grape pruning should be completed this month.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

August

WARM ZONES



Sow direct: grain crops, rocket, cosmos, statice, also sunflower in second half of August.

Sow or plant out: silver beet (pre-soak seed), spring onions, aurora daisy, dianthus, everlasting daisy, livingstone daisy, nasturtium, petunia and verbena.

In areas south of Rockhampton, *also sow or plant out:* open Chinese cabbage, mizuna, tatsoi, dill, motherwort, phlox and snapdragon. In a cold frame, *sow:* cabbage, lettuce, parsley, ageratum, celosia, and African and French marigold.

In areas north of Rockhampton, *also sow or plant out:* cabbage, lettuce, parsley, ageratum, celosia and African marigold. *Sow direct:* NZ spinach (pre-soak seed) and silver beet (pre-soak seed).

Water base of spring-flowering bulbs only.

Grow a green manure or cover crop of: wheat. In suitable soils, grow amaranth. South of Rockhampton, grow chickpea late in month. North of Rockhampton, grow lablab.

On damp soil, *apply fertiliser tea to*: mature pawpaw and cabbage, celery, leek, lettuce, silver beet and young rhubarb, if necessary. Apply to anemone and ranuncula as buds appear.

Apply seaweed tea to: avocado, all established roses and pistachio. Apply at half-strength to gerbera.



Sow direct: bush and climbing beans, grain crops and cosmos.

Sow or plant out: rosella, spring onions, aurora daisy, dianthus, everlasting daisy, livingstone daisy, nasturtium, petunia and verbenas.

In areas south of Rockhampton, *also sow or plant out*: phlox, snapdragon and statice. In a cold frame, *sow*: capsicum, cucumber, eggplant, rockmelon, summer squash, tomato, watermelon, zucchini, ageratum, celosia, and African and French marigold.

In areas north of Rockhampton, *also sow or plant out*: capsicum, cucumber, eggplant, rockmelon, summer squash, tomato, watermelon, zucchini, ageratum, celosia, African marigold and sunflower. *Sow direct*: sweet corn.

Prune: dwarf tibouchina.



Sow direct: carrot and radish.

Plant: citrus, macadamia, daylily and potted roses.

Divide gerbera.

In areas south of Rockhampton, *also sow or plant out*: beetroot (pre-soak seed), asparagus seed, Jerusalem artichoke,

potato (Brisbane and areas south), catnip, echinacea, lavender, rosemary, thyme, watercress, avocado, potted grapes, herbaceous perennial seed, shasta daisy, and also pelargonium if Full Moon falls in last half of August.

In a cold frame, *sow*: hyssop, rue, Virginia scullcap, dahlia seed and gerbera. Take cuttings of chrysanthemum.

In areas north of Rockhampton, *also sow or plant out*: sweet potato, banana, banana passionfruit, passionfruit, dandelion, oregano and pelargonium. *Sow direct*: beetroot (pre-soak seed).

After watering, *fertilise*: kiwifruit, pecan, olive, hydrangea and gerbera.

Lightly fertilise: frangipani and pistachio.

Repot pot plants until October.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required. Remove citrus gall wasp before the end of this month. Start weeding early.

TEMPERATE ZONES



Sow direct: grain crops, mizuna and statice.

Sow or plant out: dianthus, snapdragon and verbena.

In a cold frame, *sow*: celery, leek, lettuce, sweet basil, motherwort, ageratum and petunia.

After frost risk, *sow or plant out*: headed and open Chinese cabbage, rocket, silver beet (pre-soak seed), spring onions, tatsoi and coriander.

Grow a green manure or cover crop of: clover, field pea, barley or wheat. In suitable soils, grow alfalfa.

On damp soil, *apply fertiliser tea to*: mature pawpaw, camellia, (dilute by half for *C. reticulata*), also lettuce, silver beet and young rhubarb, if necessary. Apply to anemone and ranuncula as buds appear.

Apply seaweed tea to: avocado, apple, cherry and potato bed for September planting.

Water base of spring flowering bulbs only.



Sow direct: grain crops and statice.

Sow or plant out: dianthus, snapdragon and verbena.

In a cold frame, *sow*: capsicum, cucumber, leek and tomato.

After frost risk, *sow or plant out*: spring onions, chamomile, cosmos, everlasting daisy, livingstone daisy, African and French marigold, nasturtium and phlox.

In colder areas, *also sow*: dwarf peas.

Prune: bush and standard roses, except species, hydrangea and crepe myrtle in frost areas. Dead-head camellia after flowering. Lightly prune mature blueberry.



Sow direct: Jerusalem artichoke and potato.

Sow or plant out: echinacea, yarrow and shasta daisy.

Plant: herbaceous perennials and daylily.

Take cuttings of chrysanthemum and frangipani.

In a cold frame, *sow:* asparagus seed, beetroot (pre-soak seed), burdock, catnip, hyssop, meadowsweet, rue, Virginia scullcap, valerian, gerbera and dahlia seed.

After frost risk, *sow or plant out:* carrot, lavender, rosemary, thyme, avocado, potted grapes and roses, and pelargonium.

In colder areas, *also sow or plant out:* bare-rooted roses.

After watering, *fertilise:* kiwifruit, almond, apple, apricot, cherry, nectarine, peach, pear, all established roses in frost areas, crepe myrtle, daylily and rhubarb.

Lightly fertilise: blueberry.

Prune: frangipani.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required. Remove citrus gall wasp before the end of this month. Start weeding early.

Prepare beds for: leek.

Mulch: as required to keep compost damp. Mulch strawberry bed with clean straw or pine needles.

COOL ZONES



Sow direct: spinach.

In a cold frame, *sow:* celery, leek, lettuce, chamomile, motherwort and snapdragon.

In colder areas, *also sow:* sweet pea.

Grow a green manure or cover crop of: faba bean or field pea. In suitable soils, grow alfalfa.

On damp soil, *apply fertiliser tea to:* raspberry, camellia (dilute by half for *C. reticulata*) and anemone and ranuncula as buds appear. Apply at half-strength fortnightly to spinach, until thinned.

Apply seaweed tea to: potato bed for September planting and black currants. Apply at half-strength to red and white currants and raspberry.

Water base of spring-flowering bulbs only.



Sow direct: dwarf peas.

In a cold frame, *sow:* leek, tomato, chamomile and snapdragon.

In colder areas, *also sow or plant out:* broad beans and sweet pea.

Prune: crepe myrtle, hydrangea, bush and standard roses, except species. In late-frost areas, prune late this month or early September. Lightly prune mature blueberry. Tip prune summer-bearing raspberry canes. Dead-head camellia after flowering.



Sow direct: Jerusalem artichoke and potato.

Sow or plant out: late-season onion.

Plant: herbaceous perennials.

In a cold frame, *sow:* asparagus seed, burdock, catnip, echinacea and meadowsweet.

In colder areas, *also sow or plant out:* bare-rooted roses and deciduous trees, shrubs and vines.

After watering, *fertilise:* kiwifruit, rhubarb, all established roses, crepe myrtle and daylily.

Lightly fertilise: blueberry, bay, lemon grass, rosemary, sage and thyme.

Prune: cut down fruited canes on autumn-bearing raspberry.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: dahlia and chrysanthemum.

Mulch: stock up on baled mulch, as soon as available.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

September

WARM ZONES



Sow direct: grain crops, lettuce, silver beet (pre-soak seed), NZ spinach (pre-soak seed), dill, cosmos, everlasting daisy, nasturtium and sunflower.

Sow or plant out: cabbage, spring onions, sweet basil, motherwort, parsley, actinotis (flannel flower), ageratum, celosia, livingstone daisy, African marigold, petunia and verbenas.

In areas south of Rockhampton, *also sow or plant out:* suitable open Chinese cabbage, mizuna, rocket, tatsoi, aurora daisy, dianthus, French marigold, phlox and snapdragon.

Grow a green manure or cover crop of: pigeon pea or millet. In suitable soils, grow amaranth. South of Rockhampton, grow mung bean or Japanese millet. North of Rockhampton, grow lablab.

On damp soil, *apply fertiliser tea to:* young rhubarb, asparagus seedlings and young crowns, young passionfruit, melons sown in August, also cabbage, leek, lettuce and silver beet, if necessary.

Apply seaweed tea to: passionfruit, pistachio, tropical guava, carnation, ceratopetalum, all established roses, azaleas and rhododendrons. Apply at half-strength to pineapple, established natives and gerbera.



Sow direct: bush and climbing beans, grain crops, sweet corn, cosmos, everlasting daisy, nasturtium and sunflower.

Sow or plant out: capsicum, cucumber, eggplant, rosella, spring onions, tomato, watermelon, actinotis (flannel flower), ageratum, celosia, livingstone daisy, African marigold, petunia and verbenas.

In areas south of Rockhampton, *also sow or plant out:* pumpkin, rockmelon, summer squash, zucchini, aurora daisy, dianthus, French marigold, phlox and snapdragon.

Prune: Hawaiian hibiscus when old leaves yellow. Lightly prune mature fig and mature passionfruit. Dead-head roses regularly.



Sow direct: beetroot (pre-soak seed), carrot and radish.

Sow or plant out: banana passionfruit, passionfruit, pawpaw, sweet potato cuttings, catnip, chives, hyssop, marjoram, mint, oregano, rue, sage, watercress and dahlia seed.

Plant: avocado, banana, citrus, tropical guava, macadamia, gerbera, pelargonium and dahlia tubers.

Divide chives and gerbera.

In areas south of Rockhampton, *also sow or plant out:* Jerusalem artichoke, asparagus seed, potato (Brisbane and

areas south), cherry guava, echinacea, rosemary, thyme, Virginia scullcap, lavender, potted roses, chrysanthemum, herbaceous perennials and shasta daisy. Take cuttings of chrysanthemum.

In areas north of Rockhampton, *also sow or plant out*: dandelion, lemon grass, bromeliad, gazania and frangipani.

After watering, *fertilise*: mature pawpaw, tropical guava, mature passionfruit, gerbera, also established lawns after aeration and rain.

Lightly fertilise: fig, young citrus, marjoram, oregano, mint, Hawaiian hibiscus, pelargonium, palms, carnations and marguerites, herbaceous perennials after aerating bed.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Collect all flowers affected by petal blight. Remove unwanted suckers from globe artichoke.

Mulch: banana, fig, mulberry, passionfruit and Hawaiian hibiscus with compost and/or well-rotted manure. Lightly mulch macadamia with compost and manure. Mulch pineapple, ceratopetalum, camellias, rhododendrons and azaleas and protea with well-rotted manure. Mulch, as required, to keep organic fertiliser damp and protect garden from summer heat or dry conditions. Mulch carnations lightly.

TEMPERATE ZONES



Sow direct: suitable headed and open Chinese cabbage, grain crops, lettuce, mizuna, rocket, NZ spinach (pre-soak seed), tatsoi, statice and coriander.

Sow or plant out: celery, leek, lettuce, silver beet (pre-soak seed), spring onions, chamomile, motherwort, ageratum, dianthus, snapdragon and verbena.

In a cold frame, *sow:* cabbage, sweet basil and parsley.

After frost risk, *sow or plant out:* dill, actinotis (flannel flower), celosia, cosmos, everlasting daisy, livingstone daisy, African and French marigold, nasturtium, petunia, phlox and sunflower.

Grow a green manure or cover crop of: chickpea, clover, barley or millet. In suitable soils, grow alfalfa, amaranth or buckwheat.

On damp soil, *apply fertiliser tea to:* young rhubarb, asparagus seedling and young crowns, also celery, leek, lettuce and silver beet, if necessary.

Apply seaweed tea to: tropical guava, pistachio, ceratopetalum, established roses. Apply at half-strength to pineapple, established natives and gerbera.



Sow direct: grain crops.

Sow or plant out: leek, spring onions, chamomile, ageratum, dianthus, snapdragon and verbena.

In a cold frame, *sow:* capsicum, eggplant, pumpkin, rockmelon, summer squash, watermelon and zucchini.

After frost risk, *sow or plant out*: bush and climbing beans, cucumber, sweet corn, tomato, actinotis (flannel flower), celosia, cosmos, everlasting daisy, livingstone daisy, African and French marigold, nasturtium, petunia, phlox and sunflower.

Prune: dwarf tibouchina. Lightly prune mature fig trees. Dead-head roses regularly.



Sow direct: carrot, Jerusalem artichoke, potato and radish.

Sow or plant out: beetroot (pre-soak seed), burdock, catnip, chives, echinacea, hyssop, meadowsweet, oregano, rosemary, sage, thyme, yarrow and shasta daisy.

Plant: potted grapes, lavender, herbaceous perennials, pelargonium, potted roses and evergreen trees, shrubs and vines.

Divide chives, lemon balm, Virginia scullcap, French tarragon and gerbera, also globe artichoke and shasta daisy in cold areas.

In a cold frame, *sow*: asparagus seed, sweet potato, pyrethrum, dahlia seed and gerbera.

After frost risk, *sow or plant out*: avocado, blueberry, citrus, cherry guava, macadamia, lemon balm, marjoram, rue, Virginia scullcap, French tarragon, valerian, watercress, bromeliad, chrysanthemum, dahlia tubers and gazania. Also sow lawn seed or lay turf.

In frost-free areas, *sow or plant*: banana passionfruit, passionfruit and tropical guava.

In colder areas, *also sow or plant out*: olive and daylily.

After watering, *fertilise*: mature pawpaw, tropical guava, olive, pecan, plum, gerbera, also established lawns after aeration and rain.

Lightly fertilise: fig, cherry guava, pistachio, bay, lemon grass, rosemary, sage, thyme, frangipani, pelargonium and palms.

Prune: remove unwanted suckers from globe artichoke.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Mulch: fig, mulberry, with compost and/or well-rotted manure and pineapple, ceratopetalum, camellia and protea with well-rotted manure. Lightly mulch macadamia with compost and manure. Mulch as required to keep compost damp.

COOL ZONES



Sow direct: grain crops, lettuce, radicchio and rocket.

Sow or plant out: lettuce, spring onions and motherwort.

In a cold frame, *sow*: cabbage, celery, leek, silver beet (pre-soak seed), aurora daisy, calendula, cosmos, everlasting daisy, African and French marigold and snapdragon.

After frost risk, *sow or plant out*: bulb fennel, chamomile, coriander, dill, ageratum, cornflower, dianthus, nemesia, nigella, pansy and viola, phlox, statice and verbenas.

In colder areas, *also sow*: spinach.

Grow a green manure or cover crop of: clover, faba bean, field pea, barley, oats, triticale or wheat.

In suitable soils, grow alfalfa, annual lupin or vetch.

On damp soil, *apply fertiliser tea to*: young rhubarb, seedling asparagus and young crowns, also lettuce, if necessary.

Apply seaweed tea to: apple, cherry, pistachio, established roses, apply at half-strength to established natives.



Sow direct: grain crops.

Sow or plant out: spring onions.

In a cold frame, *sow*: capsicum, cucumber, leek, pumpkin, rockmelon, summer squash, tomato, watermelon, zucchini, aurora daisy, calendula, cosmos, everlasting daisy, African and French marigold and snapdragon.

After frost risk, *sow or plant out*: chamomile, ageratum, cornflower, dianthus, nemesia, nigella, pansy and viola, phlox, statice and verbenas.

In colder areas, *also sow or plant out*: broad beans and peas.

Prune: established bush and standard roses except species, in late-frost areas.



Sow direct: carrot, Jerusalem artichoke, potato and radish.

Sow or plant out: burdock, echinacea, meadowsweet, rosemary, thyme, yarrow, shasta daisy and herbaceous perennials.

Plant: potted grapes, lavender, carnation, daylily, camellia, potted roses, also pelargonium and evergreen trees, shrubs and vines if Full Moon falls in last half of September.

Divide globe artichoke, catnip, shasta daisy and take cuttings of chrysanthemum.

In a cold frame, *sow:* asparagus seed, beetroot (pre-soak seed), dahlia seed, rue and Virginia scullcap.

After frost risk, *sow or plant out:* globe artichoke, catnip, lemon balm and valerian. Also sow lawn seed or lay turf.

In colder areas, *also sow or plant out:* swede, turnip, deciduous trees, shrubs and vines in early September.

After watering, *fertilise:* almond, apple, apricot, cherry, nectarine, peach, pear, pecan, hydrangea, all roses in late-frost areas.

Lightly fertilise: pistachio.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Mulch: mulberry with compost and well-rotted manure. Remove unwanted suckers from globe artichoke.

Start weeding early.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

October

WARM ZONES



Sow direct: cabbage, lettuce, silver beet (pre-soak seed), NZ spinach (pre-soak seed) and sunflower.

Sow or plant out: spring onions, sweet and purple basil, parsley, ageratum, celosia and African marigold.

In areas south of Rockhampton, *also sow or plant out:* grain crops, dianthus, livingstone daisy, French marigold, petunia, phlox, snapdragon and verbenas. *Sow direct:* cosmos, nasturtium and everlasting daisy.

Grow a green manure or cover crop of: cowpea, lablab, pigeon pea or millet. In suitable soils, grow amaranth. South of Rockhampton, grow mung bean, soybean, Japanese millet or sorghum.

On damp soil, *apply fertiliser tea to:* young grapes, young rhubarb, young mango, young passionfruit, young pawpaw, all banana trees, melons sown in September, asparagus seedlings and young crowns, also cabbage, leek, lettuce and silver beet, if necessary, and established lawns after rain.

Apply seaweed tea to: young grapes, mature pawpaw, bulbs after flowering, chrysanthemum and crepe myrtle. Apply at half-strength to kiwifruit and young pawpaw.



Sow direct: bush and climbing beans, sweet corn, eggplant and sunflower.

Sow or plant out: capsicum, spring onions, tomato, watermelon, ageratum, celosia and African marigold.

In areas south of Rockhampton, *also sow or plant out:* cucumber, grain crops, dianthus, livingstone daisy, French marigold, petunia, phlox, snapdragon and verbena. *Sow direct:* pumpkin, rockmelon, rosella, summer squash, zucchini, cosmos, nasturtium and everlasting daisy.

Prune: climbing roses, ramblers and species roses, after flowering. Clip diosma after flowering.



Sow direct: beetroot (pre-soak seed), carrot and radish.

Sow or plant out: banana passionfruit, passionfruit, pawpaw, sweet potato, chives, dandelion, hyssop, lemon grass, marjoram, mint, oregano, rue, watercress and dahlia seed.

Plant: banana, tropical guava, macadamia, bromeliad, gazania, gerbera, pelargonium, dahlia tubers and frangipani.

In areas south of Rockhampton, *also sow or plant out:* asparagus seed, catnip, pyrethrum, sage, Virginia scullcap, chrysanthemum, shasta daisy and cherry guava.

In areas north of Rockhampton, *also plant:* pineapple.

Lightly fertilise: natives after flowering, except for kangaroo paw. Apply a very small amount to wisteria.

Prune: hard prune plumbago, also wisteria after flowering.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Mulch: asparagus with compost and well-rotted manure after harvest. Lift spring bulbs after foliage has died and store in cool conditions.

TEMPERATE ZONES



Sow direct: suitable open Chinese cabbage, grain crops, rocket, silver beet (pre-soak seed), NZ spinach (pre-soak seed), tatsoi, dill, cosmos, everlasting daisy, nasturtium and sunflower.

Sow or plant out: cabbage, leek, lettuce, silver beet (pre-soak seed), spring onions, sweet and purple basil, chamomile, parsley, ageratum, celosia, dianthus, livingstone daisy, African and French marigold, petunia, phlox, snapdragon and verbena.

Grow a green manure or cover crop of: red or white clover, pigeon pea, soybean, millet or Japanese millet, also sorghum late in month. In suitable soils, grow alfalfa, amaranth or buckwheat.

On damp soil, *apply fertiliser tea to:* young grapes, young rhubarb, young mango, young pawpaw, all banana trees,

melons sown in September, asparagus seedlings and young crowns, also cabbage, celery, leek, lettuce and silver beet and young passionfruit, if necessary.

Apply seaweed tea to: young grapes, mature pawpaw, azaleas and rhododendrons, bulbs after flowering, all passionfruit, carnations and established lawns after rain. Also to strawberries in cooler areas. Apply at half-strength to kiwifruit and young pawpaw.



Sow direct: bush and climbing beans, grain crops, sweet corn, cosmos, everlasting daisy, nasturtium and sunflower.

Sow or plant out: capsicum, cucumber, eggplant, leek, pumpkin, rockmelon, rosella, spring onions, summer squash, tomato, watermelon, zucchini, chamomile, ageratum, celosia, dianthus, livingstone daisy, African and French marigold, petunia, phlox, snapdragon and verbena.

Prune: mature passionfruit, climbing roses, ramblers and species roses, after flowering. Hawaiian hibiscus when old leaves yellow. Clip diosma after flowering. Dead-head roses regularly through the growing season.



Sow direct: beetroot (pre-soak seed), carrot, radish and sweet potato. Also sow lawn seed or lay turf.

Sow or plant out: asparagus seed, banana passionfruit, passionfruit, pawpaw, catnip, chives, dandelion, hyssop, lemon balm, lemon grass, marjoram, meadowsweet, mint, oregano, pyrethrum, rosemary, rue, sage, Virginia scullcap, thyme, watercress, yarrow and dahlia seed.

Plant: banana, blueberry, citrus, cherry guava, tropical guava, macadamia, mango, lavender, pyrethrum, French tarragon, bromeliad, chrysanthemum, gazania, gerbera, pelargonium, shasta daisy, dahlia tubers and frangipani.

Divide chives and gerbera. Repot pot plants, if necessary, until December.

In cooler areas, *also sow or plant out:* herbaceous perennials, olive, potted roses and evergreen trees, shrubs and vines.

After watering, *fertilise:* mature passionfruit and herbaceous perennials after aerating bed.

Lightly fertilise: young citrus, fig, cherry guava, palms, French tarragon, marjoram, oregano, mint, Hawaiian hibiscus, carnations and marguerites, also natives after flowering, except for kangaroo paw. Apply a very small amount to wisteria.

Prune: hard-prune plumbago, also wisteria after flowering. Collect all flowers affected by petal blight.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Mulch: banana, passionfruit and Hawaiian hibiscus with compost and well-rotted manure, also asparagus after harvest. Lightly mulch rhododendrons and azaleas with well-rotted manure. Mulch as required to keep organic fertiliser damp and protect garden from summer heat or dry conditions. Lift tulip and hyacinth bulbs as soon as foliage dies back. Where summers are very hot, lift other spring bulbs, too.

COOL ZONES



Sow direct: bulb fennel, headed and open Chinese cabbage, grain crops, lettuce, mizuna, NZ spinach (pre-soak seed), radicchio, rocket, tatsoi, coriander, dill, everlasting daisy, statice and sunflower.

Sow or plant out: cabbage, celery, leek, lettuce, silver beet (pre-soak seed), spring onions, parsley, chamomile, motherwort, ageratum, aurora daisy, calendula, celosia, cornflower, cosmos, dianthus, livingstone daisy, African and French marigold, nasturtium, nemesia, nigella, pansy and viola, petunia, phlox, snapdragon and verbena.

In colder areas, *also sow:* Brussels sprouts.

Grow a green manure or cover crop of: clover, soybean, barley, cereal rye, millet or wheat. In suitable soils, grow alfalfa, fenugreek, annual lupin, amaranth or buckwheat.

On damp soil, *apply fertiliser tea to:* young grapes, young rhubarb, asparagus seedlings and young crowns, also celery, leek, lettuce and silver beet, if necessary.

Apply seaweed tea to: young grapes, azaleas and rhododendrons, bulbs after flowering, carnations and established lawns after rain. Also to strawberries in cooler areas. Apply at half-strength to kiwifruit and established natives.



Sow direct: bush and climbing beans, grain crops, everlasting daisy, statice, sunflower, also sweet corn in last half of October.

Sow or plant out: capsicum, cucumber, eggplant, leek, spring onions, tomato, chamomile, ageratum, aurora daisy, calendula, celosia, cornflower, cosmos, dianthus, livingstone daisy, African and French marigold, nasturtium, nemesia, nigella, pansy and viola, petunia, phlox, snapdragon and verbenas.

In a cold frame, *sow:* pumpkin, rockmelon, summer squash, watermelon and zucchini.

Prune: climbing roses, ramblers and species roses, after flowering. Dead-head roses regularly through the growing season.



Sow direct: carrot, Jerusalem artichoke, potato and radish. Also sow lawn seed or lay turf.

Sow or plant out: asparagus seed, beetroot (pre-soak seed), burdock, catnip, chives, hyssop, lemon balm, meadowsweet, mint, oregano, pyrethrum, rosemary, rue, sage, Virginia scullcap, thyme, valerian, watercress, yarrow, globe artichoke and dahlia seed.

Plant: blueberry, potted grapes, cherry guava, lavender, pyrethrum, French tarragon, chrysanthemum, gazania, pelargonium, shasta daisy, dahlia tubers, daylily and evergreen trees, shrubs and vines.

Divide globe artichoke, burdock, catnip, chives, lemon balm, Virginia scullcap and take cuttings of chrysanthemum. Repot pot plants, if necessary, until December.

In colder areas, *also sow or plant out*: swede, turnip, echinacea, carnation, herbaceous perennials, camellia and potted roses.

After watering, *fertilise*: olive, plum, herbaceous perennials after aerating bed, also established lawns after aeration and rain.

Lightly fertilise: carnations, marguerites, cherry guava, bay, French tarragon, mint, oregano, rosemary, sage, thyme, pelargonium, palms, also natives after flowering, except for kangaroo paw. Apply a very small amount to wisteria.

Prune: hard-prune plumbago, also wisteria after flowering. Collect all flowers affected by petal blight.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Mulch: asparagus with compost and well-rotted manure after harvest. Lightly mulch camellia and protea with well-rotted cow manure. Lightly mulch carnations. Mulch, as required, to keep organic fertiliser damp and protect garden from summer heat or dry conditions. Lift tulip and hyacinth bulbs as soon as foliage dies back and store in cool conditions.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

November

WARM ZONES



Sow or plant out: ageratum and celosia.

In areas south of Rockhampton, *also sow or plant out:* sweet and purple basil, parsley, spring onions, dianthus, African and French marigold, petunia and verbena.

Sow direct: cabbage, lettuce, silver beet (pre-soak seed), NZ spinach (pre-soak seed), cosmos, nasturtium and sunflower.

Grow a green manure or cover crop of: adzuki bean, cowpea, lablab, pigeon pea, soybean or millet. In suitable soils, grow amaranth. South of Rockhampton, grow mung bean, Japanese millet, or sorghum.

On damp soil, *apply fertiliser tea to:* young rhubarb, melons sown in October. Also to cabbage, lettuce and silver beet and young passionfruit, if necessary.

Apply seaweed tea to: young grapes, citrus, also mango north of Rockhampton. Apply at half-strength to kiwifruit.



Sow direct: eggplant and sweet corn.

Sow or plant out: capsicum, tomato, watermelon, ageratum and celosia.

In areas south of Rockhampton, *also sow or plant out:* bush and climbing beans, rockmelon, spring onions, summer squash, zucchini, dianthus, African and French marigold, petunia and verbenas.

Sow direct: pumpkin, cosmos, nasturtium and sunflower.

Prune: climbing roses, ramblers and species roses after flowering.



Sow direct: radish and sweet potato.

Sow or plant out: passionfruit, pawpaw, dandelion, lemon grass and dahlia seed.

Plant: banana, pineapple, bromeliad, gazania, gerbera and frangipani.

Take cuttings of rosemary, thyme and watercress.

In areas south of Rockhampton, *also sow or plant out:* beetroot (pre-soak seed), carrot, pyrethrum, watercress, banana passionfruit and pelargonium.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Check roses and citrus for ‘suckers’.

Prepare beds for: a late crop of potatoes in Brisbane and areas south.

TEMPERATE ZONES



Sow direct: cabbage, grain crops, lettuce, rocket, silver beet (pre-soak seed), NZ spinach (pre-soak seed), dill, cosmos, everlasting daisy, nasturtium and sunflower.

Sow or plant out: leek, spring onions, sweet and purple basil, parsley, ageratum, celosia, dianthus, African and French marigold, petunia, phlox, snapdragon and verbena.

Grow a green manure or cover crop of: cowpea, mung bean, pigeon pea, soybean, millet, Japanese millet or sorghum. Also adzuki bean late in month. In suitable soils, grow amaranth.

On damp soil, *apply fertiliser tea to:* young rhubarb and melons sown in October, also cabbage, celery, leek, lettuce, silver beet and young passionfruit, if necessary.

Apply seaweed tea to: young grapes citrus, crepe myrtle and chrysanthemum. Apply at half-strength to kiwifruit.



Sow direct: bush and climbing beans, grain crops, sweet corn, cosmos, everlasting daisy, nasturtium and sunflower.

Sow or plant out: capsicum, cucumber, eggplant, leek, pumpkin, rockmelon, rosella, spring onions, summer squash, tomato, watermelon, zucchini, ageratum, celosia, dianthus, African and French marigold, petunia, phlox, snapdragon and verbena.

Prune: prune climbing roses, ramblers and species roses after flowering.



Sow direct: beetroot (pre-soak seed), carrot, radish and sweet potato.

Sow or plant out: banana passionfruit, passionfruit, pawpaw, dandelion, lavender, lemon grass, mint, pyrethrum, watercress and dahlia seed.

Plant: asparagus seedlings, chrysanthemum, gazania, gerbera, shasta daisy, bearded iris, banana, frangipani, mango and pelargonium.

Take cuttings of rosemary, thyme and watercress.

Lightly fertilise: bearded iris.

Prune: thin apples if necessary.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Check roses and citrus for ‘suckers’.

Prepare beds for: a late crop of potatoes in warmer areas.

COOL ZONES



Sow direct: bulb fennel, cabbage, headed and open Chinese cabbage, grain crops, mizuna, rocket, silver beet (pre-soak

seed), NZ spinach (pre-soak seed), tatsoi, dill, calendula, cosmos, everlasting daisy, nasturtium, statice and sunflower.

Sow or plant out: Brussels sprouts, cabbage, celery, leek, lettuce, spring onions, chamomile parsley, ageratum, celosia, livingstone daisy, African and French marigold, petunia, phlox, snapdragon and verbena.

In colder areas, *also sow:* cornflower.

Grow a green manure or cover crop of: mung bean, soybean, barley, cereal rye, millet or Japanese millet. In suitable soils, grow fenugreek, amaranth or buckwheat.

On damp soil, *apply fertiliser tea to:* young rhubarb, melons sown in October, also cabbage, celery, leek, lettuce and silver beet, if necessary.

Apply seaweed tea to: young grapes, chrysanthemum and crepe myrtle. Apply at half-strength to kiwifruit.



Sow direct: bush and climbing beans, grain crops, sweet corn, calendula, cosmos, everlasting daisy, nasturtium, statice and sunflower.

Sow or plant out: cauliflower, cucumber, leek, suitable pumpkin, rockmelon, spring onions, summer squash, tomato, watermelon, zucchini, chamomile, ageratum, celosia, livingstone daisy, African and French marigold, petunia, phlox, snapdragon and verbena.

In colder areas, *also sow or plant out:* suitable broccoli and cornflower.

In warmer areas, *also sow or plant out:* capsicum and eggplant.

Prune: climbing roses, ramblers and species roses after flowering.



Sow direct: beetroot (pre-soak seed), carrot and radish.

Sow or plant out: asparagus seed, chives, dandelion, hyssop, lemon balm, mint, oregano, pyrethrum, rosemary, rue, sage, Virginia scullcap, thyme, watercress, dahlia seed, bearded iris and shasta daisy.

Plant: blueberry, cherry guava, gazania, dahlia tubers, daylily and pelargonium.

Divide chives.

In colder areas, *also sow or plant out:* parsnip, lawn seed or lay turf. Plant evergreen trees, shrubs and vines.

Lightly fertilise: bearded iris.

Prune: thin apples if necessary.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Check roses and citrus for ‘suckers’.

Mulch: as required, to protect garden from summer heat or dry conditions.

Key

 NEW MOON

 FULL MOON

 FIRST QUARTER

 LAST QUARTER

December

WARM ZONES



Sow or plant out: ageratum and celosia.

In areas south of Rockhampton, *also sow or plant out:* African and French marigold. *Sow direct:* silver beet (pre-soak seed), cosmos, nasturtium, and sunflower.

Grow a green manure or cover crop of: adzuki bean, cowpea, lablab, mung bean, pigeon pea, soybean, Japanese millet, or sorghum. In suitable soils, grow amaranth. South of Rockhampton, grow millet.

On damp soil, *apply fertiliser tea to:* asparagus seedlings and young crowns, young grapes, young avocado, mango and pawpaw, melons sown in November, also cabbage, leek, young rhubarb, silver beet and young passionfruit, if necessary.

Apply seaweed tea to: to pawpaw, Hawaiian hibiscus, also to potato bed for January planting. Apply at half-strength to kiwifruit and young pawpaw.



Sow or plant out: capsicum, tomato, watermelon, ageratum and celosia.

In areas south of Rockhampton, *also sow or plant out:* bush and climbing beans, rockmelon, summer squash, zucchini, and African and French marigold. *Sow direct:* eggplant, pumpkin, cosmos, nasturtium and sunflower.

Prune: climbing roses, ramblers and species roses after flowering. Tip prune young fig trees.



Sow or plant out: dandelion, lemon grass and gazania.

Plant: mango.

In areas south of Rockhampton, *also sow or plant out:* banana, banana passionfruit, passionfruit and pineapple. *Sow direct:* beetroot (pre-soak seed), carrot, parsnip, radish and watercress.

Take cuttings of hyssop, mint, oregano, rosemary, sage, thyme and watercress.

After watering, *fertilise:* all banana trees.

Lightly fertilise: Hawaiian hibiscus.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Prepare beds for: leeks, also potatoes (Brisbane and areas south).

Mulch: pineapple with well-rotted manure.

TEMPERATE ZONES



Sow direct: cabbage, lettuce, silver beet (pre-soak seed), dill, cosmos, nasturtium and sunflower.

Sow or plant out: leek, spring onions, ageratum, celosia, African and French marigold, petunia, phlox and verbena.

Grow a green manure or cover crop of: adzuki bean, cowpea, mung bean, pigeon pea, soybean, millet, Japanese millet or sorghum. In suitable soils, grow amaranth.

On damp soil, *apply fertiliser tea to:* asparagus seedlings and young crowns, young grapes, melons sown in November, young avocado, mango and pawpaw cabbage, celery, leek, lettuce, young rhubarb, also silver beet and young passionfruit, if necessary.

Apply seaweed tea to: to pawpaw, Hawaiian hibiscus, also to potato bed for January planting. Apply at half-strength to kiwifruit and young pawpaw.



Sow direct: bush and climbing beans, sweet corn, cosmos, nasturtium and sunflower.

Sow or plant out: capsicum, cauliflower, cucumber, eggplant, leek, rockmelon, spring onions, summer squash, tomato, watermelon, zucchini, ageratum, celosia, African and French marigold, petunia, phlox and verbena.

Prune: climbing roses, ramblers and species roses after flowering. Tip prune young fig trees.



Sow direct: beetroot (pre-soak seed), carrot, parsnip and radish.

Sow or plant out: banana passionfruit, passionfruit, dandelion, lemon grass, mint, pyrethrum, watercress, bearded iris, banana, mango and pineapple.

Divide bearded iris and take cuttings of hyssop, lavender, marjoram, mint, oregano, rosemary, sage, thyme and watercress.

After watering, *fertilise:* all banana trees.

Lightly fertilise: Hawaiian hibiscus.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

Mulch: pineapple with well-rotted manure.

COOL ZONES



Sow direct: cabbage, grain crops, lettuce, silver beet (pre-soak seed), tatsoi, dill, nasturtium and sunflower.

Sow or plant out: Brussels sprouts, leek, lettuce, spring onions, sweet basil, parsley, ageratum, celosia, cosmos, African and French marigold, petunia, phlox and verbena.

In warmer areas, *also sow direct:* NZ spinach (pre-soak seed).

In colder areas, *also sow*: Iceland poppy. *Sow direct*: bulb fennel, open Chinese cabbage and mizuna.

Grow a green manure or cover crop of: adzuki bean, mung bean, soybean, cereal rye, millet or Japanese millet. In suitable soils, grow fenugreek, amaranth or buckwheat.

On damp soil, *apply fertiliser tea to*: asparagus seedlings and young crowns, young grapes, melons sown in November, also cabbage, celery, leek, lettuce, young rhubarb and silver beet, if necessary.

Apply seaweed tea: at half-strength to kiwifruit.



Sow direct: bush and climbing beans, grain crops, sweet corn, nasturtium and sunflower.

Sow or plant out: broccoli, cauliflower, cucumber, leek, suitable rockmelon, spring onions, suitable watermelon, zucchini, ageratum, celosia, cosmos, African and French marigold, petunia, phlox and verbena.

In warmer areas, *also sow or plant out*: summer squash.

Prune: climbing roses, ramblers and species roses after flowering.



Sow direct: beetroot (pre-soak seed), carrot, parsnip and radish.

Sow or plant out: dandelion, pyrethrum, sage and watercress.

Plant: mint, chrysanthemum and bearded iris.

Divide bearded iris and take cuttings of hyssop, rosemary, thyme and watercress.

Harvest crops for storage on non-fertile days.



No sowing or planting this phase, but weed, dig or plough, prepare beds and prune back unwanted growth, if required.

CHAPTER 4

Beds, Boxes and Pots

GARDENING AND FARMING PRACTICES were brought to Australia from parts of the world where soil is deeper and richer in nutrients, and water is more plentiful. Over the last two hundred or so years, despite unsuitable conditions, Australians have persevered with these practices. However, as the continent becomes warmer and various areas become drier, many gardeners will have to adjust their gardening habits to those more suited to the climate and soils. Organic gardening improves soils, and enables gardens to cope with climate change. Australians are fortunate to have a vast variety of heat and drought-tolerant native plants, which allow the establishment of attractive, low-maintenance gardens so that precious water can be used to grow food or particular favourites. [chapter 5](#) will help you to get the best out of your garden in drier conditions.

With building blocks becoming smaller, more apartment living and less leisure time, modern gardeners also have to be more selective in their plant choices. No matter how small your living space, or how tough conditions, there are opportunities to indulge in the very therapeutic pastime of gardening. When space is limited, or water availability is restricted, flowering annuals, culinary herbs, and vegetables including cucumbers, tomatoes, lettuce, radishes, spinach, silver beet, spring onions, strawberries, baby beetroot, turnips and short carrots can be grown in pots, or polystyrene foam fruit boxes if you have an area that provides sunlight. In very warm areas, some vegetables can be grown in boxes on the

south side of the house when heat prevents them being grown in the garden.

Many shrubs and some trees will also grow happily in large pots or tubs. Sweet bay, camellias, native shrubs and citrus trees look very dramatic in large tubs in a paved area, and the citrus trees will produce or bear fruit. Our small potted kumquat provides a large batch of delicious organic marmalade each year. Some fruit trees and fruiting vines can be planted against sunny walls or fences, or trained over pergolas, thus providing food in a minimum of space. If garden space is too small to satisfy your gardening urge, enquire at your local council about community gardens in your area.

Planting vegetables or fruit trees among flowers and shrubs, or vice versa, helps to confuse insect pests by disguising the shape or scent of their food choice. Strong-smelling herbs such as lavender, rosemary and thyme also attract beneficial insects which prey on garden pests. The only restriction to mixing fruit or vegetables with shrubs is that most food plants require regular fertilising and a close to neutral soil pH, so they are not compatible with some Australian natives, or the acid-soil loving camellias and azaleas.

If you are keen to get started on a vegetable or flower garden, but your compost factory is still in its early stages and you can't wait until your green manure crop grows and decomposes, you can start your garden in large pots, foam fruit boxes, or set up an instant garden.

Planning or Renovating Your Garden

IF YOU HAVE the opportunity to create a new garden, or renovate an existing one, there are any number of books

available to provide inspiration for designs. Whichever style of garden you prefer, there are a few basic guidelines that may save you hard work or disappointment later.

- First, cover your entire growing area with a green manure crop. Your soil will be improving while you work on your design.
- Choose a style of garden that is compatible with your climate zone and time available for gardening.
- Before laying permanent garden structures, ensure all garden areas will have easy access to water. Consider future water requirements. Plumbing extensions, if necessary, should be done first.
- Group plants with similar needs together. Don't mix plants that need regular watering or plenty of fertiliser with plants that have different requirements, or you will have problems keeping all your plants happy.
- Garden beds do not have to be in straight lines, nor do they have to run north to south. Curved lines are more relaxing to look at, and beds can be defined by laying out your garden hose to help you decide on the shape. At least, curve solid garden edging where paths intersect. It is human nature to cut corners and garden accidents often occur at these points.
- On sloping ground, beds should be positioned across, rather than along, slopes to save water and to avoid soil erosion. On very steep ground, terraced gardens solve these problems.

- Before laying paving, remove precious topsoil for use on beds. Paving is usually laid on a sand or gravel base, so don't waste large areas of topsoil.
- Allow a safe area for children or pets to play.
- All gardens require a utility area for bins and so on. Position it for easy access.
- Clotheslines need good air circulation and some sunlight. Avoid placing them under trees. Retractable lines may be the answer if space is limited.
- The Aussie BBQ area will be used more often if positioned with easy access to the house for setting up and clearing away and if the seating area has some shade, especially in the hotter months.
- The vegetable garden will receive more attention if it is close to the house.
- Choose trees and shrubs that suit the scale of your property. Check the mature heights before purchase. Large trees in a small garden will create numerous problems for you (or your neighbours) later.
- Dense evergreens on the north side of the house can block winter sun. Consider deciduous trees, or a pergola with a deciduous vine for summer shade.
- Ensure that fruit trees and vines are not shaded by buildings or larger trees, and will not shade the vegetable garden. Put stakes at proposed planting

sites and observe the shadows cast. Remember that winter shadows will be much longer.

- Before planting trees or large shrubs, check that they will not be under power lines or other obstructions, or close to plumbing lines. It sounds obvious, but we have all done it at one time or another.
- Don't overplant trees and shrubs. Work to the spacing of mature widths for these plants. It will look slightly bare at first, so fill in the spaces with flowering annuals, herbs or short-lived, hardy shrubs like marguerites.
- Windbreaks work best when they filter wind by about 50 per cent rather than forming a solid wall. On windy sites, water evaporation is much higher and water use increases dramatically. Consider establishing a fast-growing windbreak of drought-tolerant, short-lived trees, such as acacias, to protect slower growing trees and shrubs.

Check drainage first

When choosing a new area of soil for planting, the first thing to do is check your soil drainage by digging a hole in the planting area as you would to plant a shrub or tree. Fill the hole with water and leave it for one hour. If the hole is empty after one hour, the area is suitable for planting. If the water drains very rapidly, your sandy soil can be made more moisture retentive with the addition of plenty of well-rotted organic matter, especially manures. Extremely sandy soil can also be made more water-retentive with bentonite, a clay formed from volcanic ash. If a little water remains after one

hour, raised beds will produce better results. If the hole is more than half-full of water, gypsum may help improve your drainage (see [chapter 9](#)). Fill in the hole, add some well-rotted organic matter to the top 10 cm of soil and defer planting in that area until drainage improves, or use only plants that thrive in boggy conditions.

Garden beds

PREPARATION PHASE: *Last Quarter*

Forget deep digging or double digging of garden beds. We now know that deep digging is not necessary to improve drainage or to add organic matter to your soil. Manures buried 30 cm deep decompose slowly and anaerobically, and can increase soil pathogens.

If you are blessed with deep topsoil, regular digging will only damage the soil structure created by earthworms and soil micro-organisms. If you have shallow topsoil, deep digging will mix subsoil into the garden bed, slowing down your efforts to improve your topsoil. Large stones and clay lumps from subsoil cause root divisions in some root crops. Small pebbles are not a problem in garden beds as the acids in humus slowly extract the nutrient minerals from stones, so don't worry about sifting garden soil to remove all stones. However, some digging is required to work compost or other organic matter into the top 8–10 cm of soil to start the process of improving soil health and structure. Get used to using a garden fork to dig as they do less damage than spades to earthworms.

All digging stirs up dormant weed seeds in soil. As germination rates are lower during Last Quarter phase, it is a good time to prepare garden beds. If you have to prepare

planting areas outside this phase, heavy mulching will help deter weed seed germination. Avoid using herbicides to kill weeds, as they do more harm than good to your soil.

Never work garden soil when it is sodden. If soil sticks to your boots, it is too wet to be worked. Allow it to dry out a little. This is very important with heavy soils as tramping over and digging wet soils further compacts the topsoil. Also avoid preparing beds when the weather is hot and dry, as disturbing the soil surface increases water evaporation.

For best results, garden beds should have mature compost, and any extra fertiliser required, combined with the top 8–10 cm of soil at least one month before planting, to give soil micro-organisms time to convert the nutrients in fertiliser into a form readily available to plants. If mature compost is not available, green manure crops or well-rotted animal manures can be used when preparing beds. Organic, spent mushroom compost or small amounts of old poultry manure can be added for most fruit, vegetable and flower beds, but not for potatoes, strawberries, acid-loving plants or Australian natives. Always check your proposed crop's pH and fertiliser requirements before preparing beds.

Garden beds should be watered thoroughly after preparation, then temporarily covered with an 8-cm layer of organic mulch, even in cooler months, to suppress weeds, conserve moisture and provide insulation for soil micro-organisms to get to work. During winter, mulch should be applied in the middle of the day when soil is warmer.

Raised beds for vegetables, annuals, herbaceous perennials, shrubs and trees can be very helpful in addressing several problems. Raising your garden beds improves drainage and

increases the depth of topsoil. If using pathways between beds, scrape the topsoil from path areas and add it to the beds before mixing in compost. Pathways can be treated with gypsum, if necessary, to improve subsoil drainage, then covered with a more durable type of mulch. Further additions of compost and green manure crops to your garden beds will gradually increase the topsoil depth by providing conditions that allow earthworms and micro-organisms to work deeper in your soil. Raised beds can also help reduce frost damage by allowing cold air to drain from the bed surface. Solid borders are not required unless the beds are higher than 25 cm.

The vegetable garden

Vegetable gardens don't have to be purely utilitarian. French kitchen gardens, or potagers, are artistic as well as useful, and some include statues or bird baths as part of their design. Bird baths provide a safe water source for birds and beneficial insects as any chlorine in the water evaporates fairly quickly in the sun. A well-tended vegetable patch that combines fruit, vegetables, herbs and flowers can be a very attractive garden feature. Flowering annuals and natives attract bees that pollinate fruit and vegetables, and also provide nectar for the native wasps that carry off caterpillar pests. Try to include lavender in your vegetable patch. Bees are very fond of all lavenders and are not immune to the calming properties of the herb.

Beds can be any shape you choose. As you will need to reach all parts of each bed for planting, harvesting, fertilising or weeding without trampling over the bed, beds need to be a convenient width for these activities. Beds between 1.2 metres and 1.5 metres in width are a more efficient use of space than long, thin beds. Blocks, rather than rows, work

well in small areas. Cones made of bamboo canes, rather than rows of trellis, can be used to support climbing plants in small gardens. Your vegetable patch needs lots of sunlight in New Zealand and cooler areas in Australia, and some sunlight in all seasons in other areas, to gain the maximum benefits from your garden space.

It has been estimated that about 9 square metres of soil surface will supply one person with vegetables each year, which means a family of four would require about 36 square metres, conveniently divided into four sections, plus space for paths and any fruit trees, or vines. If your garden does not allow enough space to provide all vegetables for your family, it is worthwhile using your garden space to grow some of your seasonal favourites and regularly growing green manure crops to keep your soil healthy. Any naturally ripened produce, grown as nature intended, will benefit your general health because many of the foods we eat as vegetables, fruits, culinary herbs and spices are, in fact, mild medicinal herbs.

Making an Instant Garden

THERE ARE MANY VERSIONS of no-dig gardens where layers of paper, hay, straw and organic fertiliser are stacked on top of the ground, in a method more commonly known as sheet composting. However, most no-dig gardens require a thick layer of compost that can be a problem if you are starting out, as quality compost may be difficult to find in some areas. If you have a garden centre that supplies premium- grade organic topsoil, you can get started as soon as you can get the topsoil home.

Ask about the ingredients of soil or compost before purchase. Do not purchase anything containing sewage sludge as it can

include chemical waste. Half a cubic metre of topsoil will fit into a small box trailer and provide a 1.2 m x 2.8 m garden bed, which will be enough to get you started. If you cannot obtain enough topsoil, you can start Section 1 of your garden in foam boxes and pots, using an organic potting mix.

The following method for an instant garden is one we found successful in supplying a range of vegetables while we waited for green manures to improve soil in our permanent garden patch.

- Mark out the full size of your intended vegetable or flower garden area. You can choose an area on lawn or weedy soil. You don't have to remove the weeds or grass, unless it is kikuyu, which can grow from every piece left in the soil. An organic method for getting rid of kikuyu in a proposed garden area can be found in [chapter 9](#).
- Mow the area without the grass catcher, or slash weeds and leave them lying on the ground.
- Lightly aerate the soil by rocking a garden fork backwards and forwards.
- If you know the soil is acidic, dust the growing area with dolomite as this will encourage soil organisms to start working.
- Divide the growing area into three or four sections which run across any slope of the land.

Section 1

- Cover the first section with several layers of newspaper, keeping it within the bed border. The newspaper will have to be completely covered by the other materials or it will act as a wick, drawing moisture from the bed. Saturate the paper.
- Cover the paper with an 8-cm layer of teased out organic mulching material, or lucerne hay, if available. Water the mulch and sprinkle with an organic complete fertiliser.
- Mix the topsoil with some well-rotted cow manure and add some worm castings or certified-organic blood and bone.
- Cover the hay with at least a 15-cm layer of topsoil and water gently to settle the soil.
- Cover the soil with a 5-cm layer of teased out organic mulch, or place the mulch around sides of beds, depending on what you intend to grow.
- Your garden is now ready for planting seedlings. You will not be able to grow long root crops in this garden during the first year but you will be able to grow beans and peas, leafy greens, broccoli, cabbage, cauliflower, round radishes, corn, beetroot, spring onions, tomatoes, capsicum and herbs. The organic fertilisers applied before planting will not be available to plants for several weeks but seedlings will respond to fertiliser tea applications. The residue from the tea will work down through the hay,

assisting its decomposition and improving soil under the bed.

Section 2

- Lay down newspaper as for Section 1. Saturate the paper.
- Cover the paper with a thick layer of manure mixed with hay or straw. Stable cleanings that do not contain vermicides or veterinary medicines are very good for this, as the urine in straw adds extra nitrogen. Mince large clumps of manure with the edge of a spade for faster breakdown.
- Water the mixture and cover with an 8-cm layer of organic mulch. This method of bed preparation is called ‘sheet composting’.
- Keep the manure and straw mixture just damp.
- Alternatively, you can set up a compost factory in a wire hoop (see [chapter 2](#)) directly onto this section of soil.

Sections 3 and 4

Sprinkle both these sections with organic complete fertiliser or organic blood and bone, a little dolomite if your soil is acidic, and grow an inoculated green manure legume, or a grain that provides a lot of organic matter. By the time your first crop of vegetables or flowers have reached maturity, soil in Section 2 will be improved, with Sections 3 and 4 being improved not long after.

Growing Plants From Seed

THE FIRST RULE to remember when sowing seed is not to sow too thickly. Mix fine seed 1:2 with clean, dry sand in a glass jar or small plastic bag for better distribution, pouring a thin line of the mixture along the planting furrow or sprinkling over the surface of seed trays.

Annuals grow fastest when sown directly into soil where they are to grow because all plants suffer transplant shock to some extent. However, it can be more convenient to start seeds for flowering annuals and vegetables in pots or trays when space is limited, or when temperatures are low. Using a temporary cold frame or cloche will give seedlings an early start in spring (see [chapter 9](#)). Apart from passionfruit, mango and pawpaw, perennial fruit plants are generally not grown from seed because most seedling trees take a long time to produce a crop, and fruit from seedlings is usually disappointing, although the ‘Granny Smith’ apple was a notable exception. Grafted trees provide quality fruit in a shorter time.

Most seeds require dark to germinate and these are usually sown at a depth of two to three times the seed’s diameter. Other seeds need some light to activate the germination process. These include lettuce, dill, catnip, German chamomile, summer and winter savory, yarrow, lemon balm, ageratum, alyssum, coleus, columbine, hollyhocks, petunia, snapdragon, stock, strawflower and some Australian natives. Sowing requirements for particular seed species can be found under individual headings in chapters 6 and 7, or on seed packets. Seed which requires light to germinate should be lightly covered with a thin layer of perlite or fine sand to avoid seeds washing away during watering. Some Australian natives prefer coarse river sand.

Pumpkin, melon and other large seeds can be irresistible to small rodents. Save some glass jars or the bottom half of plastic soft drink bottles and use them as miniature green houses to cover these seeds in the garden or in pots, until seeds germinate.

Maximum germination

Some seed will not germinate unless ample magnesium is present, possibly because magnesium dissolves the natural germination inhibitor in some seed coats. Excess potassium in garden soil can make magnesium unavailable to plants. To ensure that magnesium is available to seeds, dissolve a half-teaspoon of Epsom salts in a little warm water in a watering can and add 2 litres of cold water. Use this solution to water seed at sowing. To ensure maximum germination when sowing seed, soil must be kept consistently 'dark-damp'. Any moisture check after sowing can cause germination failure. Soil or growing mixes must be thoroughly dampened before sowing. All but legume seeds are then watered with an Epsom salts solution after sowing. Legume seeds can rot if soil is over-wet, so the Epsom salts solution can be applied to soil before sowing as part of the bed preparation and the bed is not watered again until after legumes germinate.

If sowing seed in punnets or pots, use a level quarter teaspoon of Epsom salts in a 1-litre misting bottle filled with cold water to moisten seed before covering. All sown seed should then be covered with 5 cm of fluffed-up hay, a light layer of wilted grass clippings, plastic hoods or glass jars to maintain constant soil moisture. If weather is wet, mulch will protect seeds from being dislodged by rain. Covers are removed as

soon as germination occurs. If conditions are cool and damp, water with diluted chamomile tea (see Damping-off).

Sowing seed direct in rows

When sowing seed directly into garden beds, good quality seed-raising mix can be helpful if soil is less than perfect as it allows delicate new shoots and roots to easily penetrate the mix. Some seeds, such as carrots, have difficulty breaking through soil. Root crops, lettuce, silver beet, spinach, dill, coriander and rocket can be sown in this manner.

Remove any mulch from the prepared planting area. Water the planting area to dark-damp first. Using the side of a rake, draw a furrow about 5 cm deep, deeper for large seeds, and fill it three-quarters full with damp seed-raising mix. Sow seed onto the mix at the appropriate spacing and cover to the required depth with more seed-raising mix or fine soil. Firm the growing mix with your hand to ensure contact between seed and mix, leaving the top edges of the furrow to sit slightly higher than the growing mix. Water gently.

Move the mulch aside as seedlings break through soil and the cotyledons, or seed leaves, appear. In warm conditions, add sausages of mulch between the rows and at the ends to provide a little shade for delicate seedlings and slow moisture evaporation. Water regularly and thoroughly to keep soil dark-damp.

Sowing seed in stations

Seed for larger vegetables such as melons, cucumbers, marrows, pumpkin, tomatoes, corn and the cabbage family can be sown directly into garden beds when your soil temperature is suitable for germination. Because such

vegetables require a larger space between plants they are usually sown in stations a suitable distance apart. Position any stakes required before seed is sown. In warm weather, mulch can be left in position on the prepared bed and pulled back with your hands to make planting stations. Unless soil is in perfect condition, get these plants off to a flying start by creating a 10 cm hole and filling it with mature compost. Most plants will benefit from being covered with an inverted glass jar to protect them from rodents.

Make saucer-like depressions in the soil or compost and sow two seeds 2–3 cm apart. Cover seed to the required depth with more seed-raising mix or fine soil. Firm the growing mix with your hand to ensure contact between seed and mix, leaving the top edges of the saucer to sit just slightly higher than the growing mix. Water gently.

Sowing seed in containers

To get seedlings started before planting into garden beds, you can use punnets, small pots, cardboard milk cartons, yoghurt containers or foam boxes. Just make sure the containers have been well washed and have plenty of drainage holes. Avoid metal tins as growing mixes may absorb excessive amounts of aluminium or zinc.

Seedlings grown in individual pots or segmented punnets suffer less shock since their tender young roots remain undisturbed. Tomatoes, capsicum, eggplant, pumpkins, zucchini, cucumber and melons particularly dislike root disturbance, and may sulk when transplanted. They will do better if sown in individual 8-cm pots of good depth so that they can remain in the same pot until planted out, rather than sowing in community punnets, then transplanting into small

pots before being transplanted again into the garden. In warm conditions, other vegetable plants that are only required in relatively small numbers at a time can be sown in individual pots to lessen transplant shock.

Only sterilised soil or compost is usually advised for seed containers because micro-organisms do not work in the same way in shallow containers as they do in open soil, but seeds do not need soil to germinate. Seedlings require a short-term growing medium that drains freely, allows easy movement of germinating shoots and delicate roots, yet is firm enough to support small plants. If you only have a small quantity of seeds to sow, a good quality, organic, seed-raising mix is the best option. For larger quantities, you can make your own seed-raising mix from well-washed sand and processed coconut fibre (see homemade mixes).

Fill containers with seed-raising mix to 1 cm from the top, then gently firm the mix. If using large trays or boxes, place a single sheet of newspaper on the bottom of the container and saturate paper thoroughly before filling with the mix. Make sure no paper appears above the mix, or the tray will dry out very quickly. Sow seed thinly and gently mist with an Epsom salts solution. Cover seed to the required depth with seed-raising mix and mist again.

Place seed trays or pots in a warm, sheltered position, free from draughts. Keep the mixture just damp, using only a sprinkler bar or fine hose spray. Miniature plastic greenhouses or small containers in a plastic bag inflated with air before sealing will keep the growing mixture damp when humidity is low. As seeds germinate the cotyledons, or seed leaves, appear and seedlings begin to manufacture food and

draw nutrients from the growing medium. Remove covers at germination.

Care of young seedlings

After germination water thoroughly only as required to keep the growing mixture just dark-damp. Do not overwater seedlings. Seedlings growing in sand and coconut fibre will require applications of a suitable fertiliser tea to maintain steady growth (see [chapter 2](#)). The frequency of fertiliser tea applications depends on the amount of nutrients provided by the germination mix.

Seed sown directly in rows or stations can be given one or two applications of weak worm liquid tea if growth seems slow, unless otherwise indicated. Application of a 'very weak tea' solution of organic seaweed fertiliser also encourages a strong rooting system in seedlings. Never apply liquid fertilisers to dry soil, and do not apply them as a matter of routine. Over-fertilising results in soft, sappy growth that attracts pests and fungal disease. Apply liquid fertilisers to the growing medium rather than the plant to encourage seedlings to push their roots through the growing mix and develop vigorous root systems. It can be difficult to avoid wetting foliage when seedlings are small. After applying fertiliser teas, water gently to wash fertiliser from delicate leaves.

Thinning or transplanting of seedlings is carried out at a certain height, or number of leaves on the plants. Seed leaves can be quite different in appearance to the plant's normal leaves and the next set of leaves that form after the seed leaves are the plant's first true leaves. Transplanting and thinning stages are calculated from the number of true leaves, ignoring the seed leaves. At the correct stage for thinning,

unsuitable seedlings are drawn out of the mix carefully to avoid disturbing the roots of remaining plants. After thinning, water gently to replace disturbed soil.

Many seedlings can be transplanted when they have two sets of true leaves although others, like celery, will not be ready for some time. If seedlings need potting-on before planting out, use the basic seed-raising mix with a little added mature compost or worm castings and continue feeding, when necessary, with fertiliser teas.

Frosts are very hard on the soft tissue of young seedlings, so don't plant out frost-tender plants until frost risk has passed. A cold frame or north-facing, well-lit room allows you to get a head start with seedlings until soil is warm enough for planting outside. Move seedlings away from windows at night. Don't forget to vent your cold frame during the day once seeds have germinated.

Planting out seedlings and small plants

You will have to 'harden-off' all seedlings before transplanting into the garden. For all plants that have been raised under cover, or purchased from nurseries that provide partial shade for their plants, toughen the soft seedling stems by gradually increasing the plants' exposure to sunlight over two to three days before planting out, or provide some temporary shade from hot sun in the garden bed. Punnets have to be well watered during the hardening-off period. Nurseries water seedlings several times a day in hot weather. Dashing home from the nursery and planting out does not work well in warmer months. When purchasing seedlings, avoid punnets that have a mat of roots under the tray. These seedlings will take a while to recover after planting.

Water all seedlings thoroughly with a very weak seaweed fertiliser solution at least an hour before transplanting to ensure that the seedling mix adheres to roots. A dry mix falls away during planting, allowing delicate roots to become damaged. Also make sure that soil in the planting area is damp to a depth beyond seedling root balls. Only plant out seedlings when you are sure you can provide regular water for their growth.

The best times for transplanting annuals seedlings are on fertile days during New Moon or First Quarter phases. Perennials and onions are transplanted on fertile days during Full Moon phase. We have found this system works well but, if weather is very hot and dry and there is a cool change on the way, we may defer planting to a non-fertile day in the correct phase with better conditions. Fertile days appear to be more important for germinating seed, striking cuttings, pruning and planting bare-rooted perennials than for transplanting seedlings whose roots are protected by growing mix.

When conditions are warm to hot, seedlings will recover more quickly if planted directly into a mulch-covered bed. Pull mulch back to make planting holes, at suitable spacings, the same size as the pot or punnet segment. Use a rake handle to make holes for punnet seedlings and plant seedlings at the same depth as they were in the pot or punnet, unless otherwise indicated. Planting them deeper can cause rotting of plant crowns in some species. Use your fingers to gently firm soil around the base of each plant and settle soil by watering gently around the base of the seedlings. Pull mulch back a little further if seedlings are touching the mulch. When weather is very hot, delay transplanting until the late

afternoon and give seedlings a generous watering. This allows young plants some hours of cooler conditions before having to cope with hot sun.

To transplant individual pots or tubes, lightly squeeze the sides of the pot then, supporting the seedling stem between your index and middle fingers, turn your hand palm up and rap the base of the pot firmly with your other hand. The potting mix should slide out of the pot like jelly out of a mould. If the moistened mixture falls apart completely, the seedling has not made enough root growth for planting out.

When transplanting seedlings in non-segmented trays or punnets, use an old dinner knife to divide the mix into plugs and lever out each plug for planting. This will avoid damaging tiny stems and cause less root disturbance than lifting out a group of seedlings and teasing them apart.

Allow several days for seedlings to settle in before deciding if they need liquid fertiliser. Protect your crop from snails if necessary (see [chapter 9](#)).

Damping-off

Gardeners who germinate seed occasionally come across a problem called ‘damping-off’, where fresh seeds fail to germinate, or young seedlings become dark green and slimy at the base, then collapse. This problem is more common in seed trays than the open garden unless conditions are cold and humid, or herbicides have been regularly used on garden soils. Several pathogenic fungi are blamed for this condition and nurseries will advise you to spray with fungicide and to treat seeds with fungicide before sowing. Fungicides do not control all the fungi activated in damping-off and are very toxic to earthworms. Chemical fungicides and insecticides

also adversely affect the mycorrhiza, which supply nutrients to plant roots. Try to avoid these products because they will be transferred to soil when seedlings are planted out.

Seeds do not require fungicide treatment before planting. As certified-organic growers we are not allowed to use chemical fungicides, yet have very little trouble with damping-off because the condition is really caused by overwatering seeds that have been sown too closely together. The damp, crowded conditions allow the fungi to take hold. Instead of using fungicides, we water with cold, very weak, German chamomile tea at sowing and after seedlings emerge if weather is cold and humid. You can use organic chamomile tea bags. Make a cup of chamomile tea and allow it to steep for 15 minutes, then dilute it to 1.5 litres with cold water. Chamomile leaves work even better than the flowers so if you want to grow your own patch of chamomile, seed suppliers are listed later in this chapter. Epsom salts can be added to chamomile tea when sowing seed to avoid over-wetting soil by applying two separate solutions. If using chamomile leaves, you do not need Epsom salts as green leaves contain magnesium.

Types of seed

Many people are confused by the difference between open-pollinated, hybrid and genetically engineered seed.

Open-pollinated or non-hybrid seeds grow true to type and mature seeds can be saved for future planting. Farmers throughout the world have used this type of seed for thousands of years, swapping seed every ten years or so to strengthen strains. Lack of diversity through a restricted gene pool eventually weakens the progeny in both plants and

animals. Vegetables, herbs and fruits grown from open-pollinated seeds have stood the test of time for their flavour and nutritional value, as well as health and vigour of the plants. They have also proven their ability to adapt to climate change. Saving seed from your own produce ensures you will have plants that thrive in your particular growing conditions.

Open-pollinated seeds have not been genetically engineered. Organic open-pollinated seed is grown without pesticides or chemical fertilisers, and the seeds are not treated with chemical fungicides. Some fruit and vegetables such as parsley, watermelon, broccoli and other members of the cabbage family can cross-pollinate within the same genus if other species are planted nearby, but seed from legumes, tomato, lettuce, cucumber, passionfruit and pawpaw are fairly easy for beginners to save.

Hybrid seed is a deliberate cross-pollination between two selected plants, within the same species, which each possess a different desired trait. One parent may be chosen for vigorous growth and the other for colour, perfume or flavour. These seeds are mainly produced by major seed companies. Some hybrids for commercial production are bred for appearance, longer shelf life or ease of transport, which explains the good-looking, tasteless fruit and vegetables we sometimes find in shops. Most hybrid seed has been treated with fungicide before sale.

F1 hybrids are produced by self-pollinating each selected parent plant for up to ten generations to ensure the chosen trait is strong. Seed produced by the first cross-pollination between the two parents is called a first filial, or F1, hybrid. Because it can take considerable time to breed seed with

particular characteristics, hybrid seed is usually more expensive than open-pollinated seed. Hybrid seed producers claim that hybrid seed is more vigorous than open-pollinated seed but hybrid vigour is artificial in that it only exists for one generation. Saving seed from hybrids usually results in the following year's crop reverting to the characteristics of only one of the parents, or the seed is sterile. This is nature's way of ensuring that survival of the species does not rely on a very limited gene pool.

Genetically engineered, genetically modified, or bio-tech seeds have a gene with certain characteristics inserted into the seed. Gene technology companies prefer the term 'genetically modified' or 'bio-tech' because these terms sound less invasive, but GE, GM and bio-tech seeds are exactly the same. The selected gene may improve the plant's resistance to herbicides, tolerance to cold, or allow it to produce its own pesticide. Gene technology companies would have us believe that gene insertion does not differ from hybridisation. However, there is one enormous difference. Hybridisation can only occur within related species, as nature does not allow salmon to reproduce with tomatoes. Gene technology can insert a salmon gene into a tomato seed to improve the tomato's tolerance to cold. All GE seed also contains an antibiotic-resistant or virus-promoter identification marker because GE seed is patented and always remains the property of the gene technology company that produced it. GE seed cannot be saved by the farmer or gardener, and must be purchased each year. Under current law, any seed grown by Australian farmers that is fertilised by wind-blown GE pollen becomes the property of the gene technology company, because the seed will contain the identification marker. Currently, GE crops of banana, canola, chickpea, clover,

cotton, grape, pawpaw, pineapple, poppy (for oil seed), rice, soybean, sugar cane and taro are being trialled in Australia.

If gardeners rely solely on hybrid seed, many open-pollinated varieties of vegetables, fruits and grains will be lost forever, as has happened in the UK. Australia has already lost 75 per cent of vegetable varieties that were available early last century. A group that is working hard to prevent further losses is the Seed Savers' Network, who collect seed through some sixty groups around Australia, test the plants for yield and nutrition, then produce open-pollinated seed for distribution. They also provide seed, advice and training in Asian, African, Pacific and South American countries to assist them in growing nutritious, high-yielding crops in their local conditions. Seed Savers' work will do more to prevent world hunger than GE crops, which have to be purchased annually and rely heavily on chemicals.

Open-pollinated seed for the tried-and-true varieties of flowers, herbs, fruits and vegetables can be obtained from the following seed companies. Most supply seed in packets or bulk as required. Some suppliers also have interesting cottage garden plants. These are not the only seed companies who supply open-pollinated seed. Western Australia has restrictions on plants or seed for particular species being purchased interstate. There are organic grower groups in all states of Australia and New Zealand, and they will be able to advise on suitable seed suppliers within your area.

Greenpatch Organic Seeds

All organic seed sourced only from Australian growers.

PO Box 1285, Taree NSW 2430

Tel–fax: 02 6551 4240

www.greenpatchseeds.com.au

Green Harvest

Organic seed and inoculated green manure seed, including compatible legume/grain mixes.

PO Box 92, Maleny QLD 4552

Tel: 07 5435 2699

www.greenharvest.com.au

Austral Herbs and Seeds

Culinary and medicinal herb seed plus organic vegetable seed.

The Shamrock, Cowsby Road, Niangala NSW 2354

www.australherbs.com.au

The Seed Savers' Network

Vegetable seed.

Box 975, Byron Bay NSW 2481

Tel–fax: 02 6685 6624

www.seedsavers.net

Phoenix Seeds

Standard and organic seed. Also some hybrid seed.

PO Box 207, Snug TAS 7054

Tel: 03 6267 9663

phnxseed@ozemail.com.au

Eden Seeds

Standard and organic seed. No sowing information with organic seed.

MS 905, Lower Beechmont QLD 4211

Tel: 07 5533 1107

www.edenseeds.com.au

Planting Shrubs, Trees, Vines, and Herbaceous Perennials

PLANTING PHASE: *Full Moon*

Only plant when sufficient water is available from rain or irrigation to establish good growth. This applies whether planting one tree or a whole forest. Care taken before and during planting helps long-lived plants to develop strong root systems that will enable them to withstand drought conditions in future years. See [chapter 5](#) for various methods of irrigating when your water supply is limited. Bare-rooted plants are kept with the roots wrapped in moist hessian from purchase until planting, and any damaged roots are trimmed back to healthy growth. Always give potted plants a thorough soaking at least an hour before planting. If the mix in pots is dry it will fall away from the root ball, allowing feeder roots to become damaged at planting time.

Deciduous trees, shrubs and vines are planted during winter while they are dormant, except where winters are very cold, or very wet, when it is better to plant them late winter or early spring. In Cool Zones where summer temperatures are mild, evergreen shrubs, trees and vines can be planted in spring, after frost. In other areas, early autumn planting allows

evergreen plants to become established before having to cope with summer heat. Do not add fertiliser other than fully mature compost or very weak seaweed solution to soil at planting time. Remove nursery labels at planting time. Most labels disintegrate quickly but their ties can cause damage to developing stems, often to the point of dieback. If plants require labelling, use an indelible marker on a plastic label poked into soil near the plant's base. Protected from UV light by mulch, these labels last a long time.

It is always good practice when digging holes to plant trees and shrubs to place soil from the top 10 cm into one pile and the rest of the soil in a separate pile. This will ensure that the more biologically active topsoil does not end up at the bottom of the hole.

Planting into garden beds

When planting into well-drained garden beds where soil has been improved, planting holes only need to be slightly deeper and wider than the pot or root ball. This will avoid damaging soil structure. Holes for bare-rooted plants should be slightly wider to allow you to settle soil around the roots. Replace enough lower soil in the hole so that the soil level in the pot will sit level with the garden bed. Carefully remove the plant from its pot and tickle soil at the bottom of the root ball to loosen it a little unless the species resents any root disturbance. Position the plant at the correct level, making sure any budding union or graft is positioned well above the top of the hole (see diagram). Position support stakes, if required, before filling in the hole. For bare-rooted plants, arrange the bare roots over a mound of lower soil, adding more soil if necessary to ensure the roots are well supported.

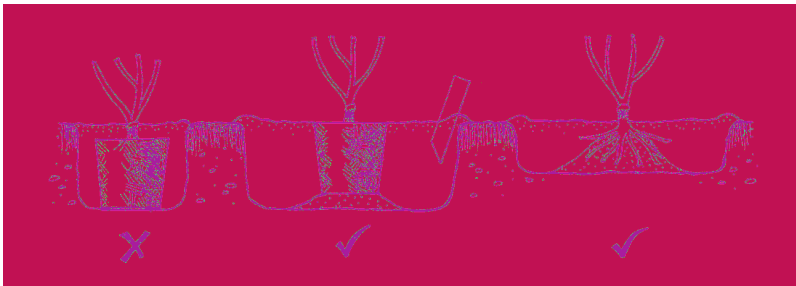


Fig. 4.1 Correct depth for planting potted and bare-rooted shrubs, trees and vines. The incorrect depth is shown on the left.

Fill the hole to about 8 cm from the top with lower soil, then water gently to settle the soil. You may have to part-fill several times when planting bare-rooted trees, jiggling the tree stem to ensure roots are well supported and to avoid air pockets. You can then position a piece of pipe or a plastic bottle to water efficiently after mulch has been applied. Finish filling the hole with humus-rich topsoil, creating a shallow dish at the top to prevent water running off and gently firming soil around the base of the plant with your hands. Do not trample the soil. Gently water the filled area again using a very weak seaweed solution, ensuring soil has settled around the roots and the graft is well clear of the soil surface. If planting in spring or in warm areas where winters are dry, add an 8-cm layer of organic mulch over the planting area, keeping mulch 10 cm clear of the stem or trunk.

Planting into open ground

Check soil drainage well before planting time and improve the drainage with gypsum, if necessary, then test again. If a little water still remains in the planting hole an hour after filling, trees and shrubs will have to be grown in raised

stations with the bottom of the planting holes above the poorly drained section and you may need to have some extra topsoil on hand at planting time.

When planting orchards, the planting area should have a green manure crop sown at least three months before planting to start improving soil in the whole area and to give fruit trees a good start. When planting native trees and shrubs that don't need a lot of fertiliser, a green manure grain such as rye or millet, slashed and left on the surface as mulch, blocks weeds, retains moisture and improves the soil as the mulch breaks down.

When you have to plant in soil that is not in perfect condition, make planting holes slightly deeper than the pot or root ball, and three times the pot or root ball width to encourage roots to spread out for stability. Place soil from each hole into separate topsoil and lower soil piles. If planting from tubes, make holes four or five times wider than the tube. The belief that narrow planting holes force roots to grow deeply is counterproductive, especially in heavy soils. The feeder roots of trees are below the drip line or edge of a tree's canopy. By restricting lateral root growth in heavy soil, you can stunt above-ground growth. The best way to encourage roots to grow deeply is to water efficiently and keep soil rich in humus so that soil life increases the depth of topsoil.

If soil is well-drained, mound a little soil in the centre of the planting hole so that the soil level in the pot is level with the top of the hole. Place a garden stake across the top of the hole to show the correct height. Carefully remove the plant from its pot and position on the mound. For bare-rooted plants, arrange the bare roots over a larger mound, adding more soil if necessary to ensure the roots are well supported. Position

any budding union or graft above the top of the hole (see figure 4.1). Then position support stakes, if required.

When planting from pots, mix some completely mature compost or leftover seedling mix through the pile of lower soil to create a transition zone between the pot soil and the unimproved soil. Very sandy soil should have some bentonite added. Do not dig in mulch or partly decomposed matter as it can cause problems for young roots when dug deeply into soil. Then mix a larger quantity of compost through the topsoil pile and continue the planting procedure as for planting in garden beds.

Plant stakes, ties and barriers

If shrubs or trees need support, as they will if the site is windy, position three supporting stakes in a triangle around the plant, just outside the root ball. Position stakes before filling planting holes to avoid putting stakes through the root ball. It is usually advised to position stakes on the windward side of trees, but prevailing winds can change seasonally and the three-stake method overcomes this problem. Pantyhose or a strip cut across soft, knit fabric is then tied around the stakes. This support system allows plants to move slightly with the wind, but not blow over, and results in plants developing a strong root system. Securing a tree firmly to a stake can cause it to snap in strong winds and can also damage bark. A temporary hoop of chicken wire can be attached to stakes to protect trees from grazing animals or hares.

Rather than using old car tyres to protect the roots of young trees where chickens forage, cut a 90-cm square of chicken wire. Cut a 12-cm hole in the centre of the square, then cut

from the hole to one edge of the square. Place this mat around the tree after planting and peg it down with bent pieces of fencing or coat-hanger wire. The mesh mat allows easy watering and feeding, prevents chickens scratching at tree roots, and is easily removed without damaging the tree.

In areas where a single stake is used to support tomatoes, use pantyhose or knit fabric strips twisted into a figure of eight to secure each plant by slipping the tie around the plant's stem and crossing the ends before tying around the stake. The figure-of-eight pattern does not constrict plant growth, but is not suitable for windy areas.

Thin strips cut from pantyhose or across old singlets or T-shirts work quite well for most garden ties as they stretch to allow some movement. If you forget to remove them, the ties will break down before doing any damage. Never use wire or firm plastic ties to attach plants to supports as these can cut into soft plant tissue.

Getting the most from your garden

The nutritious fruit and vegetables and the beautiful flowers we enjoy are only a side-effect of nature's real purpose: reproduction of the species. Plants expend a lot of energy producing seed and their capsules (which include fruits and some vegetables) to ensure that seeds will have suitable conditions for survival. Once plants have set viable seed, flower production and cropping ceases.

Regularly pick strawberries, marrows, cucumbers, beans, peas, tomatoes, capsicum, eggplant and broccoli to keep flowers forming and to prolong cropping. Leaving over-mature fruit and vegetables on these plants not only

limits crops, the overripe produce can attract pests and disease. Don't allow flowers to form on basil.

Remove spent flowers from flowering annuals, violets, dahlias and roses before seed capsules form to encourage plants to produce more flowers. Seed heads should never be allowed to form on young rose bushes as the production of rosehips greatly weakens young plants.

Many flowering shrubs are pruned immediately after flowering. This practice guarantees that plant energy is diverted into growth rather than seed production. Do not allow young fruit trees to produce a full crop until branches are strong enough to support the weight of fruit. Overcropping of young fruit trees results in branches that split or have a downward curve, and poor general growth.

Container Gardening

THIS IS A GOOD ALTERNATIVE when open soil space is limited, water is scarce or climate conditions are unsuitable for growing plants in the open garden. Pots allow us to grow plants that can be very invasive in garden beds and to enjoy in a very small area various favourite plants that require different growing mediums. Container plants can be used as very attractive features in the garden or indoors. While nature didn't intend plants to grow inside houses, some plants have proved to be very adaptable to indoor life. Spathiphyllums and philodendrons, in particular, which grow as understory plants in forests and are used to low light conditions, are suitable for busy people whose homes are closed up for most days of the week. Many container plants can spend their entire lives indoors where lighting is strong enough for them to make food, while others can be brought indoors for short

periods so that we can enjoy their flowers or interesting foliage.

An extremely wide range of plants can be grown in containers, including some fruit trees and food crops, and the first two considerations for healthy growth in pots are a suitable container and the correct growing mix.

Suitable containers

A suitable container is not necessarily the most attractive one. Many large terracotta, ceramic or concrete pots have only one hole in the base, which provides inadequate drainage for many species of plants. You have to drill more holes in the base without breaking the pot (virtually impossible with concrete pots). These containers also have similar thermal properties to brickwork and retain heat for lengthy periods. This can be used to advantage in some situations but growing mixes in pots can become extremely hot on sunny patios, killing off organisms that keep the mix healthy and burning the feeder roots of plants. Plastic pots heat and cool more quickly and they usually have more holes, which allows for good drainage. Deep foam boxes provide some insulation for growing mixes where visual appeal is not a priority, but growing mixes in shallow foam planters can get very hot. Regularly check the growing mix of existing container plants to see if it is becoming hot and move them, if necessary, as heat-stressed plants will start to attract pests. Grouping smaller pots around the base of large clay tubs helps prevent them from overheating and provides a group humidity that many plants enjoy. Most plants prefer wide, squat containers rather than narrow, tall ones. Citrus will grow happily in wide-mouthed, large clay tubs if positioned so that the tub itself receives some shade during the day.

Terracotta, concrete and some ceramic pots draw moisture from the growing mix, requiring more frequent watering for their occupants. Soak these pots thoroughly before filling with growing mix. Also beware of large ceramic pots that curve inwards at the top. All plants require repotting or a change of growing mix occasionally and it is difficult to remove plants from these containers without breaking the pot. If you have already committed yourself to a large ceramic pot, put your plant in a slightly smaller plastic pot inside the clay one, bringing the top of the plastic pot to just below the rim of the clay pot by placing it on large stones or blue metal for good drainage.

We have not found water reservoir pots suitable for most large shrubs or small trees as the roots work their way into the reservoir at the bottom of the pot and the plants deteriorate in the way they would if growing in waterlogged soil. This type of pot seems to suit hanging baskets that receive a lot of air circulation and tend to dry out quickly, or plants with mild, fibrous root systems. Plants like spathiphyllums (which will grow in fish tanks), some ferns, Louisiana and some of the other beardless iris and plants that don't mind 'wet feet' seem quite happy in reservoir pots.

Moisture-loving plants will benefit from having a saucer placed under pots, but try to avoid using pot saucers wherever possible and definitely don't use them under pots for natives. Pot saucers slow drainage and, when used, should always have some small tiles placed between them and the base of the pot. For large tubs that require a pot saucer, fill the saucer with small pebbles so that the base of the pot sits almost level with the top of the saucer. Terracotta saucers are not waterproof. These and some ceramic saucers that have not

been carefully glazed will damage or stain the surfaces they are placed on, particularly carpet and timber. Air must be able to circulate freely between the saucer and the floor to prevent moisture damage. For pot plants on surfaces such as tables, take plants to a sink for watering and only return them to the saucer after excess water has drained away.

When positioning outdoor pots on solid surfaces, always place some small tiles under each pot to ensure good drainage. Pieces of shallow paving tiles are very good for large pots and scrap tiles can be obtained cheaply from the discard bin at tile suppliers. Bricks raise pots too much, allowing air circulation under the pot to dry the mixture too quickly.

Containers for large plants should have an internal depth of 8 cm or more than the depth of the potted plant you are purchasing. This allows room for drainage material in the base of the pot and at least 5 cm of growing mix between the drainage material and the existing depth of the root ball.

POTTING AND GROWING MIXES

When growing plants in containers, do not fill pots with garden soil because earthworm and microbe activity do not work in exactly the same way in pots and you will probably end up with poor drainage and other problems. Where I have recommended not adding soil to growing mixes, this is because unimproved soil, or soil that has been treated regularly with synthetic fertilisers, pesticides or herbicides, is more likely to contain some soil-borne diseases. Avocado, brassicas, strawberry, tomato, boronia, camellia, carnation and kangaroo paw are just a few plants that are sensitive to particular soil diseases and the problem is more likely to

increase in pots. Once you have used organic methods to turn your soil into a healthy, friable loam, you can include some of your soil to make a good quality growing mix. In the meantime, it is safer to use a certified-organic growing mix. Non-organic mixes may contain lots of pine bark which will become water-repellent very quickly and may contain growth-detering tannins, depending on the type of bark used.

Potted plants such as bonsai and orchids require special growing mediums and care, according to the species. If you are advised to add peat moss to your mix, use coconut fibre instead. Both are used to improve structure and retain water in the mix but world supplies of good peat moss are dwindling.

Before opening bags

Ripping or tearing sealed bags of any garden product releases drifts of tiny particles that can be inhaled immediately, or transferred to clothing and inhaled later. Inhaling dust particles from growing mixes that have dried out has been linked to Legionnaires disease, a very serious type of pneumonia. This is more likely to occur with poor quality, non-organic mixes but it is good practice to use the following procedure when opening all bags of potting, seedling or growing mixes and animal manures.

Drag the bag and garden hose to where you want to use the product because growing mixes and manures become much heavier when wet. Put on a disposable paper mask, then cut — not tear — a top corner of the bag, just large enough to insert your garden hose and allow a fine spray of water to thoroughly dampen the mix. It is then safe to cut open the bag.

This method is not suitable for products such as dolomite, lime, gypsum, fish meal, seaweed meal or pelleted fertiliser that would be damaged by adding water, but these products have not been linked to Legionnaires disease. However, it is good practice to always wear a disposable mask when opening bags and to cut rather than tear heat-sealed bags. Thick paper or woven bags can be opened by unravelling the stitching at the top.

Homemade seed-raising mix

We have used this basic mix of sand and processed coconut fibre, with variations for cuttings and potting mediums, to grow many tens of thousands of plants and it works well. Coconut fibre is finely chopped coconut husks and sold as coco, copra or palm peat. It retains moisture but does not break down quickly and is a suitable replacement for peat moss because, unlike peat moss, coconut fibre is easy to produce and not expensive. However, like peat moss, coconut fibre is difficult to re-wet if allowed to dry out.

Use 2:1 by volume of moistened, chopped coconut fibre to well-washed river or beach sand. Beach sand contains salt and must be cleaned thoroughly before use. The coconut fibre will require soaking for an hour or so before use. Moist coconut fibre expands so don't overfill the container used for soaking. When the coconut fibre is completely moist, mix it thoroughly with the sand. Mixing potting mediums is like stirring paint, that is, mix until you think it is ready, then mix again. During mixing, occasionally take a handful of the mix and squeeze tightly. If the mixture pretty much retains its shape, it is ready to use. If it won't hold its shape, you need more coconut fibre or water. You can add a little vermiculite to the mixture if you wish, but do not overdo it as vermiculite

can store a lot of moisture, resulting in an over-wet mixture that encourages fungal disease. Do not add compost or manure to a seed-raising mix for shallow punnets. Seeds carry their own nutrition to see them through the germination process until they form their seed leaves. Nutrients can be supplied in a weak liquid form until seedlings are ready for planting out. Mixtures for 8-cm pots or for potting-on seedlings after germination will benefit from the addition of a little fully mature compost or worm castings, or of organic complete fertilizer — not pelleted fertiliser. Large foam boxes can have quite a bit of compost added to the mix. Compost must be fully mature though, as partially decomposed compost can cause problems in containers. As you become more familiar with organic fertilisers, you will get to know how much you need to add to get the results you want.

Homemade growing mix for small pots

Small plants usually require repotting more often and this basic mix is suitable for most small to medium-sized pots and plants in hanging baskets.

Mix thoroughly one part well-washed sand and one part moistened coconut fibre. Add one part mature compost and mix again. If you do not have a lot of compost, you can use one part sand, one-and-a-half parts coconut fibre and add a half-measure of worm castings. Do not add manures to this mix or use synthetic fertilisers.

As a general rule, if the plant likes light soil, add a little more sand, or add more coconut fibre for plants such as ferns, which prefer moister conditions. Cacti and succulents grown in shallow containers require a growing mix of equal parts of sand and coconut fibre with only a very small amount of

compost added. This can vary with the species. You can purchase suitable growing mixes for cacti. If you use one of these initially, you will have a good idea of the texture you will require when repotting.

Homemade growing mix for large pots

Large plant containers require drainage material added to the base of the pot to ensure that the growing mix does not block drainage holes, or is not lost when watering. Broken terracotta pots were normally used for this but less terracotta is used today. Blue metal or gravel is suitable for most plants. Broken chinaware or pieces from broken bricks can be used, but not broken tiles because they can pack into flat layers. Even roughly broken pieces of expanded polystyrene foam or foam shapes used in packaging can be used effectively for this purpose.

The following recipe is a basic growing mix that can be used for plants in medium-sized to large pots, or deep foam fruit boxes. The mix can be varied slightly according to the needs of particular plants. It is unsuitable for use with synthetic fertilisers.

Start with your basic seedling mixture materials of well-washed sand and moistened coconut fibre, using one part sand and one part fibre. Mix these together thoroughly, then add one part mature compost and mix again. Finally, add one part good quality organic soil and mix thoroughly.

If your climate is hot and dry, add some bentonite to the mix. Add only one-fifth of the measure you used for the other materials. For plants that prefer sandy conditions, you can add up to a half-measure of sand to the basic mix.

Australian native mix

The homemade mix for large pots can be used for natives that do not require a sandy soil, but use coarse river sand, not beach sand. A little well-rotted leaf mould can make up part of the compost measure. For natives that require a sandy soil, add a half-measure or more of coarse river sand to the basic mix. The amount of extra sand will depend on whether the soil is a clay loam or sandy loam. When putting drainage materials in the base of pots, do not use blue metal as it can also supply some phosphorus and other minerals to the mix.

Camellia and azalea mixes

These plants require very similar conditions. Some camellia growers do not recommend using soil in camellia-growing mixes because phytophthora root rot can be spread in potting soil, but the same growers also recommend using synthetic fertilisers, fungicides and chemical pest treatments that will wash into the growing mix (see root rot, [chapter 9](#)). If your camellia and azalea nursery only has mixes which contain synthetic fertilisers, you can use the above mix for large pots and add a quarter measure of crushed charcoal and a little bentonite, if available. Bentonite supplies a little calcium but commercial camellia growers use dolomite to bring acid mixes to a pH between 5.5 and 6.5. Camellias and azaleas only dislike lime in excess when it makes their trace elements unavailable.

Food crops and flowering annuals in containers

Another advantage of container planting is that if you find that you have planted your crop where it is too hot or too shaded, you can usually move it to a more suitable spot. Annuals and suitable food plants can be grown in plastic pots

of at least 35 cm diameter. A wide range of plastic pots are available today so you don't have to use black plastic. Suitable food crops can be grown in deep, polystyrene foam boxes.

Large pots should have 2–3 cm of blue metal or something similar placed in the bottom of the pot before filling to ensure good drainage. If growing plants in foam boxes, choose one with plenty of drainage holes. Thoroughly wash boxes in warm, soapy water before use. Place a single sheet of newspaper across the bottom of the box and saturate it thoroughly. Pages from glossy magazines are not suitable for this purpose. The paper will stop your growing mix from washing away when watering. Unless you allow the container to dry out, the paper will gradually break down when the growing mixture is holding together.

Fill the container with a certified-organic growing mix, or the homemade mix for large containers. You can add some extra worm castings to the mix for heavy feeders, but don't overdo it. For strawberries in hanging baskets, add an extra half-measure of worm castings. Fill the box or large pot with the growing mix to 2–3 cm from the top. Sow seed or plant seedlings following the growing instructions for each species and water gently. A light mulch should be used to maintain surface moisture until germination. Any extra fertiliser required can be added as half-strength fertiliser tea.

Watercress containers

Because watercress grows naturally in streams, it must be kept continually moist with clean water. It can be grown in pots with a larger saucer underneath so that you can keep the mixture moist and drain off the water for use on other plants

before it becomes stagnant or a breeding spot for mosquito wrigglers. Drain it just before rewatering the watercress. The larger saucer allows you to keep a check on the quality of the water. Wide pots 13–15 cm deep are a good shape for growing watercress. The larger the surface area of the pot, the better. We have grown watercress for many years in a medium-sized foam box with holes in the base. This box sits inside a larger foam box without holes, the kind used to transport broccoli. The outer box serves as a reservoir and, to prevent a build up of stagnant water, we make a hole in the end of the outer box slightly smaller than a plastic cork or bottle stopper. The hole should sit at least 1 cm above the interior base of the outer box because it can be tricky to cut a hole in polystyrene foam to an exact fit for the stopper. Drain water, when necessary, in the same way you would drain an esky. Watercress can also be grown in water reservoir pots and the hanging basket shape is very suitable if the reservoir is kept full. The only problem with this type of pot is that the excess water is hidden from view and it is easy to forget to change the water as often as you should. Watercress will survive missing a water change or two if watered thoroughly, trimmed back and moved to a shadier spot before going on holidays, but clean water is important with this plant.

The growing mix for watercress is one part sand, one part shredded coconut fibre and one part fully mature compost. There is no need to put draining material into the container for watercress. If you don't have enough mature compost you can make up the third part by mixing coconut fibre with worm castings, but do not add manures or other fertilisers to the mix. Mature compost and worm castings have been well processed by organisms and are very safe. While the coconut

fibre has not been composted, we have not found it to cause any problems in the mixture.

Spring bulbs in containers

Spring bulbs flower well in containers with drainage holes, both indoors and outdoors. Bulbs in containers are planted later than those in open ground. Keep bulbs cool, then store them in your vegetable crisper three weeks before Full Moon in May. If Full Moon occurs in early May, gardeners in Warm Zones can refrigerate bulbs three weeks before Full Moon in June.

Pots or bowls for bulbs grown for indoor decoration only need to be 10 cm deep with a wide top. Hyacinths, tulips and daffodils are all suitable. Use bulb fibre for potting or you can mix an equal proportion of well-washed sand, coconut fibre and roughly crushed charcoal. Place a layer of coarse charcoal over drainage holes, then cover it with enough damp growing mix to allow the necks of bulbs to sit just below the pot rim. Allow enough space for a thin layer of pebbles for mulch. Bulbs can be packed pretty close, with about 2 cm between them. Carefully fill around each bulb with damp growing mix, making sure there are no air pockets. Cover the pot surface with pebble mulch, then wrap each pot with plastic to prevent the growing mix drying out and keep them in a completely dark, cool place. If you can't find a completely dark spot, loosely wrap each pot in a couple of layers of black plastic. Check for signs of foliage growth after five weeks. When foliage is 4 cm high, remove the plastic cover and keep bulbs in a well-lit but cool outdoor area until ready to flower. Warm rooms during foliage growth can cause stem problems, which spoil the effect. As bulbs won't absorb nutrients from

the growing mix to produce good flowers the following year, potted bulbs are usually discarded after flowering.

A container at least 15 cm deep with a wide top is suitable for outdoor bulbs. Choose a pot that suits the normal depth of planting for the selected bulbs. These can then be grown in the same manner as spring bulbs in open ground, but bulbs are planted later because pot mixes will not be as cool over winter as open soil. If using shallow containers, use the growing mix for small pots. Plant bulbs about 2.5 cm apart. Deeper containers can be filled with the growing mix for large pots with some extra worm castings added and bulbs can be planted at normal depth. After planting bulbs, cover pots with a thick layer of organic mulch and keep them in the coolest, shadiest spot in your garden. Water often enough to keep the growing mix just damp. When foliage appears, move pots to where plants are well lit, but the pot itself receives some shade. *Freesia* spp. and *Sparaxis tricolor* don't mind if pot soil gets a bit warm, but they do like a bit of shelter from very hot afternoon sun. If planning to reuse bulbs in deep containers, allow foliage to die off completely before lifting. If you are planning to discard bulbs after flowering, they can be planted at a shallower depth above a layer of drainage material covered with a 3-cm layer of growing mix.

CARING FOR CONTAINER PLANTS

Because growing mixes containing coconut fibre or peat moss are difficult to re-wet if allowed to dry out completely, it is important to water pot plants regularly. Potted plants get thirsty more quickly than those in open ground because they have less soil moisture to draw on. Water pot plants thoroughly when necessary, not out of habit. Poke a finger 2

cm deep into the growing mix and if it feels damp, the plant doesn't need watering.

Windy weather is extremely drying to all plants. Avoid placing hanging baskets and ferns, in particular, in windy areas. Use mulch in pots in sunny positions to prevent rapid drying. A layer of small pebbles or gravel thick enough to insulate the mix looks very attractive in pots, but avoid the ones with artificial colours. They can't be good for your growing mix.

When the growing mix dries in pots, the mix becomes water-repellent and shrinks slightly, leaving a thin gap between the pot and the mix. When watered, most of the water runs down the gap inside the pot and out through the drainage holes, leaving your plant still thirsty. Small to medium-sized pots can be rescued by putting the whole plant, pot and all, into a container of water filled to above the top of the pot. Leave the pot in the water until bubbles cease rising from the pot. A temporary submerging will not do plants any harm. Make sure all the soil in the pot is completely wet before allowing the excess water to drain off. Large pots are more of a problem if they are too large to be submerged in a laundry tub or similar container.

Where you are permitted to leave your garden hose on fast drip, this can be used to thoroughly re-moisten soil in large pots. Move the hose to several different positions on the surface of the mix. When water starts to drip from the base of the pot, the mixture is wet. Otherwise, you can use two plastic soft-drink bottles filled with water to perform the same task. Cover the top of a filled bottle with your thumb and invert the top, 2 cm deep, into the growing mix. Firm the mix around the bottle neck. Support the bottle with sticks or a couple of

large stones so that a continuous flow of pea-sized bubbles rises through the water. Position another bottle on the opposite side of the pot. You may have to repeat this procedure a couple of times for very large containers. Outdoor pots and tubs containing trees or bushy plants can easily dry out when rain is prevented from reaching the growing mix because of a dense plant canopy. Check these containers regularly for dampness, even in wet weather.

Pot plants grown under cover benefit from being put out in the rain occasionally to wash dust from the leaves and so improve the plant's food-making ability. It also helps prevent attack by two-spotted mite, a common occurrence when foliage is dry for long periods. If the plant is too large to move, a regular dowsing of foliage with water will help. This is particularly important with plants like azaleas. Avoid the use of oils to keep indoor plants dust-free as oil can clog the respiration holes in plant leaves.

It is a good idea to check the positioning of indoor and patio pot plants in autumn. Move pot plants if they will not be getting enough light through the winter months, but not near windows that remain uncovered at night as these positions can become very cold. When heating or air-conditioning is used in the home, mist plants regularly to maintain humidity. Reposition plants that will be too close to heat sources during winter months. Cyclamens, poinsettias and zygocactus all come from areas with cold nights and will flower longer if put outside when the sun sets and brought back inside in the morning.

More indoor plants are killed by overwatering in winter than any other cause. Most plants slow their growth in winter and, like us, hate having cold, wet feet. The

finger-in-the-potting-mix rule before watering is very important in winter. Potted figs are very prone to turning yellow and sulking from overwatering and lack of air circulation during winter.

Do not fertilise potted plants out of habit. Organic growing mixes that contain compost or worm castings provide a steady supply of nutrients that is sufficient for most indoor plants. For other plants, follow the general guidelines for that particular species but apply the appropriate fertiliser as a half-strength fertiliser tea.

Earthworms in pots

If you add soil or compost to your growing mixes you may occasionally find an earthworm in your pot plants. Its presence is indicated by fresh worm castings, rather like very tiny clumps of horse manure, on the mix surface or around the base of the pot. While earthworms are marvellous in garden soil, their tunnels can expose roots to too much air in pots. If you suspect the presence of an earthworm, ease the plant out of its pot and look for tunnels. If the worm has been in there for some time, it is fascinating to see the network of tunnels earthworms create. Rescue the worm or worms, and return them to the garden under some mulch. Return the plant to its pot and water gently to settle the mix. Don't use chemical solutions to remove earthworms as they will also kill other organisms in your organic mix.

Potting and repotting

As soon as the weather warms in spring and plants recommence growth is a good time to pot up plants or repot plants growing in warm positions, unless otherwise indicated. Herbaceous perennials and similar plants can be divided and

repotted in early autumn. Most indoor plants can be repotted from mid-spring until December. Small plants in pots up to 20 cm wide will probably need repotting each year. Plants in pots up to 35 cm wide may only require repotting every two years. The growing mix in larger pots will require replacing less often.

Select a suitable container before you start potting or repotting. Do not place small plants in large pots, thinking you won't have to repot so often. Potting mix not used by the plant within a year will turn sour. Use a pot one size larger when repotting.

Repot plants when the growing mix is just damp. If plants are growing well and there are no roots protruding from the holes in the pot base, they do not need repotting. When a young plant's root area has filled the entire pot it needs moving to a slightly larger pot. It is unrealistic to expect young or naturally large plants to grow well in pots that are too small for them unless you are prepared to follow bonsai techniques.

Small plants can be removed by supporting the plant with one hand and rapping the base with the other hand as when planting out seedlings. Large, solid-sided containers can be turned on their side with one person pulling the plant while another pushes the base of the mix with a rake handle inserted into a drainage hole. It is difficult to remove plants from concrete pots because feeder roots tend to adhere to the concrete. You may have to run a thin strip of metal around the inside of the pot before you can remove the plant. Lay out some newspaper to hold any gravel mulch and the draining material from the bottom of the pot as these can be reused after hosing. Discard any growing mix that falls from the pot.

After placing 2 cm of drainage material in the base of medium-sized pots, or 3 cm for large pots, add enough fresh growing mix to the bottom of the pot to ensure the top of the root ball sits 2.5 cm down from the pot rim for small plants, or 3.5 cm for large plants. Water the mix gently and top up if necessary. Position the plant in the pot and fill with fresh growing mix in two or three stages, gently watering between filling to avoid air pockets in the mix. The top of the root ball should sit at exactly the same height as it was in its previous pot, and any graft must sit well clear of the mix surface. Give a final, gentle watering to settle the top of the mix and reapply the gravel or pebble mulch. Allow any excess water to drain before returning plants indoors. Do not fertilise for at least several weeks except for half-strength seaweed fertiliser where advised. The fresh organic mix is supplying food to your plant.

Many mature plants in the largest size tubs can have two straight slices, 8 cm at their widest point, cut from opposite sides of the root ball before replacing the plant into fresh growing mix (see diagram). Trimming plant roots in this manner provides space in pots without damaging all the delicate feeder roots. Put a white plastic plant marker, or something that won't break down within three years, into the top of the repotted plant on one of the sides with the root ball trimmed. Next time you repot, trim the root ball at 90 degrees to the cuts made at this repotting. The space provided by the trimmed root ball and growing mix that falls away when removing plants from pots will allow space for enough fresh growing mix to be added to the pot.

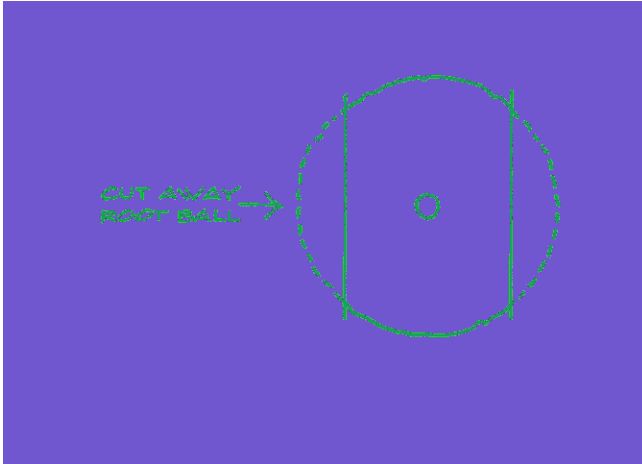


Fig. 4.2 Removing 8 cm on opposite sides of the root ball of shrubs and trees grown in very large pots allows new potting mix to be added. When plants require repotting again, trim the root ball at right angles to the previous pruning.

Repotting cymbidiums

Cymbidiums should be potted on only when they are looking a little cramped in their pots and immediately after they have finished flowering. This practice will avoid damaging delicate new shoots that develop at the base of pseudobulbs. It is also a good time to remove dead leaf bases from the pseudobulbs. This can be done easily by making vertical tears in the dried leaf base and pulling the pieces sideways. Dead leaf debris around pseudobulbs is a haven for scale insects and orchid beetles. If you are unsure about dividing cymbidiums or other orchids, your local library or bookshop is sure to have at least one book giving step-by-step instructions.

Pot plants at holiday time

Bromeliads, most orchids and other natural tree-dwelling plants given a thorough soaking can muddle through for two weeks without extra water. Give them a good soaking on your return.

If you have pot plants coming into flower, give them to a friend to mind because they require more water at this time. Put off fertilising your pot plants if you are going away because any fertiliser in the pot will become more concentrated at the potting mix dries out.

Group outdoor pot plants, including hanging baskets, close together on the shadiest side of the house and give them a good soaking. A couple of weeks in the shade will not harm sun-loving plants and the close grouping increases humidity around the plants. If you have arranged for a friend to water your garden, it makes their work easier to have all your pot plants in one spot.

For large outdoor plants that can't be moved, water thoroughly and apply a gravel mulch if the pot does not already have mulch. Use the two inverted plastic bottles routine, supporting the bottles in a vertical position. While the growing mix is damp, water loss from the bottles will be very small but, as the mixture starts to dry, capillary action will slowly draw water into the mix. Huge pots may need more than two bottles. Test it out well before leaving for holidays.

If you don't have a shade house with a misting system or someone to water your pot plants, indoor plants can be packed together on thick wads of newspaper in the bottom of your bath or shower, providing your bathroom gets adequate light for plants. Give the plants a thorough soaking and pack crumpled newspaper around the plants. Water again to wet

the newspaper, but cover the drain hole this time. A little water in the bottom of the tub is fine. If your bathroom is unsuitable, pack soaked pot plants together on trays or in broccoli boxes in the coolest room in the house with wet newspaper packed around them.

For water-loving plants, such as spaths and ferns, pack them together on a tray on the floor and position a bucket full of water so that the bucket bottom is no lower than the top of the plant pots. Soak long strips of lamp wick, thick cotton cord or towelling in water. (Fabrics other than cotton are not suitable.) Place a generous length of the wick in the bottom of the bucket and lay the other end across the top of each pot.

CHAPTER 5

Drought-Proof Your Garden

WHETHER WE LIKE IT or not, there are strong indications that rainfall patterns are changing and Australians are going to have to make changes to their gardening and agricultural habits. It is understandable that many people are cynical about warnings of global warming and the need to conserve water when they can see sprinklers being used extensively on government and council properties, sometimes in inappropriate weather conditions, while broken water mains can wait up to 24 hours for repairs, and while farmers are permitted to take water from damaged river systems to irrigate water-hungry cotton and rice crops.

Those who have to rely on tank water are already well aware how precious water is, and many Australians are keen to learn how to adapt to climate changes. Most of us now use a broom instead of a hose to remove grit from paths and patios, but some who have always had an unlimited water supply at the turn of a tap will only take water conservation seriously when the price of water reflects its true value.

Fine-spray irrigation and sprinklers allow a lot of water to evaporate and should only be used in a confined area where a humid atmosphere is necessary, and never used where the water supply has any salt content, as this will damage plant foliage. Rushing around to give the garden and lawn a fifteen-minute watering every day does more harm than good and wastes water. Watering in this manner can wet no more than the top centimetre of soil and only encourages plant roots to remain close to the soil surface, making delicate feeder roots more likely to be damaged by summer heat, wind or

weeding. Shallow-rooted shrubs and trees become dependent on their daily water 'fix' and will soon become stressed and start to attract insect pests if they have to go without. Unfortunately, severe restrictions on hose usage in some areas only encourage this type of wasteful panic watering.

Water-repellent soil

The most important thing you can do to save water in gardens is to increase organic matter in your soil, whatever its type. Humus makes your soil more receptive to moisture and immediately improves its moisture-holding capacity while allowing excess water to flow deeper into soil. On dead soils without humus, water beads on the surface and runs off slopes before it can be absorbed.

Pure sand is very receptive to water but allows it to drain too quickly to depths where it is useless to most plants. Very sandy soil requires the addition of lots of humus and some bentonite to make it more moisture-retentive. Clay soils without humus have hard surfaces that resist water penetration. Once we have made our soils more moisture-retentive, efficient watering methods and mulch will save a considerable amount of water in our gardens.

Products called 'soil wetters' and 'moisture granules' are often advised by garden experts to address the problem of water-repellent soil. Soil wetters are basically detergents that break the surface tension of soil so that water can penetrate. These appear very efficient, as water quickly disappears into the soil surface. However, I found that the upper layer of soil stayed quite moist, while the soil underneath was still dry. This would encourage roots to stay close to the soil surface, resulting in less tolerance of dry conditions. Moisture

granules are polymers, a collection of small molecules that absorb water and these are usually mixed through soil, or potting mix. In trialling various ways of getting water-repellent soil to accept water, I have found that the most effective way was to mix some barely damp organic matter through the soil or potting mix. The soil samples containing a small amount of damp organic matter, including the sample with some squeezed-out coco peat, stayed consistently damp for much longer because the organic matter improved the capillary action of water through the soil.

Efficient Watering

APART FROM SOME Super-sensitive plants, most mature plants need the top centimetre of soil to dry between waterings. Continually wet soil prevents the passage of air and gases through soil and it eventually becomes sour. Well mulched trees, shrubs and vines benefit more from a thorough watering in the late afternoon every seven to ten days in hot, dry weather. Deeper, though less frequent, watering encourages roots to penetrate further into the soil, resulting in stronger growth and greater resistance to hot weather and storms.

As a general rule, the fibrous roots of shrubs and trees form a system of branches and stems radiating underground, with the ends of the uppermost roots lying beneath the outer canopy of the plants' foliage. As the shrub or tree increases in size, so does the root area. This system provides a stable anchor, allowing shrubs and trees to withstand strong winds and enabling feeder roots that absorb moisture and nutrients to take advantage of rain which falls from the outer foliage canopy (drip line). Mulch should extend beyond this line to prevent weeds or grass competing for moisture, and rain will trickle slowly down through mulch. When hand-watering,

poke the hose under the outer edge of mulch to apply water quickly. It does not help to develop a strong drought-tolerant root system when water is always applied to shrubs and trees at the base of the stem or trunk.

For large garden areas of vegetables, flowering annuals, herbaceous perennials or shrubs, T-tape or drip irrigation through poly pipe is an efficient way to water. A water filter should be attached to the tap and cleaned regularly to prevent blockages in the line. Drip irrigation should be installed under mulch because drippers will only water a small area without mulch. The mulch covering increases water movement through soil and makes watering more efficient. Water in irrigation pipes and garden hoses also heats very quickly on sunny mornings and can reach an extremely high temperature when the pipe or tape is lying on open ground. Train everyone to return garden hoses to a shady position immediately after watering and always check water temperature in hoses before using them on plants. This is very important in warmer months when plants benefit most from watering in the late afternoon, if you water soil only. In cooler months it is better to water on a rising temperature to avoid wet foliage when temperatures drop at night. In cold weather, only water when necessary, not out of habit. Avoid watering in the middle of the day in hot weather as it can cause scorching of plant tissue. Mulched plants will be able to hang on until late afternoon although they may look a little droopy.

Movable soaker hoses wrapped in hessian and turned upside down can also be used to water average-sized vegetable beds without a lot of water being lost to evaporation or washing away the soil surface. Adjust the water flow so that water just trickles onto the bed. Ensure that water coming through the

hose is cool and tuck the hose under mulch for more efficient watering.

Large beds of flowering annuals use considerable amounts of water in our climate but flowering annuals also provide food for bees that pollinate plants and nectar for wasps that control caterpillars, especially when shrubs are not flowering. Annuals that do not receive adequate water will quickly succumb to pests and diseases. If you do not have drip irrigation and water is in short supply, plant annuals in tubs or troughs instead of garden beds to conserve water, using them to create accents in the garden rather than the main source of colour.

Restrict weed growth in your garden. As well as being hosts to some insect pests, weeds are vigorous competitors for soil moisture.

Young shrubs and trees

Where freshly planted trees or shrubs are spaced too far apart for drip irrigation to be efficient, there are ways to save a lot of water and still keep your garden healthy. If you can use a garden hose on a slow trickle where the water source is free of salt, you can use 20 cm lengths of 50 mm plumbing pipe, or plastic soft drink bottles with the base removed. Insert the pipe or bottle (neck down) into soil near the drip line of plants so that the middle of the opening is 5–6 cm below the soil surface. Cut the lower opening at an angle to allow for a slightly faster delivery of water at this depth. Testing has shown that you don't have to water the whole root area to keep trees and shrubs alive. If water drains from the pipe very slowly, soil is already damp in the plant's root area. Until the tree or shrub is well established, move the pipe outwards to

the edge of the canopy as the plant grows. This allows you to get water to the root area quickly and encourages strong root growth. Mulch applied over the root area and kept back 10 cm from the stem or trunk will prevent surface evaporation.

Shrubs and trees

Where hosing time is limited, moats can be used to deliver water to trees and shrubs quickly. A moat is a rim of soil placed just outside the outer canopy of the plant. If used on young shrubs and trees, it will have to be moved outwards regularly so that it remains just outside the plant canopy.

A moat is higher than the usual saucer of soil used when planting trees or shrubs. The moat can be 5–6 cm high and the area covered with organic mulch. Water can be applied by poking a hose under the edge of the mulch and flooding the moat. This allows you to apply water quickly when you have a lot of plants to attend to.

One problem with this method is in areas of seasonal high rainfall, where you will have to remember to remove a small section of the moat to allow excess water to drain away, or your plant could suffer collar rot. This section can be replaced when the dry season begins. On sloping ground, the moat can be a crescent shape on the low side of the plant only, with soil built up high enough to hold 5 cm of water. Crescent moats do not allow excess water to build up during heavy rain so it will not have to be altered (see diagram).



Fig. 5.1 A crescent moat can prevent water run-off on sloping ground while a full-circle moat is used on level ground to conserve water. The moat area must extend beyond drip lines of plants.

Rimmed beds

An extension of the moat system are ‘rimmed’ or ‘basin’ beds used by the Native Americans to grow corn in desert areas. This method can be used for corn, silver beet, lettuce and other vegetables that require more regular watering. Topsoil in the bed is improved as much as possible using compost or other organic matter as suited to the soil texture. The rim does not have to be as high as the rim for shrubs and trees — 3 cm would be suitable. On sandy loams, unless soil is saline, beds are not raised because drainage is not a problem. Mulch the bed, including the rim. Flood the bed to 2 cm and only water again when necessary. As with other full moats, a small section will have to be temporarily removed during the wet season.

I have been told that this method is also good where water supplies contain some salt as the flooding pushes salt to the outer edges of the bed, away from plant roots. In these situations, the vegetable bed is wider than usual so that plants can sit well inside the edges of the bed and mulch is not carried to the bed edges. Raising the bed allows salt to leach below plant roots. I must confess to not having used it for this purpose as I did not know about this method when we had to use bore water on our vegetable garden.

Drought Conditions and Water Restrictions

WHERE HOSING TIME is limited, invest in a water breaker, with or without the wand, for use when hand-watering. Water breakers look like shower heads with lots of tiny holes and are the nozzles used by nurseries because they deliver maximum water with least soil disturbance, allowing you to water a lot of plants in a very short time. They are also gentle enough to water small seedlings.

Prioritise your watering

Water seedlings first, then the vegetable garden, followed by young perennials and annuals when the tips just start to droop, fruit trees as required and finally other mature plants when they need it.

Keep all your garden beds and large plant containers mulched and, if possible, move pot plants to cooler positions where they will require less watering. Group perennial pot plants together during drought to reduce watering, as groups of plants retain a more humid atmosphere. Plants in containers will also benefit from more thorough watering less often. Surprisingly, more pot plants are killed by overwatering than underwatering. When watering pot plants with a hose, a lot of

water can be wasted falling on hard surfaces around pots. Small pots can be watered by dunking in a bucket half-filled with water so that water flows just over the rim of the pot. Then hold the pot above the bucket while excess water drains off. It is surprising how many small plants can be watered with just half a bucket of water.

Skip the fertiliser

As both solid and liquid fertiliser should only be applied to damp soil and well watered after application, it won't hurt to skip fertilising during dry conditions if water use is restricted. In fact, you can do more harm than good fertilising water-stressed plants. Until conditions improve, use fertiliser only on seedlings and vegetables that are high priority for watering.

Windbreak

Even gardens that are not normally windy can get periods of hot winds, which dry gardens much faster than hot sun. When water is in short supply such gardens can suffer serious damage. There is a product available called 'Windbreak', which is made of loosely woven, weatherproof fabric to provide temporary protection in such situations. Wind protection slows water evaporation from plants and soil. The fabric ends can be tacked to tomato stakes and the screen set up quickly, when needed, to protect vulnerable parts of the garden.

Water tanks

Weather experts predict more long, dry periods in the future with rain falling more heavily for shorter periods. Water tanks allow us to take advantage of storm rainfall that would

otherwise flow down drains and out to sea. Water storage no longer has to take up a lot of garden area as tanks and water storage systems are available in a variety of shapes to suit most situations, including tanks for under-house storage and long, thin tanks that fit snugly along the side of a building. Even if your roof covering is not suitable for collecting drinking water, you can use the stored water for the garden, to top up swimming pools or wash vehicles.

Household water

In many households a lot of water is wasted while waiting for running water to warm. Put a bucket in the shower recess or jugs in sinks to catch this water before it goes down the drain. Remove the bucket before getting into the shower and use this water for vegetables or container plants so that you can use limited hose time for other parts of your garden. Don't leave water running while cleaning your teeth.

Systems to treat or filter used household water (grey water) are now available. Most of these are easier to install in new houses than existing ones. Untreated household grey water has been used on gardens by some during severe water shortages but grey water, generally speaking, can do a lot of damage to gardens. Your great-grandmother probably threw the laundry water over her lemon tree to remove scale insects, but that water contained real soap and washing soda. It had also been boiled, which killed pathogens. Modern detergents can be very alkaline and some contain ingredients that are not beneficial to plants or soil organisms. If you have a washing machine that allows you to divert water from various parts of the washing cycle, the water from a deep-rinse cycle is probably the safest to use in an emergency, or bath water which still looks fairly clean. Kitchen water is not suitable for

garden use unless it has just been used for rinsing vegetables. Untreated grey water must not be used on food crops and is too alkaline for seedlings, pot plants, natives, camellias, azaleas and lawns.

Saline water supply

Water high in any type of salt can cause serious problems in gardens. Improving your soil will help to prevent salt build-up. Avoid using sprinklers as they increase the problem. Good saturation with soaker hoses and water breakers prevents salt build-up and you can try using rimmed beds. Seeds and seedlings should be watered with drinking water as they are very sensitive to salt. If you are a keen gardener, it may be worthwhile installing a water tank and use stormwater on your garden, otherwise your choice of plants becomes limited. The following plants are known to be salt-sensitive: French beans, broad beans, peas, lettuce, parsnip, radish, sweet potato, strawberries, raspberries, avocados, apples, pears, almonds, peaches, plums, apricots and citrus.

Don't forget the wildlife

During drought conditions wildlife can be short of water as creeks and dams start to dry up. In metropolitan areas, changing from sprinklers to drip irrigation can also deprive birds and beneficial insects of a water source. This was brought home to me many years ago when we lived in a low-rainfall area with no natural water courses. I spotted a solitary bee meandering across the bottom of a dry bird bath so I filled the bath with tank water and shortly after the bee flew away. I was most surprised, five or so minutes later, to see the rim of the bird bath thick with bees who were enjoying the water. Insect-eating birds and beneficial insects

are valuable visitors to gardens, so spare some clean water for them on a permanent basis. Water for birds will have to be safe from cats, or they will not use it. Chlorinated swimming pools are not a suitable water source for birds, insects or frogs. If you are finding dead bees in your swimming pool, you definitely need a bird bath.

Frogs are not only valuable visitors to gardens, they are also an indicator of a healthy environment. During drought, breeding is reduced and frogs hide to keep cool, but they will be the first to tell you when rain is on the way. Frogs need a more secluded water source. A semi-shaded pond with some overhanging foliage and no fish provides them with water and a breeding place. If you don't have a pond, a large bowl of water with a couple of ferns or bromeliads beside it in the shadiest part of the garden or shade house will provide them with a suitable water source, especially if you add a water plant to the bowl to keep the water oxygenated. If the container is large enough for tadpoles, they will probably breed in it. Large concrete pots or laundry tubs with sealed drainage holes make popular frog ponds. Don't worry about mosquitoes breeding; the frogs and tadpoles will clean those up. Some frogs live happily in the base of water reservoir pots, but these are not deep enough for breeding purposes.

Lawns

Maintaining vast expanses of lush, green lawn requires a lot of water and time, and is really only for those who are blessed with good, regular rainfall. Otherwise, the lawn can end up owning you and, let's be honest, there are far more interesting aspects to gardening than looking after grass.

Lawn grasses are very competitive for moisture and nutrients, and some contain compounds that deter the growth of other plants. Shrubs and trees grown in lawn areas require a broad margin between the plant canopy and the lawn, especially while young. We have all seen weedy little trees that don't seem to get much larger growing in lawns.

Don't worry too much about the lawn if water is in short supply. Lawns brown-off before the weeds they contain so it can be a good opportunity to spot weeds growing in your lawn and dig them out. At times when water is limited, it is more beneficial to keep other plants alive and let the lawn fend pretty much for itself, except for a small area where children play. Most unwatered established lawns go into a state of dormancy, rather than dying. Looking out over the district following an 18 mm shower after a long, dry period, I noticed that grass was green as far as the eye could see, yet the eucalypts looked almost deciduous because the soil watertable was still below their roots. Many grasses are very resilient and bounce back quickly after a shower of rain. These are the species more suited to our climate and your local nursery will be able to assist you in choosing the correct one for your microclimate.

New lawns are very sensitive to irregular watering and difficult to establish during water restrictions. Defer planting lawn or laying turf until conditions improve. If the sight of yellow grass drives you crazy, you may want to downsize your lawn area. Considering a lawn's light requirements in Cool and Temperate Zones, your lawn is probably covering the perfect spot for your vegetable garden.

Mulching Your Garden

MULCHING IS ONE of the most important tasks in Australian gardens, as bare earth cultivation is very damaging in most areas of the country. Ideally, mulch should be laid down as soon as soil warms to protect plants from summer heat. Outdoor pot plants, too, will benefit from mulch in hot, dry conditions if they can't be moved to slightly cooler positions. As well as slowing water evaporation, mulch prevents surface soil crusting, which inhibits water penetration and wastes a lot of water. A layer of mulch 5–7 cm thick will prevent humus washing from soil in heavy rain and insulate soil against temperature fluctuations, providing cool conditions suitable for earthworms. Leaf moulds and shredded autumn leaves used as mulch can be applied more thinly. Mulching will also discourage weed growth around plants and many plants resent cultivation in their root area. You won't need to water as often, saving you time with watering and weeding, and saving you money in water usage.

In warmer areas mulch should be laid down as beds are prepared to prevent weeds taking over in the time between preparation and planting. Mulching after bed preparation also allows earthworms and beneficial bacteria to get working on the organic matter dug into the bed. Where plants need frequent applications of water or fertiliser, as in vegetable gardens, fluffed-up 'sausages' of mulch between rows are more practical than around each plant. Semi-tropical gardens will benefit from mulch all year round; mulch prevents heavy summer rain leaching nutrients from soil and water evaporation during dry seasons.

As mulch can slow the warming of soil, gardeners in Cool Zones can apply mulch during spring when soil is warm enough for planting. They may have to weed the bed first, or

move mulch aside a week or so before planting to allow the soil to warm. In all zones, mulch should only be applied after rain or a thorough watering. Always keep mulch 10 cm clear of shrub and tree stems, and extend mulch beyond the drip line of these plants. Top up mulch as required.

Types of mulch

Organic mulches are the best for your garden. Important mycorrhizal fungi that live on decomposing organic matter will be present in soil where organic mulch is used. Mulch hay, straw, sugarcane residue, spent mushroom compost, lemon-grass tops, grass clippings, green manures, cover crops, well-rotted animal manures and spent crops can be used as mulch to protect soil and provide food for earthworms who break it down into fertiliser. Grass clippings from the lawnmower catcher can form a dense mat, so allow them to wilt before using as mulch. Mature compost can also be used as mulch. Plants can use it immediately, as it has already been processed by earthworms.

Mulch hay, straw and sugarcane residue are usually supplied in compressed bales to allow for packaging or tying. Hay, in particular, comes apart in smaller wads, called biscuits. Biscuits are tightly packed mulch and, placed on garden beds, form a thick mat that cannot be penetrated by water. Tease apart biscuits before using as mulch. A dense mat is not necessary when applying mulch; a small amount of fluffed up mulch retains ample soil moisture in topsoil to allow seeds to germinate. Stock up on organic mulch early as it can be hard to find once dry conditions set in. If bales are kept dry, they should last at least twelve months.

Some gardeners resist using organic mulch because they think it makes their garden look untidy and has to be replaced each year. Organic mulches need regular replacement because they break down to enrich the soil and improve its structure without you having to pick up a spade. This process results in a much healthier garden. Using well-rotted animal manures as mulch is nature's slow-release fertiliser system, and some plants require little or no fertiliser other than the mulch. When well-rotted manures and compost are used as mulch, they should always be covered with a 2–3-cm layer of hay or grass clippings. These materials are full of living organisms that will die if allowed to dry out.

Try to vary the type of organic mulch used on your garden to ensure it receives a good variety of nutrients as the mulch breaks down. Another complaint about organic mulch is that it can harbour garden pests such as snails and slugs. This is true, but organic mulch also provides hiding places for pest predators. When working in the garden we occasionally find frogs and lizards who enjoy dining on snails and slugs. As the initial stages of organic mulch decomposition may create a temporary nitrogen shortage if your soil is low in nutrients, an application of organic nitrogen-rich fertiliser such as manure tea will overcome the shortage until earthworms are producing fertiliser.

A thick layer of twigs can be used as a long-term mulch in orchards and shrub beds to slow water evaporation in dry conditions. Gravel and pebbles can be used as a long-term mulch in suitable areas. These materials are not suitable for gardens where plants are changed regularly. Larger stones are an excellent mulch for permanent parts of gardens. A layer of pebbles thick enough to keep soil damp makes an attractive

mulch for pot plants and the pebbles can be removed easily when repotting is required.

Uncomposted wood chips, shavings, sawdust and pine bark placed directly onto soil will cause a nitrogen shortage during the breakdown process because they take longer to decompose but, in severe weather conditions, they can be better than nothing. Pine bark, which has been very popular for many years, leaches tannins that are toxic to some plants. Pine bark and eucalyptus wood chips also contain oils that encourage soils to become water-repellent if other organic matter is not present. Use eucalyptus leaf litter only on bushland native varieties. These materials are usually laid over black plastic or weed mat to slow decomposition and prevent soil nitrogen shortage. Sheeting can only be used in flat areas as mulch has a tendency to slide off the smooth surface of the plastic or weed mat on sloping ground.

Black plastic is not suitable as a permanent mulch because it deprives soil of natural rainfall, prevents humus being added to soil and makes manual watering more difficult. Soil under the plastic eventually becomes sour. Uncovered black plastic can become very hot and may cook plant roots in some conditions. It can, however, be used effectively to kill off weeds that are perennial pests.

In areas where you just want to deter weeds, flattened cardboard cartons can be used as a temporary mulch. Weed mat is only a temporary solution as mulch. Although it does allow some water penetration, it also prevents humus being added to soil and makes soil very hot when it is not covered with another material. Cover material over weed mat gradually builds up small leaf litter and wind-blown soil,

allowing weed seeds to germinate. Weed roots are able to penetrate weed mat.

A species of termite called *Schedorhinotermes intermedius* is fond of using woodchip and pine-bark mulch as a temporary refuge and food source before proceeding to more substantial timber structures on your property. This type of mulch should be raked vigorously several times a year to ensure termites have not set up house.

Mulch in colder months

There is great difference in opinion among gardeners on whether to leave mulch on gardens in winter. The answer depends a lot on your microclimate and the type of plants in your garden. In some plant species new growth is stimulated by soil temperature, while the amount of light received by buds is the stimulation required by others. If soil temperature is the important factor, regrowth can be deferred until frost danger has passed by keeping soil cool.

Mulch acts the same way as insulation in the roof of your house. It makes changes in soil temperature slower and less dramatic. Organic mulch in autumn keeps soil slightly warmer, thus prolonging the growing period. When frosts occur, frost will form on the top of mulch but it will also form on moist, bare ground, which is why you should not water the garden in the afternoon in cold weather. At sunrise, the soil temperature 8 cm under mulch can be 4°C higher than on bare ground. However, by midday, bare earth will have warmed far more than soil under mulch, but the temperature of bare earth will fall more dramatically at sunset. Where frosts are not a consideration, remaining mulch can be left on the garden through winter.

In some vineyards and where deciduous plants have frost-tender buds, bare soil is usually maintained during winter because heat absorbed by soil during the day is slowly released at night, allowing air above soil on a still night to remain 1–2°C higher than mulched soil nearby. This practice can be helpful on flat ground where spring frosts occur close to bud-burst and cold air cannot drain away.

Some plants such as spring bulbs are usually mulched because they need cool soil temperatures to produce good flowering, yet bulbs can pop out of frozen soil. Established roses are usually mulched during winter because it is believed to reduce ‘black spot’ damage. Nature also provides deciduous trees in the wild with a mulch of their own leaves during winter. These are trees and shrubs which need a resting period and cooler soil allows this. Herbaceous perennials are mulched after cutting back in autumn. In very cold areas, herbaceous perennials and artichokes are completely covered with mulch and soil is banked around them. French tarragon and strawberries can be completely covered with straw in very cold areas. Carnations and pinks do not like being mulched in cold, wet conditions. Pansies also need a bit of a chill to promote good flowering although modern hybrids perform fairly well in most areas.

In Cool Zones in sheltered areas, we can use the soil’s ability to trap warmth and get an early start on planting by applying straw mulch to a small patch of frost-hardy vegetables and annuals in the afternoon and removing it in the morning after frost has melted. Lettuce, English spinach and some varieties of cabbage germinate at fairly low temperatures.

Drought-tolerant Plants

DURING MORE THAN two years of drought in our area, we had to use our limited water supply for marketable food crops and our vegetable garden. Consequently, our acre of decorative garden consisting of both natives and exotics had to rely, after mulching, on limited rainfall for survival. Everything survived, except for one young mango tree, but our collection of Hawaiian hibiscus and tibouchinas were not happy about the conditions. However, the drought has produced some unexpected results, particularly in plants which are supposed to require regular irrigation. The two species which surprised us most were gardenias and common violets. Some gardenias suffered an occasional bout of sooty mould but recovered without treatment. The violets proved remarkably hardy, surviving on rainfall alone. Most of them are self-sown and don't grow in garden beds.

Well-established roses, at least seven years old, did remarkably well, too. Younger roses required an occasional watering to keep them going, while plumbagos and Mock Orange growing in part-shade under tall trees have done well on just rainfall for the whole drought period. I don't suggest for a moment that you deny your garden regular irrigation but you can see that you do not have to water an established garden every day. By encouraging a strong root system, keeping soil as healthy as possible and selecting plants that suit your climate, you can have an attractive garden without using a lot of water.

The following list of shrubs and trees have a reputation for being drought-tolerant and are able to survive on natural rainfall when mature. Australian natives feature strongly in this list. Many have tough, leathery or modified leaves which reduce water loss in hot, dry conditions. They also have a

dual root system that allows them to draw moisture from deep in the subsoil during drought, and a fibrous root system in more aerated topsoil when subsoil is saturated. Young native seedlings in the wild usually start life where nature has provided leaf litter, decaying roots or animal droppings for humus, because many are mycorrhiza-dependent. Using herbicides, pesticides or fungicides where these plants are grown only reduces their ability to survive drought conditions. Many palms start life in the shadow of a parent and will not do well if planted alone in hot sun. Most succulents will survive light frosts.

All young plants will benefit from good planting practice (see [chapter 4](#)) and organic growing methods. Plants expected to survive with minimal watering should be protected with organic mulch. In open, windy areas, use large stones as mulch. Young plants will benefit from an occasional deep watering until established. Shrubs in the list may require some watering in prolonged dry conditions because they have smaller root systems.

This list is certainly not complete. I have deliberately omitted some plants because they have become environmental pests in Australia or they are toxic to humans or stock. Silky Oak can suddenly topple when soil loosens during storms after a drought period and eucalypts will drop limbs in an effort to conserve moisture during drought. Consequently, large trees should not be planted close to buildings or thoroughfares. I have only included cypresses that are resistant to cypress canker because this disease is more likely to occur under stressful conditions. I have also left out the African Tulip Tree and the native mint bushes. They may survive drought

conditions but they look very sad and appreciate regular watering.

DROUGHT-TOLERANT PLANTS FOR AUSTRALIAN GARDENS

(A) Australian native

(D) Deciduous

F/T Frost tender

(NZ) New Zealand native

* Requires a light soil

F/H Frost hardy

SMALL SHRUBS AND PLANTS

- BOTANICAL NAME: *Acacia acinacea* (A)
HEIGHT: 1-2m
COMMON NAME: Gold-dust Wattle
- BOTANICAL NAME: *Acacia drummondii* (A)
HEIGHT: 1-2m
COMMON NAME: Drummond's Wattle
- BOTANICAL NAME: *Acacia myrtifolia* (A)
HEIGHT: 1-2m
COMMON NAME: Myrtle Wattle
- BOTANICAL NAME: *Agapanthus praecox orientalis*

HEIGHT: 1m

COMMON NAME: Lily of the Nile

NOTES: aka African lily

- BOTANICAL NAME: *Agave americana*

HEIGHT: 1-2m

COMMON NAME: American Aloe

- BOTANICAL NAME: *Alyogyne hakeifolia* (A)

HEIGHT: 1-2m

COMMON NAME: Desert Rose

- BOTANICAL NAME: *Baeckea ramosissima* (A)

HEIGHT: 0.3m

COMMON NAME: Rosy Heath Myrtle

NOTES: Shelter from wind

- BOTANICAL NAME: *Banksia ornata* (A)

HEIGHT: 1-2m

COMMON NAME: Desert Banksia*

- BOTANICAL NAME: *Berberis aggregata* (D)

HEIGHT: 1-1.5m

COMMON NAME: Chinese Barberry

NOTES: Alkaline soil (spines)

- BOTANICAL NAME: *Berberis x rubrostilla* (D)

HEIGHT: 1.5m

COMMON NAME:

NOTES: Red autumn leaves

- BOTANICAL NAME: *Berberis thunbergii* (D)

HEIGHT: 1m

COMMON NAME: Japanese Barberry

NOTES: (spines)

- BOTANICAL NAME: *B. t. 'Atropurpurea'* (D)

HEIGHT: 1m

COMMON NAME: Purple Japanese Barberry

NOTES: (spines)

- BOTANICAL NAME: *Berberis wilsoniae* (D)

HEIGHT: 1m

COMMON NAME: Wilson's Barberry

NOTES: Good autumn colour

- BOTANICAL NAME: *Calocephalus brownii* (A)

HEIGHT: 0.6m

COMMON NAME: Cushion Bush

- BOTANICAL NAME: *Capparis spinosa* (A)

HEIGHT: 1m

COMMON NAME: Caper Bush

- BOTANICAL NAME: *Carpobrotus chiliensis*

HEIGHT: 0.15m

COMMON NAME: Sea Fig

NOTES: Good beach plant

- BOTANICAL NAME: *Cassia artemisioides* (A)

HEIGHT: 1.5m

COMMON NAME: Silver Cassia*

- BOTANICAL NAME: *Cassia nemophila* (A)

HEIGHT: 1-2m

COMMON NAME: Desert Cassia*

- BOTANICAL NAME: *Cassia sturtii* (A)

HEIGHT: 1.5m

COMMON NAME: Sturt's Cassia

NOTES: Not Tas.

- BOTANICAL NAME: *Chrysanthemum frutescens*

HEIGHT: 1m

COMMON NAME: Marguerite Daisy

- BOTANICAL NAME: *Cistus spp.*

HEIGHT: 1-2m

COMMON NAME: Rock Rose

- BOTANICAL NAME: *Dampiera rosmarinifolia* (A)

HEIGHT: 1m

COMMON NAME:

NOTES: Blue-purple flowers

- BOTANICAL NAME: *Drosanthemum floribundum*

HEIGHT: 0.15m

COMMON NAME: Small-flowered Pigface

NOTES: Succulent

- BOTANICAL NAME: *Dryandra nana* (A)

HEIGHT: 0.6m

COMMON NAME: Small Dryandra

NOTES: Acid soils

- BOTANICAL NAME: *Echeveria spp.*

HEIGHT: 0.3m

COMMON NAME: Rosette succulents*

NOTES: Light frost only

- BOTANICAL NAME: *Echinocereus spp.*

HEIGHT: 0.5m

COMMON NAME: Hedgehog Cactus*

NOTES: Light frost only

- BOTANICAL NAME: *Eremophila debilis* (A)

HEIGHT: 0.6m

COMMON NAME: Amulla

NOTES: F/H

- BOTANICAL NAME: *Erica lusitanica*

HEIGHT: 1-3m

COMMON NAME: Spanish Heath*

- BOTANICAL NAME: *Erica melanthera*

HEIGHT: 1-2m

COMMON NAME: Purple Heath*

- BOTANICAL NAME: *Euryops spp.*

HEIGHT: 1m

COMMON NAME:

NOTES: Yellow daisies

- BOTANICAL NAME: *Felicia angustifolia*

HEIGHT: 1m

COMMON NAME: Blue Daisy

- BOTANICAL NAME: *Gazania hybrida*

HEIGHT: 0.2m

COMMON NAME: Treasure Flower

NOTES: F/T

- BOTANICAL NAME: *Gompholobium latifolium* (A)

HEIGHT: 1.5m

COMMON NAME: Golden Glory Pea

NOTES: Some shade
- BOTANICAL NAME: *Grevillea alpina* (A)

HEIGHT: 1m

COMMON NAME: Alpine Grevillea
- BOTANICAL NAME: *Grevillea aquifolium* (A)

HEIGHT: 1-1.5m

COMMON NAME: Holly Grevillea
- BOTANICAL NAME: *Grevillea dryandri* (A)

HEIGHT: 0.5m

COMMON NAME: Dryander's Grevillea
- BOTANICAL NAME: *Grevillea lavandulacea* (A)

HEIGHT: 0.9m

COMMON NAME: Lavender Grevillea
- BOTANICAL NAME: *Grevillea thelemanniana* (A)

HEIGHT: 1m

COMMON NAME: Hummingbird Bush

NOTES: aka Spider-net Grevillea

- BOTANICAL NAME: *Grevillea wilsonii* (A)
HEIGHT: 1.5m
COMMON NAME: Wilson's Grevillea
- BOTANICAL NAME: *Hardenbergia spp.* (A)
HEIGHT: 3m
COMMON NAME: Native Sarsaparilla
NOTES: Ground cover F/T
- BOTANICAL NAME: *Hebe spp.* (NZ)
HEIGHT: 0.3-2m
COMMON NAME: Veronica
NOTES: Some F/T
- BOTANICAL NAME: *Helichrysum spp.*
HEIGHT: 0.3m
COMMON NAME: Paper Daisy
- BOTANICAL NAME: *Hypericum calycinum*
HEIGHT: 0.3m
COMMON NAME: Rose of Sharon
- BOTANICAL NAME: *Indigofera australis* (A)
HEIGHT: 1-2m
COMMON NAME: Australian Indigo
NOTES: Fast

- BOTANICAL NAME: *Isopogon dubius* (A)
HEIGHT: 1m
COMMON NAME: Rosy Cone Flower
NOTES: V. pretty Light frost only
- BOTANICAL NAME: *Juniperus horizontalis*
HEIGHT: 0.6m
COMMON NAME: Creeping Juniper
NOTES: Alkaline soils
- BOTANICAL NAME: *Juniperus sabina*
HEIGHT: 0.9m
COMMON NAME: Savin Juniper
NOTES: Alkaline soils
- BOTANICAL NAME: *Kunzea pomifera* (A)
HEIGHT: 0.5m
COMMON NAME: Muntries
NOTES: Grnd cover Cool & Temp
- BOTANICAL NAME: *Lampranthus spp.*
HEIGHT: 0.3m
COMMON NAME: Pigface
NOTES: aka Iceplant - succulent
- BOTANICAL NAME: *Lasiopetalum behrii* (A)

HEIGHT: 1m

COMMON NAME: Pink Velvet Bush*

- BOTANICAL NAME: *Lavandula dentata*

HEIGHT: 1m

COMMON NAME: French Lavender

NOTES: aka Toothed Lavender

- BOTANICAL NAME: *Lavandula stoechas*

HEIGHT: 0.6m

COMMON NAME: Italian Lavender

NOTES: aka Spanish Lavender

- BOTANICAL NAME: *Leptospermum rotundifolium* (A)

HEIGHT: 1-2m

COMMON NAME: Round-leafed Tea-tree*

- BOTANICAL NAME: *Leucopogon virgatus* (A)

HEIGHT: 0.5m

COMMON NAME: Common Beard Heath*

- BOTANICAL NAME: *Limonium spp.*

HEIGHT: 0.5-2m

COMMON NAME: Statice

- BOTANICAL NAME: *Mahonia aquifolium*

HEIGHT: 1.2m

COMMON NAME: Oregon Grape

- BOTANICAL NAME: *Melaleuca lateritia* (A)

HEIGHT: 1-2m

COMMON NAME: Robin Red Breast Bush

- BOTANICAL NAME: *Melaleuca pulchella* (A)

HEIGHT: 1m

COMMON NAME: Claw Flower

- BOTANICAL NAME: *Melaleuca steedmanii* (A)

HEIGHT: 1.5m

COMMON NAME:

NOTES: Deep red flowers F/H

- BOTANICAL NAME: *Melaleuca thymifolia* (A)

HEIGHT: 1m

COMMON NAME: Thyme Honey Myrtle

- BOTANICAL NAME: *Micromyrtus ciliata* (A)

HEIGHT: 0.6m

COMMON NAME: Rockgarden Myrtle

- BOTANICAL NAME: *Myoporum acuminatum* (A)

HEIGHT: 1-2m

COMMON NAME: Water Bush

- BOTANICAL NAME: *Myoporum parvifolium* (A)

HEIGHT: 0.3m

COMMON NAME: Creeping Boobialla

NOTES: Ground cover

- BOTANICAL NAME: *Pelargonium spp.*

HEIGHT: 1m

COMMON NAME: Geranium

- BOTANICAL NAME: *Phebalium stenophyllum* (A)

HEIGHT: 1.2m

COMMON NAME:

NOTES: Yellow star flowers

- BOTANICAL NAME: *Philotheca myoporoides* (A)

HEIGHT: 1m

COMMON NAME: Long-leaf Wax Flower*

- BOTANICAL NAME: *Philotheca verrucosa* (A)

HEIGHT: 1m

COMMON NAME: Fairy Wax Flower*

- BOTANICAL NAME: *Phlomis fruticosa*

HEIGHT: 1m

COMMON NAME: Jerusalem Sage

- BOTANICAL NAME: *Pimelea octophylla* (A)

HEIGHT: 0.6-1m

COMMON NAME: Downy Rice Flower*

NOTES: F/T

- BOTANICAL NAME: *Podalyria sericea*

HEIGHT: 1.2m

COMMON NAME: Silky Podalyria*

NOTES: Not Cool Zones

- BOTANICAL NAME: *Pultenaea pedunculata* (A)

HEIGHT: 0.1m

COMMON NAME: Matted Pea Bush

NOTES: Ground cover

- BOTANICAL NAME: *Pultenaea scabra* (A)

HEIGHT: 1m

COMMON NAME: Pea Bush

- BOTANICAL NAME: *Rosmarinus officinalis*

HEIGHT: 1.2m

COMMON NAME: Rosemary

- BOTANICAL NAME: *Ruscus aculeatus*

HEIGHT: 1m

COMMON NAME: Butcher's Broom

- BOTANICAL NAME: *Salvia grahamii*

HEIGHT: 1.2m

COMMON NAME: Red Sage

- BOTANICAL NAME: *Santolina chamaecyparissus*

HEIGHT: 0.6m

COMMON NAME: Lavender Cotton

- BOTANICAL NAME: *Solanum pseudocapsicum*

HEIGHT: 1m

COMMON NAME: Jerusalem Cherry

NOTES: Poisonous berries

- BOTANICAL NAME: *Swainsona canescens* (A)

HEIGHT: 0.6m

COMMON NAME: Grey Swainson Pea

NOTES: Violet flowers

- BOTANICAL NAME: *Swainsona formosa* (A)

HEIGHT: 1m

COMMON NAME: Sturt's Desert Pea*

NOTES: Red and black flowers

- BOTANICAL NAME: *Swainsona greyana* (A)
HEIGHT: 1m
COMMON NAME: Darling Pea
NOTES: Pink flowers - heavy soils
- BOTANICAL NAME: *Templetonia retusa* (A)
HEIGHT: 1-2m
COMMON NAME: Red Templetonia*
- BOTANICAL NAME: *Tetralthea pilosa* (A)
HEIGHT: 0.3m
COMMON NAME: Black-eyed Susan
- BOTANICAL NAME: *Thryptomene calycina* (A)
HEIGHT: 1-2m
COMMON NAME: Grampians Thryptomene*
- BOTANICAL NAME: *Thymus spp.*
HEIGHT: 0.3m
COMMON NAME: Thyme
NOTES: Ground cover or border
- BOTANICAL NAME: *Westringia fruticosa* (A)
HEIGHT: 1-1.5m
COMMON NAME: Coastal Rosemary

- BOTANICAL NAME: *Xanthorrhoea australis* (A)

HEIGHT: 1m

COMMON NAME: Grass Tree

NOTES: Plant when small

LARGE SHRUBS

- BOTANICAL NAME: *Acacia decora* (A)

HEIGHT: 3m

COMMON NAME: Showy Wattle

- BOTANICAL NAME: *Alyogyne huegelii* (A)

HEIGHT: 2m

COMMON NAME: Blue Hibiscus

- BOTANICAL NAME: *Atriplex nummularium* (A)

HEIGHT: 2-3m

COMMON NAME: Old Man Saltbush

NOTES: Hedge or low windbreak

- BOTANICAL NAME: *Baeckea virgata* (A)

HEIGHT: 2-3m

COMMON NAME:

NOTES: White tea-tree flowers

- BOTANICAL NAME: *Banksia ericifolia* (A)

HEIGHT: 3m

COMMON NAME: Heath Banksia*

- BOTANICAL NAME: *Beaucarnea recurvata*

HEIGHT: 2m

COMMON NAME: Elephant's Foot Palm

NOTES: Not Cool Zones

- BOTANICAL NAME: *Berberis sargentiana* (D)

HEIGHT: 2m

COMMON NAME: Sargent's Barberry

NOTES: (spines)

- BOTANICAL NAME: *Brachysema lanceolatum* (A)

HEIGHT: 2m

COMMON NAME: Swan River Pea

- BOTANICAL NAME: *Buddleja alternifolia*

HEIGHT: 2-4m

COMMON NAME: Fountain Buddleja

NOTES: Attracts butterflies

- BOTANICAL NAME: *Buddleja salviifolia*

HEIGHT: 2.5m

COMMON NAME: Winter Buddleja

NOTES: Attracts butterflies

- BOTANICAL NAME: *Buxus microphylla*
HEIGHT: 2m
COMMON NAME: Japanese Box
NOTES: Poisonous to stock
- BOTANICAL NAME: *Caesalpinia gilliesii*
HEIGHT: 2.5m
COMMON NAME: Bird of Paradise Tree
NOTES: Legume F/T
- BOTANICAL NAME: *Calliandra tweedii*
HEIGHT: 3m
COMMON NAME: Powder Puff
- BOTANICAL NAME: *Callistemon acuminatus* (A)
HEIGHT: 3m
COMMON NAME: Thin-leafed Bottlebrush
- BOTANICAL NAME: *Callistemon phoeniceus* (A)
HEIGHT: 2-3m
COMMON NAME: Lesser Bottlebrush
- BOTANICAL NAME: *Callistemon salignus* (A)
HEIGHT: 4m
COMMON NAME: Pink Tips

- BOTANICAL NAME: *Callistemon teretifolius* (A)
 HEIGHT: 2-3m
 COMMON NAME: Needle-leafed Bottlebrush
- BOTANICAL NAME: *Calothamnus spp.* (A)
 HEIGHT: 2-3m
 COMMON NAME: Net Bush*
- BOTANICAL NAME: *Cantua buxifolia*
 HEIGHT: 2-3m
 COMMON NAME: Flower of Incas*
- BOTANICAL NAME: *Chaenomeles speciosa*
 HEIGHT: 2m
 COMMON NAME: Japonica
 NOTES: Semi-deciduous
- BOTANICAL NAME: *Chamelaucium uncinatum* (A)
 HEIGHT: 2m
 COMMON NAME: Geraldton Wax
- BOTANICAL NAME: *Chamaerops humilis*
 HEIGHT: 2m
 COMMON NAME: Mediterranean Palm
 NOTES: Temp Zones only

- BOTANICAL NAME: *Coprosma repens* (NZ)
HEIGHT: 3m
COMMON NAME: Taupata or Mirror Plant
NOTES: Fast hedge
- BOTANICAL NAME: *Cytisus spp.*
HEIGHT: 2-6m
COMMON NAME: Broom
- BOTANICAL NAME: *Dodonaea viscosa* (A)
HEIGHT: 2-3m
COMMON NAME: Sticky Hopbush
NOTES: Warm & Temp Zones
- BOTANICAL NAME: *D. v. 'Purpurea'* (NZ)
HEIGHT: 3m
COMMON NAME: Purple Hopbush
NOTES: Temp Zones
- BOTANICAL NAME: *Doryanthes excelsa* (A)
HEIGHT: 2m
COMMON NAME: Gynea Lily
NOTES: Flower stem - 5m
- BOTANICAL NAME: *Doryanthes palmeri* (A)
HEIGHT: 2m

COMMON NAME: Spear Lily

NOTES: Arching flower stem

- BOTANICAL NAME: *Dryandra mucronulata* (A)

HEIGHT: 2m

COMMON NAME: Swordfish Dryandra

NOTES: Acid soils

- BOTANICAL NAME: *Elaeagnus pungens*

HEIGHT: 2-3m

COMMON NAME: Silverberry

- BOTANICAL NAME: *Eremophila deserti* (A)

HEIGHT: 1-3m

COMMON NAME: Turkey Bush

- BOTANICAL NAME: *Eremophila spp.* (A)

HEIGHT: 0.6-5m

COMMON NAME: Emu Bush

NOTES: Heavy soils Some toxic

- BOTANICAL NAME: *Eucalyptus burdettiana* (A)

HEIGHT: 3m

COMMON NAME: Burdett's Gum*

- BOTANICAL NAME: *Eucalyptus crucis* (A)

HEIGHT: 3-6m

COMMON NAME: Silver Mallee*

- BOTANICAL NAME: *Eucalyptus desmondensis* (A)

HEIGHT: 3-5m

COMMON NAME: Desmond Mallee

- BOTANICAL NAME: *Eucalyptus forrestiana* (A)

HEIGHT: 2-4m

COMMON NAME: Fuchsia Gum

NOTES: Hedge or windbreak F/H

- BOTANICAL NAME: *Eucalyptus grossa* (A)

HEIGHT: 2-3m

COMMON NAME: Coarse-leaved Mallee

NOTES: Clay soils

- BOTANICAL NAME: *Eucalyptus kruseana* (A)

HEIGHT: 2-3m

COMMON NAME: Bookleaf Mallee

NOTES: F/T when young

- BOTANICAL NAME: *Eucalyptus lehmannii* (A)

HEIGHT: 5-8m

COMMON NAME: Bushy Yate

NOTES: Windbreak Limbs drop

- BOTANICAL NAME: *Eucalyptus nutans* (A)
HEIGHT: 3-4m
COMMON NAME: Nodding Gum*
NOTES: Red flowers Fast hedge
- BOTANICAL NAME: *Eucalyptus oldfieldii* (A)
HEIGHT: 2-3m
COMMON NAME: Oldfield's Mallee*
- BOTANICAL NAME: *Eucalyptus pyriformis* (A)
HEIGHT: 3m
COMMON NAME: Pear-fruited Mallee*
NOTES: F/T when young
- BOTANICAL NAME: *Eucalyptus tetraptera* (A)
HEIGHT: 2-4m
COMMON NAME: Four-winged Mallee
- BOTANICAL NAME: *Eucalyptus viridis* (A)
HEIGHT: 2-4m
COMMON NAME: Green Mallee
- BOTANICAL NAME: *Euphorbia pulcherrima* (D)
HEIGHT: 2-3m
COMMON NAME: Poinsettia
NOTES: Sap toxic - F/T

- BOTANICAL NAME: *Euphorbia spp.*

HEIGHT: 0.5 -5m

COMMON NAME: Spurge

NOTES: Sap toxic
- BOTANICAL NAME: *Goodia latifolia* (A)

HEIGHT: 2m

COMMON NAME: Clover Tree
- BOTANICAL NAME: *Grevillea macrostylis* (A)

HEIGHT: 2-3m

COMMON NAME: Mt. Barren Grevillea
- BOTANICAL NAME: *Grevillea pterosperma* (A)

HEIGHT: 2-3m

COMMON NAME:

NOTES: White flowers
- BOTANICAL NAME: *Grevillea rosmarinifolia* (A)

HEIGHT: 2m

COMMON NAME: Rosemary Grevillea
- BOTANICAL NAME: *Hakea sulcata* (A)

HEIGHT: 2-2.5m

COMMON NAME:

NOTES: Small purple flowers

- BOTANICAL NAME: *Hakea undulata* (A)
HEIGHT: 2-2.5m
COMMON NAME:
NOTES: Cream flowers
- BOTANICAL NAME: *Hakea victoriae* (A)
HEIGHT: 2-4m
COMMON NAME: Royal Hakea
- BOTANICAL NAME: *Hakea vittata* (A)
HEIGHT: 2-4m
COMMON NAME:
NOTES: Striped pods
- BOTANICAL NAME: *Hibiscus heterophyllus* (A)
HEIGHT: 2.5m
COMMON NAME:
NOTES: White flowers, red throat
- BOTANICAL NAME: *Jacksonia floribunda* (A)
HEIGHT: 3m
COMMON NAME: Holly Pea
- BOTANICAL NAME: *Kunzea ambigua* (A)
HEIGHT: 4m
COMMON NAME: Tick Bush

NOTES: Cool & Temp Zones

- BOTANICAL NAME: *Lambertia formosa* (A)
HEIGHT: 2m
COMMON NAME: Mountain Devil*
- BOTANICAL NAME: *Leptospermum squarrosum* (A)
HEIGHT: 2m
COMMON NAME: Peach-flowered Tea-tree*
- BOTANICAL NAME: *Melaleuca decussata* (A)
HEIGHT: 2-4m
COMMON NAME:
NOTES: Mauve flowers
- BOTANICAL NAME: *Melaleuca elliptica* (A)
HEIGHT: 3m
COMMON NAME: Granite Honey Myrtle
NOTES: Red flowers
- BOTANICAL NAME: *Melaleuca fulgens* (A)
HEIGHT: 2m
COMMON NAME: Scarlet Honey Myrtle
- BOTANICAL NAME: *Melaleuca hypericifolia* (A)
HEIGHT: 2-4m

COMMON NAME:

NOTES: Orange-red flowers

- BOTANICAL NAME: *Melaleuca macrorycha* (A)

HEIGHT: 2-3m

COMMON NAME: Long-claw Paperbark

NOTES: Not Cool Zones

- BOTANICAL NAME: *Melaleuca nesophila* (A)

HEIGHT: 2-3m

COMMON NAME: Showy Honey Myrtle

NOTES: aka Lavender Paperbark

- BOTANICAL NAME: *Melaleuca radula* (A)

HEIGHT: 2m

COMMON NAME: Graceful Honey Myrtle

- BOTANICAL NAME: *Melaleuca wilsonii* (A)

HEIGHT: 2m

COMMON NAME: Common Honey Myrtle

- BOTANICAL NAME: *Melianthus major*

HEIGHT: 2-3m

COMMON NAME: Large Honey Flower

- BOTANICAL NAME: *Metrosideros excelsus* (NZ)

HEIGHT: 3m

COMMON NAME: Pohutukawa

NOTES: Slow growing in pots

- BOTANICAL NAME: *Nitaria schoberii* (A)

HEIGHT: 2m

COMMON NAME: Dillon Bush

- BOTANICAL NAME: *Olearia paniculata* (NZ)

HEIGHT: 2-3m

COMMON NAME: Akiraho

NOTES: Hedge or windbreak

- BOTANICAL NAME: *Persoonia juperina* (A)

HEIGHT: 2-3m

COMMON NAME: Prickly Geebung

- BOTANICAL NAME: *Phormium tenax* (NZ)

HEIGHT: 2m

COMMON NAME: NZ Flax

NOTES: Sword leaves

- BOTANICAL NAME: *Polygala myrtifolia*

HEIGHT: 2m

COMMON NAME: Polygala*

- BOTANICAL NAME: *Pomaderris lanigera* (A)
 HEIGHT: 3m
 COMMON NAME: Woolly Pomaderris
- BOTANICAL NAME: *Portulacaria afra*
 HEIGHT: 2.4m
 COMMON NAME: Chinese Jade Plant
 NOTES: aka Elephant's Food
- BOTANICAL NAME: *Punica granatum* (D)
 HEIGHT: 3m
 COMMON NAME: Pomegranate
 NOTES: Alkaline soils
- BOTANICAL NAME: *Pyracantha coccinea* 'Lalandeii'
 HEIGHT: 3m
 COMMON NAME: Scarlet Firethorn
- BOTANICAL NAME: *Pyracantha fortuneana*
 HEIGHT: 2m
 COMMON NAME: Yunnan
 NOTES: Red berries Hedge
- BOTANICAL NAME: *Sollya heterophylla* (A)
 HEIGHT: 2m
 COMMON NAME: Bluebell Creeper

NOTES: Some shade needed

- BOTANICAL NAME: *Spartium junceum* (D)

HEIGHT: 2-3m

COMMON NAME: Spanish Broom

- BOTANICAL NAME: *Tecoma capensis*

HEIGHT: 2.5m

COMMON NAME: Cape Honeysuckle

NOTES: Climber

- BOTANICAL NAME: *Viburnum tinus*

HEIGHT: 3m

COMMON NAME: Laurustinus

NOTES: Slow-growing hedge

- BOTANICAL NAME: *Yucca spp.*

HEIGHT: 1-9m

COMMON NAME: Yucca

NOTES: Not Cool Zones

SMALL TREES

- BOTANICAL NAME: *Acacia adunca* (A)

HEIGHT: 7m

COMMON NAME: Wallangarra Wattle

NOTES: aka Golden-glory Wattle

- BOTANICAL NAME: *Acacia aneura* (A)

HEIGHT: 6m

COMMON NAME: Mulga

NOTES: Stock feed

- BOTANICAL NAME: *Acacia baileyana* (A)

HEIGHT: 7m

COMMON NAME: Cootamundra Wattle

- BOTANICAL NAME: *Acacia calamifolia* (A)

HEIGHT: 2-5m

COMMON NAME: Wallowa Wattle

- BOTANICAL NAME: *Acacia podalyriifolia* (A)

HEIGHT: 2-6m

COMMON NAME: Mt. Morgan Wattle

NOTES: Not Cool Zones

- BOTANICAL NAME: *Acacia pubescens* (A)

HEIGHT: 3-5m

COMMON NAME: Downy Wattle

- BOTANICAL NAME: *Acacia spectabilis* (A)

HEIGHT: 3m

COMMON NAME: Mudgee Wattle

- BOTANICAL NAME: *Albizia lophantha* (A)

HEIGHT: 4-6m

COMMON NAME: Cape Wattle

- BOTANICAL NAME: *Allocasuarina verticillata* (A)

HEIGHT: 6m

COMMON NAME: Drooping Sheoak

NOTES: Cool & Temp Zones

- BOTANICAL NAME: *Angophora hispida* (A)

HEIGHT: 3-5m

COMMON NAME: Dwarf Apple Myrtle

- BOTANICAL NAME: *Banksia marginata* (A)

HEIGHT: 3-5m

COMMON NAME: Silver Banksia*

- BOTANICAL NAME: *Butia capitata*

HEIGHT: 6m

COMMON NAME: Jelly Palm

NOTES: Edible dates (spines) W. Temp. & Tropics

- BOTANICAL NAME: *Butia yatay*

HEIGHT: 4m

COMMON NAME: Argentine Yatay

NOTES: (spines) W. Temp. & Tropics

- BOTANICAL NAME: *Callistemon citrinus* (A)

HEIGHT: 2-5m

COMMON NAME: Red Bottlebrush

- BOTANICAL NAME: *Callistemon viminalis* (A)

HEIGHT: 3-6m

COMMON NAME: Weeping Bottlebrush

- BOTANICAL NAME: *Callitris verrucosa* (A)

HEIGHT: 6m

COMMON NAME: Turpentine Pine

NOTES: Hedge or windbreak

- BOTANICAL NAME: *Ceratonia siliqua*

HEIGHT: 5-9m

COMMON NAME: Carob Tree

NOTES: Edible pods

- BOTANICAL NAME: *Cercis siliquastrum* (D)

HEIGHT: 3-7m

COMMON NAME: Judas Tree

NOTES: Pink flowers on trunk

- BOTANICAL NAME: *Colutea arborescens*
HEIGHT: 5m
COMMON NAME: Bladder Senna
- BOTANICAL NAME: *Cordyline australis* (NZ)
HEIGHT: 5-9m
COMMON NAME: NZ Cabbage Tree
- BOTANICAL NAME: *Cordyline stricta* (A)
HEIGHT: 2m
COMMON NAME: Slender Palm Lily
- BOTANICAL NAME: *Eucalyptus calcogona* (A)
HEIGHT: 3-6m
COMMON NAME: Gooseberry Mallee*
- BOTANICAL NAME: *Eucalyptus eremophila* (A)
HEIGHT: 3-8m
COMMON NAME: Tall Sand Mallee
NOTES: Windbreak F/H
- BOTANICAL NAME: *Eucalyptus landsdowneana* (A)
HEIGHT: 3-5m
COMMON NAME: Port Lincoln Mallee
NOTES: Hedge or windbreak

- BOTANICAL NAME: *Eucalyptus leucoxylon* (A)

HEIGHT: 5-8m

COMMON NAME: Yellow Gum

NOTES: Clay soils

- BOTANICAL NAME: *Eucalyptus steedmanii* (A)

HEIGHT: 7m

COMMON NAME: Steedman's Gum

NOTES: Fast growing

- BOTANICAL NAME: *Eucalyptus torquata* (A)

HEIGHT: 3-6m

COMMON NAME: Coral or Coolgardie Gum

NOTES: Fast growing

- BOTANICAL NAME: *Geijera parviflora* (A)

HEIGHT: 3-8m

COMMON NAME: Wilga

- BOTANICAL NAME: *Grevillea juncifolia* (A)

HEIGHT: 6m

COMMON NAME: Honeysuckle Spider Flower*

- BOTANICAL NAME: *Hakea elliptica* (A)

HEIGHT: 2-5m

COMMON NAME:

NOTES: White flowers

- BOTANICAL NAME: *Hakea laurina* (A)

HEIGHT: 3-5m

COMMON NAME: Pincushion Hakea

- BOTANICAL NAME: *Juniperus deppeana*

HEIGHT: 6m

COMMON NAME: Alligator Juniper

NOTES: Alkaline soils Cool only

- BOTANICAL NAME: *Koelreuteria paniculata* (D)

HEIGHT: 6m

COMMON NAME: Golden Rain Tree

- BOTANICAL NAME: *Lagerstroemia indica* (D)

HEIGHT: 3m

COMMON NAME: Crepe Myrtle

- BOTANICAL NAME: *Livistona humilis* (A)

HEIGHT: 6m

COMMON NAME: Sand Palm*

NOTES: Some shade to start

- BOTANICAL NAME: *Melaleuca styphelioides* (A)

HEIGHT: 5-8m

COMMON NAME: Prickly Paperbark

NOTES: Also swampy

- BOTANICAL NAME: *Myoporum insulare* (A)

HEIGHT: 2-6m

COMMON NAME: Common Boobialla

- BOTANICAL NAME: *Olea europaea*

HEIGHT: 5m

COMMON NAME: Common Olive

NOTES: Irrigate for cropping

- BOTANICAL NAME: *Persoonia linearis* (A)

HEIGHT: 3-5m

COMMON NAME: Narrow-leaf Geebung

- BOTANICAL NAME: *Pistacia vera* (D)

HEIGHT: 5m

COMMON NAME: Pistachio

NOTES: Edible nuts

- BOTANICAL NAME: *Pittosporum undulatum* (A)

HEIGHT: 6m

COMMON NAME: Sweet Pittosporum

- BOTANICAL NAME: *Pittosporum crassifolium* (NZ)

HEIGHT: 4m

COMMON NAME: Karo

NOTES: Chocolate flowers

- BOTANICAL NAME: *Plumeria acutifolia* (D)

HEIGHT: 2-5m

COMMON NAME: Frangipani

NOTES: F/T Warm & Temp only

- BOTANICAL NAME: *Prunus cerasifera* 'Nigra' (D)

HEIGHT: 4m

COMMON NAME: Purple-leaf Cherry Plum

NOTES: Cool Zones

- BOTANICAL NAME: *Prunus lusitanica* (D)

HEIGHT: 2-5m

COMMON NAME: Portuguese Laurel

- BOTANICAL NAME: *Tamarix aphylla*

HEIGHT: 6m

COMMON NAME: Athel Tree

NOTES: Fast growing; F/T

- BOTANICAL NAME: *Tamarix petandra* (D)

HEIGHT: 4m

COMMON NAME: Late Tamarisk

NOTES: F/T

LARGE TREES (Not suitable for average gardens)

- BOTANICAL NAME: *Acacia mearnsii* (A)
HEIGHT: 6-13m
COMMON NAME: Black Wattle
NOTES: Fast windbreak
- BOTANICAL NAME: *Acacia pendula* (A)
HEIGHT: 6-10m
COMMON NAME: Weeping Myall
- BOTANICAL NAME: *Acacia salicina* (A)
HEIGHT: 3-13m
COMMON NAME: Willow Wattle
NOTES: Windbreak; Not Tas.
- BOTANICAL NAME: *Allocasuarina luehmannii* (A)
HEIGHT: 13m
COMMON NAME: Bulloak or Buloke
- BOTANICAL NAME: *Banksia serrata* (A)
HEIGHT: 7-10m
COMMON NAME: Saw Banksia*
NOTES: aka Old Man Banksia

- BOTANICAL NAME: *Bismarckia nobilis*

HEIGHT: 18m

COMMON NAME: Madagascar Palm

NOTES: Warm Zones only
- BOTANICAL NAME: *Brachychiton acerifolius* (A)

HEIGHT: 6-30m

COMMON NAME: Illawarra Flame Tree
- BOTANICAL NAME: *Brachychiton populneus* (A)

HEIGHT: 6-16m

COMMON NAME: Kurrajong

NOTES: Fodder tree
- BOTANICAL NAME: *Brachychiton rupestre* (A)

HEIGHT: 6-16m

COMMON NAME: Queensland Bottle Tree
- BOTANICAL NAME: *Brahea edulis*

HEIGHT: 9m

COMMON NAME: Guadalupe Palm

NOTES: W.Temp. & Warm areas
- BOTANICAL NAME: *Callisris columellaris* (A)

HEIGHT: 16-25m

COMMON NAME: Sand Cypress Pine*

NOTES: Hedge or windbreak

- BOTANICAL NAME: *Callitris endlicherii* (A)

HEIGHT: 13-20m

COMMON NAME: Black Cypress Pine*

NOTES: Hedge or windbreak

- BOTANICAL NAME: *Capparis mitchellii* (A)

HEIGHT: 3-10m

COMMON NAME: Tree Caper

NOTES: (thorns)

- BOTANICAL NAME: *Cassia brewsterii* (A)

HEIGHT: 6-10m

COMMON NAME: Leichhardt Bean*

NOTES: Not Cool Zones

- BOTANICAL NAME: *Casuarina glauca* (A)

HEIGHT: 13-16m

COMMON NAME: Grey Bulloak

NOTES: aka Swamp Oak (wet or dry)

- BOTANICAL NAME: *Casuarina cristata* (A)

HEIGHT: 6-16m

COMMON NAME: Belah

NOTES: Heavy soils

- BOTANICAL NAME: *Codonocarpus cotinifolius* (A)
HEIGHT: 3-10m
COMMON NAME: Bell-fruit Tree
NOTES: Pink bark; Not Tas.
- BOTANICAL NAME: *Cupressus glabra*
HEIGHT: 7-13m
COMMON NAME: Arizona Cypress
NOTES: Temp & Warm Zones
- BOTANICAL NAME: *Cupressus torulosa*
HEIGHT: 10-20m
COMMON NAME: Bhutan Cypress
NOTES: Temp & Warm Zones
- BOTANICAL NAME: *Eucalyptus camaldulensis* (A)
HEIGHT: 20-30m
COMMON NAME: River Red Gum
NOTES: Also floodlands Fast growing F/H
- BOTANICAL NAME: *Eucalyptus melliodora* (A)
HEIGHT: 20-40m
COMMON NAME: Yellow Box
- BOTANICAL NAME: *Eucalyptus populnea* (A)
HEIGHT: 10-16m

COMMON NAME: Bimble Box

NOTES: Windbreak Clay soils

- BOTANICAL NAME: *Eucalyptus sideroxylon* (A)

HEIGHT: 10-16m

COMMON NAME: Red Ironbark

NOTES: aka Mugga. Very hardy

- BOTANICAL NAME: *Eucalyptus stricklandii* (A)

HEIGHT: 6-10m

COMMON NAME: Strickland's Gum

NOTES: Fast F/H

- BOTANICAL NAME: *Fraxinus oxycarpa* (D)

HEIGHT: 10-16m

COMMON NAME: Desert Ash

- BOTANICAL NAME: *Gleditsia triacanthos* (D)

HEIGHT: 16m

COMMON NAME: Honey Locust

- BOTANICAL NAME: *Grevillea striata* (A)

HEIGHT: 10-13m

COMMON NAME: Western Beefwood

- BOTANICAL NAME: *Jacaranda mimosifolia*

HEIGHT: 6-13m

COMMON NAME: Jacaranda

NOTES: Semi-deciduous

- BOTANICAL NAME: *Lagunaria patersonii* (A)

HEIGHT: 6-13m

COMMON NAME: Norfolk Island Hibiscus

- BOTANICAL NAME: *Livistona mariae* (A)

HEIGHT: 15m

COMMON NAME: Central Aust. Cabbage Palm*

NOTES: Some shade to start

- BOTANICAL NAME: *Melia azedarach* (A)

HEIGHT: 8-30m

COMMON NAME: White Cedar

- BOTANICAL NAME: *Metrosideros excelsus* (NZ)

HEIGHT: 6-15m

COMMON NAME: Pohutukawa

NOTES: Hedge or pot Slow.

- BOTANICAL NAME: *Phoenix dactylifera*

HEIGHT: 20m

COMMON NAME: Date Palm*

NOTES: (spines) Warm Zones

- BOTANICAL NAME: *Phoenix rupicola*
HEIGHT: 8m
COMMON NAME: Cliff Date Palm
NOTES: (spines) Warm Zones
- BOTANICAL NAME: *Pinus halepensis*
HEIGHT: 10-13m
COMMON NAME: Aleppo Pine
NOTES: Windbreak
- BOTANICAL NAME: *Pittosporum phillyraeoides* (A)
HEIGHT: 4-10m
COMMON NAME: Weeping Pittosporum
NOTES: Fragrant yellow flowers
- BOTANICAL NAME: *Robinia pseudoacacia* (D)
HEIGHT: 10-15m
COMMON NAME: Black Locust
- BOTANICAL NAME: *Schinus molle*
HEIGHT: 8-16m
COMMON NAME: Peppercorn Tree
NOTES: Female red berries
- BOTANICAL NAME: *Sorbus aucuparia* (D)
HEIGHT: 5-10m

COMMON NAME: European Mountain Ash

NOTES: aka Rowan

- BOTANICAL NAME: *Washingtonia filifera*

HEIGHT: 15m

COMMON NAME: Petticoat Palm

NOTES: W.Temp. & Warm areas

- BOTANICAL NAME: *Washingtonia robusta*

HEIGHT: 20m

COMMON NAME: Cotton Palm

NOTES: W.Temp. & Warm areas

CHAPTER 6

The Food Garden

APART FROM VITAMINS, minerals and fibre, fruit and vegetables contain anti-oxidants and compounds that are beneficial to our health. It is good advice to eat five serves of vegetables and two serves of fruit daily, but it is also important to vary them as much as possible. Eating only silver beet, or peas, or broccoli, or lettuce as a green vegetable can cause concentrations of particular elements or compounds that have the potential to interfere with some processes in the body. A diet containing three or four serves per week of a wide variety of fruit and vegetables provides maximum health benefits from these foods. Many nutrients and flavours in fruits and vegetables are formed as crops near maturity, and are deficient in crops that are harvested early and artificially ripened. Despite public protests, some fruits are still irradiated to prolong their shelf-life, resulting in reduced nutrients.

Synthetic fertilisers limit plants' absorption of some beneficial minerals, and commercially grown crops are routinely sprayed with pesticides and fungicides, whether they need it or not. Commercially grown crops are not regularly tested for pesticide residue. It is worthwhile growing even a few of your favourite fruits and vegetables by organic methods — not just for their health benefits, but for the greatly improved flavour.

All fruit and vegetables prefer organic growing methods. As your soil improves, your plants will become more naturally pest and disease resistant. You can prevent some serious plant diseases simply by increasing the amount of organic matter in your soil and practising crop rotation because the beneficial

micro-organisms in the organic matter will kill off pathogens in soil. The pest-detering pheromones given off by healthy plants are nature's way of ensuring that the best plants will survive to reproduce and improve the species.

If you can, give children their own section in the garden; this allows them to learn healthy horticulture methods, and encourages them to eat more fruit and vegetables. Lettuce, dwarf green beans, baby beetroot and carrots, spinach, rainbow chard, radishes and 'Di Cicco' broccoli all grow quickly enough to keep children's interest. While sweet corn and popcorn take a little longer, their size is impressive, and most children enjoy eating the crop.

Most of the fruit and vegetables we have become accustomed to eating originated in more fertile areas of the world, and require more water and nutrients than Australian natives. Vegetable garden beds are prepared in the same way as described in [chapter 4](#), with additions of organic matter to the top 8–10 cm of soil, but they may need additional nutrients supplied by worm castings or organic complete fertilisers. An application of organic seaweed fertiliser a week or so before planting will ensure a full range of trace elements is available. Always check your crop's pH and fertiliser requirements before preparing beds for fruit and vegetables. Do not add dolomite or lime unless it is necessary. Regular liming is required only with conventional growing methods because synthetic fertilisers increase soil acidity.

If you do not have ready access to lots of compost, manure or mulch, prepare the bed by growing a green manure for four to six weeks as a soil conditioner, or your own weed-free mulch. If you do this in autumn in cool areas or winter in milder areas, your soil will be greatly improved for spring planting.

Warm Zone gardeners can grow a suitable green manure during the wet season to improve the soil for autumn and winter planting. If you only have small quantities of kitchen scraps and weeds, recycle them through a small compost worm farm to produce the best organic fertiliser for your food crops.

When growing vegetables or fruit in pots or foam boxes, do not just fill the containers with garden soil. [chapter 4](#) provides information on growing plants in containers, including suitable growing mediums for container gardening. Seed depth is the same as for growing in the open ground, but plants may require less water more frequently, and the strength of liquid fertilisers will have to be reduced.

Some fruit and vegetables require the application of a gentle, liquid form of fertiliser at certain times. These should be applied to the soil instead of foliage. Foliar feeding encourages a weak root system, requiring more frequent watering, and can burn foliage in harsh climate conditions. Always gently wash any liquid fertiliser from foliage immediately after application. Do not be tempted to use synthetic liquid fertilisers as they do not help your soil and contain high concentrations of nitrogen, resulting in sappy growth which encourages pests. A variety of organic fertiliser teas provide balanced nutrients in plant-friendly form, and these are easy to make from small quantities of organic sources. Teas can be applied, when necessary, as supplementary fertilisers. Recipes for fertiliser teas can be found in [chapter 2](#).

Regular watering is advised for fruit and vegetable plants, but this does not necessarily mean daily watering or using a lot of extra water. Soil needs to be kept just ‘dark-damp’ for best

growth, nutrient uptake and soil activity. See [chapter 5](#) for ways to use water more efficiently in your garden. Increasing the humus content in your soil will also increase its water-holding capacity, allowing water to move deeply into the soil. Organic mulches on garden beds will greatly reduce water evaporation in warm or windy weather, allowing longer periods between watering while supplying a slow-release fertiliser as it breaks down.

Nets are very handy when growing fruit and vegetables as birds can severely damage crops, especially during drought conditions when their natural food source is scarce. Some birds prefer immature fruit and green tomatoes, or leafy greens, so keep nets on hand for quick application. Flying foxes or fruit bats fly out in squadrons each evening in search of fruit and blossom. A different type of netting is required to effectively deter these animals; they can get badly tangled in bird netting, and you don't want to have to remove them from nets.

Summer Sun Protection

A GOOD PERCENTAGE of the fruits and vegetables we commonly grow in Australia originated in areas of latitudes north of 37°N, where sunlight is less intense. The local equivalents of these latitudes are south of Bendigo in Victoria, and Auckland in New Zealand. Consequently, European-based recommendations for the amount of sunlight required by various plants do not apply to most of Australia.

In many parts of Australia, especially where air pollution is low, summer sun can damage fruit and vegetables. Tomatoes, capsicum, chilli, eggplant, silver beet, lettuce, cucumbers and strawberries can all suffer from sunburn. Some shade during

the hottest part of the day when temperatures are high will reduce your garden's water consumption because plants that originated in higher rainfall areas 'perspire' a lot in the hot sun, too.

A lopsided tent fly made of 50-per-cent shade cloth is an effective way to protect your crops when foliage cover may not be enough to prevent sunburn. It can be erected quickly using two star stakes and a length of strong cord. Crops, including tomatoes and capsicum, ripen well under this type of shade, and lettuce and cucumber really appreciate some relief from hot sun.

Another popular method of providing plant protection uses arches made from lengths of flexible polypipe slipped over the tops of a pair of garden or star stakes. Use 38 mm diameter polypipe for garden stakes, and 51 mm pipe for star stakes. Pipe sawn into lengths 2.1 times the width of vegetable beds will provide strong support. Arches of this type can be spaced up to 1.5 metres apart, and left permanently in position to support shade cloth or bird netting. Arches can also be used to form a cloche for frost protection (see [chapter 9](#)), providing the arches are high enough to prevent foliage touching the plastic cover. A framework of two intersecting arches will keep netting clear of fruit on trees.

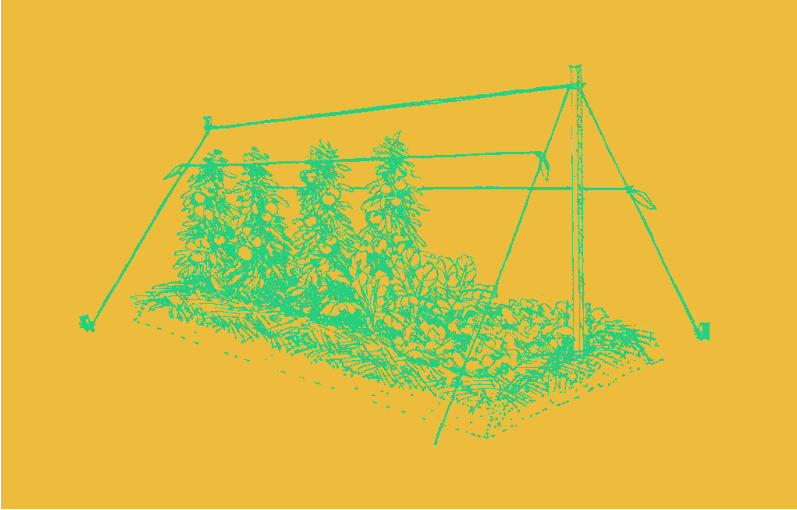


Fig. 6.1 A shade cloth tent-fly to protect vegetables from sunburn. The angle of the fly sheet can be adjusted to provide shade only when it is needed. Always allow good airflow under the shade cloth.



Fig. 6.2 Canopies supported by polypipe arches make it easy to protect precious crops from sunburn, frost, birds and flying foxes..

Shared or Separate Beds?

MIXING VEGETABLES in your garden rather than planting blocks of one variety will suit small gardens, and will help to confuse pests by disguising the shape and smell of the preferred crop. Although there are a few vegetables that do not like each other (for example, corn and sweet potatoes, broccoli near leeks, or peas and beans beside onions or garlic) many vegetables enjoy similar conditions and grow quite happily side by side. If you use compost in preparing beds, you may find vegetables growing of their own accord among other crops from time to time. However, certain vegetables and fruits do better if given a bed of their own, for various reasons.

Unlike most vegetables, potatoes and strawberries require an acid soil and will not perform well in soil suited to most other vegetables. Asparagus require a separate, permanent bed because the plants can be productive for up to twenty years. You can occasionally grow some leafy greens between asparagus when it is not cropping.

Similarly, berries are perennials and need a permanent space, but they can be grown against a fence at the back of a bed. The planting holes for leek seedlings are filled in gradually, which is awkward in a mixed bed. Globe artichokes are large perennials that take up a lot of permanent space in the vegetable garden. Their attractive foliage provides an interesting backdrop to flowering annuals, or they can be grown among other herbaceous perennials.

Jerusalem artichoke and sunflower are related; their roots produce substances that deter the growth of some plants around them, so these two are better on their own. Sunflowers attract beneficial insects to your garden. However, they also attract sulphur-crested cockatoos that can be very destructive when they are bored.

Wormwood and walnut trees have a deterrent effect on nearby plants. Dandelion, a great liver tonic, gives off substances that cause premature ripening of surrounding plants, and may be better in a pot, or a small corner on its own. Pumpkins take up a lot of space, and the leaves produce a weak natural herbicide that can deter nearby seedlings. They also inhibit the growth of tomatoes and potatoes.

Apart from certain plants making poor neighbours, the only down side to mixing vegetables in your garden patch is that it can make it difficult to practise crop rotation, which is

necessary to prevent a build-up of disease in the soil. Keep a note of vegetable positions each season to make it easier to avoid repeatedly planting crops that belong to the same family.

To avoid repetition under the separate headings in this chapter, detailed information on various methods of sowing seed, caring for seedlings, and planting of seedlings and fruit trees can be found in [chapter 4](#). Suitable sowing times for each plant can be found in the gardening diary in [chapter 3](#).

Culinary Herbs

WITH THE EXCEPTION of spearmint and watercress, all the culinary herbs listed below require a well-drained soil. When growing herbs that require a sunny position, remember that some European herbs are used to cooler summer conditions and may benefit from a little shade in warm areas or where air is not polluted. Generally speaking, Mediterranean herbs are more adaptable to our climate. All will grow better in soil containing some humus, but the richness of soil varies with each genus, as do organic fertiliser requirements. Most culinary herbs can be grown in pots, or deep foam boxes, if garden conditions or space restrictions prevent them being grown in the open garden. Although marjoram does not like cold, and rosemary and thyme do not like heavy summer rainfall or cold wet winters, there is no reason why you can't enjoy these herbs on a suitable balcony or verandah where you can give them conditions more to their liking. Use a potting mix similar to the type of soil they prefer in open ground. Add some coarse river sand to the mix for those herbs that prefer drier conditions (see [chapter 4](#)).

Many plants now popular as culinary herbs were first used not for their flavour but for their medicinal properties. In the days before refrigeration, traditional food combinations originated because people discovered that foods eaten with certain herbs or spices made the food easier to digest or less likely to cause food poisoning. Thyme and sage are two such accompaniments as both aid the digestion of fatty foods and also have antiseptic properties. Chilli is another herb that contains an alkaloid which is a gastrointestinal antiseptic and food preservative (it is listed under Capsicums and Chillis, on p. 210). Frost-sensitive ginger, *Zingiber officinale*, and turmeric, *Curcuma longa*, can only be grown well in Warm Zones, but their roots are laden with anti-oxidants and other health-protecting compounds. We should all include more of them, either fresh or dried, in our diet. Ginger is used in treating bronchial illnesses and nausea (including travel sickness). Turmeric, which provides the yellow colouring in curry powder, is beneficial to the circulatory, respiratory, and reproductive systems. Add some to the water when cooking rice to add both colour and flavour. A species of turmeric is currently being clinically tested for possible use in cancer treatment, a development that won't surprise Chinese herbalists who include this herb in their treatment for cervical cancer.

Quite a few culinary herbs, including turmeric, are uterine stimulants. Under normal circumstances, they help to keep the reproductive system healthy, but herbs that stimulate the uterus can cause problems during pregnancy. It is herb oils that have the stimulating effect, and essential oil levels in herbs can vary with their growing conditions and seed heritage. Although not all texts concur on which herbs should be completely avoided during pregnancy, it is prudent to

avoid herb oils in medications and aromatherapy during pregnancy unless they are prescribed for you by a qualified herbal practitioner, and to limit your consumption of pesto, tabouleh, and peppermint tea.

Many culinary herbs can be propagated from seed but some are slow to germinate, and others may not produce plants with equal quality of flavour. These herbs can be propagated quite easily with semi-hardwood cuttings (see [chapter 8](#)). Culinary herb perennials tend to become woody after four years and do not produce as much new growth. At this stage, they should be replaced with new growth from cuttings or seed. Flower petals of organically grown calendula, dianthus, nasturtium, pansy, rose, viola, and the common violet can also be used in small quantities to add colour and subtle flavouring to foods.

BASIL (*Ocimum* spp.)

SOWING PHASE: *New Moon*

There are over one hundred species of this genus of annuals and perennials, but the cultivars of sweet basil, *O. basilicum*, are most popular in Australia. These frost-sensitive annuals are suited to warm temperate climates and Warm Zones. *O. b.* ‘Genovese’ is considered the best for pesto and garlic dishes. It has dark green foliage, white flowers, grows to 60 cm, and does not run to seed quickly. *O. b.* ‘Dark Opal’ has dark-purple leaves and bright pink flowers. It is not as vigorous as green basil, and requires warmer temperatures for good growth. The specific compounds in basil improve digestion and help protect against intestinal parasites. Basil also stimulates milk flow in nursing mothers.

Leaves are used fresh and will blacken in the refrigerator unless protected. Harvested basil can be kept for a short

period in a glass of clean water. Prevent pesto discolouring by sealing the surface with a thin layer of olive oil. Sweet basil goes perfectly with tomato dishes, and the two grow well together, but its reputation for protecting tomatoes from pests is a little over-rated.

Sweet basil requires damp soil containing plenty of humus and organic mulch. In milder areas it grows well in full sun but when weather is both hot and dry it appreciates some shade. Basil does not like poultry-based fertilisers so try to avoid these when preparing soil and fertilising. Sweet basil will require a couple of applications of worm castings or compost through the growing season. Try to irrigate before noon where possible, especially later in the season, to avoid wet foliage as temperatures fall.

Sweet basil grows easily from fresh seed sown in soil with a temperature of 20°C, or more. Seed is sown thinly, 5 mm deep, in punnets in a warm, protected position. Transfer seedlings to individual small pots at first true-seed stage. Plant into the garden or large pots when seedlings are 8 cm tall, and weather is warm. As seed germinates in about one week and seedlings grow quickly, seed does not have to be sown very early in spring. Purple basil is sown about a month later in warm temperate areas.

Pinch out growing tips several times to establish bushy growth, and cut whole stems back to just above a leaf axil rather than picking only leaves. Mark your strongest plant and keep it for seed collection. Regularly pinch out flower heads before they develop as basil will stop growth once it sets seed. As soon as weather becomes cool, leaves will blacken. Spent plants can be transferred to the compost heap. In warm temperate areas, make a small second sowing in late summer

and grow in a protected area, three plants to a large pot, for use through cooler months. Allow seed cases to start to brown on the plant selected for seed, then cut off the stems that formed seed first and allow these to dry indoors on a sheet of paper. (Do not save seed if growing more than one type of basil.)

BAY (*Laurus nobilis*)

PLANTING PHASE: *Full Moon*

The Bay Laurel, Sweet Bay, or True Laurel tree is a decorative and useful addition to any garden. Its botanical name is an indication of its importance to ancient Mediterranean civilisations, and the term ‘*baccalaureate*’ originates from the practice of making laurel wreaths from the foliage of the tree. Bay leaves have been used to add flavour to soups, stews, and milk puddings for centuries. The dried or partly dried leaves are used whole, and removed before serving. Fresh leaves have a slightly bitter taste. Bay leaves are also an important addition to bouquet garni and have a reputation for keeping crawling insects out of cupboards. They are also used commercially to keep weevils out of dried figs. Bay leaf tea is used as a rinse to treat dandruff. Most commercial bay leaves are imported, and therefore fumigated or irradiated before sale. To obtain a ready supply of pesticide-free bay leaves, grow your own. Save mature leaves when trimming the tree and hang them to dry in an airy place. Then strip the dried leaves from the stem and store them in an airtight container to prevent oils evaporating.

Although this attractive tree can grow to 12 m in the garden, it is quite slow growing and therefore very suited to growing in large pots in a warm, sunny, protected position. You will

require only one tree for culinary purposes. Bay requires full sun in cool and cool temperate areas but appreciates some protection from the worst afternoon sun in warmer areas if grown in a pot. A gravel mulch is beneficial in warm areas. Young trees are frost sensitive. Plant your bay tree after soil warms in spring, or in March in Warm Zones. Bay prefers a humus-rich damp soil, and potting mix. Do not put it in a water reservoir pot, as the roots will grow into the water and the tree will react as if grown in poorly drained soil.

Tip prune young trees to develop a strong framework. Prune potted trees in early spring, and clip them in summer to maintain an attractive shape. The impressive foliage and slow growth of this tree make it a popular subject for topiary. Apply worm castings in spring, and water the foliage during prolonged dry spells to avoid attack by two-spotted mite. If growing a bay in open ground, do not allow grass to grow up to the trunk. Mulch the tree thickly, and avoid digging in the root area as this will encourage suckers to rise from any damaged roots.

The ‘bay laurel’ must not be confused with the ‘camphor laurel’ which grows to an enormous size, and deters the growth of others plants beneath it. A reputable nursery will ensure that you purchase the correct tree. Bayberries, used for making candles in the Northern Hemisphere, come from *Myrica pennsylvanica*, a different tree altogether. Bay rum is not made from bay trees, either, but from *Pimenta racemosa*, a tree native to the West Indies.

CHAMOMILE see German Chamomile

CHIVES (*Allium* spp.)

SOWING PHASE: *Full Moon*

Common chives, *A. schoenoprasum*, and Chinese or garlic chives, *A. tuberosum*, are perennial members of the onion family that are used more for their delicate onion flavour than for their medicinal properties. The leaves, bulbs and flowers of the plants are all edible, and the mauve flowers make an attractive addition to salads.

Common chives (which grow into a clump of hollow tubular leaves to 50 cm) and garlic chives (which have solid, flat, strap leaves) can both be grown from seed sown in spring 6 mm deep in punnets. As soon as they are established they can be transplanted into the garden, several plants to a group, or grown in a larger pot in organically rich, moist soil in a sunny or partly shaded position. New plants are formed within the clump over the growing season. Chives are low-maintenance herbs, but they can be given fertiliser tea in spring if new growth seems slow. Chives are harvested, as required, by cleanly snipping a clump of stems with scissors. Do not harvest the whole clump at once or the plant will be very slow to recover.

Common chives tend to die back in winter while garlic chives are evergreen. Both should be divided into several small clumps and moved to fresh soil every few years to keep them growing vigorously. Divisions can be made in spring in Cool Zones, and spring or autumn in other zones.

CORIANDER (*Coriandrum sativum*)

SOWING PHASE: *New Moon/First Quarter*

A common ingredient in Asian food, coriander (or cilantro) is a fast-growing annual whose foliage, roots and seeds are used for flavouring. It also has anti-fungal and anti-bacterial properties that delay the deterioration of unrefrigerated food.

Coriander is cold tolerant, and seed can be sown through autumn or in early spring. Fully mature plants can reach 90 cm. Avoid planting it near fennel because coriander impairs the maturation of fennel. Soil which is rich in humus and moisture-retentive is most suitable for coriander. It is said to be a good companion to carrots, but coriander prefers an acid soil, and ours always self-seeds in a mulched strawberry bed. If growing coriander for foliage, it will require some shade in hot areas. Seed is sown directly 1 cm deep and 10 cm apart. Germination will occur in two to three weeks, depending on soil temperature.

Whole plants are pulled like carrots, as required, when foliage is between 15 and 25 cm high. Coriander will quickly run to seed where soil is dry or watering is erratic, and prefers cool, wet winters and a dry summer for seed collection. Seed heads can be harvested, when they have developed a sweet, aromatic smell. Spread seed heads on a large sheet of paper, indoors, to fully mature and dry, then store in an airtight container.

DANDELION (*Taraxacum officinale*)

SOWING PHASE: *Full Moon*

Although considered a weed by gardeners unfamiliar with the benefits of herbs, the humble dandelion is an excellent liver tonic. Dandelion contains considerable amounts of B and C vitamins, beta-carotene and a wide range of minerals essential to our health. It is an excellent diuretic, rich in potassium, and is used to reduce oedema in hypertension and inflammation in arthritis. Dandelion's diuretic properties have led to its common name, 'Wet-the-Bed'. All parts of organically grown plants are useful; the leaves are eaten as a vegetable or used to

activate compost heaps, roots are used as a coffee substitute, and the flowers, with green parts removed, can be made into wine.

Don't ever use wild dandelions as they may have been sprayed with pesticides, and dandelion is sometimes confused with 'flat weed' which has similar yellow flowers. The leaf-edge serrations on dandelion are quite jagged, hence its name *dent de lion* — literally 'lion's tooth' in French. Dandelion flowers are borne on single stems that rise from the crown centre. Stems and leaf midribs are hollow. Flat-weed leaves are fleshy and hairy with more scalloped edges, and the flowers grow on branched stems.

Dandelion prefers a sunny position, and a deep soil with a close to neutral pH. However, its appearance as a weed in many places indicates that it is quite adaptable to growing conditions, and it may prefer a little shade in hot areas. As dandelion induces maturity in surrounding plants, it is best grown in deep pots filled with good quality potting mix, or given a small permanent garden section of its own. Seed of vigorous cultivars is available from open-pollinated seed suppliers, and these can be sown during warm months. Seed can be sown directly or in punnets, about 3 mm deep. Germination will occur in about three weeks. Plant seedlings out, after hardening-off, when quite small because dandelion has a tap root which cannot form properly in a small pot. Plants do not require special care but do appreciate plenty of humus added to soil. Apply a small amount of compost in spring. Remove mature leaves regularly and add them to your compost heap. Remove flower heads, too, before they can set seed, as dandelion self-seeds easily.

The compound which gives dandelion its bitter-sweet taste is beneficial to the liver and gall bladder. In spring, young dandelion leaves are only slightly bitter and make a tasty addition to a green salad. For a more delicate flavour, the leaves can be blanched by inverting a flower pot over the plant for a fortnight before picking the youngest leaves. After two years of growth, the long tap root can be harvested in autumn or winter (when it has a sweeter flavour), then roasted and ground.

DILL (*Anethum graveolens*)

SOWING PHASE: *New Moon/First Quarter*

Dill is a fast-maturing, annual herb that is diuretic, beneficial to digestion and anti-bacterial. It is an ingredient of gripe water used to treat colic in babies. Both seeds and foliage have culinary uses; the seeds are often added to pickles and vegetable dishes, and the feathery foliage is used to flavour fish, potato, egg dishes and salad dressings. The plant attracts beneficial insects to gardens.

Dill grows to 90 cm and is similar in growth to fennel, but dill has blue-green foliage and hollow stems. It is not suitable in conditions with extremes of hot or cold. In warm temperate areas, sow in very early spring. Dill likes a moist soil, rich in humus. Seed is sown directly into its permanent position, away from carrots. Do not grow fennel if you wish to use dill seed as the two cross-pollinate. Sow dill seed around your cabbage patch in spring because they are good companions. Scatter seed, and lightly rake soil over the top to prevent it washing away. Small quantities of seed sown monthly will be more useful than one large crop because dried dill has a very poor flavour. Seed germinates in about two weeks, and plants

can reach maturity in just over two months. Water regularly as dill will run to seed quickly if soil is too dry. Gradually thin plants up to 20 cm apart. Thinnings can be used in recipes. If you want only foliage, remove flower heads as soon as they appear. If you want to use seed, harvest seed heads as they start to turn brown and dry them indoors on a large sheet of paper. Once dill is allowed to go to seed in your garden, you may not have to sow seed for several years because dill self-seeds easily.

FRENCH TARRAGON (*Artemisia dracunculus* ‘Sativa’)

PLANTING PHASE: *Full Moon*

French tarragon is one of the most frost-sensitive members of the wormwood family. It has a distinctive aniseed taste. Foliage from fresh herbs is used in French cuisine, especially with fish and chicken dishes, sauces, butters, and salad dressings. Fresh foliage is also used to flavour vinegars. (Once dried, French tarragon has little flavour.)

French Tarragon is a semi-hardwood perennial, to 60 cm, that likes a moderately fertile soil with perfect drainage. Foliage is light green, soft and linear. The plant forms a spreading clump. You will probably only need one plant if it is well cared for. Be suspicious of French tarragon seed as this plant rarely sets seed. It is propagated by division in spring, or from cuttings taken in warmer months. When buying French tarragon, taste a leaf before purchase to ensure you don't buy its poorly flavoured cousin, Russian tarragon.

French tarragon prefers a sunny position in Cool and Temperate Zones where herbaceous perennials grow well, but will grow better in a cool, partly shaded position in warm temperate areas. It is not really suited to Warm Zones because

it needs a period of dormancy. In warm temperate areas and very cold areas, it can be covered during winter months with a thick layer of fluffed-up clean straw. In cold areas, apply straw in the middle of the day. Where winters are mild, apply straw very early in the morning. French tarragon needs regular watering in warmer months and an application of compost or worm castings, under mulch, in spring. Divide plants every four years, and place the selected division in a new position.

GARLIC (*Allium sativum*)

PLANTING PHASE: *Full Moon*

Apart from its vampire-repelling reputation, garlic has remarkable anti-bacterial and anti-viral properties. It has been recognised as a medicinal herb since the Babylonians and ancient Egyptians used it to treat respiratory and digestive infections, as well as an expectorant. Other ingredients in garlic help lower ‘bad’ cholesterol, prevent thrombosis, assist in reducing high blood pressure and blood sugar, and boost the immune system. Garlic plays an important role in the ‘heart-healthy’ Mediterranean diet. Garlic oil has been used externally to treat acne, boils, and skin injuries.

Garlic’s curative properties are shared to some extent with other members of the allium family: onions, spring onions and leeks. Allicin (allyl disulphide), one of the thirty-three sulphur compounds in garlic, gives the onion family its characteristic odour. Cooking reduces the allicin content and, consequently, the therapeutic benefits. If you avoid garlic because of ‘garlic breath’, chewing a few parsley leaves after eating garlic will solve the problem.

Both garlic and onions are helpful in the prevention and control of parasitic infestations in poultry. In the garden, garlic is beneficial to roses, both strengthening their growth and intensifying the fragrance of perfumed roses. It also makes an effective organic spray against various garden bugs.

Garlic does not have a high nitrogen requirement. It requires a sunny position and a well-drained, humus-rich soil with a balance of nutrients and a neutral to slightly alkaline pH. No manure should be added to the bed. Garlic is very sensitive to waterlogging so raised beds will help where soil is heavy.

Garlic does not produce viable seed; plants are grown from bulbs separated into cloves. Use only Australian garlic because imported bulbs may be fumigated or irradiated to prevent shooting. Planting times depend on local microclimates because cloves require a period of temperatures below 10° C for best growth, bulbs take approximately six months to mature, and warm, dry conditions are required close to harvest. Where winters are mild, chilling garlic bulbs in a plastic bag in the vegetable crisper for several weeks before planting improves bulb and leaf development. Where ground hardens in winter, cloves are best planted in autumn and covered thickly with mulch because very low temperatures over a long period will affect bulb development. Late April or early May planting, after chilling cloves, may allow growers in Warm Zone high rainfall areas to avoid harvesting during the wet season.

Make narrow planting holes 5 cm deep and drop an unpeeled clove, pointed end up, into each hole. If planting large quantities of garlic, cloves should be planted 15 cm apart, and covered with an 8-cm layer of organic mulch as garlic plants do not compete well with weeds. Keep soil consistently damp

during dry periods and apply a seaweed fertiliser when growth appears during spring. Cut off flower heads if they appear so that the plants' energy is directed to bulb formation. Bulbs will start to form in warm weather.

At about the end of October, remove some soil beside a bulb to see whether bulbs have filled. If so, cease watering. Garlic can be harvested during dry weather as soon as leaves start to dry out. It is better to harvest a little early than too late — leaving plants in the ground too long will cause bulbs to open up and side shoots to form. Dig out the whole plant, using a garden fork, and shake free of soil. Take care harvesting because earthworms love soil close to garlic. Trim the roots with a vegetable knife. In moderate heat, plants can be laid out on the bed for up to a day to assist drying. In hot conditions, bulbs must be kept out of direct sunlight as they can suffer sunburn. Plants can be spread out on racks under cover for up to a week until outer layers of bulbs have dried considerably. Garlic should then be hung in bunches, or left on racks, in a cool, dry, airy place until all sap from the leaves is drawn into the bulbs and leaves feel dry. This process is known as curing the garlic. When the bulbs seem dry, cut off the leaves 1.5 cm above the bulbs to allow all inner layers to dry. (Curing can take up to a month in Cool Zones.)

GERMAN CHAMOMILE (*Matricaria recutita*)

SOWING PHASE: *First Quarter*

Several plant genera are commonly called chamomiles. Those most well known are German chamomile and Roman chamomile, *Chamaemelum nobile*. German chamomile is a small, delicate annual to about 50 cm, with white daisy flowers that have yellow, domed centres and a strong 'apple'

fragrance. Chamomiles are beneficial in the garden, and have long been known as the plants' physician because they keep other plants healthy. A tea made from the feathery foliage of chamomile is used to prevent damping-off in seedlings and to prevent other fungal diseases in the garden. Foliage rubbed on insect bites quickly relieves pain. Adding the foliage to a compost heap accelerates decomposition. Dried flowers of German chamomile are used to make a tea to soothe nerves and treat insomnia, or as a final rinse to condition blond hair. Chamomile extracts are widely used in toiletries and provide fragrance in herbal shampoos. The oils in chamomile plants have strong anti-inflammatory, analgesic and anti-fungal properties, and they also stimulate the immune system. However, excess ingestion of this herb can cause irritability.

German chamomile, which can be identified by a hollow inside the yellow centre of mature flowers, is used most commonly because it is less bitter and easier to harvest than Roman chamomile. Do not grow both types of chamomile at the same time because they can cross-pollinate. German chamomile is not suitable for growing as a lawn; lawns are grown from a Roman chamomile cultivar, *C. n.* 'Treneague', a non-flowering, spreading perennial. Dyer's chamomile, *Anthemis tinctoria*, has yellow daisy flowers and is a different plant altogether, although distantly related.

German chamomile grows well in soil containing some humus. It can handle sun or part shade, and prefers a soil pH of 6–7. Mix seed with two parts sand and sow in autumn in frost-free areas, or in spring to early summer in cool and cool temperate climates. Seed can be sown directly into the garden or in punnets. Chamomile seed requires light to germinate, and should be covered with just enough sand to prevent it

washing away. Because of shallow sowing, it may be easier to get it started in punnets in dry conditions. Once German chamomile goes to seed, you will probably find it coming up each year in spring or autumn (whichever it prefers in your conditions). Transplant seedlings about 20 cm apart when they have four true leaves. Either tip prune seedlings or cut the first flower with a long stem to encourage bushy growth. Large quantities of flowers are harvested with a wide-toothed comb attached to the front of a dust pan.

LEMON GRASS (*Cymbopogon citratus*)

PLANTING PHASE: *Full Moon*

Lemon grass is a perennial that thrives in warm climates. It grows in a clump, and foliage can reach 120 cm in height. This genus contains lemon- and rose-scented oils, and the stem bases are used to flavour Asian food. The lower 7 cm or so of stem, which is the most tender, can be sliced and added to stir-fries, or prepared as a tea, with or without sliced fresh ginger root. The whole stem base can be bruised and used to flavour sauces, then removed before serving. The stems also make wonderful skewers for barbecuing fish, prawns, or chicken; adding delicate flavour during the cooking process.

Lemon grass is an anti-bacterial and anti-fungal herb which is used in toiletries and soaps. The leaves can be chopped and infused, then used externally to treat athlete's foot or scabies. Insect-repellent citronella oil is made from *C. nardus*, which is not used as a culinary herb.

Lemon grass is suitable for growing in warm temperate areas and Warm Zones. It is frost tender and requires a minimum temperature of 7°C for steady growth but can tolerate a short spell of cooler night temperatures. Lemon grass is prone to

rust if vigorous growth is not maintained. It likes a warm, sunny position in humus-rich soil, and regular watering. It benefits from an application of seaweed tea in autumn, and an application of organic complete fertiliser in spring. Lemon grass can be coaxed to grow in Temperate Zones in 30-cm pots on a sunny patio where the hard surface absorbs heat and reflects it back during the night. Do not grow lemon grass in very large pots if it will have to be moved to a more protected position in winter.

When we grew lemon-grass seedlings we found the flavour disappointing as they had apparently crossed with the citronella species. It is very easy to get a clump started in warm weather from just one stem (see [chapter 8](#)) from a plant with good flavour. You can start with a plant from a nursery, or beg a lemon-grass stem from a friend, as most lemon-grass stems sold in supermarkets have had the base well-trimmed. Plant out when soil temperature is at least 20°C. Stems are harvested individually, as required, by grasping the stem base, then twisting, and pulling. Be careful — the leaf edges are sharp. Trim the stem top, and remove roots and tough outer leaves before use. Trimmed lemon-grass foliage makes a good mulch around the clump.

MARJORAM (*Origanum majorana*)

PLANTING PHASE: *Full Moon*

Marjoram (or sweet marjoram) is also known as knotted marjoram because of the knot-like formation of its immature flower bracts by which the plant is easily identified. Marjoram and oregano belong to the same genus, but they have a different growth habit and slightly different requirements so I have listed them separately to avoid

confusion. This genus is rich in flavonoids and contains the antiseptic thymol, although oregano contains larger amounts than marjoram. Marjoram has a delicate flavour and should be added towards the end of the cooking process. It is delicious in scrambled eggs. Medications containing this herb are not recommended during pregnancy.

Marjoram is a small perennial, to 60 cm, with rounded, velvet, green-grey leaves and tiny pink flowers. Stems are a distinct red-brown. This herb does not like cold, wet winters and may die out in unsuitable conditions. It is happiest in a raised bed containing humus, in a warm position. Marjoram requires slightly more humus than thyme or rosemary but can rot if soil is too rich. It prefers a close to neutral pH. It requires mulching during warm seasons but may grow better in cooler areas if mulch is removed in autumn so that winter sun can warm the soil.

Plants can be propagated from seed but are very slow to establish. It grows more quickly from semi-hardwood cuttings taken in warmer months when plants are not flowering. Marjoram can be planted out in spring or early autumn. Water marjoram as necessary, under mulch during warmer months, but be sparing with water in winter in Cool and Temperate Zones. Lightly apply worm castings or organic complete fertilizer in mid-spring before mulching. Plants are kept bushy by picking stems for culinary use.

MINT (*Mentha* spp.)

PLANTING PHASE: *Full Moon*

Mints belong to a genus of twenty-five species with different flavours and medicinal properties. Most are spreading perennials to 60 cm but a few are ground covers. The family

can grow rampantly in moist soils, and may need to be contained. Cut the base from a large pot and sink it in a garden bed to confine mint roots to a small area. Alternatively, you can use root divisions for plants as these tend to be less vigorous than those grown from cuttings. Tip cuttings root easily in water (see [chapter 8](#)).

Mints prefer a humus-rich soil with a soil pH of 6–7, and regular watering. In frost-free areas, mints can be planted out under 3 cm of mulch in early spring or early autumn. In frost areas, keep cuttings over winter and plant out after soil warms in spring. A thin layer of fluffed-up mulch, applied while plants are dormant, allows new growth to push through mulch while keeping soil damp. Most will grow in sun or part shade. Flavour will be more intense in plants grown in full sun. A light application of worm castings before mulching is all that is required as fertiliser for most mint species.

Spearmint (*M. spicata*) is tolerant of poorly drained soil. This is the mint used in cooking, drinks and the sauce that traditionally accompanies roast lamb. It is also used for Middle Eastern mint teas. The oils in spearmint improve digestion, are less irritating than peppermint oils, and safer for children. Spearmint oil is used commercially in mouth washes, toothpaste and chewing gum.

The plant is upright, and the lanceolate bright-green leaves have serrated edges. Spikes of small white or pink flowers are borne in warmer months. Pinch back or cut stems regularly to keep growth young and tender. Remove flowering stems as they appear. Cut plants back in late autumn and cover with 3 cm of mulch.

Peppermint (*M. x piperita*) is a flavour familiar to most as an ingredient in desserts, confectionery, and toothpaste. Peppermint oils are stronger than those of spearmint. They are decongestant, antiseptic and anti-spasmodic, and are used in various products to assist digestion. Peppermint tea is often recommended to soothe colds or morning sickness, or relieve indigestion. However, overuse of peppermint oils can contribute to gastric reflux by relaxing the sphincter muscle at the top of the stomach. It should be used only occasionally during pregnancy as peppermint oil in any form poses a risk to unborn babies and infants.

Peppermint prefers a well-drained soil and lots of water. This mint is a hybrid bred from spearmint and watermint, *M. aquatica*. Plant height is variable and leaves of peppermint are more oval than those of spearmint. Leaves are often tinged purple, and flowers are pink to mauve. Peppermint requires a very fertile soil, and a generous application of worm castings or organic complete fertiliser in spring and autumn. In warmer areas, keep soil covered with 5 cm of organic mulch all year.

Pennyroyal (*M. pulegium*) contains essential oils that are included in some flea powders, soaps, detergents and herbal insect repellents. As pennyroyal contains pulegone, a powerful uterine stimulant, pregnant women should avoid the use of pennyroyal in any form.

OREGANO (*Origanum vulgare*)

PLANTING PHASE: *Full Moon*

Oregano (also known as wild marjoram) has a robust peppery flavour that suits many Italian recipes. Oregano leaves taste best when dried but the herb can also be used fresh. Avoid

imported dried oregano which has been irradiated or fumigated. The quality of plants grown from seed may vary widely, so grow oregano from semi-hardwood cuttings taken from plants with very good flavour. Otherwise, cut off small sections of base growth that already have roots. Plant or divide oregano in spring in most areas. In very warm areas, cuttings can be planted out in late summer to early autumn.

Oregano is a spreading perennial, to 45 cm, that sends up vertical foliage stems. Stems are red-brown and leaves are more lanceolate than those of sweet marjoram. They are also thicker and hairy. Pink-lilac flowers are produced on the vertical stems in summer. *O. v.* 'Album' has white flowers and lighter green leaves.

Oregano prefers a raised bed containing a moderate amount of humus, and a warm position in Cool and Temperate Zones. It will grow in a slightly shaded position in Warm Zones. Oregano can tolerate slightly lower temperatures than marjoram, and is fairly drought tolerant, but it is also shallow rooted and its spreading habit makes the application of thick mulch unsuitable when growing multiple plants. Lightly apply worm castings or organic complete fertiliser in mid-spring. Maintain a light layer of mulch around the plant, and water regularly in dry conditions to keep soil slightly damp. Remove spent flower stems.

PARSLEY (*Petroselinum crispum*)

SOWING PHASE: *New Moon*

While parsley is used liberally in Europe and the Middle East, some Australians still regard it as little more than a decorative garnish. However, this lush green herb contains quite large amounts of calcium, potassium, beta-carotene, vitamin C,

folate, iron, magnesium, phosphorus, and anti-oxidants which help our immune and cardiovascular systems. It also contains apigenin, a flavonoid that helps reduce allergic responses. Parsley aids digestion and, being rich in chlorophyll, is an excellent cure for garlic breath. Pregnant women should avoid parsley essential oil, parsley roots, seeds and excessive amounts of parsley leaves because parsley is a uterine stimulant.

Growing your own parsley ensures that it arrives in your kitchen with maximum nutrients intact. Parsley grows well in pots, although the pot needs to be fairly deep because parsley is related to carrots and has long roots. *P. c.* ‘Moss Curled’ and the flat-leafed parsley, *P. c.* ‘Italian’, can be used generously to add flavour to soups, sauces, casseroles, pasta dishes and salads. Italian parsley has a stronger, but delicious, flavour and is a hardier plant than curly-leafed parsley. Both species are resistant to frost, but seed will germinate more quickly as soil warms.

Seed can be sown from spring to early summer, or in autumn, 5 mm deep in seedling trays or small pots. Use only fresh seed, and don’t forget to add the Epsom salts solution because parsley needs magnesium to germinate. Germination will occur in seven to fourteen days, depending on air temperature. Seedlings in trays can be very carefully transplanted into 5-cm tubes or pots when the first true leaves are fully extended. When the seedlings have four true leaves, plant them out into compost-rich soil with a close to neutral pH, and water deeply. Parsley will run to seed prematurely if soil becomes dry. Continue fertiliser tea after transplanting until plants become well established.

As parsley is a biennial, plant it two years in a row so that your parsley doesn't all go to seed at the same time. Once parsley goes to seed in organically improved soil, you will rarely be without it. If planning to save seed, grow a single species or you will end up with a nondescript variety. Curly-leafed parsley appreciates some shade in hot areas, but flat-leafed parsley will grow well in full sun. Once parsley has formed two rows of strong stalks around the crown it can be harvested continually from the outside, leaving new growth in the centre.

Another species, *P. c. tuberosum*, is grown only as a medicinal herb. Cultivation is the same, but soil should be of a similar depth and texture to that required for carrots. Roots can be harvested during autumn or winter of the first year of growth.

ROCKET (*Eruca sativa*)

SOWING PHASE: *New Moon*

Rocket, sometimes known as the French roquette or by its Italian name, rucola, is a Mediterranean annual herb to 60 cm, belonging to the crucifer family that has been cultivated for two thousand years. Rocket adds a peppery, nutty flavour to salads, pasta sauces or stir-fries. It has irregular leaves with deep scallops and cream flowers with purple veins. It is suitable for all climate zones and plants are mature in two months, but leaves should be picked when young and tender because the flavour becomes bitter when mature.

Rocket prefers a cool, damp, humus-rich soil, but avoid the use of uncomposted manures when preparing soil for rocket as they can impart an unpleasant flavour to the foliage. Plants should be watered regularly, or foliage will become tough and

very coarse flavoured in hot, dry conditions, and plants will run to seed very quickly. Seed forms in long, thin pods which shatter easily.

Sow seed, 6 mm deep, directly into a garden bed and cover lightly with mulch. Seed should germinate within two weeks. Sow a small quantity of seed each month. In Cool Zones and cool temperate areas, seed can be sown from late winter to early summer. In Warm Zones and warm temperate areas, flavour will be best if seed is sown through autumn and winter.

ROSEMARY (*Rosmarinus officinalis*)

PLANTING PHASE: *Full Moon*

Rosemary has been associated with remembrance ever since ancient Greek scholars put sprigs of rosemary in their hair to improve their memory. The crisp, clean fragrance of rosemary does tend to clear the head. The herb is a liver tonic, and oils in rosemary are both antiseptic and anti-inflammatory. Rosemary's flavour combines well with lamb and potato dishes. A tea made from rosemary can be used as a rinse to treat dandruff.

This tough, evergreen perennial, to 1.5 m, is suitable for all growing zones that do not have heavy frosts, and can be kept shorter in height with regular clipping. Foliage is dark green and conifer-like, and pale blue flowers appear in clusters along stems in spring. It is reputed to be a good companion for cabbage, beans and carrot, although these plants require more water and richer soil than rosemary. Bees love rosemary and it will attract them to your garden.

Rosemary requires perfect drainage so a raised bed is advised. Soil should contain some humus to keep it free-draining, and have a close to neutral pH. This plant is suitable for growing in dry areas, stony ground and exposed coastal conditions, but also grows well in average garden soil if kept away from plants that require a lot of water. Rosemary will grow in full sun to light shade. It requires a light application of worm castings or complete organic fertiliser in spring, a 5-cm layer of organic mulch and watering under mulch in prolonged dry periods.

Rosemary is tedious to grow from seed but it grows easily from semi-hardwood or heeled cuttings taken in warm months. In fact, cuttings strike so readily that there is really no need to try growing it from seed. Over the years I have propagated it, in various temperate areas, from sprigs collected on Anzac Day. You will only need one plant for kitchen use. Cuttings taken in summer can be planted out in autumn when about 5 cm tall, or kept in 8-cm pots over winter for transplanting in spring.

Regularly pull out growing tips from young plants to establish bushy growth. Tip prunings can be used in the kitchen. Remove spent flower heads immediately after flowering, or new growth will occur beyond the flower head, resulting in bare, woody patches. Rosemary require similar pruning to callistemons. Cutting whole stems for culinary use just above a node will generate more lateral growth. The shrub tends to become woody and less productive after four years and plants for culinary use should be replaced from cuttings. There are many named rosemary cultivars which are bred more for flowers than flavour. Foliage is often smaller on the named

cultivars but flowers are available in white, pink, mauve and various shades of blue.

SAGE (*Salvia* spp.)

SOWING AND PLANTING PHASE: *Full Moon*

Sage tea made from a teaspoon of chopped sage leaves steeped in a cup of boiling water until warm is an excellent gargle for sore throats. There are 900 species of *Salvia* with various medicinal benefits but the common sage, *S. officinalis*, is the one to use for gargling. *Salvia* comes from the Latin *salvare*, ‘to save’. It contains a lot of thujone, which is antiseptic, removes toxins and stimulates the immune system. This herb is used to treat menopausal symptoms but should be avoided during pregnancy. Common sage tea is a safe alternative to pharmaceutical drugs for drying up lactation at weaning. A fresh sage leaf rubbed over the teeth and gums removes plaque and keeps gums healthy, too.

Sage is easy to grow in a sunny, raised bed. It is a frost-hardy, evergreen perennial to 60 cm in height and almost a metre wide. Foliage is grey-green and spikes of lavender or pink flowers are prolific in late spring. Bees are very fond of sage flowers. Plants sold as *S. officinalis* are sometimes *S. lavandulifolia*, also called narrow-leaf sage, or Spanish sage. This is a more compact shrub with almost grey, velvety foliage and blue-violet flowers. It can be used as a culinary substitute for common sage, and makes an attractive feature shrub.

Sage requires slightly more humus in the soil than thyme and rosemary, and more regular watering. Growth will improve with a light application of worm castings or complete organic fertiliser in spring, and a 5-cm layer of organic mulch, but

over-fertilised sage will attract pests. Sage grows easily from seed sown 5 mm deep in punnets after weather warms in spring. Transplant into individual 8-cm pots at two true-leaf stage, and transplant into the garden when weather is not extremely hot or cold, and seedlings are 6 cm high. Don't save seed if you grow a variety of sages. You will only need one or two plants for culinary use. Plants can be propagated from tip cuttings taken during warmer months. You may have to replace your sage plants every four years when new growth slows.

THYME (*Thymus* spp.)

PLANTING PHASE: *Full Moon*

There are about 350 species of thyme and, except for woolly thyme, they all have fairly similar properties. The traditional use of thyme in poultry stuffing has a very practical basis as poultry will cause food poisoning if prepared, cooked or stored incorrectly, and thyme is rich in thymol — one of the strongest antiseptics known. It is used commercially in mouth washes and toothpastes. The oils in thyme are also fungicides and vermifuges, and should be avoided during pregnancy. An excellent remedy for respiratory complaints is thyme and lemon tea. Common thyme, *T. vulgaris*, and, for children, the milder lemon thyme, *T. citriodorus*, are perfect for this preparation. Steep a teaspoon of thyme leaves in a covered cup of boiling water for ten minutes. Strain the infusion into another cup and add the juice of half a lemon and pure honey to taste. Sip this warm mixture slowly, especially at bedtime, where it can work undisturbed overnight.

Common thyme is a hardy, evergreen perennial with very small leaves, and spikes of pale pink to mauve flowers in

spring or summer. Lemon thyme has slightly broader, fleshier leaves. It spreads more quickly and flowers in late winter or spring. Flowers are edible, too.

All *Thymus* species are extremely hardy and drought-tolerant and suitable for all growing zones. Plants grow to only 25 cm high, with a similar spread, making them ideal border plants. Thyme requires a raised bed in a sunny position, and similar growing conditions to rosemary. A light application of worm castings or complete organic fertiliser in spring, and a 5-cm layer of organic mulch should keep it healthy. Thyme requires mulching during warm seasons but may grow better in cooler areas if mulch is removed in autumn so that winter sun can warm the soil. Growth and flavour in thyme seedlings is variable, and it is very easy to propagate from semi-hardwood cuttings taken after flowering. Cuttings are definitely the best option where you want to plant a thyme border or grow it in large quantities. It is not possible to specify a precise time for all zones because various species have different flowering times. Cuttings taken in summer can be planted out in autumn when about 5 cm tall, or kept in 8-cm pots over winter for transplanting in spring. Spent flower heads should be removed immediately after flowering by grasping a clump of stems and cutting just below the heads. Because of their tiny leaves, thyme are difficult to trim above leaf axils but fortunately thyme does not mind where young wood is cut. Simply make sure you leave some foliage on the stem below the flower heads.

WATERCRESS (*Nasturtium officinale*)

PLANTING PHASE: *Full Moon*

Although another common plant is so-named, this plant is the true nasturtium. Watercress is another member of the brassica family, and contains similar compounds to radish. While we eat it especially for its peppery taste, watercress has a range of therapeutic properties. It is able to clear toxins from the body and is a valuable medicinal herb used as a diuretic, expectorant, and to treat rheumatism and skin eruptions. Its soft, rounded leaves are high in vitamin C, and also contain beta-carotene, vitamins B1 and B2, calcium, iron, sulphur, phosphorus and iodine.

Watercress is a perennial creeper that can be grown from seed or cutting. It grows naturally in clear water but unfortunately wild-collected watercress is no longer safe for consumption because of the risk of parasitic infection from polluted streams. Only grow watercress if you can spare clean drinking water to keep it growing as dam or saline water are not suitable. For a continuous supply of watercress when air temperatures are above 10°C, it can be easily grown in suitable pots or foam boxes which provide efficient use of water (see [chapter 4](#) for details).

Greenpatch and Eden both supply watercress seeds, or you can start your crop by purchasing a bunch of fresh watercress from the supermarket. Select half a dozen good stems, and strike cuttings in a glass of water (see [chapter 8](#) for details).

Full sun conditions can be too strong for watercress in many areas of Australia but it grows well under 50-per-cent shade cloth or on a well lit verandah. Make sure it is out of reach of chooks and other animals who appreciate this nutritious herb. Once your cuttings produce roots, make grooves in the top of the growing mix and lay the cuttings, roots downward, along the grooves. Cover the root sections

with a little growing mix, keeping the leafy top section clear of soil, and water gently. When the tops are 10–12 cm high, pinch out the growing tips to encourage bushy growth. The plants will naturally flop across the growing mix, taking root where they touch the mix, and leafy laterals will grow vertically. Once plants are well established, harvest regularly to keep them producing leaves rather than flowers.

Cut lateral stems a node or two from the main stem to allow more shoots to develop, and rinse well in clean water before using. Use only the young green leaves which are rich in nutrients. Leaves can be added to sandwiches, salads and soups.

Popular Fruits and Vegetables

[Popular Fruits and Vegetables](#)

Popular Fruits and Vegetables

ALMOND see Pome and Stone Fruits

APPLE see Pome and Stone Fruits

APRICOT see Pome and Stone Fruits

ASPARAGUS (*Asparagus officinalis*)

SOWING AND PLANTING PHASE: *Full Moon*

This delicious vegetable has been used as a medicinal herb for various health problems for the past 2000 years, at least. Low in kilojoules but rich in folic acid, vitamins C and B6, rutin, cholesterol-lowering pectin and potassium, asparagus plants also contain asparagine which is very important for both bladder and prostate health. Some growers blanch asparagus spears by hilling up plants but green asparagus also contain magnesium for healthy muscles, including the heart.

The asparagus plant is a long-lived herbaceous perennial that requires a permanent bed in a cool part of the garden. It can be grown from cold to warm-temperate areas, and has a reputation for being salt tolerant. It may be grown in some milder Warm Zone areas too, if a suitable site can be found. In cool and cool-temperate climates, the bed should be set up in a sunny position where it is protected from wind. In areas where summer temperatures are hot, these plants grow quite happily in part-shade where the soil stays cooler. This is particularly important while plants are dormant and cropping. The south side of a building, or in the shade of trees is a good position for a bed. Avoid positions where large tree roots will compete for moisture. We were very pleased with the improvement in cropping and growth of this favourite after

we moved the crowns to a bed along the south wall of our shade house, because spring can be very hot and dry in our area.

This genus produces separate male and female plants. The crowns purchased from nurseries are usually male plants. Some people prefer only spears from male plants that have been hilled up for blanching, but we have found the male plants are slower to get going in spring and the spears from female plants are so tender they can be eaten raw, or steamed in a few minutes. A mixture of male and female plants works well.

The average family would require about two dozen plants. Spears can be harvested over a period of two months in spring. The plants take approximately three years from seed to harvest but, once established, they will produce for twenty years or so. Asparagus plants are very easy to grow from both seed and crown and are naturally disease and pest resistant. If you have decided you can't wait three years for a crop, you can purchase all mature crowns from a nursery, or you can start with a few purchased crowns that are old enough for a small harvest the first season, and grow the rest from seed. Mature crowns may have to be ordered in advance.

Asparagus beds must have perfect drainage or else the crowns will rot, and the bed requires a soil depth of 24–25 cm. In many gardens, a raised bed is the answer to improve drainage and allow you to mix organic matter right through the soil without the problem of organic matter being buried deeply. In other words, treat it more like container planting. The bed can be built on top of the ground and prepared over time to be ready for winter planting. As the bed will remain for 20 years, it is worth putting a bit of effort into preparing the soil. First

check drainage in the bed area and treat with gypsum, if necessary. Then aerate the soil under the growing area by rocking a garden fork backwards and forwards, and apply a dusting of dolomite, unless the soil is already alkaline. Because of the soil depth required by asparagus crowns, the bed will require a border of old bricks or planks of untreated timber on their edge, held up by short stakes driven into the ground. Do not cement the bricks in position as the small gaps ensure good drainage. Three rows of bricks will sit 24 cm high. The bed will be easier to access if you leave one long side of the border open until you have prepared the soil.

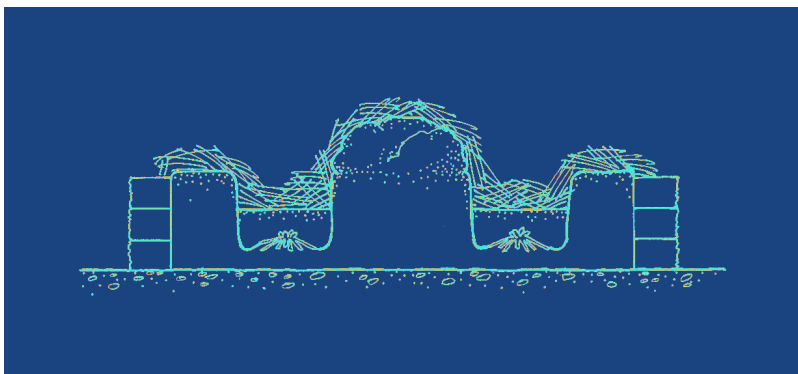


Fig. 6.3 Cross section of an above-ground asparagus bed where topsoil is shallow. With regular applications of organic matter, soil under the bed will improve in depth and texture.

When compost and manure are available, the bed can be prepared about seven weeks before planting crowns because soil activity is slower in autumn. If your soil is sandy, it will probably only need the addition of a 10-cm layer of mature compost, or well-rotted manure, worked through 15 cm of soil in the raised bed. If your soil is heavy, use 10 cm of compost or manure with 10 cm of soil and 5 cm of coarse

sand. Water the prepared bed thoroughly and cover it with a 7-cm layer of organic mulch. Ideally, soil pH should be about 6.5. Asparagus beds in warmer areas will require at least a 10-cm layer of organic mulch all year. If you do not have access to a lot of manure or compost, you can start preparing the bed in summer by putting 15 cm of sandy soil (or the equivalent depth of heavy loam and sand mix) into the bed area. Then set up a wire-hoop compost heap on the soil in the bed and dig the mature compost through the topsoil before planting. Alternatively, you can grow a green-manure legume/grain mix in the soil on the bed for four weeks before slashing.

Spread a little well-rotted manure or some worm castings through the slashed crop and dig the mixture into the top 10 cm of soil.

The only problem with growing these plants from seed is that if you want only male plants, you will have to grow a lot more plants than you need because the female plants are identified when the two-year-old females produce berries. If you are quite happy with female plants or a mixture of both, the exercise is easy. Asparagus seed is sown in early spring in all zones, 1 cm deep, in seed trays or punnets, or sown in seed beds in mid-spring. Seed may take three weeks to germinate. Sow more seed than you will need and select the best seedlings. Keep seed beds well insulated with organic mulch. To save space in the garden, asparagus seedlings can be potted-on for the first two years, then planted out in winter when crowns are close to being mature enough for harvest. Feed seedlings regularly with fertiliser teas, including seaweed tea, through the growing season. For seedling and potting mixes, see [chapter 4](#).

During winter, while plants are dormant, asparagus crowns can be planted in a prepared bed. Purchased crowns should be kept damp, loosely wrapped in several layers of wet newspaper, until they are planted out. Remove mulch from the bed. Mark out planting stations 40 cm apart in the prepared bed. Rows should be close to a metre apart for blanched asparagus to allow for hilling, or 60 cm apart for green asparagus. Position stakes between planting stations so that tall slender shoots can be loosely tied. This will make bed maintenance easier until crowns are well established. Dig holes 20 cm deep, and wide enough to accommodate the roots. Make a small mound of soil at the bottom of each hole to support the crown roots. Place two- or three-year-old crowns on the bottom of the holes, spreading the roots out carefully over the mounds and taking care not to damage the shoot buds at the top of the crown. Cover each crown with 6 cm of soil, leaving the rest of the soil in piles on the bed. Water carefully to settle soil around the roots. Temporarily re-cover the bed with mulch to keep the compost damp and protect the young crowns where winters are very cold, or dry. Keep soil damp, and gradually fill in the holes as the plants grow. An occasional application of weak fertiliser tea can be beneficial until crowns are well established. Do not harvest any shoots from two-year-old crowns, and don't hill up asparagus in the first year after planting. For those who prefer blanched asparagus, soil between rows can be used in late winter to increase soil depth in rows by 10 cm, then covered with mulch.

A light harvest can be made for a couple of weeks from three-year-old crowns, but only harvest spears that are thicker than 1 cm. Any spears thinner than this should be left to grow to full height to nourish the plant so that the roots can store

food for next year's spears. Green spears are harvested when they are 15–18 cm above ground, and before the tip opens up. Use a small kitchen knife to cut them just above ground level, taking care not to damage any other shoots. Harvesting needs to be done every day or so, otherwise spears become feathery at the top, and tougher. Once plants are established, harvesting can continue for about eight weeks as long as the spears are vigorous. For blanched spears, carefully remove soil from around the spear and cut spears 15 cm long with a sharp knife below ground level. Experts say that only 75–80 per cent of spears should be harvested. This is difficult to estimate without x-ray vision. We have found that, if spears are 1.5 cm thick, harvesting for about two months does not seem to damage the crowns as long as the plants are well fed and watered during the growing season. Once spears start to slim down, or slow down, it is a suitable time to cease cropping.

When harvesting is completed, apply a layer of mature compost, or well-rotted manure, around plants and cover it with a 3-cm layer of organic mulch (much thicker in warmer areas). You do not have to add other fertilisers because the mulch is also feeding the plants. Check under mulch regularly to ensure the soil is damp. This is particularly important in built-up beds. If you have female plants, sections of foliage carrying berries will have to be cut off before berries start to mature, or too much energy will be put into seed production instead of strengthening the crown for next year's crop. In all gardening zones established asparagus plants need cutting back to ground level during autumn or early winter (when foliage has yellowed) after nutrients have been drawn back into the crown. If manures have been used, check soil pH, and dust with dolomite, if necessary. Top up the bed to the

original level with well-rotted organic matter after cutting plants back, and cover the whole bed with organic mulch. At the same time, give the whole bed an application of seaweed tea.

To prepare asparagus, rinse well to remove dirt, then flex each spear between the fingers. Use the part of the spear above where it snaps. Forget about standing it up in bundles for cooking. Fresh, young asparagus spears can be steamed quite quickly. Do not add salt to the water if boiling asparagus. The lower, tougher part of the stem below where it snaps can be chopped and frozen in plastic bags for use in soups.

AVOCADO (*Persea americana*)

PLANTING PHASE: *Full Moon*

The avocado or alligator pear is a fruit we eat as a vegetable. It is used as a butter substitute in Mexico, but sometimes avoided in Australia because of the mistaken belief that it is high in cholesterol. Avocado is high in ‘good’ fats, plus thirteen essential minerals that help to keep cholesterol levels normal. It also contains B and E vitamins, beta-carotene and moderate amounts of fibre. Avocado tend to taste bitter when cooked. The pulp makes an excellent face mask, and the inside of the peel removes rough skin from the elbows and heels.

Avocado is suitable for growing in frost-free temperate areas and Warm Zones. Some cultivars are more cold-tolerant than others. Avocado can be grown in warm, protected gardens in Temperate Zones that receive light frost, but young trees require frost protection for several years or they will die. It is not suitable for saline areas. Avocado requires a sunny

position protected from winds, especially salt-laden winds. Soil must be well drained as it is prone to root rot, and planting trees on a raised mound, without a depression to hold water, is helpful in low-lying areas. Always buy grafted avocado trees from a reliable nursery.

Some avocado cultivars grow to 10 m, with a similar spread, and you may require two trees because the male and female flowers on trees may not open at the same time. Unfertilised trees may still produce small oval fruit without seeds. These are sold in fruit markets as cocktail avocado. ‘Wurtz’ is a self-pollinating, dwarf cultivar suitable for small gardens. Although the tree may only grow to 3 m, it produces fruit while quite small, and the ripe, green fruit are full size with a delicious flavour.

Avocado thrives on organic growing methods, and soil should be prepared two months before planting, with plenty of compost or very well-rotted manure, and a close to neutral pH. Trees can be planted in early autumn or spring, and lightly mulched with organic matter. Be meticulous about keeping mulch clear of trunks. Avocado require deep watering under mulch to keep soil consistently damp, but not wet. Do not allow fruit to form for two years after planting.

If growth seems slow, young trees can receive fertiliser tea in summer during their first year. In August, apply seaweed tea (diluted for young trees) and, from September onwards, maintain the depth of mulch to 8 cm. Organic complete fertiliser can be applied in spring, and also to established trees after harvest. Poultry-based fertiliser or worm castings are very suitable. The timing of fertiliser for avocado is very important because avocado trees fertilised within six weeks either side of flowering have a tendency to drop their fruit.

Keep a record of when your avocado trees come into flower. If the soil is too cool for fertilising and mulching six weeks before flowering, do not fertilise until at least six weeks after flowering. Although evergreen, avocado trees may shed some leaves during flowering. They require regular, light trimming of dead twigs (see [chapter 8](#)).

Avocado fruit do not ripen completely on trees, which allows you to harvest fruit over a considerable period of time. Fruit should be cut from trees (not pulled) with a short stalk when rough-skinned fruit becomes very dark purple, or smooth-skinned fruit loses its shine. Fruit can be ripened indoors in a paper bag with or without a ripe banana or apple added; it is fully ripe when the stalk pops off and the flesh yields slightly to gentle pressure. Fruit that contains small, hard spots just under the skin has been attacked by fruit fly. Avocado has the ability to seal off fruit-fly eggs so that they cannot develop in immature fruit. However, this protection does not extend to fully mature fruit. Avocado oxidises quickly when exposed to air, and the addition of a little lemon juice helps to keep the flesh green. If you only need half an avocado, leave the seed in the remaining half and wrap the fruit in plastic, then use it within a day or two. The method of removing an avocado seed by hitting it with a knife blade is quite dangerous if your aim is slightly off, as the seeds are tough. Flipping the seed out with a teaspoon is much safer.

BANANA (*Musa sapientum*)

PLANTING PHASE: *Full Moon*

Banana ‘trees’ are actually giant herbs which can produce fruit within eighteen months of planting suckers. The fruit is very popular and easily digested when ripe. Bananas are rich

in minerals, including potassium, phosphorus, calcium and chromium (the mineral that helps satisfy a sweet tooth). Overripe bananas can be used in cakes and muffins.

Banana trunks and fronds are fleshy, and sensitive to frost and strong winds. They are suitable for growing in warm temperate areas and Warm Zones with good rainfall, or an unrestricted water supply, as they will require a weekly watering in hot, dry weather. Bananas can be successfully grown in a sunny, protected position against a north-facing wall in Temperate Zones that only receive an occasional light frost, although they will take longer to produce fruit. Some cultivars reach 8 m in height, but ‘Dwarf Cavendish’, which grows to 2 m, and ‘Williams’, to 3 m, are very suitable for home gardens.

Because banana trees grow so quickly and produce a large crop of fruit in a short period, they are heavy feeders. This plant grows best when soil pH is no lower than 6, and when it is prepared with plenty of humus and organic complete fertiliser. A dusting of natural wood ash can be beneficial if soil is acidic as banana requires soil with a good potassium content. Poultry-based complete fertilisers are very suitable for bananas trees and many seaweed fertilisers supply potassium. However, being too heavy-handed with high potassium fertilisers can cause magnesium to become unavailable, and banana trees require this element, too.

Banana roots are very shallow, and thick organic mulch that includes compost or worm castings is necessary at all times. A cover crop can be grown about eight weeks before planting to provide humus and mulch. Suckers of suitable banana cultivars can be obtained from neighbours or local nurseries (there may be restrictions on which cultivars can be grown in

some areas in order to protect commercial crops from disease). Suckers can be planted at the same depth, 2.5 m apart, in dark-damp soil from mid-spring to early summer in Temperate Zones, or anytime except the wet season in Warm Zones. Single plants will have to be supported with three stakes. Apply a thick organic mulch around the planting area but do not water suckers for two to three weeks after planting, otherwise the base can rot.

Fertilise young plants with manure tea or worm liquid tea in late spring and February, plus an application of complete organic fertiliser around the drip line in December. Mature clumps can have fertiliser tea in October and an application of organic complete fertiliser in December and February. An application of seaweed tea is helpful in February, especially in high rainfall areas.

Weed the growing area regularly. It is illegal in some areas to allow weeds to grow within 2 m of banana trees. (Some weeds are hosts to pests that cause serious damage or diseases in bananas.) Allow plants to develop as many suckers as possible during the first two years. Bananas are more wind resistant when they have formed a clump. Dead leaves and chopped-up stems can become part of the mulch around banana plants. Wash tools in warm, soapy water after using them to cut off banana vegetation; it may be necessary to use steel wool to remove sap.

In temperatures over 20°C, fruit develops on a long, flowering stem in tiers that make up a large bunch. To maintain warmth, developing fruit is usually covered with coloured plastic, left open at the bottom. (Clear plastic can cause sunburn). Fruit can be allowed to ripen on trees, or indoors once its sharp angles soften and fruit appears fuller.

This can occur from autumn to late winter. Remove the purple flower remnants and hang the bunch so that the banana fingers point downwards. When we lived in Sydney, where it became too cool to ripen bananas outdoors, we used to hang the whole bunch from a beam in the garage, with a ripe apple in a mesh onion bag suspended underneath. The ethylene produced by apples really made a difference to ripening; the first time we tried this, we attached the rope to the thickest part of the bunch stem, and the bananas ripened in the opposite to normal order.

Banana stems only produce fruit once. After harvesting, cut back the stem to 1 m above ground. Apply compost and seaweed tea under mulch. When suckers have formed at the base of the stem, cut the shortened stem at an angle above the top of mulch. On established clumps of bananas, retain a healthy sucker facing outwards, and remove the others. Where bananas are grown on hillsides, the sucker facing most uphill is left to grow.

BEANS

SOWING PHASE: *First Quarter*

Green beans are especially beneficial to the urinary tract, and also provide phosphorus, magnesium, iron, fibre, B vitamins including folic acid, plus some vitamin C and beta-carotene. Beans are low in kilojoules, and dried bean seeds contain protein, calcium, potassium, complex carbohydrates, and the anti-oxidant CQ-10, making them beneficial to cardiovascular and skeletal health.

Green beans only require steaming, or stir-frying, for a short period before serving, and they will remain an attractive green colour. Overcooking green beans makes them tough. Don't

add bicarbonate to cooking water as it removes B vitamins. Excess beans can be blanched with boiling water and frozen for winter use, but fully mature pods won't taste any better when they thaw.

Dried beans contain purines and are often avoided by sufferers of gout or migraine; others avoid dried beans because they can cause flatulence. This is more likely to occur in people who eat beans infrequently because they don't develop the enzymes required to digest them. Adzuki beans are more easily tolerated by these people. A teaspoon of ground ginger added to dried beans at the start of cooking is said to greatly reduce flatulence. This makes sense, as ginger is helpful for general poor digestion. Dried beans require soaking in cold water for several hours before cooking gently in fresh water until tender. Don't add salt to beans until the end of cooking.

Green beans, *Phaseolus vulgaris*, are salt-sensitive plants. They are easy to grow in all zones at some time of the year if they can receive regular, deep watering and some wind protection. Heavy mulching of plants helps in most growing areas of Australia. As green beans are frost sensitive, do not sow seed until the soil warms. Beans appreciate a more humid atmosphere than peas, and some overhead watering can help prevent two-spotted mite in dry conditions. Beans, however, may be prone to rust when conditions are hot and humid. All beans may have to be netted in drought conditions as birds are very good at removing pods.

Green beans prefer a sunny position but may require some temporary shade in very hot, dry weather. Don't plant them near beetroot, bulb fennel, onions, or garlic. Beans need good drainage, a soil pH not lower than 6, humus-rich soil and

some pre-planting complete organic fertiliser. Soil rich in compost builds resistance to bean fly. Prepare beds early and cover with mulch. (I was told by an inoculant supplier that green beans will not fix nitrogen in your garden because they require a specific rhizobium bacteria which is not found in Australian soils, and not available commercially. However, navy beans are recommended as a green manure in some areas, and navy, kidney, lima and greens beans all require the same inoculant, RCR3644, so you may be lucky enough to be able to introduce this nitrogen-fixing bacteria into your garden.)

If you only have a small garden, dwarf beans, *P. v. humile*, are the answer. (Dwarf beans do not require any support.) If growing climber beans, position a 2-m trellis, similar to that for growing peas, before sowing seed. If only very small quantities are required, tepees or wire hoops can be used. You can also sow climber beans between sweet corn seedlings to shade bean plants, once the corn is over 45 cm high. Avoid sowing if rain is predicted within 36 hours. Thoroughly water the growing area just before sowing seed. Sow a small quantity of seeds each suitable month in your zone to ensure an ongoing supply. Seed can be sown directly into mulched beds: pull the mulch back a little from each seed position, and press each seed into dark-damp soil, up to the depth of the top joint of your index finger, about 2.5 cm deep. Dwarf beans grow better in blocks than rows. Sow seed in stations, no closer than 35 cm, to allow plants to develop enough foliage to protect pods from sunburn. Space climbers no closer than 20 cm to allow roots to spread. If you wish, you can sow two seeds in each position, 3 cm apart, and remove the weaker seedling at first true leaf stage. Large quantities of legume

seed can be sown in furrows 6 cm deep and covered with 4 cm of soil.

Rake soil over the seed, then mulch the growing area. Do not water seeds again until the seedlings appear about a week later. Three weeks after sowing, fertilise seedlings with seaweed tea, and add an application of fertiliser tea at flowering time. Gradually hill soil, up to 10 cm, around plants to improve root growth. If foliage becomes yellow even though drainage is good, apply fertiliser tea to soil around plants. *Phaseolus* species can take between eight and eleven weeks to commence cropping. Pick pods when they are young and tender. Picking pods every day or two will also prolong harvesting. Mark your best producers and allow pods to remain on plants. Other bean genera are grown in much the same way, but can take up to sixteen weeks to mature. If cultivars are to be used as dried beans, see [chapter 8](#) on saving legume seed. Lima beans are shelled before they dry. After harvesting, cut plants down and allow them to remain as mulch. ‘Broker’ yields well, and tolerates hot weather, as does the climber ‘Blue Lake’. There are many open-pollinated bean cultivars available for various uses.

Snake bean, *Vigna unguiculata sesquipedalis*, (related to cowpea) is a prolific cropper that takes about twelve weeks, or less, to harvesting. You won’t need many plants. For the best flavour, pick pods very often while young and tender rather than waiting to see how long they can grow. These climbing beans require slightly warmer conditions and will fix nitrogen if you have grown a green manure crop of cowpeas or mung beans in recent years. Snake bean can also be used in a green-manure crop rotation.

Mung bean, *V. radiata*, can be grown as a warm season green manure. Save some seed from your crop to sprout for salads and stir-fries.

BEETROOT (*Beta vulgaris* Condivita Group)

SOWING AND TRANSPLANTING PHASE: *Full Moon*

Beetroot with deep purple-red colouring is rich in anti-oxidants and fibre. It is an excellent blood purifier and liver tonic, beneficial to both the lymphatic and digestive systems. As well as enjoying freshly baked or steamed baby beetroot, try adding a small amount to vegetable juices or eating it raw, finely grated, in salads. The flavour of fresh, home-grown beetroot blends well with oranges, and bears no resemblance to the tinned variety favoured in the Aussie hamburger. The baby leaves of beetroot make a colourful and healthy addition to a green salad, but do contain some oxalic acid.

Beetroot is very easy to grow in well-drained, humus-rich soil, and matures in about eight weeks. It can be grown in beds, or deep polystyrene fruit boxes if space is limited. The younger the beetroot, the higher the nutrient levels. Roots can be harvested from walnut shell-size upwards. Beetroot is salt tolerant and can be sown at any time except during the wet season in Warm Zones, or from early spring to early autumn in other areas.

Heavily manured or legume-enriched soil may produce more leaves than roots so beetroot is a good crop to follow leafy greens, which require more nitrogen. Do not sow it directly after silver beet as they are just different forms of the same plant. Boron, found in seaweed fertiliser, is required for healthy root formation in beetroot, otherwise black, hard

patches will form on the roots. A light application of organic poultry-based fertiliser will assist growth. Beetroot prefers a soil pH of around 6.5. Over-liming the bed can cause beetroot leaves to yellow, and blocks the availability of essential boron.

Because beetroot seeds, like silver beet, have a corky covering, soak seeds in water overnight, then sow 2 cm apart, and 1.5 cm deep, in furrows. Germination occurs in about ten days. We get the best results growing beetroot in small blocks with rows 16 cm apart so that the foliage shades the soil between the rows. Rows can be 20 cm apart in cooler areas, and mulched between rows when necessary. Sow small quantities of seed each Full Moon phase through the growing season rather than a single large crop.

The secret to tender beetroot is to grow it as quickly as possible. Water beetroot deeply as it has a taproot. Beetroot grows more quickly if seeds are sown direct but seed can be started in punnets in early spring if the ground is still cool. Transplant carefully to the same depth, 4 cm apart, when the first true leaves are fully extended.

Beetroot seeds are composite and two or more plants can grow from each corky seed. Thin seedlings to 4 cm apart, and later to 8 cm apart (closer if you are growing all of them as baby beets). The leaves of the second thinning can be used in salads. Do not hill up beetroot as the swollen top of the taproot sits up from the soil. Beetroot does not require additional fertiliser unless early growth is very slow. An application of worm liquid tea for lazy seedlings, and seaweed tea when the roots are 2 cm across, will develop better roots. Harvest beetroot before it is 7 cm across. Beetroot larger than this tends to be tough.

‘Rapid Red’ and ‘Feuer Kugal’ can be grown any time. ‘Early Wonder’ is a good cultivar for summer. ‘Derwent Globe’ and ‘Detroit Dark Red’ are popular garden varieties. ‘Bull’s Blood’ and ‘Boltardy’ grow better in cooler conditions.

BLUEBERRY (*Vaccinium* spp.)

PLANTING PHASE: *Full Moon*

The blueberry is a North American medicinal herb rich in vitamin C, and contains anthocyanosides and other anti-oxidant compounds that protect blood capillaries and help reduce cholesterol and triglycerides. Its most important use, though, is in the treatment of diabetic retinopathy and cataracts. Anthocyanosides are believed to help prevent glaucoma, and are beneficial to eyesight, particularly night vision. Blueberries freeze well, and a five- or six-year-old bush can produce about 5 kg of fruit. Modern cultivars are bred from three different species of blueberry, each requiring a different period of winter cold. The most common variety grows to about 3 m in height. Fruit matures in time for Christmas. Blueberries can be enjoyed fresh, baked into pies, muffins and pancakes, or made into syrup and jam.

If you have the right conditions, blueberry can be a very attractive addition to your garden, adding colourful autumn foliage. The trees need humus-rich soil with a pH of around 5.5, and cold conditions in winter to stimulate fruit growth, so they are not suitable for areas where winters are mild. Blueberries are grown commercially on the mid-north coast of NSW about 270 km north of Sydney. Although this coastal area is very warm from October to March and winters are fairly mild, the blueberries are grown in the hills about 15 km inland where they receive a chill on winter nights. Despite

their requirement for some chilling in winter, young blueberry plants are very sensitive to spring frosts and need some protection in early years. Suitable blueberry cultivars for your area can be obtained from your local nursery.

Prepare the planting area with plenty of unlimed organic compost, or well-rotted cow or horse manure, and plant bushes about 1.5 m apart in spring, after frosts. Do not add extra fertiliser during the first year. Established blueberry plants need only a lightly scattering of organic complete fertiliser in late winter or early spring, and regular watering or rain. After fertilising, apply a thick layer of organic mulch 10 cm from the multiple stems. Mulching is essential because blueberry plants are very shallow-rooted and resent cultivation in the root area. Do not grow them in the middle of lawns. Native birds have developed a liking for blueberries and netting will probably be required to protect fruit close to maturity. Although cross-pollination is not essential, planting two varieties is recommended to ensure good cropping.

BROAD BEAN (*Vicia faba*)

SOWING PHASE: *First Quarter*

I have heard some gardening experts say that broad beans are only suitable for cold climates. While these beans do perform beautifully in cold areas and are not suitable for the tropics, gardeners in some warm and temperate areas can enjoy these legumes, even if the crop is not as large. Broad beans provide fibre, complex carbohydrates, iron, phosphorous, potassium, and A, B, and C vitamins (although some people are unable to digest broad beans). Dried, ground broad beans provide a traditional starter for sourdough bread. These beans have been cultivated for thousands of years; apparently the term

‘beanfeast’ dates back to the use of broad beans in Roman feasts at the conclusion of funeral services.

Warm Zone plantings are only possible in autumn. Temperate and Cool Zones can plant them from March to June, while cold areas with low summer temperatures can continue planting into spring. As with peas, broad bean plants are frost hardy but their flowers are not. Precise planting times will depend on the cultivar and local conditions to avoid flowering and cropping when frosts occur. At temperatures of 20°C, broad beans can be ready to harvest in fifteen to sixteen weeks. Flowers appear several weeks before this time. The long-pod broad beans, with ten seeds per pod, are recommended for cooler climates. ‘Long Pod’ and ‘Aquadulce’ grow to 1.5 m while ‘Coles Dwarf’, which matures quickly, and ‘Egyptian’ are better for mild or windy areas, and these only grow to about a metre tall. The taller broad bean cultivars can also be grown as an uninoculated winter green-manure crop in mild areas, not to fix nitrogen but to deter fusarium wilt. Broad beans will not set pods when temperatures are too high, but this is not a problem where they are being grown as a green manure.

Choose a sunny position protected from cold, southerly winds. Broad beans like a well-drained, humus-rich soil with a pH around 6.5. Soil fertilised for a previous leafy-green crop should be suitable. Excess nitrogen can prevent broad bean plants setting pods so avoid areas where a lot of manure has been added, but a dusting of wood ash can be beneficial when preparing soil. Do not add dolomite or wood ash if you are growing beans as a green-manure crop for potatoes. Any pre-planting fertiliser required to improve soil must be added

several weeks before sowing. Cover prepared soil lightly with mulch.

A trellis or support is needed for broad beans and should be positioned before planting. Sow seed in double furrows spaced 25 cm apart. Broad beans do not climb in the same way as peas, and require fencing-in just to prevent them blowing over. Mark out furrows and position stakes to 1 m high on the outer corners of furrow pairs. Twine can then be wound around the outside of the stakes at a height of 45 cm and 90 cm to provide support as plants grow. If planting a large crop, space furrow pairs 90 cm apart. Avoid sowing when rain is predicted. Make furrows 7 cm deep, then water soil until dark-damp, and sow seeds about 18 cm apart along the furrows, then cover with 5 cm of soil, leaving a small depression at the top. Cover the planting area with mulch and do not water until seeds have germinated. Failure to germinate in legume seed is most often caused by over-watering before germination occurs. Seedlings should emerge within fourteen days. If wood ash was not added to soil, apply seaweed tea to soil only, in the first New Moon phase after sowing.

Keep soil just damp during plant growth. If weather is continually dry, maintaining 5 cm of mulch will keep soil moisture more constant and encourage root growth. Extra fertiliser is not usually required. Sometimes brown patches called 'chocolate spot' appear on broad bean foliage. This is usually associated with potash deficiency and aphids. Detering aphids with a strong jet of water as soon as sighted, and applying seaweed tea, can help avoid the problem.

After experimentation, I have not found that removing growing tips makes any noticeable difference in pod setting.

When weather is warm enough for insect activity, pod setting will improve. Mark plants which produce pods on lower stems, or produce more pods, and save these plants for seed (see [chapter 8](#) for more information). Broad beans are ready to harvest when pods are young and have just started to develop ‘bumps’ but seed is about kidney-bean size. These seeds can be used without removing their skins. Just shell and use them like peas. Don’t wait until pods become puffy before harvesting. Young broad beans have a delicious flavour, and are more easily digested. They are delicious in vegetable risottos and pasta dishes.

When the main crop is finished in areas with milder winters, cut plants back to 30 cm high during First Quarter phase and you will usually obtain a smaller second crop of beans from shoots growing from the base of each plant.

BROCCOLI (*Brassica oleracea* Italica and Botrytis Groups)

SOWING PHASE: *First Quarter/New Moon*

Broccoli is a very nutritious member of the crucifer family that also includes Brussels sprouts, cabbage, Chinese cabbage, cauliflower, horseradish, kale, kohlrabi, mizuna, mustard greens, swede, turnip, watercress and stock. It is also related to radish. All cruciferous vegetables contain varying amounts of ten different anti-oxidants, or phytochemicals, which either block the action of toxins, or synthesize enzymes that eliminate carcinogens from the body. Including moderate amounts of cruciferous vegetables in our diet is now recommended to help protect us from some forms of cancer. Broccoli also provides alpha-carotene, beta-carotene, vitamins B, C, and E, plus iron, calcium, phosphorus and magnesium.

The edible part of broccoli is a closely packed head of unopened flower buds. Broccoli needs warm weather for vigorous early growth and cool conditions to form heads. In hot weather heads can fail to form, or open prematurely spoiling the flavour of the vegetable. When conditions become too hot for broccoli, it will start to attract brassica pests such as the cabbage white butterfly.

Broccoli is frost hardy, and can take between eight and twenty-four weeks to mature depending on the climate and cultivar. Consequently, planting times given in the planting diary are general and will vary according to the cultivar. ‘De Cicco’ only takes about eight weeks to mature and is planted later than ‘Green Sprouting Calabrese’ or ‘Italian Green Sprouting’, which take about fourteen weeks. ‘Purple Sprouting Early’ is a confusing name for a cultivar which matures very slowly through winter for an early spring harvest. New cultivars of broccoli are proving to be more heat tolerant, allowing more flexibility in sowing times. They are easy to grow in pots or polystyrene fruit boxes, if space is limited.

Broccoli requires a sunny, well-drained position in very humus-rich soil with a pH of 6.5 to 7. All brassicas require both molybdenum and boron for good growth and harvestable crops. While moderately acid soil limits availability of molybdenum, alkaline soil restricts boron. Add dolomite or lime cautiously. Do not apply borax to the soil to treat boron deficiencies as following crops may be sensitive to high boron levels. Both boron and molybdenum can be supplied by using organic seaweed fertiliser and a moderate amount of certified organic poultry-based fertiliser when preparing the bed, unless you know your soil contains adequate amounts of

boron. When mixing brassicas among other vegetables, apply seaweed fertiliser to the soil in these areas, too. A layer of 5–6 cm of organic mulch will be beneficial in most areas.

Broccoli can be sown directly into a prepared bed. Sow two seeds, 2 cm apart, and 6 mm deep, in stations 40 cm apart. Germination occurs in about a week to ten days. Thin seedlings to the strongest one at each station when the second pair of true leaves appear. Keep soil dark-damp, and hill the plants slightly as they grow. Small seedlings can be given one or two applications of weak worm liquid tea, but do not over-fertilise this vegetable. Early in the sowing season where summers are hot, or bed space is limited, broccoli seed can be sown in 8-cm pots, two seeds to each pot, and thinned to the strongest seedling. Transplant into a mulched bed four to six weeks later when seedlings are about 12 cm high and have developed a strong root system. Give transplanted seedlings an application of very weak seaweed fertiliser tea. Eight plants per month are ample for the average family but if you only want to grow a few plants, mixing them among other vegetables that like similar conditions will help disguise broccoli from brassica pests. Keep broccoli away from leeks, though, because compounds given off by leeks tend to result in spindly, pest-prone broccoli.

Water broccoli deeply and regularly under mulch during dry weather. As the heads start to develop, check the plants regularly, and commence harvesting as soon as the heads are firm and tightly packed. Don't allow broccoli to over-mature. It must be harvested before the buds begin to open. Cut broccoli heads with a short stalk, as needed. Use a sloping cut so that rain will not collect in the cut end of the stem and cause disease. In some cultivars, smaller side heads will

shortly appear after the main head is removed and these can be harvested, too. An application of worm liquid tea may help improve development of side heads. Excess broccoli can be cut into florets, blanched with boiling water, and frozen for later use.

To prepare broccoli, cut a section from the head and rinse well in salty water to flush out any bugs that may be hiding among the buds. Cut broccoli into small florets including some of the very nutritious tender stems. Cooking broccoli in water loses a lot of nutrients, and overcooked broccoli is most unappetising. Adding bicarbonate of soda to the cooking water destroys B vitamins in vegetables. Just steam or stir-fry broccoli for about three minutes until barely tender, and it will stay green.

Brassicas cross-pollinate easily so saved seed will not be true-to-type if you have several members of this large family going to seed at the same time.

BRUSSELS SPROUTS (*Brassica oleracea* Gemmifera Group)

SOWING PHASE: *New Moon*

Brussels sprouts are a relatively recent addition to the crucifer family, developed in Belgium about 200 years ago. They share the health-protecting anti-oxidants of broccoli. The edible part of the plant is a collection of miniature cabbage-like growths that develop along the plant stem below a crown of large leaves. As well as vitamins A and C, the ‘sprouts’ contain iron, phosphorus and folic acid.

Brussels sprouts are frost hardy and suited to growing in Cool Zones and cool temperate areas only, as the sprouts need a

distinct cold period to develop properly, and frost improves their flavour. Brussels sprouts grown in areas with a mild winter often develop loosely formed sprouts with poor flavour, and are more prone to attack from grey aphids. Each plant produces three dozen or more sprouts, so the number of plants you grow depends on how much you like them. Probably ten or so plants divided into two sowings would be sufficient. If you want to grow only a few plants, mixing them among other vegetables that like similar conditions will help confuse brassica pests.

Brussels sprouts take approximately eighteen weeks or more to mature after planting out in warm weather. ‘Seven Hills’ produces a staggered crop of sprouts which can be convenient for small families. This vegetable requires a position with winter sun, and well-drained, humus-rich soil with a pH of 6.5 to 7, where molybdenum and boron are both available (see Broccoli). Cover the prepared bed with 5–6 cm of organic mulch.

Brussels sprouts are usually sown in 8-cm pots, two seeds to each pot, 2 cm apart, and 6 mm deep. Germination occurs in a week to ten days. Thin seedlings to the strongest one when the second pair of true leaves appear. Apply enough weak fertiliser tea to keep seedlings growing steadily. When seedlings are about 12 cm high and have developed a strong root system, position short stakes 60 cm apart in the growing area, and transplant seedlings slightly deeper. Do not give additional fertiliser for two months, as too much fertiliser can also cause loosely formed sprouts. In mild conditions Brussels sprouts can be sown directly into the bed in the same way as broccoli.

Water Brussels sprouts deeply and regularly under mulch during dry weather, and hill plants slightly as they grow. Tie plants to the stakes just under the crown of the plants as sprouts begin to form. Gradually remove the lower leaves by pulling sideways to give sprouts room to grow. Commence harvesting as soon as sprouts are large enough to eat. In cultivars that mature all at once, cut the whole stem just above ground level. Excess Brussels sprouts can be blanched with boiling water, and frozen for later use.

To prepare sprouts, remove the outer layer of leaves and rinse well in salty water to flush out any bugs. Then steam sprouts lightly, or cut in half, blanch for two minutes in boiling water, and saute in a small amount of butter. Brassicas cross-pollinate easily so saved seed will not be true-to-type if you have several members of this large family going to seed at the same time.

BULB FENNEL (*Foeniculum vulgare azoricum*)

SOWING PHASE: *New Moon*

Bulb fennel (also known as sweet fennel or Florence fennel) is a variety of perennial fennel grown as an annual for its swollen stem base. The tender inner stems have a delicate aniseed flavour and, sliced horizontally, can be used like celery in salads. This vegetable is often used in Italian recipes. The fine, feathery foliage can be used in the same way as ordinary fennel. Stems and foliage of fennel are a diuretic and anti-inflammatory, and beneficial to the digestive system. Seeds improve milk flow in lactating mothers.

Bulb fennel has the same soil fertiliser requirements as celery, and beds can be prepared in the same way, although bulb fennel can tolerate a slightly more alkaline soil and prefers a

sunnier position. Both have similar water requirements, but I do not know if bulb fennel is also salt tolerant. It requires more care than the ordinary fennel herb because bulb fennel will run to seed before developing a swollen base if soil is too dry. Bulb fennel does not usually require blanching as foliage above the 60 cm stems, and a thick layer of mulch, will help to shade the roots. In warmer parts of Australia, bulb fennel is grown through autumn and used as a winter vegetable. It takes just over three months to mature in warm weather, but is considerably slower in cool conditions.

Sow seed thinly, directly into shallow furrows in warm weather, and cover with 5 mm of soil. Gradually thin seedlings to 20 cm apart. Sow small quantities of seed, repeatedly, rather than producing a single crop. Foliage from thinnings can be added to salads. Harvest swollen bulbs as soon as they are the size of a small apple, and continue to harvest until bases are 10 cm across. The outside stems are discarded before preparation, but bases wider than 10 cm will start to become coarse and tough. Stem bases can be stored in the vegetable crisper for short periods. Bulb fennel will cross-pollinate with common fennel and dill, and is not a particularly good companion to other vegetables.

CABBAGE (*Brassica oleracea* Capitata Group)

SOWING PHASE: *New Moon*

Cabbage is a member of the crucifer family and shares the health-protecting anti-oxidants of broccoli, and is also low in kilojoules. It is a good source of vitamin C and folic acid, especially when eaten raw. Savoy cabbage has greener, more crinkled leaves, is more cold tolerant, and contains more folic acid, and some beta-carotene.

Cabbage can be grown from spring to autumn in Cool and Temperate Zones, and virtually any time other than the wet season in Warm Zones. Mature cabbage can tolerate light frosts, and modern cultivars are more tolerant of warmer climates than most brassicas, although old cultivars may run to seed if cool weather warms suddenly. Avoid planting out cabbage too early as some areas experience a short spell of hot weather early in spring. Plants take eight to sixteen weeks to mature depending on the climate and cultivar. Consequently, planting times given in the planting diary are general and will vary according to the cultivar. ‘Sugarloaf’, ‘Primo’ and ‘Golden Acre’ are fast maturing, produce small heads, and are well suited to small gardens where a fast turnaround of crops is helpful. Cabbage grows well in warm weather before days shorten and growth stops. ‘January King’ and ‘Wintergreen’ can survive in the garden over winter, but should be covered with clean straw in very cold areas. ‘Red Dutch’ and ‘Red Drumhead’ have deep red to purple leaves and produce heads weighing about 3 kg under good conditions.

Cabbage require a sunny, well-drained position, and more fertile soil than other brassicas. A bed that has been enriched with a green manure suits them, and soil should have a pH of 6.5–7 where molybdenum and boron are both available (see Broccoli). A layer of 5–6 cm of organic mulch will be beneficial in most areas. In early spring, or where bed space is limited, cabbage seed can be sown in 8-cm pots, two seeds to each pot, 2 cm apart, and 6 mm deep. Germination occurs in about a week to ten days. Thin to the strongest seedling when the second pair of true leaves appear. Apply weak fertiliser tea regularly, and transplant, slightly deeper, after soil has warmed and frost danger has passed. Seedlings should be

about 12 cm high and have developed a strong root system before transplanting into stations 40 cm apart for fast growing cultivars, and half as wide again for larger, slower growing cabbages. Hill the plants slightly as they grow. In warm weather, cabbage seed can be sown directly into prepared beds in the same manner as broccoli but cabbage seedlings respond to moderate applications of weak worm liquid tea until well established. Large cultivars will benefit from an application of manure tea as heads start to form. An application or two of weak seaweed fertiliser tea may also be helpful in high rainfall areas. Six or eight plants per month are ample for the average family but if you only want to grow a few plants, mixing them among other vegetables that like similar conditions will help disguise them from cabbage white butterfly.

Water cabbage deeply, and regularly. A cabbage is mature when the head will not yield to pressure from your hand. The crop tends to mature over a very short period, so start harvesting early while heads are still small, sweet and tender. Remove the tough outer leaves and core before using. Cabbage is best lightly cooked, or raw. However, it is a bit of a waste to eat coleslaw with seafood because raw cabbage can reduce the absorption of iodine. Cabbage contains considerable amounts of vitamin K, the coagulant factor, and should be eaten in moderation by people taking blood thinners, such as warfarin.

Brassicas cross-pollinate easily so saved seed will not be true-to-type if you have several members of this large family going to seed at the same time. (Cabbage may not set viable seed in hot, humid conditions.)

CAPSICUMS AND CHILLIS (*Capsicum annuum*)

SOWING PHASE: *First Quarter*

Capsicums and chillis are produced by variations of the same plant. They are related to tomato, eggplant and potato, and must not follow any of these crops for at least three years. Both capsicums and chillis are rich in vitamin C and beta-carotene, plus the important anti-oxidant lycopene. They are a digestive, circulatory and metabolic stimulant. Chillis also contain varying amounts of capsaicin, the alkaloid that makes chilli 'hot'. This group includes tabasco, paprika and cayenne. Capsicum, *C. a. Grossum* Group, (also known as sweet pepper or bell pepper) produces milder tasting fruit, and fully ripe capsicums are easier to digest than green ones.

In very warm climates, capsicum and chilli plants are short-lived perennials, but they are grown as annuals in most areas of Australia because they require warmth and are very frost sensitive. Being related to the tomato, they require a similar position, soil preparation, soil pH and cultivation to tomato plants. They are also susceptible to blossom-end rot, sun scald where air is unpolluted, and fruit fly. Plants require staking because their stems are brittle and the fruit of some cultivars is quite large for the size of the plant. Unsupported stems will flop over but don't produce roots along stems as easily as tomatoes. Some cultivars only grow to 50 cm in height while others grow to around a metre. The only differences in cultivation between tomato and capsicum are that capsicum seed germinates at a slightly higher temperature, and plants require slightly more wind protection. Plants mature between eight and thirteen weeks, depending on growing conditions. Small cultivars can also be grown in large foam boxes or pots.

This genus is not suitable for very cold areas. Although they can be grown in pots in some cool areas, these plants require warm air more than direct sun, and set fruit when night temperatures are warm. They can technically be grown all year in Warm Zones but night temperatures may be too low to set fruit during winter. Where summers are hot, fruit will ripen fully under 50-per-cent shade cloth. In fact, the chillis that self-seed and grow as perennials on our farm choose positions where they are protected from hot afternoon sun. The Moscow-bred ‘Healthy’ and a pimento cultivar called ‘Lipstick’ are more suitable for cooler climates, and they mature fairly quickly. If you are growing both types and you wish to save seed, they should be separated (see [chapter 8](#)).

Capsicum and chilli seed can be sown direct in very warm weather. In most areas seedlings are started early in a cold frame, or warm, protected position, then transplanted when soil has warmed and seedlings are at least 10 cm high. Seed is sown 5 mm deep in 8-cm pots, two seeds to a pot, and thinned to the strongest seedling when 5–6 cm high. Transplant seedlings into a warm mulched bed, 40 cm apart for small cultivars, and 50 cm apart for large ones. In cooler areas, planting 70 cm apart in a mulched bed allows sun to warm the mulch. Warm mulch can raise the air temperature around plants a degree or so when the warmth is released at night. When fruit starts to form, give plants a light application of organic poultry-based complete fertiliser, then repeat each warm month to maintain fruit production.

Fully formed capsicum and chilli can be picked when green, or ripe. Always cut through the stem above fruit when picking as you can remove a whole branch if pulling fruit from plants. Fully ripe sweet capsicum may be red (‘Californian

Wonder'), yellow ('Golden Wonder'), or brown ('Sweet Chocolate'). There are quite a few different cultivars available and the 'Bullhorn' cultivars are good, too. Remove the seeds and membrane when preparing capsicum because these contain some capsaicin. If you blacken the skin and remove it, you will also remove the silica that helps build strong hair and nails. Overripe capsicum left on plants will attract pests, so check your crop every few days. Pests don't seem to like chillis, and they can be left to dry on bushes then threaded on a string, and hung in a dry, airy position.

There are well over a hundred cultivars of chilli which are usually labelled with a 'heat rating' because some people have low tolerance to capsaicin. Chilli seeds are sometimes included to give added bite to recipes. If you find a particular chilli dish too 'hot', don't reach for a glass of water to quench the fire. Drink milk instead. Cows' milk products neutralise capsaicin, which is why sour cream accompanies some chilli dishes, and yoghurt goes with curry. Always wear gloves when preparing chillis because capsaicin is not water soluble and, even after washing your hands, just touching your eye can cause a severe burning sensation. If this happens, bathe your eye with milk or cream, or a teaspoonful of sour cream, creme fraiche, or yoghurt. Use whatever you can reach quickly. Then rub your hands with the same thing before washing them again, in soapy water. After preparing chillis you should use a milk product to wipe down your work surfaces before washing them.

CARROT (*Daucus carota* subsp. *sativa*)

SOWING PHASE: *Full Moon*

Carrots can be eaten raw or cooked, and are an excellent source of the anti-oxidant beta-carotene which is converted in the body to vitamin A. As beta-carotene is fat soluble, the inclusion of a small amount of fat or oil with meals, and minimal cooking, assists the absorption of this vitamin.

Carrots can be grown from early spring to early autumn in cool and temperate areas, and all but during the worst of the wet season in warm areas. Sowing seed too early can result in bolting if weather warms quickly because carrots are biennials that naturally run to seed after winter. Carrots are an area-efficient vegetable in the garden as they can be grown quite close together and taste best when grown quickly with regular watering. Carrots take between nine and fourteen weeks to mature, depending on the cultivar. While deep top soil is necessary to grow carrots with long tapered roots, short or globe varieties can be grown in shallower soil, or deep pots. Heavy soil and stones can produce forked or misshapen roots, so remove stones when preparing the planting area and add some sand if soil is heavy. Working some compost into the planting area helps deter carrot fly, as does interplanting with spring onions or shallots.

Carrots require good drainage, so a bed raised 20 cm will help. Do not plant carrots after legumes, or give them manure tea as too much nitrogen in the soil will produce a lot of tops instead of roots. New growers and children may find it more rewarding to start with short carrots such as ‘Amsterdam’, ‘Lady Finger’, ‘Thumbelina’, ‘Chantenay Medium’, ‘Early Short Horn’, ‘Little Finger’ or ‘Baby’ until they know which produces the best results in local conditions. For home use, sow small quantities of seed each Full Moon phase through the growing season rather than one large crop.

Because carrots do not transplant well, seed is sown direct in furrows 2 cm deep and 20 cm apart. Furrows are covered with 1 cm of seed-raising mix, very light compost, or soil mixed with sand. Carrot seed is not strong and can have difficulty pushing through loamy soil but the covering mixture should be firmed with your hand to ensure good contact with seed. The depression left in the furrow helps keep soil damp. Water very gently, and cover area with a light mulch of fluffed-up hay or grass clippings, until germination has occurred. We have found that mulch greatly improves the germination rate with carrots. You can also try mixing carrot seed with radish seed. Radish seedlings break the soil surface quickly, making it easier for the carrots to emerge, and radish foliage shelters the young carrot seedlings. Ants are very fond of carrot seed and will steal it, particularly where topsoil has not been thoroughly dampened to the full depth of the bed, or where soil dries out quickly. If ants are a chronic problem, despite thorough watering, white pepper can be used as a deterrent. Make furrows 2 cm deep and 5 cm wide, and sprinkle seed in a thin line along the centre of the furrow. Then add a sprinkling of ground white pepper over the surface of the furrow before covering.

Germination can take less than two weeks in warm conditions, or three weeks in cool weather. Seed leaves on carrots are strappy and look nothing like carrot tops. Mulch can be moved aside when germination has occurred, but keep a light layer between rows when conditions are hot, or very dry. Water regularly to keep soil damp. When seedlings on standard size cultivars have produced their first set of feathery, true leaves, thin seedlings to 3 cm apart. When tops are 15 cm high, thin seedlings to 6 cm apart. The second thinnings can be eaten. Delayed thinnings are another cause

of forked roots in carrots. Do not hill up carrots as burying the crowns can cause them to rot. Baby carrot cultivars are thinned by removing alternate carrots when crowns are getting close together.

Harvest as required after eight weeks to avoid the entire crop being ready at one time. Some cultivars of carrots do not store well. Avoid storing carrots with apples as ethylene given off by apples makes carrots soft. Do not leave carrots until eighteen weeks as they will become over-mature, and sugars in roots will convert to starch. Carrots get woodier as they age. Harvest when soil is damp, not wet. Gently loosen soil between rows with a garden fork for easier removal.

For heavy soils: ‘Royal Chantenay’ (stores well), ‘Thumbelina’, and ‘Lady Finger’.

Warm Zones: ‘Danvers’ and ‘All Seasons’.

West Australia: ‘Western Red’ and ‘King West’. Both mature in about nine weeks.

CAULIFLOWER (*Brassica oleracea* Botrytis Group)

SOWING PHASE: *First Quarter/New Moon*

Cauliflower is a close relative of broccoli and shares its health-protecting anti-oxidants. It also provides some vitamin C, folic acid, iron and fibre. The edible part of cauliflower is a closely packed head of fine stems prior to the development of flower buds, and is known as a curd. The name cauliflower is a derivation of ‘cole’ meaning cabbage.

Cauliflower is frost hardy but a little more difficult to grow than broccoli because cauliflower are more sensitive to high temperatures and irregular watering. If your water supply is

limited it is best to avoid growing this vegetable because a short, dry spell can result in a complete crop failure.

Cauliflower need warm weather to produce large leaves but will not commence forming a curd until cool weather. Plants can take between twelve and twenty-six weeks to mature after planting out. Planting times given in the planting diary are general and will vary according to the cultivar. The large 'Paleface' is very slow to mature and better suited to Cool Zones, or cool temperate areas. It should be planted much earlier than 'Snowball' which matures in about twelve weeks and has a curd measuring 15 cm across. 'Phenomenal Early' takes fourteen to sixteen weeks to mature. Both 'Phenomenal Early' and 'Snowball' can tolerate warmer conditions than other cultivars of cauliflower.

Cauliflower require a sunny, well-drained position and very humus-rich soil. All brassicas prefer a soil pH between 6.5 and 7.0 where molybdenum and boron are both available (see Broccoli). Varying degrees of boron deficiency in cauliflower can cause failure to form a curd, a brown, bitter-tasting curd, or a hollow stem. Mulch is essential with cauliflower to avoid moisture fluctuations. Do not plant too many of the same cultivar at one time because they will all reach maturity within a short period. About eight plants sown each month over the sowing season results in a more useable harvest for the home gardener. If you only want to grow a few plants, mixing them among other vegetables that like similar conditions will help disguise cauliflower from brassica pests.

Cauliflower seed can be sown directly into the prepared bed in stations of two or three seeds about 2 cm apart, and 6 mm deep. Stations can be spaced about 60–70 cm apart, or much closer together for 'Snowball'. Germination occurs in about a

week to ten days. Thin seedlings to the strongest one when the second pair of true leaves appear. Hill plants slightly as they grow. Give seedlings one or two applications of weak worm liquid tea, if growth seems slow. Early in the sowing season where summers are hot, or bed space is limited, cauliflower seed can be sown in 8-cm pots, two seeds to each pot, and thinned to the strongest seedling. Transplant into the prepared, mulched bed when seedlings are about 12 cm high and have developed a strong root system.

Water cauliflower deeply and regularly under mulch during dry weather. One or two applications of seaweed fertiliser tea may be helpful in high rainfall areas. As curds start to develop, break the centre vein in long outer leaves so they can be folded, or tied, over the top of the curd to prevent it discolouring in sunlight. Start harvesting curds as needed as soon as they become well developed. Cauliflower must be harvested before the curd becomes soft and loosens up. Excess cauliflower can be cut into florets, blanched with boiling water, and frozen for later use.

Steam or stir-fry cauliflower to retain the most nutrients. It is delicious served with a cheese sauce or a little grated cheese, and small florets can be added to salads after a quick blanching.

Brassicas cross pollinate easily, so saved seed will not be true-to-type if you have several members of this large family going to seed at the same time.

CELERY (*Apium graveolens* subsp. *dulce*)

SOWING PHASE: *New Moon*



Celery has a long history as a medicinal herb. It contains apiol, which has a cleansing effect on the cardiovascular and urinary system, and improves blood pressure. The bitter taste of medicinal celery has been bred out of modern cultivars but they still retain some of its health benefits, and celery juice is a good cure for a hangover because of its cleansing and diuretic properties. The seeds are used to improve joint mobility by removing excess acid from the body. A relative of mineral-rich parsley, celery is very low in kilojoules but high in folic acid and fibre, with moderate amounts of potassium and vitamin C. Blanched celery has less magnesium than green celery, but the leaves add minerals and flavour to soups.

Although it is related to parsley, celery is much fussier about its growing conditions. It grows best at 13–24°C, is frost sensitive, has shallow roots and must be grown very quickly or it will become tough and bitter tasting. Only grow celery if you have lots of water to spare, although it does not mind salty soil because celery originated in salty marshes. Celery is not suitable for growing in high, or very low, temperatures. It dislikes heat waves, so gardeners in Warm Zones will have to grow celery as weather cools, and gardeners in Cool and Temperate Zones will have to start celery in a cold frame, or it will take forever to reach a suitable stage for planting out. If seed is sown too early, young plants will run to seed when transplanted if temperatures remain at less than 13°C for any length of time after germination.

Soil in the planting area must be well drained, with a pH around 6.5. Celery has a high fertiliser requirement, including the trace element boron. Prepare beds well before planting out with plenty of well-rotted manure and compost. Or, you can

use a green-manure crop, or sheet composting, in the growing area one month before sowing seed in pots. If the organic matter does not include seaweed, water the prepared bed with seaweed tea, then cover it with a thick layer of mulch. Setting up drip irrigation, a soaker hose, or a rimmed bed will be helpful with this vegetable as it can develop fungal disease from overhead watering. The number of plants required will depend on whether you plan to pick whole plants or harvest stems as required. If picking plants whole, you will probably need about fifteen seedlings for planting out at one time. Some cultivars can take up to seventeen weeks to fully mature but this is not a problem if you harvest stems individually.

Mix seed with two parts sand and sow, barely 3 mm deep, in punnets. Don't forget the Epsom salts tea. Seed germinates best at around 18°C, so keep seedlings around that temperature or a little higher. In Warm Zones, place the punnet in an inflated plastic bag to retain moisture, and keep it in a shaded area. Young seedlings are more adaptable to warmer temperatures than older plants. Seed may take several weeks to germinate. Remove the bag at germination, but protect seedlings from snails and slugs. Keep the seedling mix consistently damp, and feed seedlings fortnightly with half-strength fertiliser tea. When seedlings are large enough to handle, transplant the best seedlings, plus a few extras, into individual 5-cm pots, then into 8-cm pots, disturbing the roots as little as possible. The day before repotting, water seedlings with half-strength seaweed tea. Continue watering and fertilising regularly. When seedling are at about 12.5 cm high, and outdoor temperatures are suitable, transplant seedlings into the mulched bed. If planning to harvest when mature, plant them in a block 15 cm apart to help them blanch naturally. If harvesting stems, space seedlings 25 cm apart.

Make sure the crowns sit on the soil surface, and give seedlings a thorough soaking. If temperatures are very warm, use shadecloth to protect them from sun. If weather suddenly turns very cold, temporarily pack clean straw around the block of plants. If the time of maturation coincides with very cold weather, celery can be completely covered with clean straw.

Erratic watering will cause ‘black heart’ by restricting calcium flow to plants. Celery will probably require some manure tea through the growing period but the frequency of application will depend on how well the bed was prepared. Excess fertiliser will attract snails and slugs, so apply just enough to keep celery growing quickly. Wrapping stems in paper or plastic tubes for blanching also attracts snails and slugs, while hilling plants can cause crowns to rot. Use cardboard milk cartons if you must blanch celery, or set up a 90-per-cent shadecloth fence around the block of plants, three weeks before maturity. The fence should only be as high as the base of the foliage. If harvesting stems, pull each stem out slightly, then pull to the side to remove it cleanly. ‘Ventura’ is a dark green, fast-maturing celery which is adaptable to various climates. ‘Tendercrisp’ is stringless and will grow into cold weather. ‘Golden Self Blanching’ is shorter, stringless and suitable for picking individual stems.

CHERRY see Pome and Stone Fruits

CHILLI see Capsicums and Chillis

CHINESE CABBAGE (*Brassica rapa* spp.)

SOWING PHASE: *New Moon*

Chinese cabbages are members of the crucifer family and share the health-protecting anti-oxidants of broccoli. There are now so many greens known as Chinese cabbage (because they easily cross-pollinate with each other, and with turnips) that it is difficult to give specific planting times. Basically, there are two main types of Chinese cabbage. The open-headed variety, *B. r. Chinensis* Group, have broad white stalks topped by rounded, deep-green leaves. They are a good source of vitamins A, B and C, and also contain some potassium and iron. The headed type, *B. r. Pekinensis* Group, which look a bit like a cos lettuce, have similar nutrients but less calcium. Some are suited to warmer climates and are frost sensitive while others prefer cooler weather. Like cabbage, the former tend to bolt if sown too early in spring. The safest times to grow Chinese cabbage are from late March to the end of July in very warm areas, and through the milder periods of spring and autumn in other areas.

The open-headed types take only six to eight weeks to mature, and the headed types take about eleven weeks. Choose only cultivars that are suited to your area. Your local seed supplier will be able to advise you on suitable cultivars. Open Chinese cabbage are easy to grow in pots or polystyrene fruit boxes, if space is limited.

All types of Chinese cabbage grow well in a sunny, well-drained position in humus-rich soil with a pH of around 6.5. These brassicas do not freeze well, so six plants sown each month over the sowing season would be required for a family. A separate bed is not necessary. Mix them among other vegetables that like similar conditions to help disguise them from brassica pests. As with other brassicas, Chinese cabbage will benefit from an application of seaweed fertiliser

to soil in the growing area to ensure essential trace elements are available to the plants.

If the bed does not contain plenty of mature compost or well-rotted manure, add a small amount of worm castings or an organic complete fertiliser to the planting area. Chinese cabbage seed is sown directly into a prepared bed in stations about 30 cm apart. Sow two seeds 2 cm apart, and 6 mm deep at each station. Germination occurs in about a week to ten days. Thin seedlings to the strongest one when the second pair of true leaves appear. All Chinese cabbage must be grown quickly for tenderness and the best flavour. Water thoroughly in dry periods as these vegetables will run to seed when short of water. Give seedlings one or two applications of weak worm liquid tea if growth seems slow. Harvest as required when plants are young and tender.

Open varieties: ‘Bok Choi’ will grow in all but the hottest or coldest conditions. It is usually planted in autumn and spring. ‘Pak Choi’ can be grown from after frost until autumn and may bolt in cold conditions. ‘Pock Choi’ can be grown spring and autumn and is less suited to cold conditions. ‘Tall Paak Tsoi’ can be planted in summer in cool and temperate areas and anytime in warm areas. ‘Choy Sum’ can be grown any season except hot summers.

Heading varieties: ‘Wong Bok’ can be grown in spring, summer, and autumn in cooler areas but only in autumn in warm areas. ‘Michihli’ is better suited to warmer conditions.

CHINESE GOOSEBERRY see Kiwi Fruit

CITRUS (*Citrus* spp.)

PLANTING PHASE: *Full Moon*

Fruit from various citrus species is enjoyed in most countries of the world for its flavour and high vitamin C content. The astute Captain Cook fed limes to his crew to prevent scurvy on their long voyages. Citrus fruits also contain folic acid, thiamine, iron, fibre and bioflavonoids. Some contain high levels of pectin in their seeds and pith, and are used to gel less acidic fruits. Pectin and bioflavonoids are important for healthy blood vessels. The anti-oxidants in citrus literally prevent the oxidation, or discolouration, of other fruits and vegetables exposed to air.

Some citrus species are also valuable medicinal herbs. The oils in citrus are strongly antibacterial and powerful cleaners. For an effective disinfectant for household surfaces and children's toys, add five drops of lemon essential oil to 600 ml of water in a misting spray bottle. (Make sure you purchase essential oil because lemon fragrance oil is very diluted and does not contain the same properties.) Some recent medical research suggests that lemon essential oil, vaporised in an oil burner, can neutralise airborne coccus bacteria that are responsible for serious diseases.

Immature fruit will not ripen after picking. Fruit can be stored at room temperature for up to a week, then kept in the refrigerator. The commercial practice of waxing citrus fruit after harvest is a good reason to grow your own if you use lemon or orange zest.

Citrus are evergreen perennials that require long periods of warmth and a mild winter for good growth. Most will not tolerate prolonged periods of temperatures below 7°C, although the mandarin cultivar *C. reticulata* 'Clementine' and some lemons are more cold tolerant. Some mature citrus will tolerate light frosts. In such areas, trees should be grown in

the warmest part of the garden, preferably on sloping ground so that cold night-air can drain away, even if the best spot is in your front garden. Well-cared-for citrus trees are very attractive and enjoy similar soil conditions and fertiliser to roses and Hawaiian hibiscus. Some species will not fruit in extremely hot climates, although the lime thoroughly enjoys sub-tropical conditions and is very frost-sensitive.

To minimise problems with citrus, plant only grafted cultivars that are suitable for your area. Purchase plants only from a reputable nursery because staff know which rootstocks are suitable for your soil and climate conditions. Avoid purchasing citrus plants from markets or fairs where citrus are often sold without rootstock details. Fruit produced from seedlings will be of unpredictable quality and will require a very long waiting period. In areas with hot summers, citrus trees can be planted in March to allow them to make growth before soil cools. Where summers are milder, trees can be planted in spring. Prepare soil in February for autumn planting, or in late autumn for spring planting.

Plant citrus in a sunny position where they are protected from strong winds from blossom to harvest. Windy conditions are very drying, and water is extracted from fruit to the leaves. It's not possible to be more specific about timing because various species fruit at different times of the year, and growing conditions can vary flowering times even more. Keep trees well mulched with organic matter during the growing season, and give them a deep watering regularly in dry weather. Citrus produce roots close to the soil surface so don't allow grass to grow under the tree. Mulch will reduce the need for weeding. A layer of chicken wire pegged down

under the canopy will protect surface roots if you plant your citrus trees in the chook yard.

Citrus can also be successfully grown in large tubs if you maintain careful pruning to prevent fruit forming at the end of long whip-like branches where the weight of the fruit can damage the tree. (See [chapter 8](#) for more information on citrus pruning, and [chapter 4](#) on growing citrus in containers.)

All citrus require good drainage and a raised area will help in areas where soils are heavy. Citrus enjoy organic conditions and soil should contain plenty of well-rotted organic matter, preferably compost. A soil pH of 6.5 is ideal. Citrus require a good supply of fertiliser to keep them growing vigorously, and to maintain resistance to pests. If your citrus trees are constantly attacked by pests you have either planted them in the wrong spot, or you need to have a serious look at your watering and fertilising program.

The annual amount of organic complete fertiliser required for the age of the tree is divided into two applications — one after harvest and another approximately six months later — but avoid periods of extremely hot weather. Organic fertilisers are applied to the soil surface where they supply nutrients steadily over a period. Include compost, worm castings or well-rotted manure as part of your fertiliser for citrus. If possible, fertilise citrus after rain at any time of the month. Fertiliser is applied to the soil surface under the outer edge of the tree canopy, then re-covered with mulch. If trees are making excessive soft growth, reduce the amount of fertiliser at the next application. Young trees can be fertilised with fertiliser teas, as required, to maintain strong growth, as long as their mulch contains plenty of organic matter. Don't always use manure tea for young citrus. An application to

damp soil of a fertiliser containing copper (such as seaweed tea) in July and November will help prevent fruit drop, and build plant resistance to pests. Citrus have a high magnesium requirement that can become apparent, especially in autumn, when leaves may become pale. This deficiency can be caused by acid soil, by the leaching of magnesium from soil in heavy rainfall areas, or by the restriction of magnesium due to the overuse of high potassium fertilisers. Acid soil can be corrected by applying dolomite over the soil surface and watering it in. In the other two cases, an application of Epsom salts can provide a quick solution to prevent crop loss, but you will have to adjust your fertilising routine to prevent the problem in future. Epsom salts can be applied at the rate of up to two kilograms for a fully grown tree, or as little as a quarter of a kilogram for a young tree. Apply Epsom salts in the same method as fertiliser, and water it in.

Lemon

The lemon tree, *C. x limon*, is a fairly adaptable citrus species, and a very useful addition to any garden. The most common cultivars of lemon are ‘Eureka’, and ‘Lisbon’. ‘Meyer’ has a milder flavour but is more heat and cold tolerant, although it will not take heavy frosts. Bush lemons will grow fairly quickly from seed in very hot areas, and are used as a rootstock for some other citrus species.

Lemons crop at different times of the year but are quite prolific in autumn. A popular flavouring in many recipes, lemon juice has both antibacterial and anti-fungal properties. Rubbing wooden chopping boards with a cut lemon is a good way to remove food smells and keep boards hygienic. We all know the comfort of lemon drinks for winter colds. A squeeze of lemon juice in a glass of warm water first thing in the

morning is the best beauty treatment of all. Lemon pulp is also used externally to treat some skin conditions. Excess lemons can be preserved for use in Middle Eastern recipes, or made into lemon and ginger marmalade. The delicious fruit of the lemonade tree, and other lemons, can be juiced and frozen in ice cube trays, then stored in double plastic bags in the freezer for use in drinks and sorbets.

Orange

Sweet oranges, *C. sinensis*, are popular as fruits and juices, and the zest adds flavour and fragrance to cakes and desserts. ‘Washington Navel’ oranges ripen from autumn to winter, and ‘Valencia’ ripens in spring and summer. Some oranges are ripe even though they have a small patch of green on their skins. These tend to be organically grown because supermarkets are more interested in buying fruit with cosmetic appeal. Well-grown oranges should feel heavy for their size. The bitter (or Seville) orange, *C. aurantium*, ripens in winter and is mainly used for marmalade. It is used medicinally for diverse purposes. Neroli oil and orange-flower water also come from the Seville orange.

Mandarin

Mandarins, *C. reticulata*, ripen in winter. Ripe fruit is well coloured with a slightly loose skin, and should feel heavy. Mandarins are an excellent liver and respiratory tonic, and have been used to assist recovery from mastitis.

Grapefruit

Grapefruit, *C. x paradisi*, requires warm growing conditions, similar to those of oranges. It becomes very thick-skinned and poorly flavoured in cool conditions, although ‘Wheeny’ is

more suitable for temperate areas. Fruit is very large and fruit will have to be thinned on young trees. Grapefruit ripens in winter and keeps longer than other citrus due to its thick pith. Ripe fruit has an even colour.

Grapefruit is low in kilojoules but, because of its sharp flavour, is often preferred as a juice made from the slightly sweeter pink cultivars, or the pleasant tasting ‘Ruby Red’. It is the grapefruit pulp that is most beneficial, though, and half a grapefruit two or three times a week is said to help keep arteries free of plaque. Pink and red cultivars are not always available so if the taste of yellow grapefruit is too sharp for you, smear a spoonful of honey or brown sugar over the cut half, and pop it under the griller for a couple of minutes. Grapefruit is able to increase the absorption of some pharmaceutical drugs, so check with your doctor before making grapefruit a regular part of your diet.

Lime

‘Tahiti’ lime, *C. x latifolia*, provides a popular flavouring for food and drinks because the juice is not as sharp as the Mexican lime, *C. aurantiifolia*, and its action on the body is cooling. This citrus species grows well in very warm temperate areas and Warm Zones where adequate water is available. Ripe fruit is small and plump with dark green skin that yellows as the fruit becomes over-mature.

Cumquat

Cumquats (or kumquats), *C. japonica*, are perfect for pot culture as their leaves are small and the fruit resembles miniature oranges. The ripe fruit is not to everyone’s taste but it does make a delicious, healthy marmalade.

CUCUMBER (*Cucumis sativus*)

SOWING PHASE: *First Quarter/New Moon*

Cucumber contains moderate amounts of vitamin C, and has been recognised since Nicholas Culpeper's days as beneficial to the bladder. It is popular in summer salads and as an accompaniment to curries. While the fruit may be eaten mainly for its cooling effect on the body, the best reason to eat cucumber is that it is an excellent skin cleanser, taken internally and used externally. I know of one major cosmetic company that uses freshly juiced cucumbers in one of their products. If you have problems with skin blemishes, try eating more cucumbers. Fresh cucumber slices are very soothing to heat-rashes and sunburned skin, and also bring relief to tired eyes when used as a covering.

Cucumber is a frost-sensitive climbing annual, to 2 m. It grows best in full sun in mild climates but needs shading where summers are hot. It will grow and fruit well under 50-per-cent shade where air is warm. It can also be grown in large tubs fitted with a support for the vine. However, it requires a lot of water during summer in most areas, so do not grow it if you have severe restrictions on watering. Water-stressed cucumber tastes bitter, and it will be wasted effort.

In warm areas with good airflow, cucumber vines grow well when planted between sweet corn. This provides the cucumbers with some much-needed shade, keeps their shallow roots cool, and gives them something to climb on. The cucumber plant acts as a weed deterrent for corn, and the two grow well together. Cucumbers are prone to fungal disease when the fruit touches soil so growing them among

sweet corn allows the fruit to hang safely above the soil surface. In cool areas with poor airflow, cucumber foliage can stay wet when shaded, and this can also contribute to fungal disease.

Cucumber require well-drained soil. Raised beds containing plenty of compost and a little organic complete fertiliser, and covered with mulch to keep roots cool, will get cucumber off to a good start if you are using drip irrigation. Apply seaweed tea to the planting area after preparation. If you don't have a lot of compost, set up a flat-topped planting mound about 40 cm across for every two plants required. About four plants are probably sufficient, at each sowing. Allow about 50 cm between each mound. Then mix as much compost as possible through the soil in the centre of each mound. Cucumbers can also be grown on a chicken wire trellis, positioned where it gets some shade in warm areas. Trellis growth provides good airflow around the vines. You may have to loosely tie the first stems to the wire with thin strips of pantyhose as tendrils on lateral stems seem more adept at twining.

Seed can be sown directly into mounds, or rows, when soil is at least 18°C. Sow two pair of two seeds, 10 mm deep, in each mound, or two seeds every 75 cm, if sowing in rows. Space seeds 3 cm apart in each pair. Cover sowing points with jam jars where rodents are a problem, and remove the jars as soon as germination occurs (a week to ten days). Thin seedlings to the strongest one in each group when the first true leaf is extended. Where rodents are a problem, or you want to get an early start on growing, a pair of seeds can be sown, in 8-cm pots, for every cucumber plant you require. Pots will have to be placed in a cold frame, or covered with a miniature greenhouse and kept in a warm area. Plant out

when seedlings are 15 cm high, and soil is warm. In cool areas, you may have to pull mulch back temporarily to warm soil before planting. Water deeply, as required, to keep soil dark-damp, rather than watering vines every day. Try to avoid watering foliage, and water before lunch so that foliage is not wet when the temperature drops. Although this cannot be avoided during rain periods, the less it happens the better. Some cucumber cultivars are prone to fungal problems, but the delicious, fast-growing 'Green Gem' is resistant to mildew, and fairly heat tolerant.

Left to their own devices, cucumbers and melons produce long shoots bearing male flowers, then set fruit some distance from the roots. These shoots are easily damaged when working in the garden, and fruit is lost. Pinch out growing tips after stems have formed six or seven leaves, as well as any side shoots that have produced eight leaves without any female flowers. Female flowers are easy to recognise on cucumber vines; a miniature gherkin sits behind where the flower petals begin. If pollination does not occur, the tiny gherkin turns yellow and drops off. Tip pruning of climbing vines is important, too, to allow branches to spread out across the trellis.

Vines can take from eight to twelve weeks to bear fruit. Apply worm liquid tea once the first lot of fruit is about 5 cm long. Don't use manure teas as they may encourage growth rather than fruiting. Place a handful of clean mulch under each developing fruit to avoid contact with soil. Cucumbers for pickling as gherkins can be cut with a short stem when at the 5 cm stage. The common green salad cucumbers are picked for salad use at about 20 cm in length. They have a fairly smooth skin, and the prickles wipe off easily. Lebanese

cucumbers are slimmer, dark green, and may have slight longitudinal ridges. They can be picked at 20 cm or slightly smaller. White, apple cucumbers are usually mature around 8 cm in diameter.

Green cucumbers are eaten when fruits are immature and taste the best, which is probably why some people find green cucumber skin difficult to digest. Lebanese cucumbers, or apple cucumbers, are more easily digested. Because fruit is harvested before it matures seed, cucumber vines can keep fruiting until weather is too cold. Apply worm liquid tea every month or so, if necessary, to keep vines growing well. Check vines every few days and remove fruit before it becomes overripe. In very warm weather, you may have to check every day. Cropping will stop once mature seed is formed. Cut fruit from the vines with a short stem as pulling fruit can snap off whole sections of vine. We get really good cropping in our area from cucumbers sown in the last half of January, or first week of February, because they are fast growing, rainfall is usually higher, and weather does not get too cool for them until early June. If you find that cucumbers become overripe too quickly when sown in spring, try sowing them later.

CURRENT (*Ribes* spp.)

PLANTING PHASE: *Full Moon*

Currants are high in vitamins C and E, plus calcium, magnesium and fibre. Redcurrants contain more iron than blackcurrants.

Currants have a limited growing range in Australia. All species require similar soil, position and planting times to raspberries, but blackcurrants are grown in the same way as

herbaceous perennials while red and white currants are grown as deciduous shrubs. Fertilise in the same way as raspberries, but use full-strength seaweed tea in late winter, and give a second application of half-strength seaweed tea to red and white currants after harvest. Currants flower early and may need overnight covering when frosts occur at flowering time. Save some fertiliser bags or weed mat for this purpose.

Currants are pruned at planting time, and after harvest. Advice on pruning currants can be found in [chapter 8](#).

EGGPLANT (*Solanum melangena*)

SOWING PHASE: *First Quarter*

Eggplant (or, more correctly, aubergine) is a very frost-sensitive, short-lived perennial, grown as an annual for its shiny fruit, which can be grilled, baked or fried. Ripe fruit can be deep purple, lavender, orange, green or white, oval or pear-shaped, and varies in length from 8 to 25 cm, according to the cultivar. The name eggplant came from the cultivars, rarely seen today, whose small, white, oval fruit looked just like hens' eggs growing on a bush.

Eggplant is related to tomato, capsicum, chilli and potato, and must not follow any of these crops for at least three years. When growing small quantities of tomato, capsicum, chilli and eggplant, we find it easier to grow them as a group rather than spreading them through the garden. I know this is not advised because they share similar diseases and pests but, you may only want one chilli, two eggplant, three capsicum and four tomato plants. Grouping them together makes it easier to provide the correct growing conditions and keep them healthy, and it saves a lot of problems with crop rotation. Eggplant can also be grown in large foam boxes or pots.

Being related to tomato, eggplant require a similar position, soil preparation, soil pH, and cultivation to tomato plants. Like capsicum and chilli, eggplant germinate at a higher temperature than tomatoes, and require staking because their stems are brittle and the fruit of some cultivars is quite large compared with the size of the plant. In all but very warm areas, seed is sown later than tomatoes, but still in a cold frame, or warm, protected position. Sow seed 1 cm deep in 8-cm pots, two seeds to a pot, and carefully thin them to the strongest seedling when 5 cm high. Transplant seedlings into a warm, mulched bed, 50 cm apart, when weather is quite warm and seedlings are about 15 cm high, disturbing roots as little as possible. In cooler areas, space seedlings further apart as for capsicum. In warm areas, seed can be sown direct, in stations. Plants take between ten and fourteen weeks to mature. Lightly apply organic poultry-based complete fertiliser as flower buds form, and do not allow soil to dry out while fruit is setting. If growing a cultivar with large fruit, do not allow plants to set too much fruit at once. Cut fruit from plants with a short stem when large enough to use but still firm with a glossy skin. Large eggplant do not necessarily taste better, and overripe fruit starts to wrinkle. Green eggplant cultivars such as ‘Applegreen’ tend to set fruit early and are better for cooler areas.

FIG (*Ficus carica*)

PLANTING PHASE: *Full Moon*

Figs are ancient fruits containing fibre, vitamin C, beta-carotene and flavonoids. The fibre in figs acts as a gentle laxative. Fruit can be eaten fresh, dried, poached or glazed. Sap from trees is sometimes used to remove warts. The large leaves provide pleasant shade in summer.

The fig is a deciduous tree to 8 m, which can be kept to a size suitable for small gardens by pruning regularly. Trees will grow in all zones in Australia where summers are hot. High summer rainfall may cause splitting of fruit. Mature trees can tolerate some frost but young trees will require covering on frosty nights. They grow best in a sunny protected position, in humus-rich soil with a close to neutral pH. Drainage must be excellent and a raised bed is ideal. The fig tree is quite drought tolerant but will not produce fruit in drought conditions. Trees can be grown from purchased named cultivars, or propagated from hardwood cuttings. (See [chapter 8](#) for pruning and taking cuttings from figs.) Figs require consistently damp soil to produce crops, and heavy mulching will reduce watering and protect shallow roots from damage when weeding. Mulch should contain good quality compost as a fertiliser. Otherwise, apply worm castings or a light application of organic complete fertiliser in spring and at the end of summer, plus an application of seaweed tea in spring. Fertiliser tea applied in early spring and midsummer will help if trees are not growing vigorously.

Fruit skin is actually a swollen stem surrounding the fertilised flowers. The lower end of the fig is open so that a species of wasp can pollinate flowers. Not all figs require this form of pollination. ‘Brown Turkey’, ‘White Adriatic’, ‘Cape White’ and ‘Black Genoa’ are self-pollinating. Choose fruits that are well coloured and soft with a sweet smell. Overripe figs smell sour because fermentation is taking place. They will have to be removed to encourage further growth.

GLOBE ARTICHOKE see Garden Favourites, p. 349

GRAPE (*Vitis* spp.)

PLANTING PHASE: *Full Moon*

Vines of *V. vinifera* have been in cultivation for over 4,000 years. The leaves, fruit and seeds have long been used as medicinal herbs, or food and drinks, supplying a range of anti-oxidants to protect the cardiovascular and digestive systems. Very little is wasted with this plant. Seeds are not only used medicinally but also to produce a polyunsaturated culinary oil, and the residue from pressed grapes is made into cream of tartar.

Various grape cultivars can be found to suit all growing zones, but areas with high summer rainfall will have problems with fungus and harvesting. Some cultivars require more chilling than others. Learning the climate requirements and suitable planting distances for your chosen cultivar will get you off to a head start. If you want to provide heavy summer shade over a pergola attached to your home, choose a decorative, rather than fruiting, vine because grapes that mature in heavy shade absorb potassium, which affects fruit flavour; or they become mouldy where airflow is inadequate. However, if you are happy with dappled shade and don't mind climbing a ladder to thin foliage, fruiting vines are suitable — as long as the area has good air circulation.

There are now severe restrictions on grapes being moved to different areas. These controls have been introduced to prevent the spread of grape phylloxera, a disease spread by an aphid that causes galls to develop on grape foliage or roots. Never accept cuttings or plants from outside your neighbourhood as you could introduce the disease, which is capable of wiping out whole vineyards. Some cultivars are resistant to the disease so if you live in a phylloxera area, you will have to choose *V. lambrusca* cultivars, or *V. vinifera*

cultivars grafted onto *V. lambrusca* rootstocks. Always purchase a grape vine from a reputable local nursery because they will know what is suitable for your area.

Growing large quantities of grapes is a separate subject and requires entirely different preparation to growing several vines for home use. Grapes are very long-lived deciduous vines so good soil preparation will not be wasted. Grapes are quite adaptable to soil pH between 5.5 and 8, but soil must be well drained. The regular use of compost will bring soil to a more beneficial pH where all nutrients are available. A raised planting area is recommended because grapes have deep roots. The position must be sunny, and should be protected from strong winds, but breezes can help foliage dry quickly after rain and help prevent downy mildew (see [chapter 9](#)). Grapes require a strong support because mature fruit-laden vines are very heavy. In the home garden, grapes can be grown against a sunny fence or wall, or over a pergola, if wires are set up as for growing passionfruit so that tendrils can twine around the wires. For grapes, a lower fruiting wire is situated 100 cm above ground, with a second wire 50 cm above it. If using a free-standing trellis, make sure support posts are well anchored in the ground.

Work plenty of well-rotted organic matter and a small amount of organic complete fertiliser into soil during late winter, and plant out potted young vines when soil temperature reaches 12°C. Do not plant vines any deeper than they were in the pot. Planting should be completed by October or some cultivars may not be able to store enough food in their stems and roots for strong growth in the following season. Vines that have not been in their permanent position for two years require weekly watering in dry conditions from when soil warms in spring

through to late April — or early May in warm climates. They also need an annual application of seaweed tea. Apply fertiliser tea in October, December and February, but skip the October application for newly planted grapes.

During the first year or two after planting out, the aim is to get strong vine growth to the fruiting wire. Some cultivars need support to reach the wire, in the same manner as passionfruit. Others grow better if allowed to spill on the ground during their first season, but this would not be convenient near a pergola. During the first growing season you will have to find out how your cultivar should be pruned in order to produce a good crop of fruit. (For first-season pruning, see [chapter 8](#).)

While mature grapes are very hardy, they do require regular watering from rain or irrigation starting at bud burst and continuing through fruit-set to veraison (when berries swell and change colour). Water shortage at fruit-set will affect both the current year's growth and bud setting for the following year, and berries will tend to split at veraison. Watering of mature vines is reduced as fruit reaches maturity, which can vary from one to twenty-one days from harvest, according to the cultivar. Mulching of grapes depends on the climate conditions (see [chapter 5](#)).

Apply organic complete fertiliser and seaweed tea to mature vines after harvest. Harvest in cooler regions can be during March and April, or as early as mid-January in warm areas. The amount of fertiliser required varies with the vine's vigour. Aim at getting a good balance between foliage and fruit.

GUAVA (*Psidium* spp.)

PLANTING PHASE: *Full Moon*

The tropical guava, *P. guajava*, is suitable for growing in warm temperate climates and Warm Zones of Australia. The cherry guava, *P. cattleianum*, can tolerate some frosts and is more suited to Temperate and Cool Zones. Psidium species have a tendency to drop their fruit if soil is too dry, and fruit will not ripen further after picking. Guavas are self-pollinating. Suitable named cultivars are available from local nurseries. I have grown them easily from seed but only with the intention of grafting suitable cultivars because there is no guarantee of fruit quality with seedlings.

Tropical guava

Trees are semi-evergreen with attractive, deeply veined, oval leaves. Leaves are shed in early spring and quickly replaced with new pink foliage. These guavas are fast growing to about 5 m, and produce plenty of fruit in good conditions. Fruit is yellow skinned, about 5 cm in length, with flesh ranging in colour from cream to deep pink. It usually ripens from late summer through autumn, depending on growing conditions. Fruit is eaten fresh or juiced, and is rich in vitamin C. The flesh is sweet, and the fragrance of ripe fruit is very strong.

Tropical guava require a sunny position in well-drained soil with a pH of 6.5. The growing area should be prepared with plenty of humus. Plant trees after soil warms in spring, and mulch them thickly. Water deeply to keep soil damp. Stressed tropical guava trees are prone to fruit fly attack and sooty mould. Apply worm castings and seaweed tea under fresh mulch each spring.

Cherry guava

This is a smaller, slow-growing tree, grown more for its attractive trunk and thick, dark-green foliage than its fruit. Flowers are uninteresting but the clusters of purple-red fruit are very attractive. The fruit are slightly acidic, and used mostly for decoration, or jellies and jams. Because of its slow growth, the cherry guava requires only a light application of organic complete fertiliser in spring and is very suitable for growing in large pots. Soil or potting mix must be well-drained and contain plenty of humus. Pinch out growing tips on young plants to encourage bushy growth. Apart from that, it does not usually require pruning.

JERUSALEM ARTICHOKE (*Helianthus tuberosus*)

PLANTING PHASE: *Full Moon*

Jerusalem artichoke is one of those forgotten vegetables that has recently been rediscovered by chefs. The edible parts are the small tubers, which have a nutty flavour and contain A, B and C vitamins. (Adding lemon juice to the cooking water will prevent tubers discolouring.) Jerusalem artichoke come from North America and were formerly known as Canadian potatoes. This ‘artichoke’ is a herbaceous perennial belonging to the same genus as the sunflower. The first part of their name is a corruption of *girasole*, the Italian for ‘sunflower’, and the second part may refer to the flavour of the tubers, or the scaled flower buds, reminiscent of globe artichoke, but no one seems to know for sure.

Jerusalem artichoke can remain in soil all year and requires a permanent bed. It is suitable for growing in all areas except those with heavy summer rainfall. In warmer areas, it may be happier in part shade where soil is cooler. This plant has similar soil and fertiliser requirements to the potato, and beds

can be prepared in the same way. Jerusalem artichoke tubers can also be planted at the same time as the main crop of potatoes in your area because the plant is completely frost hardy, and takes a similar time to produce a crop. Six plants will be plenty to start with. Occasional Jerusalem-artichoke eaters may be happy with two plants.

Jerusalem artichoke tubers are small and knobby, rather like young ginger root. The tubers do not have to be chitted before planting. Select healthy tubers with at least two 'eyes', but don't cut any large tubers. Plant tubers 10 cm deep, and 50 cm apart. Water deeply, as required, to keep soil damp, and mulch the bed as soil warms. In warm areas, mulch may have to be topped up in summer.

Jerusalem artichoke do not have to be hilled up as they grow. Plants can reach more than 150 cm when mature. Flower buds should be cut off before they open or plant energy will be diverted from root growth to flowers. Make a note in the gardening diary of when buds appear because about six weeks later tubers will start to mature. Harvesting can commence as foliage dies down. Tubers can be harvested, as required, until new growth begins in spring. They are collected, like new potatoes, by foraging in the soil around the base of plants. In very cold areas, cover the bed with a thick layer of mulch before the first frost. This will insulate soil and allow you to harvest through winter. Pull back the mulch in early spring to allow soil to warm. Because of the method of harvesting, some tubers will remain in the bed and reshoot in spring. In early spring, apply complete organic fertiliser. Don't forget to replace mulch after soil warms as it will add humus to the bed as it breaks down.

KIWI FRUIT (*Actinidia* spp.)

PLANTING PHASE: *Full Moon*

The kiwi fruit, also known as a Chinese gooseberry (although it is not a true gooseberry), is an example of very good marketing because New Zealanders have taken advantage of the fact that it grows well on their North Island. Kiwi fruit is produced on deciduous vines that perform well in areas with moderate rainfall and a cool winter, but they do not like late-spring frosts. The fruit has green flesh with a circle of tiny black seeds in the centre, and is covered in brown, hairy, inedible skin. Kiwi fruit are rich in vitamin C and contain some fibre and iron.

Kiwi fruit are quite heavy feeders and soil should be prepared with plenty of organic matter in a sunny, well-drained position, protected from hot winds. Male and female flowers bloom on separate plants, and you will need one male vine for about ten female vines. Vines require a strong T-shaped trellis with support posts about 2 m high, spaced 3 m apart. Sturdy cross bars should be 120 cm long. Attach three rows of heavy-duty wire to one cross bar, spaced 60 cm apart, then stretch along the trellis in the same way as electric power lines. Vines are planted in winter at 5–6 m spacings. Alternatively, male and female vines can be planted at opposite ends of a pergola. Mark the male vines clearly because they require different pruning to female vines.

Vines must be watered regularly for strong growth. Fruit matures between March and May, depending on local temperatures. Kiwi fruit require the equivalent of 25 mm of rain weekly for three months before harvest. Fertiliser requirements will increase steadily over the first three years after planting. Apply organic complete fertiliser in late winter or early spring, and cover lightly with mulch. Heavier mulch

should be applied after soil warms in areas where vine bases are exposed to hot sun because these vines have shallow roots. Apply half-strength seaweed tea from when blossoms form in October until late December, and again after harvest.

Fruit is mature when it looks plump and yields slightly to gentle pressure. Fruit harvested too early will wrinkle and taste bitter. Kiwi fruit can be stored at room temperature for a couple of days to fully ripen. It stores well in the vegetable crisper.

LEEK (*Allium ampeloprasum* Porrum Group)

SOWING AND TRANSPLANTING PHASE: *New Moon/First Quarter*

Leeks are ancient members of the onion family with keeled, flat leaves, a thickened stem instead of a bulb, and a milder flavour than bulb onions. Used as a treatment for sore throats since Roman times, leeks are rich in vitamin C, iron and fibre.

The plants are frost hardy and less sensitive to day length than bulb onions but still grow best through autumn and winter in Warm Zones. Leeks can take up to sixteen weeks to fully mature after transplanting, depending on temperature, nutrients and water. Mature leeks do not have to be harvested, and can be left in the ground until needed. Baby leeks have recently become a popular vegetable with chefs because of their sweet, delicate flavour and fine texture. These are harvested once the stem is about 2 cm thick.

Leeks require a position that receives winter sun in a well-drained bed of humus-rich soil. Add some organic complete fertiliser, and a light dusting of natural wood ash if it is available. Worm castings are a very good fertiliser for

leeks because we have noticed that earthworms are not very active in leek beds, and some other fertilisers take longer than normal to be broken down. Leeks grow best when soil pH is neutral to very slightly alkaline. As leeks are planted quite deeply, they will require a raised bed if topsoil is shallow, or drainage is poor. You could try growing leeks in deep foam boxes or pots, if space is limited, but shallow containers are not suitable. Leeks need a space of their own because the method of planting out is difficult when interplanted with other crops, and also because some vegetables, such as broccoli and beans, do not like being near leeks.

Seed is sown thinly, 6 mm deep, in trays or punnets. Seedlings should emerge within fourteen days and respond well to regular applications of various fertiliser teas. When seedlings are 15 cm long and about matchstick thick, they are ready for transplanting. This period may take up to six weeks in cool conditions so the bed can be prepared just before sowing.

Make planting holes 15 cm deep and 15 cm apart in the prepared bed. Ease well-watered seedlings out of the seed mix with a soil plug around the roots. Lightly trim only the outer leaves of each seedling. Place one seedling in each hole, so that tops of seedlings sit just above the soil surface, but do not fill the hole. Water gently so that enough soil washes into each hole to cover seedling roots. Gentle watering will gradually fill the hole as the leeks grow. The soil level in the hole must stay below the growth in the centre of the plant. If holes fill suddenly in a deluge of rain, carefully scoop soil out of the hole, and water gently to wash soil from the centre of the plant.

Once the planting holes have filled, water leeks regularly and thoroughly, as roots are well below bed level. Leeks are more tender if grown quickly, so continue regular applications of weak fertiliser tea, with the occasional addition of seaweed tea to assist growth.

Only the white to palest green part of the leek stem is used; the rest of the stem can be quite tough. Hilling up is sometimes recommended to blanch more of the leek stem. However, too much hilling can cause the centre to rot and is unnecessary if leeks are to be used when young. Moderate hilling can be done slowly, a little at a time. Don't try to pull leeks out of the ground as you will probably snap them. Use a trowel to lever leeks upward and loosen the soil. Leeks left in the ground will produce a seed head in the following year. Viable seed is easy to save. Some varieties of leeks produce 'pups' with roots and these can be dropped into new holes and grown as the next crop. Leeks with trimmed leaves will keep well in the vegetable crisper (away from broccoli and beans). Before using leeks, split each leek lengthwise and wash well to remove the grit that can build up between stem layers.

'Musselburgh' is a vigorous, hardy cultivar, well suited to home gardens. 'Autumn Giant' is a large leek with a long stem, and matures in about fourteen weeks. 'Royal Perennial' has thick stalks and produces 'pups' for a continual supply.

LETTUCE (*Lactuca sativa*)

PLANTING PHASE: *New Moon*

Lettuce is an ancient medicinal herb that used to be harvested for the narcotic properties of its milky sap, but these properties have been bred out of modern lettuce, which is a

much sweeter vegetable than its ancestor. Apart from its dark green cultivars, lettuce provide only small quantities of vitamins and minerals, with the exception of vitamin K. Lettuce is eaten more for its crunchy texture, and for the bulk it adds to meals while barely adding kilojoules, than for its nutrient value. Lettuce also has a cooling effect on the body.

There are four basic types of lettuce, and their maturing times will vary slightly depending on growing conditions. Crispheads are the Iceberg types, which develop a solid head of leaves in up to twelve weeks. Butterheads form a smaller, looser head with softer leaves. Butterheads, which include the mignonette cultivars, mature in up to ten weeks. Cos-lettuce types have upright, oval leaves and don't form a definite heart. Cos lettuce mature about a week later than butterheads. Green cos lettuce can quickly become tough and too strongly flavoured in warm weather. 'Sucrine', which is technically a butterhead, is a good substitute for cos in caesar salads at any time of the year. The fourth type of lettuce is loose-leaf which does not form a heart at all. Leaves can be picked, as required, from the outside of plants. Many of these cultivars have ruffled, or dissected, leaves and add variety to a green salad. Picking can commence about six or seven weeks after sowing.

All lettuce require a well-drained soil, rich in humus, with a pH of around 6.5. Add a little organic complete fertiliser, and mulch the growing area after preparation. In warm weather, apply mulch thickly very early in the morning when soil is coolest. Lettuce are quite sociable vegetables and, in mild conditions where they don't need shading, can be grown with carrots, radishes, beetroot, peas, cabbage, broccoli, onions and marigolds rather than in a separate bed of their own. As

conditions get warmer, grow them on the south side of climbing beans. In cool to mild conditions lettuce grow well in full sun, but at other times they require part shade. Set up shade before planting out, or sowing seed. Lettuce can germinate at extremely low temperatures so you can get seedlings started early.

It can be difficult to get some lettuce seed to germinate when soil temperatures are over 24°C, which is just the time of year when you appreciate a green salad. Lettuce tends to suffer greater transplant shock in hot conditions, and lettuces have to be grown quickly to avoid a tough, bitter taste. Sowing lettuce directly in warmer weather is preferable to avoid transplant shock and avoid the risk of them running to seed quickly, but sometimes soil is too warm for germination, and it is much harder to maintain constant soil moisture in seed that requires shallow sowing. In hot weather, you can fool lettuce seed a little by keeping seed in the refrigerator until ready to sow, and keeping the prepared punnets in a cool area. Some lettuce cultivars will germinate when seed is covered, while others require light. As all your crop will mature at about the same time, and lettuce does not store well for long periods, start picking headed and cos lettuce before fully mature. It is better to sow a small amount of seed each month than sow a large amount of seed at once. It is a good idea to save seed from a cultivar that does well in your conditions for planting later. Lettuce seed has a dormancy period built in, so it may not germinate immediately if seed is shed into the garden. Lettuce seed is easy to save (see [chapter 8](#)).

Sow a dozen to fifteen seeds at a time onto the surface of a punnet, or wide pot filled with seed-raising mix. Barely cover seed with sand or perlite to prevent it washing away. Water

very gently. In cool conditions, place punnets in a cold frame, and keep punnets consistently damp. In warm weather, cover punnets with an inflated plastic bag, or miniature greenhouse, and keep them in a cool, shaded position until germination occurs about one week later. Give seedlings weak fertiliser tea fortnightly. Also give them a couple of applications of half-strength seaweed tea, including one just before transplanting. This really helps to develop a strong root system. Seedlings should be ready to plant out in about two weeks.

Plant out, directly into a mulched area, at the same depth seedlings were in the punnet. Water thoroughly when necessary to keep soil dark-damp. As lettuce must be grown quickly for the best flavour, they may require several applications of fertiliser tea to the surrounding soil to keep them moving along. The frequency of applications will depend on how well the growing area was prepared. They may not require any additional fertiliser at all. Don't apply fertiliser teas out of habit, or snails (who love the soft, sappy growth produced by excess nitrogen) may not leave you any lettuce. Go lightly with fertiliser teas if growing with carrots, or carrots may become all tops. If sowing direct, make a furrow about 5 cm deep and add 4 cm of compost. Sow seed thinly, and cover as for punnets. Pack sausages of mulch along the sides of the furrow to keep seed shaded and soil damp. Harvest all but loose-leaf lettuce by pulling up the whole plant.

Some crisphead and red-leaf lettuce cultivars seem to be more tolerant of hot conditions. During very hot conditions, we sow lettuce directly into styrene vegetable boxes filled to about 4 cm below the top with rich compost. This gap allows us to

stretch plastic across the top to keep seed moist, and allows room for seed leaves to emerge. Plastic is removed after germination. The boxes are kept in the shade on the south side of our house. This system works well for cos and loose-leaf cultivars of lettuce which can be picked when young. It also saves some water when the plants are kept in cooler conditions. You can sow a new box or two each month while it's hot.

Warm season lettuce include: 'Great Lakes', 'Webb's Wonderful', 'Brown Romaine', 'Sucre', 'Green Mignonette', 'Red Mignonette', 'Butter Crunch' and 'Purple Oak leaf'. 'Yatesdale' does well in winter in Warm Zones.

MACADAMIA (*Macadamia* spp.)

PLANTING PHASE: *Full Moon*

Macadamia trees are natives of the rain forests of the east coast of Australia and, until early last century, provided an important food source for inhabitants of the region. The nuts are high in unsaturated oils and are a good source of protein, phosphorus and fibre.

Macadamias are long-lived, evergreen trees that can reach 9 m in their natural habitat of northern New South Wales and southern Queensland, but may only grow to about 5 m in cultivation. They grow well in warm, relatively humid conditions and will fruit as far south as Sydney in protected coastal positions. In areas where occasional light frosts occur, young trees will have to be protected. There are several species available with either wavy-edged or serrated leathery leaves. Trees are self-pollinating and the nuts, which usually mature in autumn, have extremely hard shells. Trees can be

grown from seed but they will take a very long time to produce fruit.

Macadamia trees require a well-drained, moisture-retentive soil, rich in humus. Do not grow them if water is restricted as trees require regular deep watering in warm, dry weather. Soil pH should be slightly acid. Plant trees after soil warms in spring. This genus dislikes synthetic fertilisers and prefers a thick mulch that contains compost or worm castings and well-rotted manure. Apply mulch in spring and top it up in February. Trees are grown with a central leader and do not require regular pruning. Ripe nuts drop from trees, and are dried, under cover, on trays after de-husking to prevent nuts becoming mouldy. Shelled nuts should be stored in a sealed container and refrigerated.

MANGO (*Mangifera indica*)

PLANTING PHASE: *Full Moon*

The mango is a tropical fruit rich in beta-carotene and vitamin C. It also contains moderate amounts of iron and fibre. It is related to cashew and pistachio. Because they are so messy, it is said that the best place to eat a whole mango is in a bath. Otherwise, cut the ‘cheeks’ from the mango, and crisscross the flesh with a knife, before pushing the skin inwards to make the squares of flesh stand upright for easy removal.

Mango fruit matures from early summer to early autumn. The skin of some cultivars is partly green when fruit is ripe. Other cultivars are lemon yellow with a pink-orange blush. Fruit will continue to ripen indoors. Ripe fruit will be plump with a delicious fragrance, and skin will be smooth and firm but will yield to light pressure. Fruit with wrinkled skin is overripe, and fruit with black spots is decaying. As soon as it is ready

to eat, store fruit in a plastic bag in the vegetable crisper, and use as soon as possible. Fruit can be eaten raw, or still-firm fruit is delicious added to chicken or prawn stir-fries. Mango makes a delicious chutney, although cooking will reduce the amount of vitamin C.

The best Australian mangoes come from Queensland and the Northern Territory, but trees in protected positions can still produce edible fruit in warm temperate areas. Mature trees can tolerate light frosts, but young trees will need protection. Mango are, however, very large evergreen trees, reaching 10 m or more, with a broad canopy and should be planted at least 10 m from building foundations. They grow best in areas with reasonably high summer rainfall, and wet weather at flowering time in early spring will cause crop losses.

Named cultivars are available from nurseries. Mango trees can be grown from seed but I have never tried this because we prefer to know the type of tree and fruit we are growing, and seedling trees have a reputation for producing very fibrous fruit.

Choose the warmest position possible, with well-drained soil and protection from cold winds. Prepare the planting area with plenty of humus, and plant trees in warm months with good rainfall, then mulch thickly. In temperate areas with no distinct rainfall pattern, plant after soil warms in spring. For the first two years after planting, trees will benefit from applications of manure tea given about three or four times through the growing season, as well as organic mulch topped up regularly and deep watering, when necessary.

Older trees fruit better if fertiliser is restricted, and organic mulch will supply the nutrients they need. Apply a small

amount of organic complete fertiliser to mature trees, after harvest, and apply seaweed tea in April. Non-fruiting trees can be lightly fertilised in February. In areas with a distinct wet season, also apply seaweed tea in November. Mango require little pruning other than shortening leaders, when trees are young, to encourage about six branches to form a framework.

MELONS

SOWING PHASE: *First Quarter/New Moon*

The whole melon family, including squash and cucumber, are full of health-protecting compounds. Watermelon, *Citrullus lanatus*, contains vitamin C, beta-carotene, fibre and lycopene. The rind is very soothing when rubbed on sunburned skin. Rockmelon, *Cucumis melo*, contains beta-carotene, fibre, vitamins B and C, plus odenosene, which helps prevent blood thickening. Rockmelon is also very low in kilojoules.

Both watermelon and rockmelon require similar soil preparation, tip pruning, and care to cucumber, except that they are not grown on trellises (because the fruit is much heavier) and they do not require protection from sunburn. You can also grow them in pure compost, like pumpkin. Make sure you cover the growing area with mulch, even if you have to pull it back from the sowing area to allow soil to warm. Watermelon, especially, will set down extra roots where it comes in contact with friable, damp soil. If you remove small areas of mulch from under strong branches, and replace the mulch on top of the branches at a leaf axil that is not carrying fruit, auxiliary roots will usually form making it easier to keep plants supplied with moisture.

Both watermelons and rockmelons require a generous square metre per vine (if vines are tip pruned), so mounds will have to be placed further apart than for cucumbers. Watermelon and rockmelon will not cross-pollinate with each other but rockmelon will cross with other melons. If you are planning to save seed, grow only one watermelon cultivar and one other melon cultivar.

Seed for both watermelon and rockmelon can be sown direct into beds or mounds, but we also sow them in covered 8-cm pots for transplanting later because rockmelon seeds are irresistible to mice (and rats), and while mice are around they steal other large seeds too. Rodents lose interest in seed as soon as it has germinated. Melon seed can be sown in the same manner as cucumber when soil temperature has reached 20°C, and seed will germinate in seven to ten days. Because watermelon and rockmelon are eaten when fully mature and fruit takes longer to mature in cooler conditions, only one sowing may be possible in cooler areas. Two to three vines would probably be enough per sowing. Apply manure tea one month after sowing. Maintain a regular watering routine because erratic watering of vines can cause fruit to split. Maintain mulch where possible. As fruit forms, place a piece of styrene foam box under each fruit to keep it clean and dry; garden pests often attack melons lying on damp soil.

Watermelon

Sow seed 1 cm deep. When flowers form, apply seaweed tea to the soil around the main roots. ‘Sugarbaby’ is a small, round, fast-maturing melon on a vine that is drought-resistant, and suited to cool areas. Fruit is ripe when the tendril closest to it browns, the underside of the fruit is yellow, and it has a hollow sound when tapped.

Rockmelon

Sow seed 8 mm deep. ‘Blenheim Orange’, ‘Nutmeg’, ‘Ogen’ and ‘Sweet Granite’ are suited to short-season areas. ‘Honeydew’ is suited to warm, dry areas. Fruit is ripe when the stem shrivels and it has a distinct melon fragrance.

MIZUNA (*Brassica rapa* Japonica Group)

SOWING PHASE: *New Moon*

Mizuna is a fast-growing, frost-hardy member of the crucifer family and shares its health-protecting anti-oxidants. Mizuna’s finely divided, light-green leaves add interest and a mild mustard flavour to salads, and it has become more popular than the similarly cultivated mustard greens. Mizuna is easy to grow in pots or polystyrene fruit boxes, if space is limited.

Mizuna can be harvested about four or five weeks after sowing. It grows best in mild weather. Foliage is picked as required. Sow and cultivate as for open Chinese cabbage. Because it grows so quickly, mizuna does not usually require liquid fertiliser. It may cross-pollinate with other brassicas.

NECTARINE see Pome and Stone Fruits

NEW ZEALAND SPINACH (*Tetragonia tetragonioides*)

SOWING PHASE: *New Moon*

If your area is too warm to successfully grow leafy greens, try growing New Zealand spinach (or ‘Warrigal greens’), a vegetable that is valued in many countries because it thrives in warm weather and is more drought tolerant than lettuce, spinach or silver beet. It may look like spinach but it belongs to an entirely different family. Although tolerant of harsh

conditions, it performs better with regular watering and applications of liquid manure.

New Zealand spinach grows happily in well-drained beds prepared with plenty of well-rotted manure or compost. Seeds need to be soaked overnight before sowing directly, 1 cm deep, into a bed. About five plants are sufficient for the average family. Young tips and leaves are harvested at 7 cm. The harvesting stimulates side shoots, resulting in a short plant that spreads into a wide mat. When planted in spring, New Zealand spinach can be productive until early winter.

OLIVE (*Olea europaea*)

PLANTING PHASE: *Full Moon*

Mature olive trees manage to look dignified even when surrounded by asphalt in dry, dusty school playgrounds. These small, evergreen trees have been cultivated for many thousands of years for their fruit and oil. (Fruit has to be pickled before eating.) Olive trees are slow growing but long lived, and their grey trunks develop an attractive, gnarled appearance. The foliage is grey-green on top and silver underneath. Extracts of leaves are used to reduce blood pressure. While olive trees are very hardy and drought tolerant when used as shade trees, they won't produce good fruit, or oil, unless you give them some attention.

Trees will grow in most temperate and warm areas where water is available. Olive trees are salt tolerant. *O. e.* 'Mission' is a vigorous and cold-tolerant cultivar suitable for fruit. Cultivars are usually suited to either fruit or oil production, so decide before purchase which product you would prefer from your olive tree; the very best olive oil comes from cultivars that produce unpalatable fruit. Only purchase trees from

reputable nurseries as seedling trees may not be true to type and will take a long time to produce a crop. Choose a tree with no fewer than three branches. Nursery trees should start producing in three years.

Olives prefer a cool winter and a long, hot summer. They can tolerate some frosts, and are quite tolerant of soil types as long as the soil is well-drained. To produce good fruit, they require consistent soil moisture from late spring, when fruit is set, until autumn. The addition of humus when preparing soil and the use of a thick layer of organic mulch around trees will help reduce irrigation in dry areas. Plant trees in autumn in warm areas, or spring in cooler areas.

Irrigate under mulch, and fertilise with organic complete fertiliser in early spring and after harvest. Harvest 'green' olives by shaking trees when olives start to yellow, and collecting the fruit on sheets of weed mat placed under trees. Olives can be stuffed after pickling. 'Black' olives are harvested when purple and left at room temperature for a day before processing. Olive trees do not require regular pruning.

ONION (*Allium cepa*)

SOWING AND TRANSPLANTING PHASE: *Full Moon*

Like their close relative garlic, onions have been used for thousands of years as a treatment for respiratory and gastric infections, and contain similar compounds that boost the immune system. Raw onion juice has also been used externally to treat acne, boils and insect bites.

Onions are a slow-growing vegetable crop that make leafy growth in cool weather and mature in warm, dry weather. Leaves of onions are hollow and tubular while garlic and

leeks have flat leaves. Varieties of onions can take 6 to 8 months to reach maturity. Onion plants are sensitive to day length and, because of this, cultivars are divided into early-maturing, mid-season maturing and late-maturing varieties. Early onions mature when days are relatively short while late onions require long sunlight hours for bulbs to form. Planting the incorrect variety usually results in onions running to seed rather than forming bulbs. Late-season onions generally store better than others. In Temperate Zones, grow early varieties in autumn, and mid-season varieties in winter. Early, mid-season, and late varieties can be sown in sequence from autumn onwards in Cool Zones. From March to May, early varieties of onion can be started in Warm Zones, but onions are not suited to tropical climates and spring onions would be more suitable for these areas.

Prepare beds for the onion family early to give earthworms time to digest fertiliser before planting, or use a generous sprinkling of worm castings as fertiliser. Onions require a position that receives both winter and summer sun, humus-rich soil, a pH of 6–7 and the addition of some organic complete fertiliser. Compounds given off by onions roots may affect growth of peas and beans growing close to the onions. Good drainage is essential and a raised bed will ensure this. When preparing a new bed, lightly apply a 15 cm wide band of worm castings 5 cm below soil level.

Sow onion seed thinly and directly, 6 mm deep, into furrows 30 cm apart, in damp soil. Space rows at 35 cm in warm, dry areas to allow room for mulch. Mulch must not come in contact with the bulbs. Germination occurs in about two weeks. When seedlings are 15 cm tall, thin to 10 cm spacing. Thin to 5 cm for pickling onions, or if you plan to use

thinnings as spring onions. As onions occupy bed space for a long period, sowing seed 6 mm deep in punnets can be more convenient. If seed is sown in punnets, the bed can be prepared the week after sowing seed. Feed seedlings regularly with weak fertiliser tea, and transplant them into the garden when seedlings are about 15 cm tall and about matchstick thickness. Lightly trim the roots and tops of the seedlings before planting out, carefully avoiding the new leaf forming in the centre of each plant.

Make V-shaped furrows 3 cm deep and lay onion seedlings along one side of the furrow 10 cm apart — use 5 cm spacings for pickling onions. Use soil on the opposite side of the furrow to cover just the roots because onion bulbs form above, not below, soil level. Planting too deeply will cause bulbs to rot. Firm soil around seedling roots, then water gently. Seedlings will realign themselves vertically as they grow.

Onions usually do not need extra fertiliser but if they are not growing steadily, a weak fertiliser tea as well as a very weak seaweed tea will be beneficial. Water onions regularly in dry weather and keep weeds under control. Hand-weed between bulbs while weeds are small. Do not use gardening tools when weeding onions as young bulbs are easily damaged.

Cease watering when tops start to yellow and fall over. Like spring bulbs, nutrients in the leaves are drawn into onion bulbs as they mature. Onions are ready to harvest when tops die off completely. Avoid harvesting in wet weather. If weather is very hot, or rain threatens before tops dry out, move onions under cover where the tops can still dry quickly. Twist off the dried tops, rub off any roots, and store onions in a cool, airy place. Harvesting is best carried out on a barren

day after Full Moon if you want to store the onions before use.

Onions stored while still moist will go mouldy. As onions can absorb toxins, do not eat damaged or mouldy onions. The sulphur compounds in cut onions cause us to cry because they form a very dilute sulphuric acid on contact with moisture in the eye. Peeling onions under running water, or submerged in a large bowl of water, overcomes the problem.

Early varieties: ‘Lockyer Early White’, the brown-skinned ‘Gladalan’, and ‘Hunter River Brown’ (all suit warm climates).

Mid-season or late varieties: ‘White Spanish’ and ‘Ailsa Craig’ (good keepers), ‘Bennie’s Red’ has purple skin and develops reddish flesh on storage (great for salads and stir fries). ‘Creamgold Long Keeper’ suits cool climates and, as the name suggests, stores well.

PARSNIP (*Pastinaca sativa*)

SOWING PHASE: *Full Moon*

Parsnip is one of those vegetables people either love or hate. They are delicious roasted, and a traditional ingredient in vegetable soup, but few children will eat them cooked in other ways. Parsnips are an excellent source of vitamin C, and contain some vitamin E and folic acid.

Although distantly related to the carrot, parsnip roots look more like those of another relative, Hamburg parsley. Like carrots, parsnips require a deep, loose, well-drained soil with a pH of around 6.5. Unlike carrots, they do not come in very short cultivars, so do not grow this vegetable until topsoil is improved to a good depth. Parsnip can follow a crop suited to

humus-rich soil, but soil with a high residue of fertiliser can cause forking of roots in this vegetable, too.

Parsnip can be sown in all growing zones, but is said to be sweeter in areas where frosts occur. Plants can take up to twenty weeks to mature. They need a period of warmth for initial growth, and roots mature from late autumn into winter. Parsnip plants have evolved to produce seed in spring and, if sown in cool months, will run to seed very quickly as weather warms. Roots do not have to be fully mature before harvest. During winter, parsnip can be harvested, as required, by first loosening the soil with a small gardening fork. In very cold areas, the crop can be harvested at the beginning of winter.

Fresh seed is sown direct in furrows 2 cm deep, and 30 cm apart, in dark-damp soil. The close spacing of rows allows foliage to shade out weeds. Seed should be spaced 6 cm apart if planning a single harvest, or 5 cm apart for repeated harvesting. Cover the furrow with 1 cm of compost, and firm it with your hand to ensure good contact with seed. The depression left in the furrow will help keep soil damp. Water very gently, and cover area with a light mulch of fluffed-up hay or grass clippings until germination has occurred (up to four weeks later). Then move mulch aside. It is important with this vegetable to keep soil moisture constant, otherwise seed won't germinate or roots might split. Because parsnip is slow germinating, radish can be sown between parsnip rows to remind you to water the area. Radish will be ready for harvest while parsnip seedlings are still small. If growth seems particularly slow, apply a worm liquid tea as crowns begin to thicken.

At the first sign of new foliage growth in spring, the rest of the crop will have to be harvested, except for plants marked

for seed saving. Like carrots, parsnips will store reasonably well in the vegetable crisper as long as you keep them away from apples.

‘Tender and True’ has large roots and good flavour. ‘Hollow Crown’ has large roots and a variable maturing period, while ‘Cobham’ has wedge roots and matures in about eighteen weeks.

PASSIONFRUIT (*Passiflora* spp.)

SOWING AND PLANTING PHASE: *Full Moon*

Passionfruit vines are relatively short-lived, vigorous perennials that need replacing every five years for maximum production. They provide attractive flowers and evergreen coverage for sunny fences, trellises and pergolas as well as supplying the essential ingredient for pavlovas, and flavour for desserts, ice cream and spreads. Passionfruit resent strong winds which can damage vines and so are not suitable as windbreaks. One vine is ample for the average family. Make a note to get a replacement started four years after planting.

Black passionfruit and the ‘Panama’ cultivars grow well in Temperate and Warm Zones. The golden passionfruit has become more popular in sub-tropical areas, although two vines are required for setting fruit with this species. All passionfruit require perfect drainage in a sunny position, and prefer mild winters, with regular watering and feeding.

Mature passionfruit vines (in their second year of growth) can tolerate occasional light frost, but all young vines should be covered on clear, crisp nights if frost is a possibility. The common black passionfruit, *Passiflora edulis*, can be successful in wind-protected spots in cooler temperate areas if

grown against a north-facing brick wall, although it may be semi-deciduous in these areas and cropping will be lighter. The thin-skinned banana passionfruit, *Passiflora mollissima*, is more tolerant of cool conditions. Passionfruit vines produce their first crop of fruit within 18 months of planting. Well-cared for vines in warm areas can produce two crops per year.

Black passionfruit taste best when they have become slightly wrinkled; smooth black passionfruit have a sharper taste. 'Panama' passionfruit are ripe when mature fruit falls from the vine. Fruit should be picked up daily. Banana passionfruit taste best when a rich yellow colour and slightly soft to the touch.

Black and banana passionfruit can be grown from seed taken from a healthy fruit, and sown as soon as possible. Sow seed individually, 1 cm deep, in 8-cm pots filled with a quality seed-raising mix. Sow several pots and select the healthiest seedling. Seed is sown in Full Moon phase. Seedlings and grafted plants are also available from nurseries. Select a plant with a single stem as this will be easier to train. Seed-grown passionfruit tend to be more cold tolerant than grafted cultivars because the rootstock used for grafting is a tropical species.

Vines are not planted until after ground warms in spring, which gives you an opportunity during winter to grow broad beans as a green-manure crop to deter fusarium wilt. Seedling passionfruit can be susceptible to this fungus disease, but grafted vines are resistant. Passionfruit vines will rot if drainage is poor. Grow them in a raised bed if drainage is less than perfect. Prepare the growing area with plenty of mature compost or well-rotted animal manure well before planting,

water it, and cover with a thick layer of organic mulch. Passionfruit are heavy feeders and thrive on organic fertilisers. For this reason, some growers used to always bury an ox liver where they planned to plant passionfruit. However, this practice is not recommended — especially if you own a dog.

If growing passionfruit on a fence, wall or trellis, position two wires horizontally: one near the top of the fence, or at a reachable height on walls, and the second wire 50 or 60 cm below. Wires will have to be five metres long in Warm Zones, and about three metres long in Temperate Zones. Use very long screws or 5 cm blocks of wood to provide space between the wires and the backing so that vine tendrils can twine along the wires. Tie a piece of twine to the centre of the top wire and extend it to the ground, winding the end around a brick or rock to keep it taut. This will provide a temporary support until the vine reaches the top wire.

Harden-off the vine before planting, then remove mulch from the planting area and plant vine at the same depth it was in the pot, following good planting practice. Water gently, and replace mulch, keeping it well clear of the vine stem. Mulching is essential for passionfruit as they have very shallow roots and resent cultivation in the root area. Allow a single stem to grow to 20 cm past the first wire, then pinch out the growing tip to stimulate the growth of side shoots. Select a shoot to continue to the top wire and train a shoot along each side of the lower wire. Remove any other side shoots. Repeat this process when the leading shoot reaches the top wire. When shoots reach the end of each wire, pinch out the growing tip. Your passionfruit vine now has a framework of a central stem with four arms.

To avoid bending during harvest when growing large quantities of passionfruit, use T-shaped trellising and pinch out the growing tip 10 cm past the wire. If growing passionfruit over a pergola, run four or more wires along the top of the pergola, and run the twine from the top of a support post to guide the vine to the top. Position the vine near a post close to the centre of the length of the pergola. When the shoot is two-thirds of the way to the pergola, pinch out the growing tip. Select two strong new shoots and remove the other shoots. When the shoots are 20 cm higher than the pergola, pinch out the growing tips and train the resulting side shoots in opposite directions along the wires.

Vines need a good soaking weekly, either by rain or a hose poked under the mulch. In hot, windy weather they will require more frequent watering or immature fruit will be discarded by the vine. Young vines respond well to a regular application of manure tea or worm liquid tea during the growing season in their first year.

Mature passionfruit are pruned in spring (see [chapter 8](#)). After spring pruning, fertilise mature vines with an organic complete fertiliser or worm castings as well as an application of seaweed fertiliser tea. Then place a 5-cm layer of compost or well-rotted manure around the vine, moisten it, and cover it with 2–3 cm of organic mulch. This will act as a slow-release fertiliser through the growing season. If you do not have enough compost or manure, a regular application of fertiliser tea can be used as a substitute.

Vines in very warm areas may need a light pruning after the summer crop. After the summer crop is harvested, vines will benefit from a light application of organic complete fertiliser tucked under the outer edge of the mulch.

PAWPAW (*Carica papaya*)

SOWING AND PLANTING PHASE: *Full Moon*

Pawpaw are low in kilojoules but high in beta-carotene and vitamin C. Papain, an enzyme that tenderises protein, is extracted from the skin and pulp of unripe fruit. Ripe fruits aid the digestion of protein, so include some pawpaw with your next barbecue. Thai chefs make a green pawpaw salad.

Pawpaw are fast-growing, short-lived trees, up to 6 m, suitable for warm, humid conditions. Botanically speaking, the trees are herbs that need to be replaced every five years. They are frost sensitive, and produce the best fruit in Warm Zones with good rainfall and protection from cold winds. We have grown the common, yellow-fleshed pawpaw in a frost-free area of Sydney against the north wall of a garage, but in those conditions they take longer than the usual eighteen months to produce fruit. The redder-fleshed variety, usually sold as papaya, requires much warmer conditions. Pawpaw thrive in humus and must have perfect drainage to avoid rotting. Prepare a bed about 20 cm high and 75 cm wide, mixing lots of compost or well-rotted manure through the top soil. Cover the prepared bed thickly with mulch to keep organic matter damp.

Plants are grown from seed taken from a fully ripe fruit and sown as soon as possible, in warm weather, because seed has a short period of viability. If not planting immediately, remove the jelly coating around seeds by rubbing them on a sieve and rinsing away the pulp. Sow seed individually, 1 cm deep, in 8-cm pots. Use the mix for small pots (see [chapter 4](#)) rather than seed-raising mix. Keep soil consistently dark-damp. Sow more seed than you need because both male

and female trees are required to produce fruit. (There are dual sex trees available, but these only grow well in very warm conditions.) Keep seedlings in a consistently warm, semi-shaded position, and harden-off as for other seedlings before transplanting. When choosing seedlings to plant out, don't select only the strong ones as they may be all males, and one male tree can fertilise about four female trees. Transplant in warm weather and set up temporary shade and wind protection if weather is hot and dry. If weather is starting to cool, transplant seedlings into gradually larger pots until it's a suitable time for planting.

Seedlings are planted out into the mulched bed in groups of three in a triangle formation with seedlings barely 30 cm apart. Pull back mulch from the planting area so that it does not come in contact with seedling stems. Do not plant seedlings too close or you will have difficulty removing unwanted male trees. Space groups a good metre apart. Water deeply, when necessary, to keep soil dark-damp, but do not over-water in cooler months. Apply a fertiliser tea to soil around seedlings every two months until weather starts to cool. Apply half-strength seaweed tea in October and December until trees start to produce flowers. Female trees produce large bell flowers on short stems. Male trees produce clusters of small bell flowers on long stems. Remove unwanted male plants by sawing through the trunks at an angle just above the mulch level. If your group of trees includes a lot of males, you could try cutting some males back to 90 cm above ground. Sometimes pawpaw trees pruned in this fashion can revert to female. If you can manage to do so without damaging other trees, cut the trunks so the cut portion faces north to encourage it to dry quickly. Do this after Full Moon during the growing season. Wash saws in hot, soapy

water. If trees become too tall for harvesting, they can be pruned in a similar manner. Often, a large tin is placed over the cut end to keep it dry.

Mature trees should be fertilised with manure tea in August, and given an application of complete organic fertiliser in September as well as an application of seaweed tea in October and December. Replace organic mulch when necessary. Ripening times of pawpaw vary according to temperature. Choose fruit that is an even yellow colour and has a pleasant smell. Cut fruit from the tree and avoid getting the irritant sap on your hands. Fruit will continue to ripen indoors. Then wrap it in several layers of newspaper and store it in the vegetable crisper for up to one week. Four years after planting out seedlings, start a new batch of seedlings and plant them out in prepared soil between the groups of existing trees.

PEACH see Pome and Stone Fruits

PEANUT (*Arachis hypogaea*)

SOWING PHASE: *First Quarter*

Before growing peanuts for consumption, I strongly advise you to study an agricultural text on harvesting the nuts because peanuts have very specific humidity requirements during the drying, or curing, process. Incorrectly cured peanuts develop aflatoxins which are responsible for the extreme allergic reactions to peanut products that are becoming more and more common in the general population. Peanuts dried in domestic ovens develop unpleasant flavours.

Peanut (or ground nut) is an interesting plant to grow as a novelty because the nuts, which form underground, do not

develop on the roots but from the flower stalks (or ‘pegs’) that grow down into the soil after fertilisation of flowers.

The peanut plant is a small annual grown in full sun in warm months. It can take up to six months to mature and is not suitable for growing during long periods of rain. Peanut plants are very sensitive to organo-chlorine pesticide residue in soil, and are not suitable for growing where 2,4-D and related products have been used to clear land. Plants also require a close to neutral soil pH. The peanut is moderately drought tolerant but requires regular watering, to the soil only, from flower formation onwards. Flowering can occur from seven weeks after sowing raw peanut kernels, 5 cm deep and 35 cm apart. Soil must be well-drained and friable to allow pegs to penetrate the surface. To form nuts, plants require a lot of calcium which is absorbed directly into shells from the soil. Calcium must be applied to soil at flowering time in the form of gypsum so that soil does not become too alkaline. Nuts are harvested by digging up whole plants. Mature peanuts will be light brown inside the shell with darkened veins, and the seed coat will be thin and dry. Nuts mature as foliage starts to yellow but the crop may not mature evenly.

PEAR see Pome and Stone Fruits

PEAS (*Pisum sativum*)

SOWING PHASE: *First Quarter*

Garden peas are a source of protein, phosphorus, iron and vitamins, and can be eaten fresh or dried. Flat-podded snow peas are very popular in stir-fries and other dishes. All peas are easy to grow in cooler months, but while pea plants are frost hardy, their flowers are not. Frost-damaged flowers can affect pod formation so peas should be sown to avoid

flowering during frost periods. Depending on the cultivar and temperature, pea plants can take between seven and eleven weeks to produce flowers, and it can take a further three weeks after flowering for pods to fill. Snow peas, of course, take the shortest time because they are eaten before pods fill. The hardest part of growing peas is the timing of sowing different cultivars to suit your local conditions. Keep a note in the gardening diary of the number of weeks between sowing, flowering, and harvesting of your favourite pea cultivar so that you can get growing peas (and sweet peas) down to a fine art.

Peas need a well-drained soil containing humus, or seeds may rot. Choose a planting site that is not beside garlic, onions and shallots. Peas require support, and a trellis should be erected when you start to prepare soil to avoid trampling humus. A trellis made from two rows of 90 cm-wide chicken wire, set 10 cm above the bed surface, provides good support and can be erected quickly against a fence, or supported by tall stakes in garden beds. Young pea plants can try to strangle each other on other types of trellis if the lines are too far apart. Tepees or wire hoops can be used in small gardens as long as there is good airflow. Dwarf peas do better if flowers and pods are kept clear of soil; sticks are a suitable support for these short plants.

Prepare the bed several weeks before planting, applying plenty of well-rotted compost and checking that soil pH is around 6.5. If you do not have a lot of compost, add some organic complete fertiliser while preparing the growing area (not at sowing time). In Southern Hemisphere gardens, peas require a fertiliser that contains nitrogen because a suitable nitrogen-fixing bacteria is not usually present in our soils

unless you have recently grown an inoculated crop of field peas or woolly pod vetch in the same bed (see Crop Rotation in [chapter 1](#)). Water soil to just damp, and lightly mulch the prepared bed to keep damp. If your peas are able to fix nitrogen, you can plant lettuce or spinach between rows in suitable conditions.

Sow smaller quantities of seed each First Quarter phase through the sowing season, unless you are planning to freeze your crop. Avoid sowing when rain is predicted within 36 hours. Before sowing, water soil under the trellis to dark-damp. Press seeds into soil 10–15 cm apart, to the depth of the top joint of your index finger (as a general guide). They can be sown slightly deeper in light soil, and slightly shallower in heavy or very cold soil. Rake soil over the seed, and mulch lightly to protect emerging seedlings from birds. If soil is damp, seeds are not watered again until the seedlings appear. Excess watering at planting time can also cause the seeds to rot. Seeds should emerge in one to two weeks.

Once pods start to form, you may have to net your crop as birds are fond of garden peas. Pods have to be harvested every one or two days to keep them producing. Mark your best producers clearly if you want to save seed (see [chapter 8](#)). Break pods from stems rather than pulling them because stems are very brittle. Start picking when peas are young and tender. When pods become ridged or veined, peas have a starchy flavour and tough texture, and are also harder to digest. Excess peas can be shelled and frozen after blanching. However, snow peas are not suitable for freezing.

PECAN (*Carya* spp.)

PLANTING PHASE: *Full Moon*

The pecan is an attractive, deciduous, North American nut tree with attractive foliage. It belongs to the hickory group and is related to the walnut. Different species of pecan grow in northern and southern states of the USA. Those cultivars suited to warm areas have thinner shells and are more frost sensitive. Trees flower late, which enables them to be planted in some frost areas, but they need seven months of warm weather to produce mature nuts. Male and female flowers are borne on the same tree, but may not open at the same time, and a cross-pollinator may be required.

This genus is very slow growing, but not suitable for average-sized gardens as the trees have the potential, given good growing conditions, to reach a very large size, and their large root system competes with nearby plants. It is a suitable genus for farm areas with a long, hot summer, and deep, moist, humus-rich soil. The pecan has a dual root system consisting of a long tap root and spreading fibrous roots which make it ideal for growing above river banks or in sunny valleys that may flood occasionally. Our pecan bears nuts with only normal rainfall in good years, even though it was planted on a ridge with a shale subsoil. The bad positioning has probably kept it to a reasonable size, but it will not set fruit in drought conditions without plenty of irrigation.

Grafted trees take about five years to bear fruit, and should be planted in early winter. Before purchasing trees make sure the tap roots have not been cut back. Planting requires a much deeper hole than normal to allow the tap root to develop properly in subsoil. (See figure 4.1 in [chapter 4](#).) Before positioning each tree, refill each hole so that the tree will not be planted any deeper than it was previously. Bare-rooted

trees will show a distinct ‘soil level’ line on the trunk as the section of trunk that was below ground will be lighter in colour. Trees simply require deep watering in dry spells to become established, and an application of stable cleanings around the outer canopy edge in early spring. (See [chapter 8](#) for training pecan trees.) When the green husks on nuts split open, spread weed mat under trees to catch nuts as they fall. Nuts keep well if they are stored indoors for a couple of days before being shelled and refrigerated in an airtight container.

PINEAPPLE see Bromeliads, see p. 329

PISTACHIO (*Pistacia vera*)

PLANTING PHASE: *Full Moon*

Green pistachio nuts contain protein, calcium, iron and thiamine, and anti-oxidants, and have been used as a medicinal herb to treat asthma, and kidney and gall stones. Unsalted kernels can be used in desserts.

Pistacia vera is a hardy deciduous fruit tree suited to inland areas with low humidity. It is tolerant of both drought and alkaline soils. Pistachio trees like a cool winter but not late-spring frosts. Male and female trees flower at the same time and both are required to produce nuts. Grafted trees will produce fruit more quickly than seedlings. One male tree can fertilise about ten female trees, and trees start producing about five years after planting. Production increases for quite a number of years. The Chinese pistachio, *P. chinensis*, does not produce edible fruit.

Plant pistachio trees during winter into well-drained soil that contains humus. Avoid adding manures when preparing soil for pistachios, or applying manure teas, because they do not

need a lot of nitrogen. In their first season, young trees require mulch and occasional deep watering to establish a strong root system. Established trees require water before spring growth begins, and after harvesting nuts in late summer or autumn, but they require minimum watering through summer while nuts are maturing.

Give trees an application of seaweed tea and a light application of organic complete fertiliser, under mulch, in spring. Apply half the amount to young trees.

Nuts grow in clusters inside dark red fruit which are the husks. When fruit is mature, husks split open revealing the cream nutshells inside. As husks start to split, place sheets of weed mat under trees to collect the nuts in dry weather. Remove the red husks and spread nuts on trays, in shade, to dry. Shells can split too, exposing the green kernels, so store nuts in vermin-proof containers. Pistachio trees resent pruning, and cuts heal slowly. Young trees require minimum shaping. Shortening of leaders, if necessary, can be performed, during First Quarter phase, in mid-spring. Remove overcrowded or crossed branches on mature trees, during Full Moon phase, after harvest.

PLUM see Pome and Stone Fruits

POME AND STONE FRUITS

PLANTING PHASE: *Full Moon*

The pome fruits — apple and pear — and the stone fruits — almond, cherry, nectarine, peach and plum — all require varying amounts of chilling in winter, and some prefer only moderate heat in summer. While modern breeding techniques can produce deciduous fruit trees that require less winter

chilling, these trees may still be subject to high summer rainfall in warmer areas, resulting in spoiled fruit and years of wasted growth. Your local nursery will carry suitable grafted cultivars for your area. Unless you know a lot about growing conditions for various cultivars, it is unwise to pick favourite cultivar names and order from a catalogue.

Most pome and stone fruit trees require cross-pollination, so allow space for two fruit trees unless there is a compatible pollinator growing nearby. To make the most of available space, fruit trees can be espaliered and grown against sunny fences or walls. If space is very limited, you may find that a multiple-graft, vase-shaped tree is more suitable because compatible pollinators are both grafted to the one rootstock. Avoid multi-graft trees of different types of fruit because, usually, one species will dominate and the others will die off. Young fruit trees are often sold with one leader (stem) because horizontal branches that form from a central leader tend to produce fruit at a younger age. If you are planning to grow your tree as a vase shape, ask your nursery for advice in pruning the leader in the correct place to get you started.

All deciduous fruit trees require a sunny position and well-drained, humus-rich soil with a close to neutral pH. Avoid planting fruit trees in exposed positions where maturing fruit will be damaged by wind, or where winds blowing from the hot interior of Australia during summer will cause water stress resulting in loss of fruits that mature in autumn. Also try to avoid planting fruit trees exposed to southerly winds in spring, which keep bees snug in their hives, because cross-pollination of blossom will be poor in areas that are too cold and windy for bees. It may prove

worthwhile in orchards to plant a fast-growing windbreak to protect fruit trees.

Deciduous fruit trees are planted during early winter except where winters are very wet. In these areas planting can be delayed until the beginning of spring. If you have followed good planting practice, trees will not require fertilising for their first growing season. However, if young trees appear under-nourished, apply fertiliser as a tea. Once established, mulched trees will only require a deep watering every week or so during dry periods. Water should be applied under mulch, or through drip irrigation for large areas. Do not use sprinklers on fruit trees as they encourage brown rot in cool weather, and damage to fruit during hot weather. Some birds prefer immature fruit, so keep nets on hand for fast application.

In most areas of Australia, deciduous trees should be protected with organic mulch throughout the growing season. Extend mulch to beyond the drip line as fruit-tree feeder roots are close to the soil surface. Cultivation or mowing in the root area can cause suckers to form. Mulch must be kept at least a hand's width (about 10 cm) from the trunk or main stem, or trees will develop collar rot. The natural canopy of espaliered trees has been altered so it can't be used as a guide for the position of feeder roots. For these trees, extend mulch up to a metre in all possible directions from the trunk of a mature tree, ensuring that mulch does not touch the trunk. Try to include a high proportion of mature compost when mulching fruit trees as this will provide a full range of nutrient elements, reducing other fertiliser requirements.

Unless otherwise specified, extra fertiliser can be split into two applications; one applied at the end of winter and the

other after harvest. Fertiliser should be applied only to the soil surface, under the outer edge of mulch, and not ‘scratched-in’. Instead of mulch, you can grow a shallow-rooted, annual ground cover under fruit trees. Nasturtiums and red clover are very suitable for this purpose as they are less competitive than grass, do not require slashing, will keep fruit tree roots cooler, and deter aphids. Ground cover foliage provides humidity to allow organic fertilisers to be broken down, so sprinkle fertiliser onto ground covers around drip lines of trees, then water it in. Remove milk thistle from fruit-tree areas. They are good food for birds and chooks, but they are also hosts to aphids.

Harvest fruit carefully as bruising will occur if it is dropped into a container. Make a written note of harvest time for your different fruit trees so that you will be better able to anticipate crops in coming years. After harvesting, give fruit trees regular watering during dry periods through the rest of the growing season. Water stress will affect the formation of flower buds that produce the following year’s crop. Different types of fruit trees have specific pruning requirements — some general rules for pruning fruit trees can be found in [chapter 8](#).

Almond *Prunus* spp.

Almonds are rich in anti-virus anti-oxidants and are said to be a good hangover cure. The calcium in almonds strengthens finger nails, and the oil they contain is beneficial to skin.

Almond trees flower early and are not suited to areas with very cold winters, or very wet weather in late winter. Related to the peach, the fruiting almond, *P. dulcis*, requires a hot, dry summer to prevent nuts becoming mouldy. The flowering

almond, *P. 'Pollardi'*, is a suitable size for gardens in warm temperate areas with high summer rainfall, and is grown for its July blossom.

If fruit is required, almonds need a compatible pollinator. Although they like dry weather, soil should not be allowed to dry out through the growing season, and thick mulch will be beneficial. Grafted trees start producing fruit three years after planting and nuts are ready for harvest in late summer to mid-autumn. Hulls, which are similar to small, immature peaches, split in half and peel back to expose the stone of the fruit — the almond. Harvest when the hull has peeled back completely, but is still green. Spread sheets of weed mat under trees and shake the branches to make fruit fall. Then remove hulls from the almonds and spread the shells on racks to dry in the sun. Apply seaweed tea after harvest, and again after pruning.

Apple *Malus pumila*

It appears that the old maxim about an apple a day was correct; apples are rich in pectin and anti-oxidants that help to keep the cardiovascular and digestive systems healthy. They also contain boron to reduce calcium loss. The lignins in apple peel benefit the digestive system, and stewed apples are an old remedy for insomnia.

Apple trees require deep soil, a cool to cold winter, and a light spring rainfall. They prefer a mild summer. Soil pH should be about 6–6.5 to ensure that essential trace elements are available. Grown in hot summer areas, apples will attract more pests. Most require a cross-pollinator for good cropping. Dwarf and multi-graft trees are available for small gardens. Some cultivars, including 'Delicious', have a tendency to fruit

every second year unless fruit is thinned by the end of November. Thin during Full Moon phase. Apples require consistent watering to avoid a condition known as ‘bitter pit’ where fruit develops dry cells and a bitter flavour. This problem is common where apple trees are exposed to hot summer winds. (Bitter pit in apples presents as blossom-end rot in other plants — see [chapter 9](#).)

Apply seaweed tea in early spring. Early fruiting varieties benefit from an application of manure tea after harvest. Do not apply nitrogen fertiliser while fruit is maturing, and do not fertilise apple trees with poultry-based fertiliser, although chooks free-ranging near apple trees will not cause a problem if other organic matter is used as fertiliser. Apples are ready for picking when a gentle twist of the wrist detaches the apple stem from its spur. Pick after Full Moon on a barren day if harvesting for storage. Apples left too long will be edible but not suitable for storage because cells will have begun to decompose.

Apricot *Prunus armeniaca*

Apricots are rich in beta-carotene, which maintains healthy arteries, lungs, skin and digestive system. They also contain boron, iron, silica and fibre.

Apricot trees grow well in inland areas where summers are hot and winters are cold, but are not suitable in areas where late frosts can damage blossom. They are not as fussy about soil as some fruit trees; their main requirements are good drainage, a salt-free water supply and a close to neutral soil pH.

All apricot cultivars are self-pollinating so only one tree is required. Some cultivars are suitable for drying, while others

are better for making jam, so consider your requirements before purchase. All apricots benefit from thick mulch to prevent soil moisture fluctuations because soil must be kept damp at all times. Young trees are easily damaged by drought conditions. If mulch contains compost, trees may not require extra fertiliser, but will benefit from an application of seaweed tea in late winter, and again after harvest. Fruit ripens from early to midsummer. Apricots taste best, and smell divine, when allowed to ripen on the tree, but fruit for jam making is picked slightly earlier when it is richly coloured but still firm to the touch.

Cherry *Prunus* spp.

Sour cherries contain vitamin C and iron, and were used in the past to control coughing fits. Sweet cherries are a very popular fruit in Australia, and rich in health-protecting anthocyanins. Fruit of the sweet cherry, *P. avium*, is irresistible to both native and migrant birds and its botanical name ‘bird plum’ recognises this affinity. Nets are usually required to protect fruit.

Cherry trees require a deep, freely draining soil rich in humus, a salt-free water supply and a cold winter. Although best suited to Cool Zones and cool temperate areas with mild summers, cherries can also be grown in areas where summers are hot if altitude or other conditions provide sufficient winter chilling (as on a section of the NSW–Queensland border).

Sweet cherry cultivars require full sun and a compatible pollinator. Dwarf stock cultivars are available for smaller gardens. Cultivars of the sour cherry, *P. cerasus*, which include ‘Morello’, can tolerate some shade, and are self-pollinating. Soil must be kept damp at all times, and

cherry trees benefit from organic mulch that includes compost. The compost and an application of manure tea in early autumn may provide enough fertiliser for growth and cropping. In areas where winters are cold for a very short period, allow mulch to remain during winter to prevent soil warming on winter days. In Cold Zones, mulch may delay fruiting, and can be applied after harvest in early summer, if weather is dry. Where mulch containing compost has not been used, trees will require a light application of organic complete fertiliser in late winter, and after harvest. Applications of seaweed tea in spring and early autumn will improve disease resistance.

After flowering, fruit develops very quickly and some cultivars are ready to harvest in early summer. Allow fruit to ripen fully before picking. Fruit should be refrigerated and used within three days. Because cherries can crop early, it is easy to forget to keep watering these trees for the rest of the growing season. Water-stressed cherry trees are more susceptible to bacterial canker (see [Pruning Apricots in chapter 8](#)). Flowering cherry, of which there are several species, require similar care to fruiting varieties.

Peach and Nectarine *Prunus persica*

Both peaches and nectarines contain beta-carotene, potassium, magnesium and vitamin C. The nectarine is basically a smooth-skinned peach which is identified by the name *P. p.* Nectarine Group. Both will grow where winters are cool enough to cause dormancy but not where late-spring frosts occur, as they flower early. Most peaches and nectarines are self-pollinating, and cultivars have been developed that will grow in areas with mild winters. However, peaches grown in mild, coastal areas tend to have

less flavour than those grown where winters are cold for a short period. These trees will shed blossom if winter temperatures are not cold enough for a particular cultivar, so take your nursery's advice when choosing a tree.

Both peach and nectarine trees require a well-drained, humus-rich soil, a salt-free water supply, organic mulch and a sunny position. Apply seaweed tea at the beginning of autumn to build resistance to 'leaf curl' (see [chapter 9](#)). Fruit should be thinned to 15-cm spacings shortly after fruit-set. Peaches and nectarines both taste best when allowed to ripen on the tree, but fruit picked while still firm will ripen indoors. Handle fruit very carefully to avoid bruising and keep ripe fruit refrigerated. Fruit for cooking can be picked when close to maturity but still firm. If cropping is poor, and the correct pruning procedure has been followed, apply a manure tea as well as regular fertiliser after harvest. Red or pink flowering peach trees require similar care to fruiting varieties and grow well in warm inland areas.

Pear *Pyrus communis*

Pears contain folic acid, potassium, pectin and other water-soluble fibre. A pear at breakfast can be a good substitute for breakfast cereal. Pear trees require similar climate, conditions and care to apples, although pear trees are longer lived and some cultivars will crop in areas too warm for apples. Most require a cross-pollinator for good cropping. Pear trees are late maturing and crop best on old wood of horizontal branches. Some growers tie down branches to improve fruit production. Apply a manure tea as well as regular fertiliser after harvest and apply seaweed tea at the beginning of autumn.

Pears ripen from the inside outwards, so a pear that feels ripe may be overripe, and floury. Pick fruit when still firm, and a wedge cut from a sample fruit has a moist surface and a slightly sweet taste.

Plum *Prunus* spp.

Plums are a good natural laxative. Dark plums also contain health-protecting anthocyanins. Cultivars of plums in Australia originated from the European plum, *P. x domestica*, and the Japanese plum, *P. salicina*. Flesh can vary in colour from light yellow to deepest red. Both require a winter cold enough to cause tree dormancy but the Japanese plum can tolerate warmer growing conditions than European cultivars. Most require a compatible pollinator. Plum trees require a sunny position. For best results, soil must be kept consistently damp from late winter to leaf fall so mulching is beneficial. They will tolerate short periods of wet soil. Apply a complete organic fertiliser and compost in spring, and apply seaweed tea and top up compost after harvest.

Thin fruit to 12-cm spacings for large plums, and to 10 cm for small plums. This practice improves fruit quality and helps avoid any tendency trees might have to crop only every second year. Fruit should ripen on trees for the best flavour.

POPCORN see Sweet Corn and Popcorn

POTATO (*Solanum tuberosum*)

SOWING PHASE: *Full Moon*

The humble potato is a very nutritious vegetable containing B and C vitamins, potassium, fibre, complex carbohydrates, and protease inhibitors which help to neutralise viruses. As potatoes take up garden space for at least four months, and are

relatively inexpensive, you may not want to grow an annual supply. However, home-grown new potatoes, dug fresh from the garden, are a wonderful and extremely versatile summer vegetable.

Although they were originally a frost-tender South American annual, potatoes do not like extremes of heat and grow best in hot areas through the cooler months. Potatoes must not be planted after tomatoes, capsicum or eggplant as they belong to the same family. Plants are grown from 'seed' potatoes (virus-free potato tubers on which 'eyes', or growth buds, have formed) and take about sixteen to twenty weeks to mature. Gardeners in Temperate and Cool Zones can sow seed potatoes in late winter or early spring when they become available locally; plants rarely show above ground until frosts are over.

Potatoes need a separate growing area because they require hilling to produce a healthy crop. Never grow them in car tyres because potatoes are very efficient at absorbing heavy metals from soil and tyres contain cadmium and other heavy metals. They can be grown under straw on top of soil or, where space is restricted, in double-thickness hessian sacks, but these methods only work for Cool Zones as the tubers can get too hot in other areas. We have grown edible potatoes under straw, but they weren't nearly as good as those grown in organic soil. Potatoes suppress the growth of some plants around them, which is a problem in a mixed bed, but they do at least keep weeds under control.

Good drainage is essential for potatoes, or tubers will rot. A raised bed with soil rich in organic matter is ideal as potatoes thrive on humus and organic fertilisers. Potatoes have a reasonably high fertiliser requirement. Do not add lime or

wood ash when preparing the growing area because potatoes prefer a soil pH of 5.5–6.0, and alkalinity contributes to potato scab. Some composted, or well-rotted, cow or horse manure can be used when preparing soil. The majority of diseases that affect potatoes can be avoided by using organic methods, and good drainage. Water the growing area with seaweed tea, and cover it thickly with mulch. The seaweed will help prevent soggy potatoes by providing essential nutrients.

About a month before planting, sort healthy tubers into like-sized groups: potatoes the size of a large egg are planted whole, and larger potatoes can be cut into pieces that contain a large piece of tuber and at least two ‘eyes’. Place the tubers into partitioned sections of cardboard egg cartons and put them in a dry, well-lit position (out of direct sun) for several weeks, to allow tubers to green and harden, and ‘eyes’ to sprout. This process, known as ‘chitting’, prevents tubers rotting when placed in moist soil. Sow only unwrinkled tubers with short, strong growth. Any tubers showing long, thin growth should be discarded, as they have been allowed too little light, or are affected by a disease spread by aphids. (Disease should not occur with purchased seed potatoes, but can occur in saved tubers.)

When ready to sow, pull back mulch and dig furrows 15 cm deep and about 75 cm apart in the prepared bed. Plant tubers 30 cm apart along the bottom of the furrow, making sure the new shoots face upwards. Fill in the furrow by raking soil — do not press down. Water gently, and replace mulch. Like tomatoes, potatoes require consistent soil moisture to avoid crop problems. In potatoes, erratic watering produces tubers with hollow, or brown, centres. Water regularly under mulch

between rows. As plants grow, gradually hill up soil around them about 10 cm at a time, leaving enough foliage exposed for plants to manufacture food to fill the tubers. Replacing mulch after sowing and hilling will help to keep soil consistently damp, keep tubers cool, and prevent them from becoming green and inedible. Hilling also protects developing tubers from insects. In areas that receive strong sunlight, use a thick layer of mulch.

If the bed has been well prepared, potatoes do not usually need extra fertiliser besides an application of weak seaweed fertiliser, to the soil only, as flowering begins. At flowering time hilled soil should be about 40 cm above the bed surface, and plants can then be allowed to mature. As soon as lower leaves turn yellow, ‘chats’ (small new potatoes) can be harvested, one meal at a time, by foraging in the soil around plants. For potatoes that store well, do not harvest before plant foliage has died off. Test that the skin of a foraged potato does not come off when rubbed with your thumb. Plants are then ready to be carefully dug up, using a garden fork, and the whole crop can be harvested at once. (Potatoes pierced by the fork are not suitable for storing.)

Select suitable tubers for seed potatoes and store them separately from those for eating. Keep potatoes in a cool, dark place with good air circulation. Do not store them in plastic containers or in refrigerators for more than a couple of days. Potatoes exposed to light, including artificial light, become green so be careful choosing potatoes in supermarkets. Any potatoes that develop a green tint must not be eaten, as potatoes, being related to nightshade, contain poisonous alkaloids in all but the non-green parts of the plants. Cutting away green parts of potatoes will not remove the poison that

has formed in the tuber. Keep seed tubers in a dark, airy place until ‘eyes’ form, then proceed with ‘chitting’ before eyes sprout.

PUMPKIN (*Cucurbita spp.*)

PLANTING PHASE: *First Quarter*

Pumpkins (also known as winter squash) are rich in anti-oxidants and health-protecting compounds. Gently roasted pumpkin seeds (pepitas) are delicious, and rich in zinc and essential fatty acids which protect the reproductive system, including the prostate, and inhibit viruses. Pumpkin fruit can range in weight from 1.5 kg to 100 kg, depending on the species.

You have probably noticed that very vigorous pumpkin vines grow from compost heaps. Pumpkin is a particularly heavy feeder. The more compost pumpkins (and the rest of the squash and melon family) have to grow in, the better. Plenty of sunlight, water, and nutrients leads to fast growth and large pumpkins. These members of the squash family can take from three to five months to mature, depending on the cultivar and growing conditions. Pumpkin vines tolerate a soil pH range of 5.5–7 and prefer a moderate climate without extremes of heat or cold.

Pumpkin species can take up a lot of room in the vegetable patch and should not be grown near tomatoes or potatoes. The foliage also has a herbicide effect on small plants. The very best spot for a large cultivar is in a pile of mature compost in an out-of-the-way place where it can ramble undisturbed. You will probably only require one vine if it is well cultivated. Make a small depression at the top of the compost, and cover the heap with mulch to conserve moisture. If you do not have

enough compost for this method grow pumpkins in a mound, like cucumbers, but don't tip prune pumpkin stems because they are hollow and prone to disease when cut or trodden on. To save space and avoid damage to stems, you can try winding stems loosely around the mound while they are still flexible.

Pumpkin will put down auxiliary roots where soil is soft enough to penetrate. These extra roots will help plants to set more fruit because pumpkin vines cover a large area to be fed and watered from one set of roots. You can encourage root growth (once vines have started to set fruit) by placing half a shovelful of compost or manure soil mix under branches at a leaf joint past the fruit, and another half shovelful on top of the stem. Cover it with a little mulch to keep it damp. Water soil around the roots (including auxiliary roots) of pumpkin vines regularly, and try to avoid wetting foliage.

Seed can be sown direct when soil is 20°C, or started in 8-cm pots in areas that receive late frosts. Sow one seed 2 cm deep in two separate pots, and choose the best seedling. Plant out at the two true-leaf stage. Apply fertiliser tea, if necessary, after the vine starts setting fruit to keep it looking healthy. Excess fertiliser may affect fruit-setting. If mildew occurs, apply seaweed tea to the root areas. Place pieces of styrene foam boxes under developing fruit if soil is moist. Pumpkins are ripe when the tendril closest to the fruit dies. Some cultivars have very good keeping properties. (See [chapter 8](#) for saving pumpkin seed.)

‘Golden Nugget’ is a small bush cultivar suitable for small gardens. ‘Black Prince’ is a fairly compact vine, and ‘Waltham Butternut’ is suitable for all growing zones.

RADISH (*Raphanus sativus*)

SOWING PHASE: *Full Moon*

Radish is a frost-hardy root vegetable varying in shape from global to long and tapered. Some types of radish reach maturity in four to six weeks and are grown for the mild, spicy flavour they add to salads while others are quite pungent and take several months to mature. These radishes are often cooked or pickled. Radish is a medicinal herb that improves digestion and is effective against a wide range of bacterial and fungal infections. Radish has a high vitamin C content. It can also be used to tenderise octopus. All radishes are cruciferous vegetables, and should not be sown in soil where brassicas have recently grown.

Radishes of all types prefer a sunny position, and a well-drained, humus-rich soil that contains a full range of trace elements as supplied by seaweed fertiliser. Long cultivars will require a similar soil depth to carrots. A light application of a poultry-based organic fertiliser will assist growth if there is not a lot of compost available. All radishes require deep, regular watering, as they will become tough and hot flavoured if irrigation is inadequate, and the root will split if irrigation is erratic. Light mulching will help to keep soil moisture more constant. Do not hill radish plants; the top of the root sits up from soil.

Early-maturing radishes can be grown at almost any time in all gardening zones. Most of the cultivars are globe-shaped swellings of a taproot ranging in colour from purple, through red, to white. ‘Purple Plum’, ‘Cherry Belle’, ‘Red Planet’, and ‘Hailstone’ are popular globe cultivars. ‘French Breakfast’ is a red and white torpedo shape to about 7 cm. These are easy

to grow in pots or deep polystyrene fruit boxes, if space is limited. ‘White Icicle’ and ‘Long Scarlet’ grow to 15 cm.

Two 50-cm rows, 15 cm apart, sown monthly, are probably enough for the average family. Sow seed 1 cm deep and about 2 cm apart in furrows, and firm soil over the seed. Increase the distance between seeds to 3 cm in hot, humid weather — crowded seedlings sometimes develop a black colouring to the skin in these conditions. Germination occurs in a few days and plants mature in about four weeks in most areas. Commence harvesting when roots are young and sweet by picking alternate radishes. With leaves removed, radish will keep for a week in the crisper. Radish are good companion plants for cucumber, summer squash and zucchini. They can also be intersown with carrot or onion seed as they provide shade for the slower germinating seeds.

Late-maturing radishes include the ‘Daikon’, ‘Long White Chinese’ and ‘Black Spanish Long’. ‘Daikon’ roots can grow to 40 cm in length. Late-maturing radishes are grown in the same way as early-maturing cultivars but they require much deeper topsoil. Seeds are sown in late summer and autumn. Some cultivars can also be sown in early spring in Cool Zones.

RASPBERRY (*Rubus idaeus*)

PLANTING PHASE: *Full Moon*

Raspberries are high in iron, fibre and folic acid, and contain moderate amounts of magnesium and the anti-oxidant vitamins C and beta-carotene. Like most berry fruits, raspberries are rich in health-protecting compounds. Raspberries are soothing to those suffering from sore mouths and throats. The fruits are mildly laxative, and raspberry leaf

tea taken in the final stages of pregnancy is said to strengthen smooth muscle tissue and assist in childbirth. (Consult your health care professional for further information.)

Unfortunately, these delicious fruit are suited only to Cool Zones with mild summers where they can be grown in sun or part shade. In Australia, some shade can be helpful because fruit that becomes hot is more likely to develop mould. Mid-and late-spring frosts can damage new growth so plants may need protection in these areas.

Fruit grows on cane laterals of a long-bearing, deciduous perennial that thrives on organic growing methods. There are two types of raspberry canes: summer-bearing plants produce fruit on one-year-old canes, and autumn-bearing plants produce fruit on new canes. Find out, before purchase, which type of raspberry you are buying because summer raspberry plants are pruned at a different time of year (see [chapter 8](#)). Raspberry canes with roots can be obtained from nurseries during autumn or winter ('Lloyd George' is susceptible to cane spot so avoid this cultivar, if possible). Alternatively, suckers with roots can be severed from existing healthy, mature plants.

Beds must be well drained but moisture retentive, and should be protected from strong wind. Raised beds should be prepared with plenty of compost or well-rotted manure. Soil with a pH around 6 is ideal. Raspberry canes will require ample water in summer and they are very salt-sensitive. Canes can grow to over 2 m, and will require support in a similar manner to broad beans, but use wire in place of twine. Wires can be placed 25 cm apart, with the lower wire 45 cm above ground. The support posts for the wires should be tall enough to allow another pair of wires to be positioned about

75 cm above the first. In very cold areas, beds can be prepared in late summer for autumn planting; in other areas, prepare in autumn for winter planting. If growing lots of raspberries, rows should be placed about 1.8 m apart.

Canes or suckers should be planted, slightly deeper than they were in the ground or in pots, as close as 30 cm apart. It is said that close planting increases the quantity of fruit produced. Settle soil carefully after planting, and water gently. Cut canes back to 30 cm above ground, if necessary. In late winter, give beds an application of manure tea and half-strength seaweed tea, or full-strength seaweed tea if cane spot is a problem. In spring, apply a light layer of manure or compost to the soil surface along each side of the canes and cover lightly with organic mulch. Repeat the manure tea if growth is slow. Train the canes between the wires, tying them if necessary.

There is another plant called Queensland raspberry, or tropical raspberry, which grows in warm areas and looks similar to the European raspberry, but the small, bright-red, berry fruit are a very poor substitute for the real thing. Birds seem to like both the real raspberry, and its impostor, so netting may be required.

RHUBARB (*Rheum rhabarbarum*)

SOWING AND PLANTING PHASE: *Full Moon*

Rhubarb contains some vitamin C and quite large amounts of calcium. Only the stems are eaten because the leaves contain toxic levels of oxalic acid. Rhubarb is eaten stewed as a dessert and is very low in kilojoules, but as it is also quite bitter and acidic, the amount of sugar required to make it palatable increases the kilojoules considerably.

Rhubarb is a perennial to 60 cm, more suited to Cool and Temperate Zones because it requires a cool position. In warmer areas, it will grow better in part shade. Because rhubarb prefers a well-drained soil containing plenty of compost, with a close to neutral pH, we have found it grows well at the end of our asparagus bed, which is in the coolest part of the garden.

Although garden guides recommend sowing rhubarb seed in spring, it really is a waste of energy unless you need an awful lot of rhubarb plants. Rhubarb seedlings vary greatly in stem quality and colour so you would need to grow a number of seedlings and then select the best plants, bearing in mind that you will probably only need two or three plants for the average garden. As rhubarb plants last for many years when divided regularly, it is far easier to select good crowns at your local nursery. You can just purchase one, and divide the crown as soon as it matures. Choose a plant in autumn or spring, with good colouring and thick stems for its size.

Rhubarb's leaf production declines after about four years. Divide crowns in winter, and replant only the best sections with strong, healthy roots. Crowns are planted while dormant, into dark-damp soil, so that the leaf buds in the centre are not buried. Potted plants can be put into the garden in spring or autumn, as long as the weather is not hot. Water pots thoroughly several hours before planting, and trim back top growth so that one or two partly unfurled leaves remain. Water thoroughly again after planting and mulch to keep soil damp if weather is dry. Young plants respond to soil being kept dark-damp, and appreciate a monthly application of fertiliser tea through the warmer months until they are well

established. In warmer areas, the soil around crowns will have to be thickly mulched.

Mature rhubarb plants require an application of compost and well-rotted manure in late winter. Cover this lightly with organic mulch and water whenever soil is just barely damp. Cut off flower stalks immediately they are noticed. Don't allow plants to go to seed. Harvest only mature stalks, every month or more often, from the outside of crowns. Always leave some stalks remaining in the centre. Stalks are removed by pulling down, then sideways. Remove leaves immediately, and discard any flabby stalks. Use stalks within one week, removing the white portion at the base of stems before cooking.

ROCKMELON see Melons

SHALLOTS see Spring Onions

SILVER BEET (*Beta vulgaris* Cicla Group)

SOWING PHASE: *New Moon*

Silver beet is also known as Swiss chard or cream chard. In some areas of Australia where spinach is difficult to grow, silver beet is still incorrectly referred to as 'spinach' although they belong to two different genera. Silver beet is a different form of the plant that produces beetroot and contains similar amounts of fibre and immune system-protecting anti-oxidants. Silver beet is low in calories and its dark-green crinkled leaves contain beta-carotene, vitamin C, folic acid, iron, calcium, potassium, healthy-heart magnesium and sodium. Like rhubarb, silver beet contains oxalic acid and is usually not recommended for sufferers of kidney stones.

Silver beet is very easy to grow in all growing zones although it may be more difficult to germinate during the summer wet season in Warm Zones. Outer leaves can be harvested continually after six weeks in warm conditions. It can be grown in beds, or in deep polystyrene fruit boxes if space is limited.

This vegetable grows beautifully in soil that has been enriched with a green manure or worm castings, although most humus-rich soil with a pH between 6 and 7 is suitable. Avoid sowing silver beet directly after beetroot as they are susceptible to the same soil diseases. Silver beet requires a full range of trace elements. Apply some organic complete fertiliser and seaweed fertiliser when preparing the bed or planting container.

Because silver beet seeds have a corky covering, the seeds are soaked in water overnight, then sown 1.5 cm deep, in stations of two seeds sown 2 cm apart. Stations are spaced 30 cm apart. Germination occurs in about ten days. Silver beet seeds are composite and often produce more than one plant per seed. Carefully thin seedlings to the strongest one when they are 6 cm high. Two sowings, of ten plants each, during the growing season may be sufficient as well-grown silver beet crops for a long period. Sow a fresh crop direct if plants develop flower stems.

Grow silver beet under heavy mulch in warm areas, and water consistently and thoroughly in all areas. Silver beet grows more quickly if seeds are sown direct but seed can be started in 5-cm pots in early spring if the ground is still cool, then carefully transplanted to the same depth, after thinning, when 5 cm high. Keep silver beet growing quickly with regular applications of worm liquid tea to the soil. Apply a very weak

seaweed tea once or twice through the growing season, especially in warmer areas. Water-stressed silver beet becomes attractive to the beet leaf miner and beet rust.

Commence harvesting outer leaves as soon as they are fully extended by holding the thick stem and pulling it down and to the side. If leaves are cut, instead of pulled, the cut base is open to bacterial infection in some weather conditions. Leave enough tall leaves to protect young leaves in the centre of plants. Harvest when leaves are tender as that's when they are full of nutrients. Very large, mature leaves are tougher and have higher concentrations of oxalic acid.

Rinse leaves in salted water to flush out any hidden bugs before cooking briefly. Don't discard the young stems of silver beet; they are tender and contain nutrients. Steam or stir-fry silver beet to avoid losing B vitamins in cooking water.

The 'Fordhook' cultivars of silver beet are the most well known among home gardeners. You could also try 'Ruby Chard' with its dark green leaves, and stems that become red in cooler conditions. 'Rainbow Chard' is a natural cross between 'Ruby Chard' and cream chard which is decorative as well as nutritious. Leaves look like common silver beet but stalks on different plants range in colour from white, through yellow, pink and orange, to red.

SPINACH (*Spinacea oleracea*)

SOWING PHASE: *New Moon*

Spinach is a low-kilojoule, cool-season vegetable with deep green leaves that are rich in vitamins A, C, and E, folic acid,

magnesium, iron and fibre. It also contains moderate amounts of vitamin B6.

Spinach (also known as English spinach) is an annual which goes to seed quickly in warm weather, although it is quite resistant to cold and seeds can germinate at temperatures below 0°C. During warmer months where summer temperatures exceed 25°C, New Zealand spinach (Warrigal greens) or silver beet (Swiss chard) are grown as a substitute for spinach. As the weather cools, spinach can be planted in all zones in beds or boxes. Spinach grows in a dark green rosette, close to the ground, about 25 cm across. Leaves are smaller and less crinkled than silver beet, with a more delicate flavour. The stems are green too, and only need to be discarded if they have been allowed to become tough. Spinach is very easy to grow but must be grown quickly for the best flavour and tenderness.

Prepare a well-drained planting area with plenty of well-rotted organic matter and a scattering of organic complete fertiliser. Spinach does not transplant easily and seed is sown where it is to grow in pairs, 25 cm apart and 1 cm deep, each New Moon phase during cool months. The average family needs about twelve plants at each sowing. Seed germinates in about seven days. Keep seedlings well watered and apply a half-strength manure tea, after watering, just before the Full Moon and after New Moon. When seedlings are 5 cm high, thin them to the strongest seedling. Thinnings can be used raw in salads, or added to soups. Only continue with fertiliser tea if plants are not growing strongly. Harvesting can commence from around eight weeks after sowing.

Rinse leaves well and use as a steamed vegetable, or add to soups, stews, lasagna, quiches, or under poached eggs for 'eggs Florentine'. Don't worry about growing too much spinach because excess leaves can be rinsed, blanched (simply pour hot water over them in a colander), chopped, and frozen for use during warmer months.

SPRING ONIONS (*Allium fistulosum*)

SOWING PHASE: *New Moon/First Quarter*

There is a great deal of confusion about this vegetable. Spring onions, *A. fistulosum*, (also known as Welsh onions, salad onions, or shallots in some areas) can only be grown from seed. They do not form a bulb and are harvested as required as they only keep for short periods in the vegetable crisper. These onions are the ones used as a pencil-thick stem in salads and stir-fries, and are favoured by Chinese herbalists for their diuretic, anti-inflammatory and expectorant properties.

Spring onions should be distinguished from true shallots, *A. cepa* Aggregatum Group, which are also known as eschalots or scallions. Shallots form a number of small brown-skinned bulbs, can be propagated by seed or bulb, and can be stored.

Spring onions require a well-drained, humus-rich soil with a pH of 6–7, away from peas and beans. Add a light application of complete organic fertiliser when preparing the growing area. Raised beds will be necessary in areas that have a distinct wet season. They are easily grown in pots or polystyrene fruit boxes, if space is limited.

Spring onions can be harvested eight to ten weeks after sowing. They are better suited to warm areas than bulbing

onions and can be planted virtually any time in Warm Zones. Temperate Zone gardeners can grow spring onions from early spring until late autumn, while in Cool Zones they can be grown from spring to early autumn. Many gardeners across all zones have had success with year-round plantings of these hardy, quick growing onions so planting times will depend on your own microclimate.

Because the stem is the edible part of this vegetable, spring onions do well when sown during New Moon or First Quarter phases. Small quantities of seed can be sown thinly, 6 mm deep in furrows 15 cm apart. Sow monthly for a continual supply. Germination occurs up to a fortnight later and thinnings can be used to form a second crop. Seed can also be grown between carrots to deter carrot fly. Spring onions must be grown quickly for the best flavour. Water regularly, and apply fertiliser tea once or twice to keep plants moving along. Harvest as needed by pulling out the entire plant.

STRAWBERRY (*Fragaria* spp.)

PLANTING PHASE: *Full Moon*

Originally discovered growing at the edges of pine forests, the strawberry is a cool-climate fruit that benefits from some shade in the Australian climate, except in Cool Zones. Strawberries will fruit quite happily under 50-per-cent shadecloth in warm temperate and warm climates. If you have had problems with sunburned fruit, pick a spot that receives some shade later in the day; or, from the time fruit starts to form, grow them under a shadecloth tent fly that allows good air circulation. The shadecloth also deters birds who are wary of any overhead cover that could prevent a fast escape.

You do not need a large area for strawberries — one-and-a-half square metres is plenty to enjoy the fruits of your labour. And enjoy them you will, because home grown strawberries are really delicious. Strawberries also contain lots of vitamin C, almost two dozen anti-ageing minerals, and flavonoids that prevent DNA damage. Unfortunately, they also contain lectins which can cause an allergic response in some people.

Strawberries need an acid-growing medium rich in humus, with perfect drainage and good air circulation. They can be grown in beds, boxes or hanging baskets (in non-windy areas) with similar care. Although strawberry plants can develop leaf blight in damp, shady places where air circulation is poor, hanging baskets in windy areas will dry out very quickly. (See [chapter 4](#) for suitable growing mixes.) Try to avoid strawberry pots; they look pretty, but strawberries on the lower layers don't do well and pots lose moisture quickly. Terracotta can get very hot, and retains heat. Cool climate plants grow best when soil is cool.

Avoid planting strawberries in soil where potatoes, tomatoes, capsicums, chilli or eggplant have recently been grown because they share some diseases. Prepare a raised bed that includes plenty of humus at least a month before planting. Unlimed compost and worm castings are excellent. Plenty of manure is also beneficial, especially in light soils or where soil or water may be alkaline. If using well-rotted manure, prepare the bed in January, and avoid poultry manure and mushroom compost as these can be too alkaline. Otherwise, you can start in December by sheet-composting fresh manure on top of the garden bed. Water the prepared bed, and cover it temporarily with a thick layer of mulch to prevent manure or

compost drying out before planting. Strawberries can be planted through autumn but March planting is recommended as it gives them a chance to crop in the cooler months in Warm Zones, and make up good foliage cover before winter in Temperate and Cool Zones. A preference for acid soils indicates a higher need for trace elements. Two weeks before planting, water the bed with seaweed tea. Although strawberry plants are perennials that can produce fruit for several years, and are planted during Full Moon phase, we have had better success with planting fresh runners each year. This practice ensures larger fruit and reduces the risk of viral disease.

When planting a new bed, pull back mulch and water the bed thoroughly first. Use only runners that have formed healthy, pale-coloured roots; crowns with brown roots will not be very fruitful. Trim any stray long roots and remove old leaves from runners. Make holes much wider than they are deep, and place a mound of soil in the centre of each hole so that roots can be fanned out over the mound with the crown sitting at ground level. Strawberries will die if crowns are planted too deeply, or if roots dry out from being too close to the surface. It may take a little practice to get the positioning correct. Plant at a time of day when exposed roots will not dry out. Keep runners well covered with wet newspaper during planting. After the crowns are positioned, carefully firm soil around each plant and water thoroughly. If weather is still very warm, mulch will help prevent the soil drying out before new roots become established. Don't allow mulch to touch plant stems. Do not use black plastic as it prevents watering and feeding of soil, and can cook plant roots in some warm areas. You can use several centimetres of hay or straw, or a centimetre layer of pine needles as mulch for strawberries.

You don't need fresh needles; the partly broken down needles are beneficial too. If the bed does not contain a lot of humus, you may have to apply a manure tea in early spring. Apply half-strength seaweed tea two weeks after planting. In Cool Zones and cool temperate areas, apply full strength seaweed tea in spring. In warm humid areas, apply seaweed tea as flower buds start to form, and half-strength tea two months later. For potted strawberries, fertilise at half strength, twice as often.

Remove runners as they start to shoot. Water regularly, easing back a little as berries start to form, otherwise fruit can become watery. If the bed has not been mulched, place some clean straw under berry trusses to keep them clean. Set up shade for fruit, if necessary. Fully coloured fruit should be removed daily as overripe or damaged fruit encourages disease. During the cropping season, place a marker beside the best fruiting plants and use only runners from these plants for the following year's produce.

Later in the season, fruiting slows and strong runners grow. Move back mulch as crowns at the ends of runners start to form roots, and place a small stone on top of each runner just behind the newly formed crown. This will help developing roots to obtain good anchorage in soil. Water plants regularly and apply seaweed tea before severing new crowns from the parent once strong new growth is apparent. Remove, and dispose of parent crowns, before applying a mulch of mature compost or well-rotted manure, and cover lightly with organic mulch.

It's a good idea to start a new strawberry bed in a different spot, with a complete change of soil, every three to four years. If existing runners are disease free, they can be used to start

the new bed, after all soil has been hosed from their roots. Some growers say that you should only take runners from plants that have not been allowed to fruit. However, this involves maintaining two separate strawberry beds, and we have not had any problems with our method. If all your strawberry plants have been affected with mould or disease, burn or dispose of them in a sealed plastic bag, and purchase virus-free crowns from a reputable nursery for planting in a different spot. Then, give the affected bed a dusting of dolomite and grow a crop of broad beans in it before growing anything else.

SUMMER SQUASH see Zucchini

SWEDE (*Brassica napus* Napobrassica Group)

SOWING PHASE: *Full Moon*

Swede (or swede turnip) is a relatively new addition to the extensive crucifer family. Believed to be a cross between a turnip and a cabbage, the yellow-fleshed swede is known more commonly as rutabaga or neeps in the Northern Hemisphere, where it is the traditional accompaniment to haggis. It has similar properties and uses to turnip, although it contains less fibre and more vitamin C.

An old maxim, ‘If you can’t grow anything else, grow turnips’, refers to the ease of growing these vegetables, and it may well be true in Europe where soils are richer in minerals, but turnips and swedes are very sensitive to boron deficiency, which can occur in some Australian soils.

Swede is a frost-hardy, cool season vegetable. It is sown and cultivated in the same way as turnip although swede turnip is slower growing and may take up to sixteen weeks to fully

mature. Start harvesting when the swollen roots, or swedes, are young and tender. Unlike ordinary turnip, swedes can be left in the ground when they are mature, and frost is said to improve the flavour. Kept in a cool, dark place, harvested swedes can be stored up to two months. Small quantities can be kept in the vegetable crisper but they are not suitable for freezing. Swedes also provide a nutritious stock feed. Swede may cross-pollinate with other brassicas.

SWEET CORN AND POPCORN (*Zea mays*)

SOWING PHASE: *First Quarter*

With more and more genetically-engineered corn creeping into the food supply, it is worthwhile growing your own sweet corn or popcorn and saving the seed. Some cultivars of popcorn are already difficult to obtain.

There are five different types of corn, some of which are referred to as maize. Dent and Flint types are suitable for stock feed, cereals or cornmeal. Flour maize is easy to mill, and the remaining types are used for popcorn or sweet corn. All species of corn are descendants of a type of grass, and many produce only two cobs (or seed heads) per plant. Popcorn is a smaller plant, usually producing many more cobs per plant. The small kernels of this ancient species have air pockets inside that allow them to ‘pop’ when heated. Cracked popcorn kernels can also be used as chook food.

All cultivars of this genus have similar cultivation requirements. To save seed, you will need to plant different cultivars of corn at least one month apart, or separate them by at least 500 m. Sweet corn and popcorn are easy to grow in all areas once weather has warmed, but avoid sowing seed within seven weeks of the beginning of wet seasons as cropping will

be poor in these conditions. Corn can still be sown as a green manure crop during this period. Corn plants will thrive in a well-drained, sunny position following a green-manure legume. Otherwise, add lots of compost or manure when preparing the bed. Corn is a heavy feeder and also requires thorough watering. If water is scarce, try growing corn in a rimmed bed (see [chapter 5](#)).

When growing small quantities, it is better to plant corn in a block rather than rows because it aids pollination. If you are planning successive plantings, start from the southern or western end of the bed so that the older plants will not shade the younger ones. The seeds are planted directly into a mulched garden bed, in stations about 45 cm apart, with two seeds at each station, sown 3 cm deep. Remove the weaker seedlings when second leaves form. Once seedlings are 30 cm high, gradually hill them up about 15 cm. Hilling encourages more roots to form, improves moisture and nutrient uptake, and provides better anchorage in windy areas. Once seedlings are growing vigorously, climbing beans or cucumbers can be planted among the corn in warmer areas, to save space and protect climbers from sunburn. Cucumbers also act as weed suppressants for corn. Sweet corn takes approximately 75–90 days from seed to maturity. Corn benefits from an application of manure tea after thinning, and another application as soon as the flowers start to form at the top of the plant.

Sweet corn pollen is produced on male flowers which grow like ears of wheat at the top of each plant. For pollination to occur, the pollen must reach the green ‘corn silk’ tassels that grow out of the top of each cob. Each strand of corn silk is attached to a separate kernel. If incomplete pollination takes place kernels may mature on only one side of the cob, or not

at the very top of the cob because the silk for these kernels is in the centre of the tassel. This problem is more common when growing small quantities of corn in a protected, breeze-free garden. You can assist pollination by spraying the cob areas of plants with water in the morning when the male flowers open out like umbrella spokes, and by giving the top of the plant a gentle shake about mid-morning. Then flop the tassels over, and shake again. This will help the falling pollen adhere to the silk. Repeat this practice for several days. Some growers cut a centimetre or so off the tip of each husk as the green corn silk starts to emerge because they believe that the even edge at the top of the silk makes pollination more thorough.

Once pollination occurs, the silk starts to yellow. Sweet corn is ready to harvest when the silk loses its gloss, and a kernel at the top oozes milky sap when pressed with a thumbnail. Ease back the top of the husk a little to test the corn, then re-cover if it's not ready. Popcorn is allowed to dry on the plant (see [chapter 8](#)). It is a good idea to place nets over your corn once pollination has occurred because ravens and parrots know exactly when sweet corn is perfect for eating. Other birds will find the drying kernels attractive. The most common problem with stressed corn in warm weather is attack by the corn earworm — the larvae of a moth which lays eggs at the tips of corn husks, or in corn silk at night. The hatched grubs move into the husks where they are hidden from birds, and feed on the developing corn. Spiders help control this pest but if you have no spider webs in your corn, you can apply pyrethrum through a puffer (available from a pharmacy or hardware store) around the tops of the husks and the emerging silk. Improve irrigation of corn plants to reduce the risk of future earworm attacks.

As soon as sweet corn is harvested, the sugars in the kernels start converting to starch so the shortest possible time between harvesting and eating will make all the difference to the flavour of your corn cob. Fresh-corn devotees put water on to boil, then go and pick the cobs. Adding salt to the cooking water will only toughen corn, so add it later with a little butter. Because sweet corn is best eaten fresh, it is better to make small plantings during suitable months for a continuous supply, but it can also be frozen. For flavour try 'Hawaiian' (very sweet) or 'Golden Bantam', which can produce more than two cobs. Popcorn varieties include 'Ontos Oval' or 'Strawberry Mini'.

Corn can also be grown, until knee high, as a green-manure crop to add organic matter to your soil if you do not have access to ample amounts of compost or animal manures. 'Balinese' has heavier foliage which makes it good for fodder, cover cropping and green manure.

SWEET POTATO (*Ipomoea batatas*)

PLANTING PHASE: *Full Moon*

Sweet potato is a very nutritious root vegetable containing B, C and E vitamins. Although it is considered a subtropical crop, the delicious kumara, an orange sweet potato, is grown in New Zealand. Wherever you live, this is not a crop for small gardens. Sweet potato is related to the 'Morning Glory' vines which have become an environmental pest in some areas as they have a tendency to smother other growth. Sweet potato is sometimes used as a summer ground cover in hot, dry areas, but does not usually produce an edible crop under these conditions. Once established, sweet potato does not need a lot of care.

Sweet potato requires a good five months of warm weather for tubers to mature properly. It grows very easily in Warm Zones but needs a little coaxing in Temperate Zones. Sweet potato grows best in a sunny position and light soil containing humus, and a small amount of organic complete fertiliser. Heavier soils will require the addition of a lot of organic matter, but avoid using manures or you will end up with a lot of foliage and few tubers. Tubers are easier to harvest from raised beds, and a raised growing area will ensure that drainage is good.

Plants are grown from shoots that have sprouted from tubers. Shoots may be available from nurseries in suitable growing areas, or tubers can be kept in containers of damp sand until shoots form. I have sprouted kumara indoors in early spring from large pieces of tuber placed in a dish half full of water. Change the water regularly. When new growth is 15–20 cm long, and has some roots, carefully detach the shoots and bury them to half their length in the prepared bed when soil temperature is over 20°C. A dozen plants will provide a good supply of tubers. Apply some mulch around the new plants to keep soil damp while plants are small. Keep plants thoroughly watered until well established. Once plants get going they will shade out weed growth. Tubers can be harvested after foliage yellows. Harvest carefully in dry weather, early in the day, to allow tuber skins to toughen in the sun, or else tubers will have to be used within two weeks. Tubers can then be heaped in a dry spot until skin hardening, or curing, is completed. (This could take several days.) Tubers should be covered at night. Mature tubers have a firm skin and the cut surface is dry. If it oozes sap, the tuber is not mature enough for harvest.

TATSOI (*Brassica rapa* Narinosa Group)

SOWING PHASE: *New Moon*

Tatsoi is a very nutritious member of the crucifer family and shares their health-protecting anti-oxidants including vitamins A, and C, plus B vitamins, and iron.

Tatsoi grows into a rosette of glossy, dark green, spoon-shaped leaves which can be harvested six or seven weeks after sowing and used in salads or stir fries. This plant is frost hardy and easy to grow in most areas. It can also be grown in pots or polystyrene fruit boxes, if space is limited. Foliage can be picked as required. Sow and cultivate as for open Chinese cabbage. Chooks love tatsoi, too, and it helps produce eggs with richly coloured yolks. Tatsoi may cross-pollinate with other brassicas.

TOMATO (*Lycopersicon esculentum*)

SOWING AND PLANTING PHASE: *First Quarter*

Vine-ripened red tomatoes are rich in beta-carotene and lycopene (a carotenoid also found in red capsicum, ruby grapefruit, and watermelon). Lycopene, from the botanical name for tomato, is important for good health of both the male and female reproductive systems, particularly prostate health. Tomatoes also contain B and C vitamins, iron and potassium, and are a mild liver tonic for those not sensitive to aspirin.

Organically grown tomatoes are delicious and fairly easy to grow in beds or large pots. A wide variety of open-pollinated seed is available to suit various conditions and tastes, including low-acid and fruit-fly-resistant cultivars. Where growing space is limited, or the growing season is short due to cool weather, pot-grown tomatoes are ideal because the

growing mixture in pots stays warmer than soil. Determinate tomatoes, which stop growing when they reach a certain height, are more suitable for pot culture. Use plastic pots of at least 35 cm diameter, with plenty of drainage holes. When planting in containers, use a good quality organic potting mix, and add mature compost or some worm castings, if they are available. Alternatively, you could add a little organic spent-mushroom compost, which contains calcium. Position the tubs in a warm, sheltered position. A dwarf marigold or two in the pot are said to deter tomato pests. ‘Acadia’, ‘Quickpick’, ‘Roma’, ‘Kokomo’, ‘Tiny Tim’, and ‘Walter’ are all suitable for growing in pots.

Don’t plant tomatoes in soil that has grown tomatoes, eggplant, capsicum, potatoes, or strawberries during the previous three years. Beds for tomatoes should be prepared at least a month before seedlings are planted out. Tomatoes love lots of compost and a light application of organic, pelleted, poultry manure which has a good supply of phosphorous and calcium (two minerals required for healthy growth of tomatoes). High nitrogen and potassium levels in fertilisers are believed to increase the acid levels in tomatoes. Tomatoes prefer a soil pH of 6.5 and mature from twelve to twenty weeks after sowing, depending on the climate and cultivar. In all zones, tomatoes will benefit from mulch around plants to help keep soil consistently damp. Cover the bed with organic mulch after preparation. In cooler areas, pull mulch back several days before planting out to allow soil to warm. On a fine day before transplanting seedlings, replace mulch immediately after lunch (when soil is warmest during spring). As well as keeping soil damp, mulch will retain soil warmth.

Tomato plants are sensitive to frost. Most cultivars germinate easily when soil reaches about 20°C. Seedlings are usually started early in 8-cm pots in a cold frame, or warm protected spot, for planting in beds, or pots, as soon as the soil is warm enough for strong growth. Sow seed about 6 mm deep, two seeds to a pot, and remove the weaker seedling when plants have three strong sprigs of true leaves. To increase the root area of your tomato seedlings, turn the pot on its side when each seedling is 10–12 cm tall. Don't forget to turn it upright for watering and feeding. In about a week, the seedling stem will have grown at a right angle, and more roots will have started to form on the horizontal part of the stem.

Plant out tomato seedlings after risk of frost has passed. Position stakes where you want the plants to grow, about 50 cm apart, then plant seedlings slightly deeper than they were in pots. Tomato plants can be hilled slightly to enlarge the root area when stems are strong. Non-staking cultivars also benefit from some support as tomatoes left to grow naturally prefer a horizontal position. Staking keeps the fruit clear of soil, and saves space. Tomatoes in pots will benefit from an orchid stake to provide support.

Advice to pinch out the side shoots that form between the main stem and leaves is really only of benefit in Cool Zones where it allows more sunlight to reach the fruit. In other growing zones, tomato crops may benefit more from a bit of foliage protection. In Temperate and Warm Zones, where soil is warm enough for direct planting, strong side shoots can be used as tip cuttings to increase your tomato plants (see Tip Cuttings in [chapter 8](#)). You can pinch out the growing tips of tomato plants when they reach the top of the stake. Otherwise, they will flop over and become damaged.

Although tomatoes need warmth to grow and bear fruit, and most gardening guides recommend full sun for tomatoes, full sun in many areas of Australia also causes sunburn (visible as greyish, sunken areas) on fruit. This is particularly true where air pollution is low. In these areas, tomatoes will fruit and ripen very well under a shade cloth tent fly.

It is very important to water tomatoes regularly, and thoroughly, under mulch as erratic watering can contribute to a problem called blossom-end rot (see [chapter 9](#)). Potted tomatoes will require more frequent watering in warm weather. Avoid overhead watering as it is wasteful, can contribute to sunburn on fruit, and fungal spores can be splashed onto foliage.

After planting out, do not apply fertiliser tea to tomatoes as they grow. When plants start to form fruit, apply a light sprinkling of organic poultry-based fertiliser under the mulch of each plant, or apply it as a very weak fertiliser tea to potted tomatoes. Allow tomatoes to ripen on the plant for the best flavour. Harvest large cultivars by supporting the fruit in one hand, then snapping the stem joint above the green calyx (at the top of the fruit). Small cultivars can be harvested the same way, or a ripe truss of fruit can be snapped off at a stem joint.

Tomatoes for Cool Zones, or late crops in Temperate Zones: ‘Stupice’, ‘Rouge de Marmande’, ‘Australian Red’, ‘Peach’, ‘Black Krim’, ‘Potentate’, ‘Sweetie’, ‘Kotlas’, and the Amish and Oxheart cultivars.

Tomatoes for Tropics: ‘Tropic’ and ‘Scorpio’.

TURNIP (*Brassica rapa* Rapifera Group)

SOWING PHASE: *Full Moon*

Turnip is another member of the extensive crucifer family and shares some of their health-protecting anti-oxidants, as well as fibre and some vitamin C. Besides its use in vegetable soups, it is not a popular vegetable in Australia, probably because commercial crops tend to be sold when over mature and tough. Turnip is best eaten when young and crisp, and can be served as a low-kilojoule alternative to mashed potato.

Turnip is a frost-hardy, cool season root vegetable that can be grown from late summer to late autumn, or from late winter to early spring in very cold areas. Usually white-fleshed with a purple tint at the top of the root, turnip takes between seven and twelve weeks to mature, depending on the cultivar. Japanese turnip grows almost as quickly as radish, and is fairly easy to grow in pots or deep polystyrene fruit boxes, if space is limited. It is a small, white, oval vegetable that is delicious when harvested young, up to 4 cm in diameter. This turnip can be served lightly steamed, or raw and thinly sliced in salads.

Turnip (and swede) can be sown in well-drained, humus-rich soil that receives winter sun. Either can follow a leafy vegetable crop that does not belong to the crucifer family. All brassicas prefer a soil pH between 6.5 and 7 where molybdenum and boron are both available (see Broccoli). Outer signs of boron deficiency in turnips and swedes are cracks and a leathery appearance to the root skin. The interior of roots may also be hollow

Seed is thinly sown directly into the bed, 1 cm deep, in furrows spaced 16–17 cm apart. Use seed-raising mix or sandy soil to cover the seed. Germination occurs within ten days. Seedlings can be given a couple of applications of worm liquid tea to get them started. Thin seedlings to 6 cm

apart when the first true leaves are fully extended. Do not hill up turnips as the swollen part of the taproot should sit up from the soil. Water consistently as irregular irrigation causes the swollen part of the taproot to split. A 3-cm layer of organic mulch is recommended where winters are dry. One or two applications of seaweed fertiliser tea may be helpful during growth, particularly in high rainfall areas where molybdenum and boron may leach from soil.

Start harvesting roots when they are young and tender, up to about 5 cm in diameter for larger types of turnip. All plants should be removed at twelve weeks as they will only get tougher after this. Older, mature turnips can be used as stock feed. Turnips do not store well for long periods but will store in the vegetable crisper for a few weeks. They are not suitable for freezing. After peeling, the swollen roots can be chopped and used in soups and stews, or cut into wedges and steamed, boiled or baked.

Both ‘Purple Top White Globe’ and ‘Snowball’ are ready to harvest in around seven weeks, while ‘Gold Ball’, which has creamy-yellow flesh, takes about a week longer to mature. Turnip may cross-pollinate with other brassicas.

WATERMELON see Melons

ZUCCHINI (*Cucurbita pepo*)

SOWING PHASE: *First Quarter*

Zucchini (or bush marrow) is low in kilojoules, and contains fibre, folic acid, potassium and magnesium. It also contains vitamin C, but this is reduced through cooking. Steaming or barbecuing zucchini is the best way to retain nutrients. Its flowers are edible too.

Zucchini grows best in a raised bed or mound that contains as much compost as you can spare. If you don't have a lot of compost, add a light application of organic complete fertiliser. The ideal pH for zucchini is 6.5. Two or three plants per sowing will probably provide more than enough zucchini because these marrow taste best when harvested while immature, and vigorous plants can keep cropping over a long period. Prepare the planting area in a sunny position at least a month before planting out. Water the bed with seaweed tea, and cover it with mulch. Position mounds about 90 cm apart.

Seed can be sown direct when soil temperature has reached 20°C, or in pairs in 8-cm pots in the same manner as cucumber. Sow seed 1.5 cm deep. Transplant seedlings when 15–18 cm tall, and after soil has warmed. Harvesting can usually commence about seven to nine weeks after sowing. Water bushes under mulch, and check daily for fruit large enough to harvest. Zucchini fruits grow incredibly fast, and mature marrows require a longer cooking time because they are tougher. Harvest marrows when about 15 cm long, using a sharp knife to cut them cleanly from the bush and retaining a short stem. After your first harvest, apply some worm liquid tea, and repeat the application every month, if necessary, while bushes are cropping.

Summer squash (or scalloped squash) are grown in the same way as zucchini, and harvested when about 8 cm in diameter.

CHAPTER 7

Garden Favourites

WHEN PLANNING THE DECORATIVE areas of your garden, always choose shrubs and trees that suit your climate and the scale of your property as they will require less maintenance, and give you more time to relax and enjoy your garden. Never buy shrubs or trees with roots protruding from the base of their pot, or plants with a lot of top growth and side shoots for the size of their pot, no matter how cheap they are. Advanced specimens come in larger pots, and plants in the correct pot for their size will grow faster when transplanted because their roots have not been restricted. Reputable nurseries take good care of their stock, and repot when necessary. Paying a little more for an advanced specimen of a slow-growing cultivar could be cheaper than having to replace shrubs or trees bought cheaply at a travelling market.

Write down the botanical (or Latin) name of plants you wish to grow to ensure you purchase the correct plant for your garden. The botanical name allows you to uniquely identify a particular plant from anywhere in the world, in the same way an ISBN allows you to identify a specific book. Common names for plants can vary from state to state, however, and from country to country. (For example, Gum Tree is used as a name for a variety of trees other than *Eucalyptus*, and, confusingly, the name Lemon-scented Myrtle applies to two or more plants, but only one species is used in the food industry.) The first part of a botanical name is the *genus* name. In the botanical name *Callistemon salignus*, for example, *Callistemon* tells you it is a bottlebrush. The second part, *salignus*, is the species name, which identifies it as a

weeping bottlebrush. Where particular cultivars of a species have been bred, the cultivar name will follow in single inverted commas. For example, *Callistemon salignus* is a tall, weeping shrub with pink new growth and pale lemon brushes, while *Callistemon salignus* ‘Rubra’ (or *C. salignus* ‘Rubra’ if the genus has been previously mentioned in a text) has weeping growth and red brushes. Some plants are identified only by their genus and cultivar names, such as *Grevillea* ‘Ivanhoe’. Your local nursery will be able to advise you on suitable species for your growing conditions, if you don’t have a specific plant in mind.

Don’t forget to include some trees in your garden, if possible. Trees have longer roots and can draw nutrient minerals from deeper in the soil. Nutrients, cellulose and lignins are shed as flowers, leaves and bark, continuing nature’s cycle of returning organic matter to the topsoil for the benefit of future growth. We know that when trees are removed soil salinity and soil erosion increase, yet we continue to clear land in the name of commercial enterprise, providing conditions for more deserts in the future.

When considering which trees to plant, remember that large trees also have large roots that can cause damage to plumbing, foundations and paths when planted in unsuitable areas. Large trees also cast a lot of shade, limiting the growth of sun-loving plants in small gardens. Many *Eucalyptus* species are too large for suburban gardens. The very popular Tasmanian Blue Gum, *E. globulus*, Sydney Blue Gum, *E. saligna*, Ribbon Gum, *E. viminalis*, and Scribbly Gum, *E. signata* can grow to 30 m or more. (The average height of each storey in an apartment buildings is just over 3 m, so if you visualise a building ten-storeys high, you will have a

good idea of the mature height of these fast-growing trees.) The other Scribbly Gum, *E. rossii*, and the Willow Peppermint, *E. nicholii*, can reach 25 m, while the Lemon-scented Gum, *E. citriodora*, grows to 16 m, or five storeys high.

All trees modify the climate in your garden to some extent. Small trees may not cast large areas of shade, but they do help to keep your garden warmer in winter, and cooler in summer. Trees have such an important influence on their environment that clearing large quantities of trees can reduce rainfall over a broad area.

Never, ever plant the camphor laurel, *Cinnamomum camphora*. These large, drought-tolerant, foreign trees are fast becoming environmental pests where birds have spread the seed. The trees' camphor properties also deter the growth of other plants around them and they have no place in suburban gardens. Avoid *Nerium oleander*, too, as all parts of the plant are poisonous to humans and stock, and stock will eat it in drought conditions. Smoke from the burning wood is also toxic. There are other more suitable drought-tolerant shrubs available (see [chapter 5](#)). Oleander butterflies, enjoyed for their iridescent chrysalises that look like miniature Christmas tree baubles, survive well on native figs and other plants with milky sap. Be cautious about where you plant umbrella trees, *Schefflera actinophylla*, *Liquidambar* spp., and figs, *Ficus* spp. — they all have aggressive root systems that can cause serious problems when planted near domestic or pool plumbing. In suburban gardens, figs should be grown in pots.

Native Trees and Shrubs

WE HAVE AN ABUNDANCE of diverse natural flora in our part of the world. Many beautiful Australian and New Zealand natives are easy to grow if you follow a few basic points. Wherever you live, there are cultivars of natives that will grow in your area with minimum care. Some natives will grow happily in pots given a suitable aspect and growing mix, so large gardens are not necessary to enjoy their beauty.

All Australian native shrubs, and most of the trees, are evergreens. Only *Cedrela*, *Melia*, and *Erythina* genera are deciduous. It makes sense to include natives in gardens; they are more suited to local soil conditions and climate than foreign plants. Natives also attract bird life, including insect-eating birds and beneficial insects such as bees, to our gardens. Before purchasing natives ask about their natural growing conditions — do they prefer sun or shade, soil that is boggy or well-drained, light or heavy soil? Then you can choose plants that enjoy the conditions you can provide.

Most of Australia did not benefit from soil mineralisation during the Ice Age, and Australian soils have depended on rain and wind erosion for the release of nutrient elements from rocks. Soils in Australia can be low in phosphorus or other elements, or the major nutrients may be unavailable because of long-term soil acidity in humid areas or extreme alkalinity in low rainfall areas. Consequently, many Australian native genera, including *Hakea*, *Grevillea*, *Banksia* and other members of the protea family, have evolved to be very efficient at extracting the nutrients they need from soils. Fertilisers that contain amounts of phosphorus required by many foreign plants can be quite toxic to Australian natives, so natives should not be planted among shrubs that require regular applications of complete fertiliser. Lawns require

phosphorus to maintain good root growth, and, therefore, Australian natives should be kept well clear of fertilised lawn areas. You will have to combine raised beds and a very wide margin between natives and fertilised lawn to avoid problems. Established eucalypts have roots that penetrate deeply and may seem immune to synthetic fertilisers but infection with borers or other pests will indicate that conditions are not to their liking. Phosphorus levels are higher in New Zealand soils but may be ‘locked up’ and unavailable to plants in some volcanic soil areas. Similarly, low fertiliser requirements apply for plants native to these areas because they have evolved in conditions that restrict the absorption of phosphorus.

While many New Zealand natives adapt well to Australian conditions, some soils in New Zealand may be too rich for Australian natives that have evolved in low-nutrient soils. Most Australian natives don’t require rich soils; they require less fertiliser and, in many cases, less water than New Zealand natives. All Australian and New Zealand natives prefer organic growing methods because they depend on the gentle acids and fungi in decomposing organic matter to slowly release nutrients in the manner they require. Improvement of soil with organic matter also allows deeper root penetration, enabling natives to withstand periods of drought. During periods of high humidity in warm months, some natives are susceptible to *Phytophthora* root rot (see [chapter 9](#)). This disease is less likely to occur when grown using the guidelines described in *Caring for Natives* (later in this chapter). A wide range of natives have also proven to be adaptable to less acidic soils when they are grown organically.

The trend towards purchasing advanced trees and shrubs in an attempt to produce an instant established landscape does not generally work well with natives. Many Australian native plants are fast growing and roots can quickly become tangled and curled in pots. All natives resent root disturbance so it does not help to tease out tangled roots. Some natives never recover from twisted roots, and will always remain stunted. Natives, like all plants, suffer some transplant shock and natives seem to recover more quickly if planted when small. Plant natives in early autumn in most areas to allow plants to settle in while conditions are cool. In areas where severe frosts occur, plant in spring as soon as frosts have finished. Simple tree guards made from cardboard milk cartons can be used to initially protect seedling trees and shrubs by shading the root area. More substantial wire guards can be used in areas where grazing animals or passing pedestrian traffic present problems.

Legumes for natives

Try to include some native legumes in your garden. As well as being attractive, they also fix nitrogen in the soil for surrounding plants. There are native legumes — varying from ground covers to trees — suitable for each gardening zone. Some legumes are also very hardy and can tolerate salt winds. Useful native legumes are species of *Acacia*, *Cassia*, *Castenospermum* (Black Bean), *Goodia*, *Jacksonia*, *Mirbelia*, *Pultenaea* and *Viminaria*. New Zealand's *Clianthus* (Kaka Beak) requires some wind protection.

Species of these native legumes can also be grown in exposed coastal areas: *Brachysema*, *Chorizema*, *Dillwynia* (Eggs and Bacon), *Hardenbergia*, *Indigofera*, *Kennedia* and *Swainsona* (Sturt's Desert Pea).

Fast-growing windbreaks

A wind-blown garden results in damaged plants, extra watering, and a reduced choice of mulch materials because many organic mulches will also blow away. Because of their rapid growth and resilience in harsh conditions, some natives make wonderful windbreaks to protect the rest of your garden. Wind increases water evaporation and is more drying to plants than heat, but many Australian natives have modified leaves that prevent moisture loss from foliage.

Windbreaks work best when they reduce airflow by 50 per cent. A solid wall or hedge creates miniature whirlwinds on either side of the wall, yet well-spaced planting reduces wind on both sides of the windbreak and warms air on the downwind side on cold nights, providing some frost protection for the garden. On extremely windy sites, it may be necessary to plant two staggered rows as a windbreak with shrubs as the first line of defence, and small trees in the second row to encourage wind flow upwards.

Some windbreak species can be short lived but they are effective in providing protection for new gardens until slower growing shrubs and trees become established. Windbreak trees or shrubs are planted using the 'three-stake support' method to encourage development of a strong root system.

The following genera of natives have species that are suitable for fast-growing windbreaks: *Acacia*, *Allocasuarina*, *Banksia*, *Callistemon*, *Casuarina*, *Grevillea*, *Hakea*, *Leptospermum*, and *Melaleuca*. The boobiallas (*Myoporum* and *Eremophila*) that are native to both Australia and New Zealand, *Westringia* and some *Pittosporum* are useful front-line coastal windbreak shrubs. Many eucalypts are also used for windbreaks but

some are prone to dropping limbs under windy conditions, and I am reluctant to recommend them for suburban gardens.

Caring for natives

Due to their efficiency in extracting soil nutrients, fertiliser requirements for most Australian, and some New Zealand natives, are low. Unless otherwise specified, an annual light application of mature compost, worm castings or well-rotted cow manure to the soil surface, under organic mulch, is usually sufficient to keep natives healthy. New Zealand natives which have evolved in soil naturally richer in minerals have similar fertiliser requirements to exotics. It is just as important when growing natives to maintain soil pH within a suitable range for the species you are growing to ensure that plants are not being starved of nutrients, or absorbing them in toxic amounts.

Fertiliser can be applied after flowering, or in summer. An annual application of half-strength organic seaweed tea has been found to be beneficial in improving natives' resistance to stressful conditions. Never fertilise natives at planting time, and never fertilise any plant when soil is dry. Be careful not to over-fertilise natives grown in pots; you are more likely to kill them through over-fertilising than under-fertilising. The azalea and camellia family have low fertiliser requirements and prefer a mildly acid soil, making them good companions for many Australian natives.

A thorough watering when soil is no longer damp is all that is required for most natives. Problems can occur with natives grown in heavy soil in humid areas. Before planting natives, check that drainage is good unless you have chosen plants that have adapted to heavy or water-logged soils. Gypsum can

be applied some weeks before planting to improve clay soil drainage and allow better root penetration. Raising beds will also improve drainage. Always follow good planting practice by making planting holes much wider than they are deep, and plant natives only as deep as they are in the purchased pot.

Natives resentment of any kind of root disturbance, includes weeding, so year-round organic mulch is essential with natives (see [chapter 5](#)). Many natives like a thin layer of leaf mould or leaf litter as a mulch. Natives can absorb the nutrients they need from mulch so it also serves as a fertiliser. Crumbly cow manure also provides both a gentle fertiliser and mulch for many natives. Dry twigs are another good mulch for natives. Avoid mushroom compost for natives as it contains variable amounts of lime, and may increase soil pH to an unsuitable range. Remember to keep mulch well clear of plant stems to avoid trunk canker.

Natives in pots should not be grown in garden soil. (For tips on suitable pots and potting mixes, see [chapter 4](#)). Small, light coloured pebbles are an attractive and useful mulch for potted natives. Potted natives from high summer rainfall areas, and those on windy balconies, will require more watering than other natives.

Many native plants resent hard pruning of old wood and will die back as a result. The key to healthy native shrubs is regular pruning of new growth. With very young shrubs, pruning can be limited to simply pinching out the growing tip of each shoot. This practice stimulates the formation of several new shoots on each branch resulting in strong, bushy growth. In their natural habitat, young natives are tip pruned by native animals and insects. Failure to tip prune will eventually result in straggly, unattractive shrubs, tempting

owners to prune old wood. Tip pruning of young trees can result in shrubby growth with multiple trunks. (For details on how to tip prune and where to cut when pruning, see [chapter 8](#)). Natives are pruned during First Quarter phase to promote new growth — preferably on a fertile day for faster healing.

Many natives are pruned after flowering, when plants are ready to start a growth cycle. Because flowering times for natives will vary within species and across different areas, it is not possible to list the pruning times for all natives in the gardening diary. Pruning requirements, if any, are included in the notes on individual species.

Popular Native Plants

SOME POPULAR NATIVES, including orchids, ferns, tree ferns and grass trees, are protected species. Do not remove plants from the bush — not only is it illegal to do so but they will probably die, anyway. Only purchase plants that have an authorisation label attached.

To avoid repetition in the growing notes for Australian and New Zealand natives, please note that all natives require some humus added to the topsoil in the form of completely mature compost, dry, crumbly cow manure or well-rotted leaf mould when preparing the growing area, (unless otherwise specified).

PLANTING PHASE: Full Moon (except for *Actinotis*, First Quarter)

ACACIA

Wattles vary from small shrubs to tall trees and can be found in all climate zones. All wattles are fast-growing legumes, and many are suited to tough conditions. Some are also useful

fodder plants, while others are salt tolerant or suitable for windbreaks. All species attract insect-eating birds. While it is possible to find a species of wattle in bloom in each month of the year, wattles that bloom in some months are too large for suburban gardens, so don't select a garden specimen purely for its flowering period. With more than ninety species to choose from, you are sure to find one suited to your conditions. Some wattles only live between eight and fifteen years but good growing conditions can extend this period. Only the Coastal Myall, *A. glaucescens*, is poisonous to livestock. Being legumes, wattles do set seed pods, and young plants will benefit from a light all-over clipping, immediately after flowering.

Cootamundra Wattle, *A. baileyana*, is a popular frost- and drought-hardy tree, to 6.5 m, with silver foliage and bright yellow winter flowers. Wyalong Wattle, *A. cardiophylla*, to 3 m, tolerates dry conditions and flowers in late winter. The beautiful Mudgee Wattle, *A. spectabilis*, grows to 3 m, has ferny leaves and rich yellow flowers in spring.

The weeping Golden Wreath Wattle, *A. saligna*, to 5 m, is an attractive low windbreak tree that helps control soil erosion. Sydney Golden Wattle, *A. longifolia*, grows to a similar height and is an incredibly fast-growing windbreak or hedge plant. Coast Wattle, *A. l.* subsp. *sophorae*, to 4 m, can bind beach sand and resist salt spray.

For small gardens or pots, Drummond's Wattle, *A. drummondii*, is one of the best shrub wattles. Brown's Wattle, *A. browniana*, is a tiny shrub that likes moist, coastal conditions. Creeping Wattle, *A. aculeatissima*, is suitable for rock gardens or dry soils, and Ploughshare Wattle, *A. cultriformis*, is suitable for rock gardens in cooler areas.

ACTINOTUS

The well-known Flannel Flower, *A. helianthi*, is a beautiful, bird-attracting Australian biennial to 50 cm. It grows in warmer Temperate and Warm Zones but not in tropical areas. Flannel flowers are sown or planted in spring during First Quarter phase. Seed will not germinate unless fresh. Flannel flowers have silvery-white compound leaves and produce creamy-white daisy flowers with a velvety texture during late spring and summer. This species requires a sunny position with perfect drainage, and a warm sandy or gravelly soil. Flannel flowers need very little fertiliser or water, and can self-seed in good conditions. Remove spent flowers. If transplanting a potted plant, protect it from wind until established.

AGONIS

This is a West Australian genus of shrubs and trees to 10 m that prefer mild coastal conditions. All species attract insect-eating birds. Although heat and drought-tolerant when mature, they are difficult to establish in hot, dry areas. Willow Myrtle, *A. flexuosa*, is known for the peppermint scent of its leaves. Native Cedar, *A. juperina*, to 4.5 m, has small white flowers during spring and summer. The very fast-growing shrub, *A. marginata*, has broader leaves and white flowers with deep red centres. Tip prune young plants.

ALLOCASUARINA

Most of the species in this genus were formerly known as casuarinas, and some may still be sold under their original name. Casuarinas and allocasuarinas include the bulloaks and sheoaks (previously spelt buloke and sheoke). They are all very hardy shrubs and trees ranging between 2 m and 20 m in

height. Leaves are modified pine-like needles. Species cover all gardening zones, and some species are very versatile, being suited to both river banks and dry inland conditions. Others are tolerant of saline soils. All are very low-maintenance plants. No pruning is required, and they produce their own mulch. Drooping Sheoak, *A. verticillata*, to 6 m, is an attractive small tree with weeping branches for cool and temperate climates. Bulloak, *A. luehmannii*, to 13 m, is an attractive tree for inland areas.

ALYOGYNE

Closely related to the hibiscus family, this small genus of four species is suitable for hot, dry areas. Alyogynes are frost-hardy and fast-growing evergreen shrubs. They are not fussy about soil type provided they have good drainage. The colour of Blue Hibiscus, *A. huegelii*, is uncommon in hibiscus flowers. This species has lobed, velvet leaves and quickly reaches 2.5 m. It is drought and lime tolerant, and attracts birds. Red-throated Hibiscus, *A. hakeifolia*, grows to 2.5 m. These shrubs require pruning after summer flowering.

ANGOPHORA

Apple myrtles are drought tolerant and consist of nine species, from 3 m shrubs to 20 m trees. The popular species is the Dwarf Apple Myrtle, *A. hispida*, a small tree to 5 m, with white eucalyptus-like flowers in summer. This genus is closely related to *Eucalyptus* but angophoras have small petals instead of a cap on the flower bud, and leaves appear opposite each other along stems. The Sydney Red Gum, *A. costata*, grows to 13 m. Angophoras prefer sandy soil or dry sandstone country, and young shrubs can be tip pruned to encourage branching.

ANIGOZANTHOS

Better known as kangaroo paw, this genus of evergreen Australian native herbs grows to around 1 m in height. They are suitable for Temperate to Warm Zones. Kangaroo paw attract nectar birds, and make dramatic feature plants in the garden. They also grow very well in pots. Their distinctive flowers come in a variety of colours but not all colours are suited to all areas. Some species are frost resistant, and some do not like humidity, so your choice may be limited to the species that suits your microclimate. Red and Green Kangaroo Paw, *A. manglesii*, is very susceptible to 'ink disease' in humid conditions. Tall Yellow Kangaroo Paw, *A. flavidus*, is tolerant of most soil types and conditions.

All kangaroo paw are mycorrhiza dependent and rely on humus in soil for survival. Most like a sunny, well-drained position with coarse sandy soil, and a gravelly mulch. Green Kangaroo Paw, *A. viridis*, prefers sandy soil with a clay subsoil, and winter rain. Water the bases of plants only, and feed kangaroo paw lightly in summer. Remove spent flower heads and, when necessary, divide clumps in early autumn.

ARCHONTOPHOENIX

Bangalow Palm, *A. cunninghamiana*, and Alexandra Palm, *A. alexandrae*, are graceful, slender palms for mild to warm coastal areas. Alexandra palms prefer slightly warmer conditions. Plant at anytime in the tropics. Both palms are self cleaning. The Alexandra is identified by a thicker base and a white underside to leaves. Although these palms do not provide a lot of shade, they add a lovely tropical effect to gardens when planted in groups of uneven numbers. Shrubs can be planted close to the base of established palms. These

two palms prefer a protected position in well-drained soil, regular watering when young, and a light application of organic fertiliser in spring or late summer. No pruning is required.

ASPLENIUM

This internationally distributed genus of ferns has diverse leaf forms. The Bird's-nest Fern, *A. nidus*, is a hardy Australian species that is very easy to grow. It has coarse, broadsword fronds that form a rosette to 2 m in diameter, and a small root system. This fern grows in the dappled shade of trees where the 'nest' catches tree debris to use as a fertiliser. If leaves look pale green, apply a small amount of organic fertiliser under mulch in summer. All species of this genus can tolerate full sun in mild areas, and are suitable for growing in pots. The bird's-nest fern is frost tender and prefers mulch and regular watering, although it is very drought tolerant.

BACKHOUSIA

Lemon-scented Myrtle, *B. citriodora*, is a small tree native to Queensland, to 6 m, with unremarkable white flowers. Its leaves contain the lemon-flavoured oil used in the bush-food industry. This species is suitable for temperate and warm areas, and can also be grown as a medium to tall shrub as it tolerates regular pruning. It dislikes any root disturbance and requires organic mulch. Although this tree prefers a sunny position with good drainage and a weekly watering under mulch in warm weather, it is quite drought tolerant. Tip prune young plants if growing them as shrubs.

BANKSIA

Banksias are distinctive shrubs and trees, and a suitable species can be found for all growing zones. All but one of the sixty species of this genus are native to Australia. Banksias are sometimes referred to as honeysuckles because they are very attractive to nectar birds. Some have distinctive saw-toothed leaves. Many of the eastern species are adaptable and can grow in tough conditions, but some of the very beautiful western species are prone to fungus problems in areas where humidity is high. Mature heights vary depending on the growing conditions. Many species are frost resistant or can tolerate inland saline soils, but all banksias appreciate humus added to their soil. Banksia flower spikes (or candles) are long lived, consisting of many hundreds of pistils instead of petals, and look like cylindrical hair brushes or candles.

Saw Banksia, also called Old Man Banksia, *B. serrata*, is a tough beach tree, to 6 m, that grows in poor, sandy soil and is suited to Cool and Temperate Zones. The leaves are saw-toothed with grey undersides, and the candles are reddish coloured. The old seed heads (May Gibbs' 'Banksia Men') remain on the tree. Heath Banksia, *B. ericifolia*, is an easily grown shrub or tree that grows to 5 m on well drained soil. It has light-coloured, tiny leaves and large orange candles up to 25 cm long.

Desert Banksia, *B. ornata*, is a small shrub with saw-toothed leaves and white or cream 10 cm candles. It thrives in hot, dry climates. The attractive Scarlet Banksia, *B. coccinea*, a tall shrub from WA, has squat red spikes and round, stemless leaves. It is not easy to grow in humid areas. Silver Banksia, *B. marginata*, a shrub to 5 m, requires part-shaded, cool, moist conditions. The leaves are smooth-edged and the 10-cm candles are lemon yellow.

Young banksia plants require tip pruning. Removal of spent flower spikes immediately after flowering will improve plant growth. Mature plants are not usually pruned as the old seed heads look attractive on the tree.

BORONIA

Many of the sixty species in this genus originated in Australia. Boronias are fast-growing, small to medium shrubs with fragrant leaves. On many species, scented tulip or star flowers in various colours are borne for long periods. Some species require shaded, cool conditions, while others prefer sheltered warmth. Damp (not wet) sandy, well-drained soil, and wind protection suits many boronias. Apply 3 cm of organic mulch or a thin layer of leaf litter in spring, but keep mulch well clear of the plant base. Boronias all require a cool root area and strongly resent any root disturbance. They are susceptible to root rot (*see* [chapter 9](#)) and will benefit from a raised bed. Heavy summer rain, and extremes of climate do not suit boronias. When watering is required in warm months, water only the mulch around plants because boronias do not like flooding of the root area in warm conditions. Boronias can also be grown in pots but only if you are prepared for the possible death of the plant at repotting time. Tip prune young plants and remove spent flower stems, retaining some leaves on each stem. All boronias attract insect-eating birds.

Some of this genus, including the divinely fragrant Brown Boronia, *B. megastigma*, have a reputation for being difficult. Red Boronia, *B. heterophylla*, to 2 m, with dense green foliage and lipstick tulip flowers, and Mauve Boronia, *B. denticulata*, with pink star flowers, are considered easy to grow. *B. pilosa*, a 1 m shrub native to Victoria and Tasmania, requires cooler growing conditions.

BOTTLEBRUSH see *Callistemon*

BRACHYCHITON

This hardy, versatile genus includes the kurrajongs, flame trees, lacebarks and bottle trees. Bell flowers, in various colours, appear in summer and are followed by boat-shaped pods. These trees seem able to adapt to any area where soil is warm but they will require frost protection while young. For example, Dwarf Kurrajong, *B. bidwillii*, a native of Queensland, will grow around Geelong. Growing conditions affect tree heights and the Illawarra Flame Tree will only reach 30 m in sub-tropical conditions. All species appreciate an annual application of compost. Remove spent flowers from young trees to encourage growth and to prevent woody pods forming.

Illawarra Flame Tree, *B. acerifolius*, grows to between 6 m and 10 m in warm temperate gardens. It has large sprays of bright-red bell flowers and is semi-deciduous when flowering. While preferring deep soil with regular watering, this tree has proven quite hardy for street planting in some areas.

Kurrajong, *B. populneus*, is a hardy tree that will grow to 15 m in the right position. This useful fodder tree is lime-tolerant and will grow under a wide range of conditions. Flowers are white bells with dark spots. Western Kurrajong, *B. gregorii*, to 12 m, has yellow bell flowers and is suited to hot, dry areas. Queensland Bottle Tree, *B. rupestre*, to 15 m, is an unusual tree with a swollen trunk. It is also a fodder tree, and useful in the hot, dry inland.

BRACHYSCOME

These popular and long-flowering daisy plants are small spreading herbs with variable leaf formations and blue or mauve flowers. There are species suitable for rockeries, tubs or borders in all growing zones. All brachyscomes need a sunny, well drained position. Raised beds are beneficial. Water well until established, and during warm months. Apply mature compost or well-rotted manure around plants in spring. Clip lightly after flowering.

CALLISTEMON

A distinctive Australian genus, callistemons range from low-growing shrubs to small trees. Species can be found to suit most climate conditions. The genus contains twenty-two species but their popularity with gardeners has led to the breeding of many named cultivars. Flowers (or bottlebrushes) consist of elongated stamens in a range of colours from white to yellow, green, pink, mauve, red and purple. Bottlebrushes may appear from spring to autumn and are very attractive to nectar birds. Many callistemons can be grown in pots. Some suit poorly drained soils, while others prefer dry conditions. Many are frost resistant — in fact, Lemon Bottlebrush, *C. pallidus*, is said to be able to tolerate both exposed coastal conditions and snow. Pink Tips, *C. salignus*, tolerates saline soils. A light application of organic fertiliser after flowering will keep callistemons healthy.

The beautiful Showy, or Albany, Bottlebrush, *C. speciosus*, to 3 m, is easy to grow because it tolerates a wide range of conditions. It has 15-cm red brushes with gold tips. Crimson Bottlebrush, *C. citrinus*, 3–5 m, is also very easy to grow, and flowers in both spring and autumn. *C. violaceus*, to 2.5 m, has fuchsia-purple brushes and is suitable for pots, clay soils or soils that dry out in summer.

Young callistemons require removal of flower heads, just behind the flower, as soon as flowering has finished. This encourages the formation of three or four new shoots immediately below the cut. If spent brushes are left on the plant it will put a lot of energy into forming woody seed pods. Pod-set results in slow growth and, in later years, a spindly plant with a lot of bare patches.

CALOCEPHALUS

Snow Bush (or Cushion Bush), *C. brownii*, is an interesting small feature plant which grows to 1 m. The whole bush is white and woolly. Yellow flowers appear as woolly balls during spring and summer. It is a tough beach shrub, tolerates salt spray, and is suitable for dry soils, rockeries and pots. This little plant also attracts insect-eating birds. The snow bush is low maintenance and just requires well-drained, sandy soil in a warm position.

CASSIA

This genus of thirty species of leguminous shrubs and trees is suited to Temperate and Warm Zones. All prefer a sunny position and some are frost tender. Cassias have yellow buttercup flowers that attract insect-eating birds. Cassias are not particular about soil as long as it is well drained and includes humus. Most are suitable for growing in containers. Silver Cassia, *C. artemisioides*, is hardy and fast growing, to 1.5 m. *C. sturtii* grows to the same height and is good for inland areas. It prefers a gravelly clay soil. Clip cassias lightly after flowering.

CASUARINA see also *Allocasuarina*

Most of the Australian species of this genus have been reclassified as *Allocasuarina*. Casuarinas are very hardy trees, to 15 m, but may grow to only half that height in drought conditions. Leaves are modified pine-like needles. Shed needles provide trees with mulch and recycle nutrients into the soil. Some species are very versatile, being suited to both river banks and the dry inland. Others are tolerant of saline soils. All species are easy to care for and do not require pruning.

Coast Sheoak, *C. equisetifolia*, to 18 m (but less in dry areas), is suitable for warmer regions and useful for beach and inland planting, or for reclaiming swamp land. Belah, *C. cristata*, is a large tree suited to dry inland areas and low-lying heavy soils that experience occasional flooding.

CERATOPETALUM

The New South Wales Christmas Bush, *C. gummiferum*, grows to about 6 m, and belongs to a genus of trees that includes coachwood. Victoria also has a plant called Christmas Bush which is a different genus (see *Prostanthera*). The Ceratopetalums attract insect-eating birds. They require a warm temperate climate and deep, well-drained, light soil. Christmas bush likes protection from wind and a little shade. It produces small white flowers in spring. When the petals fall, the flower calyces enlarge and turn bright red, remaining on the tree until January. This tree has a high iron requirement and does well in red soils if they are slightly acid. Tip prune young plants. To obtain the best flowering at Christmas, apply seaweed fertiliser and compost under mulch in spring, and water regularly if the weather is hot and dry. Christmas bush usually receives adequate pruning if flowers are cut at

Christmas time. Otherwise, prune as though cutting for a vase.

CHAMELAUCIUM

Geraldton Wax, *C. uncinatum*, to 2 m, is a delicate-looking shrub that is attractive to birds. Waxy flowers with five round petals appear from late winter to spring. It will grow in most areas in a protected position where it will receive some shade at midday. Geraldton Wax is subject to root rot in poorly drained soils (see [chapter 9](#)). A sandy soil with added humus suits it well. For best results, plant this shrub at tube stage and avoid over-watering. Named cultivars of this species are also available. To prevent shrubs becoming straggly, remove branches after flowering as though cutting flowers for a vase, then mulch plants lightly with well-rotted cow manure.

CHORIZEMA

Better known as the flame pea, this is a genus of fifteen species of small spreading legumes to 1.2 m, all from Western Australia. They need a protected position in part shade in well-drained soil. Their genus name means ‘dancing with joy’, and their hot-pink, orange and yellow flowers in spring seem to do just that. After flowering, remove branches as though cutting flowers for a vase, then mulch plants lightly with well-rotted cow manure.

CHRISTMAS BUSH see *Ceratopetalum*

CORREA

This is an Australian genus of eleven species of long-flowering small shrubs, to 2 m. The bell flowers have four petals and come in a variety of colours. Correas attract nectar birds and are suited to Temperate Zones. They require

a well-drained soil in a protected position where their roots can remain cool. *C. alba*, a grey-green shrub with white bells in winter, is frost and salt-spray tolerant and well suited to foreshore areas. *C. 'Mannii'* is a smaller, easily grown shrub with deep red bells. Clip these shrubs lightly after flowering.

CROWEA

Croweas are small to medium shrubs with narrow leaves. Related to boronias and eriostemons, croweas have star-shaped, five-petalled fragrant blossoms along stems in summer and autumn. They require well-drained soil in a cool, partly shaded position. This genus is not suitable for areas with heavy summer rainfall. *C. exalata* is an attractive small shrub of variable height with bright pink flowers that are excellent as cut flowers.

CYATHEA

This genus of tree ferns with fronds up to two-metres long is native to Australia and New Zealand. Most tree ferns are sold with the fronds removed and just only the tightly curled new fronds (or fiddleheads) showing at the crown of the fern. Before purchase, check that the fiddleheads are not dry or damaged, and that the fern has an authorisation label. All cyatheas require damp soil containing lots of compost in a shaded position protected from winds. They can also be grown in large tubs. All require regular watering in dry weather, including misting of the fiddleheads. Most cyatheas can tolerate some morning sun if soil is moist. These ferns are not for areas where water is scarce or humidity is low. Mulch with well-rotted cow manure and remove dead fronds. Sections of tree fern trunk are used for growing epiphytic orchids and ferns.

Rough Tree Fern, *C. australis*, has prickles at the base of its fronds and grows to 2 m in height and 3 m diameter in cultivation. It is the hardiest of the tree ferns. This species grows to about 20 m in its natural habitat in east coast hills and forests from Tasmania to Queensland. Scaly Tree Fern, *C. cooperi*, has a more slender trunk and will grow to a height of 4 m with a 3 m diameter in cultivation. Silver Tree Fern, or Ponga, *C. dealbata*, comes from New Zealand and grows to 3 m. Fronds are silver-blue underneath. This tree fern tolerates cooler conditions.

Dicksonia is another genus of tree ferns. Soft Tree Fern, *D. antarctica*, only grows naturally in moist gullies. It is slow growing and requires shade, light soils and frequent and generous watering.

DAMPIERA

Dampieras are spreading plants with flat blue flowers in shades ranging from palest blue to deep blue-purple. There are close to sixty species of this genus, most originating in Western Australia. Dampieras are adaptable but prefer a sunny position (with some midday sun protection) in well-drained open soil. *D. cuneata* is drought-tolerant and grows to 1 m. It flowers in winter and spring and prefers sandy soils.

DARWINIA

Darwinias are suitable for Cool and Temperate Zones and belong to a genus of more than thirty species of small to medium shrubs. Most species originated in Western Australia. While some are suited to moist positions and others prefer to a dry position, all species require well-drained soil. Darwinias have variable flower forms; some blooms look like

pin-cushions while others are like bells. Lemon-scented Darwinia, *D. citriodora*, to 1 m, is easy to grow and has small heads of red and yellow flowers in spring.

ERIOSTEMON

Most of this genus has been reclassified as *Philotheca* and only two species remain under this name. Pink Wax Flower, *E. australasius*, is popular for cut flowers. It grows to 1.8 m and produces masses of pink flowers along stems in winter and spring. This shrub requires a light, slightly acid soil, a sunny position and perfect drainage. It benefits from gravel mulch and tip pruning of young plants.

EUCALYPTUS

A very large genus of around five hundred species, eucalypts can be found to suit all growing conditions. Although some are far too large for the average garden, there are many smaller species that are suitable, and all attract both insect-eating and nectar birds to the garden.

The lovely Coral Gum, *E. torquata*, has pink-red flowers in summer and grows naturally in stony hills or red loams to 8 m, but it is often smaller in cultivation. It is frost hardy and good for arid areas. Nodding Gum, *E. nutans*, only grows to 5 m, but will flower at 2 m. It grows naturally on sandy loams or rocky hills, is moderately frost hardy, drought tolerant and makes a good low windbreak. Small mallees usually form multiple trunks and produce beautiful flowers. Mallees usually require a light soil and many are drought tolerant. (Drought-tolerant species for other soils are listed in [chapter 5](#).)

One of the most popular trees for gardens is the Red Flowering Gum from Western Australia, although this tree is no longer considered a eucalypt and has recently been reclassified as *Corymbia ficifolia*. This may cause some confusion for a while as these gums are still being sold with the old labels. It can grow to 10 m, and is best in mild coastal conditions, but not suitable for exposed foreshore areas. It is frost tender when young, requires a minimum of 750 mm of rain per annum, and prefers a sandy-gravelly soil but can adapt to other soils.

Eucalypts are fast-growing and should be planted at tube stage so that their root system can develop properly. They do not require pruning. Allow them to develop their natural shape and keep young plants mulched.

FLANNEL FLOWER see *Actinotus*

GERALDTON WAX see *Chamelaucium*

GRASS TREE see *Xanthorrhoea*

GREVILLEA

Grevilleas range from ground covers and shrubs to tall trees, and not all are native to Australia. This genus consists of some two hundred species with many more named cultivars, providing at least one suitable species for all particular growing conditions. Belonging to the protea family, many grevilleas are long flowering and attract all types of birds. Leaves take many forms, and flowers range from reds and pinks to yellow and white, with many shades in between. The unusual flowers with prominent pistils are divided generally into three groups: spider, toothbrush and tropical toothbrush. Most grevilleas prefer a sunny position with well-drained soil,

and organic mulch in the warmer months. Tip pruning is necessary for young shrubs.

Mature spider grevillea plants respond to an all-over 10 cm clipping after flowering. Toothbrush grevilleas need a light clipping after flowering. Very vigorous plants can be pruned a little further down each stem. Regular pruning of tropical toothbrush grevilleas is essential. This group can be very vigorous and up to two metres can be pruned after flowering.

The silky oaks, *G. robusta* and *G. hilliana*, prefer frost-free temperate areas but are not suitable for suburban gardens. They can grow to 25m, and may blow over during storms when growing on sandstone or shale subsoil, or after drought periods. Western Beefwood, *G. striata*, to 12 m, is a good tree for hot, dry conditions.

HAKEA

Hakeas are hardy shrubs and trees that are members of the protea family and closely related to grevilleas. There are over one hundred species of this genus in Australia, and species can be found to suit all growing zones.

Although other proteas require good drainage, hakeas are very versatile. Species such as *H. nodosa*, Silky Hakea, *H. sericea*, and Willow Hakea, *H. salicifolia*, will tolerate wet soil. Some hakeas will tolerate heavy clay soils and many are drought tolerant and suitable for windbreaks.

Many hakeas do not have common names but your nursery will be able to advise on the growing requirements for their stock. They do respond well to organic matter added to the soil. The popular Pincushion Hakea, *H. laurina*, is fast growing in well-drained soil and will require staking.

Tip prune small shrubs to develop multiple branches. Hakeas produce woody seed pods that split in half to reveal two winged seeds. Some of the seed pods look attractive on mature shrubs but, as they form at the expense of growth, spent flower heads should be removed from young plants.

HARDENBERGIA

Hardenbergias are drought-hardy, shrubby low climbers with profuse sprays of pea flowers during late winter or spring. Purple Coral Pea, *H. violacea*, has purple, pink or white flowers and is found in all states except Western Australia. This plant is often incorrectly called ‘Sarsaparilla’. This species will sometimes self-seed in partly shaded areas where leaf litter has collected. *H. v.* ‘Happy Wanderer’ is an improved form with larger flowers. Native Wisteria, *H. comptoniana* (found only in Western Australia) has compound leaves and blue-purple flowers. This genus prefers a sunny to lightly shaded position and well-drained to dry soil. It requires very little care. Tip prune young plants. On mature plants, thin the current year’s growth after flowering, if necessary.

HIBISCUS

Australia has about six species of native hibiscus. They require perfect drainage and sunny, dry conditions. However, *H. heterophyllus* ‘Aureus’, a 3 m shrub with large yellow, dark-centred flowers in summer, will also grow in Melbourne. This cultivar is fast growing, frost tender, drought tolerant and a fodder tree. *H. tiliaceus*, is a salt-tolerant soft-wooded plant to 5 m. It has yellow flowers and grows on the east coast of the Australian mainland. Fertilise native hibiscus with compost when weather warms in spring. Tip prune while

shrubs are young. Plants do not require regular pruning but any necessary pruning should be carried out in warm spring weather.

ISOPOGON

Isopogons belong to the protea family and require perfect drainage, slightly acid sandy loam and organic mulch. This genus of thirty species is quite hardy and will grow in most areas except those that are very cold or tropical. Some species are as small as 30 cm while others reach 2 m. Known as cone flowers or drumsticks, all isopogons are eye-catching shrubs. Leaves take many forms and the long-lasting globe flowers can be in white, yellow, rose or purple, but they are usually grown especially for their rounded seed cases, which look like drumsticks. Spent flower heads on young shrubs should be removed on a short stem as soon as possible after flowering as formation of seed heads will divert energy from new growth. Rosy Cone Flower, *I. dubius*, grows to 1.2 m. It has fine, irregular foliage and rose-pink flowers to 5 cm in diameter.

KANGAROO PAW see *Anigozanthos*

LAMBERTIA

Another member of the protea family, this genus is suitable for growing in Temperate Zones, and consists of nine species, mostly from Western Australia. Lambertias are dense shrubs to 2 m (sometimes smaller in cultivation). All require light soil, perfect drainage and organic mulch. The only New South Wales member of the genus is the beautiful *L. formosa*, better known as Honeyflower (or Mountain Devil, in reference to its winged seed pods). Flowers are clusters of red nectar tubes that are borne over a long period and are attractive to birds

and beneficial insects. It is a lovely feature plant for gardens. Like other proteas, lambertias are long-lasting as cut flowers. Cutting flowers for indoor use provides sufficient pruning to promote the growth of new laterals. Spent flower heads should be removed on a short stem as soon as possible after flowering

LEPTOSPERMUM

This is a genus of hardy, fast-growing shrubs and small trees suitable for Cool and Temperate Zones. It is commonly known as tea-tree because early settlers made a type of tea from the leaves. However, the antiseptic and anti-fungal tea tree oil is extracted from another plant, *Melaleuca alternifolia*. Manuka Tea-tree, *L. scoparium*, is the food source for bees that produce medicinal manuka honey. This tea-tree is a frost-hardy 1.8 m bushy shrub that is native to New Zealand and south-east Australia. Leptospermums attract insect-eating birds. Some of this genus are suited to tough foreshore conditions while others prefer poorly-drained soil, so make sure you understand suitable growing conditions for your plant before purchase. Stressed plants in this genus are susceptible to attack by web moths whose larvae live in a mass of webbing in foliage and feed in a group on leaves at night. Do not spray this pest as the spray is unlikely to penetrate the web. Clip off the webbed stem and dispose of it in a sealed plastic bag. Improve growing conditions for your plant, or replace it with a species more suited to your soil and climate. Young plants can be given a light pruning after flowering.

MACADAMIA see [chapter 6](#)

MELALEUCA

Melaleucas include the paperbarks and honey myrtles. They are hardy and easily grown, and range from small shrubs to trees. All attract both insect-eating and nectar birds. They are often confused with bottlebrush; however, close observation will show that the stamens of melaleucas are in bundles while those of callistemons are loose. Flowers come in an extended colour range. With more than one hundred species to choose from, you are sure to find one suitable for your conditions.

Some species are suited to beach fronts, some are lime-tolerant, some like semi-shade, and some grow in swampy soils. The adaptable Granite Honey Myrtle, *M. elliptica*, has red brushes and grows to 3 m. Slender Honey Myrtle, *M. gibbosa*, has purplish pompom flowers in summer, grows to 2.5 m, and prefers wet soils in cool or cool temperate areas. Showy Honey Myrtle *M. nesophila*, has a similar height and flowers and is more versatile. The very beautiful Scarlet Honey Myrtle, *M. fulgens* to 1.2 m, has short red brushes with gold-tipped stamens. It is drought tolerant and very easy to grow but prefers some watering in summer. Lightly apply compost in spring and prune melaleucas in the same manner as described for callistemons.

METROSIDEROS

This genus is native to Australia, New Zealand, South Africa and the Pacific Islands. Suitable for Temperate and Warm Zones, these slow-growing plants are tolerant of both salt air and city pollution. They have leathery, dark-green leaves that contrast dramatically with the long-lasting, red eucalyptus-like flowers. The undersides of leaves are grey and furry. Lord Howe Mountain Rose, *M. nervulosa*, is a shrubby tree to 8 m. New Zealand has some beautiful species, including the rata vines and pohutukawas. Cultivars with

variegated foliage are also available from nurseries. Pohutukawa (or New Zealand Christmas Tree), *M. excelsus*, is a magnificent slow-growing specimen tree. It grows to a height of 10 m in open ground, but takes at least ten years to reach 3 m in height. This species flowers during spring and early summer. Kermadec Pohutukawa, *M. kermadensis*, is similar in appearance but flowers through the year and grows even more slowly.

Most species require a humus-rich, well-drained soil and regular watering, but the pohutukawa will tolerate drier soils and tough coastal conditions. All species appreciate a mulch of well-rotted cow manure in spring. They can tolerate annual clipping and, because of this, they are sometimes grown as hedges, but regular pruning is not required. Due to their slow growth, this genus makes hardy container plants suitable for sunny balconies or patios. When grown in pots or tubs, they require a moderately fertile, easy-draining potting mix, a sunny or partly shaded position, and a light application of worm castings in spring.

MUEHLENBECKIA

The wire plants belong to this genus that is common to Australia and New Zealand. These evergreen perennials have maidenhair-fern leaves, wiry stems and insignificant white flowers. Wire plants need a well-drained, sunny to partly shaded position, with regular watering until established. Australian Ivy or Creeping Wire Plant, *M. axillaris*, is a fast-growing, frost-resistant ground cover (or climber) for Cool and Temperate Zones. New Zealand Wire Plant, *M. complexa*, is similar but grows to about 3 m in both height and diameter. This plant will develop into a thick mat unless clipped regularly.

You can have a lot of fun with these plants as they can be trained as a metre-high hedge on cyclone or chicken wire. You can also train one over shaped chicken wire to create a small-scale topiary feature. Regular clipping is required in warm months to keep this genus under control, or you may prefer to just simply tip prune young plants and allow them to spill naturally over a bank or slope.

PAPERBARK see *Melaleuca*

PHILOTHECA

Probably the best known species of this genus is Long-leaf Wax Flower, *P. myoporoides*, a lovely shrub to 2 m, with waxy star flowers which are white on top and pink underneath. There are now named cultivars being bred from this very popular shrub that blooms from midwinter to spring. These shrubs are suited to temperate areas on the Australian east coast in well-drained, damp soil in part-shade or sun, with organic mulch and protection from wind. Some philothecas are frost hardy. Fairy Wax Flower, *P. verrucosa*, to 1 m, has double flowers. Tip prune young plants.

PITTOSPORUM

The pittosporums belong to a widely distributed genus of two hundred species suitable for cool temperate to warm areas. Some species of these useful evergreen trees are native to either Australia or New Zealand. Pittosporums have glossy foliage with wavy edges. Many species have very fragrant five-petalled flowers produced singly or in clusters. The Australian Sweet Pittosporum, *P. undulatum*, to 10 m, is a fast-growing, hardy tree that is suitable for hedges or windbreaks. Foliage is deep green and clusters of fragrant cream flowers bloom in spring. This species may need regular

light pruning. Karo, *P. crassifolium*, from New Zealand, grows to 4 m. It is a tough shrub that is drought tolerant and resistant to fire and salt spray. This species with silky leaves and chocolate flowers makes an excellent hedge, windbreak or specimen plant. Kohuhu, *P. tenuifolium*, can grow up to 6 m, and has richly perfumed small maroon flowers in spring. Foliage comes in a range of colour variations and this species also makes a striking specimen plant. Many named cultivars are available.

PROSTANTHERA

The native mint bushes belong to an Australian genus of fast-growing small to large shrubs with attractive tubular flowers and scented foliage. Species are available to suit most areas but virtually almost all prefer well-drained soil in semi-shade with wind protection. This genus may survive drought conditions but plants look very droopy in dry periods because the leaves of this family collapse quickly as soil loses moisture. Water as advised for each species. Feed lightly with mature compost and apply mulch in spring. Mint bushes respond to a light trim after flowering.

Victorian Christmas Bush, *P. lasianthos*, is a fast-growing shrub to 4 m. It has toothed leaves to 10 cm in length and sprays of fragrant white flowers tinged with pink and purple. This species prefers moist conditions and is generally short-lived.

TEA-TREE see *Leptospermum*

TELOPEA

This small genus is a beautiful member of the protea family. All five species are waratahs that have tough green leaves and

striking, crimson flower heads, similar to large grevillea flowers. All require perfect drainage and a slightly acid, sandy loam. They dislike areas with high summer rainfall. This genus has a reputation for being difficult to cultivate, but they will be easier to grow organically because they require humus and organic mulch for survival; chemically treated gardens and synthetic fertilisers are deadly to telopeas. Mulch lightly with compost or leaf mould in spring.

NSW Waratah, *T. speciosissima* grows to 2.4 m with flowers 10 cm in diameter. Some named cultivars of this species are available, including one with creamy-white flowers. Gippsland Waratah, *T. oreades*, a tree to 6 m, has slightly smaller flowers and is easier to grow. Tasmanian Waratah, *T. truncata*, grows to 1.2 m, prefers cool, moist, hill country, and has flowers 5 cm in diameter. Monga Waratah, *T. mongaensis*, grows to 2 m, with a more loosely formed flower head.

All proteas are long-lasting cut flowers and cutting flowers for indoor use provides sufficient pruning to promote the growth of new laterals. After flowering, remove any flower heads remaining on shrubs. Cut through stems immediately above a healthy leaf axil on new growth, as proteas dislike pruning of old wood. This practice is very important to encourage strong growth in young shrubs.

WARATAH see *Telopea*

WATTLE see *Acacia*

XANTHORRHOEA

The grass tree, *X. australis*, is a dramatic but extremely slow-growing feature tree for gardens. It has a thick, rough

trunk topped with a tuft of metre-long fine blades. A long spike of closely packed white flowers appears in spring. Flowering is uncommon in cultivated plants as these natives have a tendency to flower after exposure to bushfires. Grass trees are found in all states of Australia and will grow in full sun or dappled shade in a well-drained position. Purchase only plants that are well established in pots and carry authorisation labels, or they will probably die when transplanted. Grass trees are very hardy when established and have few requirements. Plants grow only about 1 cm per year, and do not require any pruning.

Natives for Pots

For those with limitations of garden space or water supply, many natives are suitable for growing in outdoor pots. Taller species will require large tubs. Named cultivars of pohutukawas, native flax and smaller pittosporums from New Zealand all look very striking in large pots. In addition to dwarf acacias and many callistemons, grevilleas, melaleucas and prostantheras, all members of the following native genera are suitable for growing in well-drained containers of a suitable size, and you are sure to find some for just the spot you have in mind.

- *Adiantum* (Maidenhair)
- *Dianella* (blue or purple flowers)
- *Anigozanthos* (Kangaroo Paw)
- *Dryandra* (protea family)
- *Asplenium* (Ferns)

- *Epacris* (Heath)
- *Banksia* (protea family)
- *Hemiandra* (ground cover)
- *Baeckea* (tea-tree flowers)
- *Hibbertia* (Guinea Flower)
- *Calothamnus* (Claw Flower)
- *Hovea* (blue pea flowers)
- *Calytrix* (star flowers)
- *Lechenaultia* (range of flower colours)
- *Conostylis* (Cottonheads)
- *Petrophile* (protea family)
- *Correa* (bell flowers)
- *Philotheca* (Wax Flower)
- *Craspedia* (Billy Buttons)
- *Pterostylis* (Hooded Orchid)
- *Crowea* (star flowers)
- *Stypandra* (blue star flowers)
- *Cyathea* (Tree Fern)

- *Tetralathea* (Pink Eye)
- *Dampiera* (pink or blue flowers)
- *Verticordia* (fringed flowers)
- *Darwinia* (some lemon-scented)
- *Xanthorrhoea* (Grass Tree)

Foreign Favourites

Countless species of trees, shrubs, perennials, vines and flowering annuals from the Northern Hemisphere were brought to the Southern Hemisphere by settlers who tried to duplicate the gardens of their former homelands. Where water supplies were plentiful, a diverse range of plants adapted well to our climate, and European-style gardens have endured in many places. However, altered weather patterns indicate that some areas of Australia will become drier in future years, and we will need to plan our gardens for these less favourable conditions. With this change in mind, a list of drought-tolerant plants is provided in [chapter 5](#).

The following list is deliberately selective; it is not intended to be comprehensive and represents only a fraction of suitable garden varieties. I have compiled these cultivation notes in response to repeated enquiries about the care of some popular foreign plants (or exotics, as they are known in horticultural terms). As a general note, all exotics will grow better if soil is enriched with humus before planting, and most will benefit from the application of organic mulch to provide more consistent soil moisture. (Detailed planting instructions for trees, shrubs, and vines can be found in [chapter 4](#).)

ALOE VERA

PLANTING PHASE: *Full Moon*

One of the few plants known by its full botanical name, this aloe has valuable skin-repairing properties. The gel-like substance in the fleshy interior of its succulent leaves soothes and heals sunburn, minor burns or chapped skin. Slice a leaf lengthwise to expose the gel, rinse it under a tap, and gently rub the cut side of the leaf across the affected area for instant relief. Aloe vera medications are used internally for digestive problems. Use of these plants should, however, be avoided by pregnant women as they contain a uterine stimulant.

Aloe vera is available from most nurseries but can also be grown quite easily from off-shoots (pups) that appear at the base of mature plants. Unlike most succulents that store a lot of moisture within their leaves, this plant prefers part-shade in warm areas, and grows well in leaf litter under tall trees. In these conditions it is quite drought tolerant, but an occasional watering during dry spells will ensure the plant produces its beneficial gel. It requires a sandy soil mix and perfect drainage. Avoid positions where soil is permanently wet because it will rot. Plant it in a warm, protected area in your garden or, if the area becomes quite cold in winter, plant it in a pot that can be moved to a warmer position during the winter months. During warmer months, cover surrounding soil with organic mulch that includes a small amount of well-rotted cow manure. Potted specimens should be fertilised in spring with a small quantity of worm castings.

ANEMONE AND RANUNCULUS

PLANTING PHASE: *Full Moon*

Both anemones and ranunculi are planted at the same time as spring bulbs, and require a similar soil preparation (see Bulbs). Corms are planted 3 cm deep and 15 cm apart directly into garden beds in a sunny position, or raised in seedling trays and transplanted when foliage is 3 cm long. Ranunculus claws face downwards at planting, and anemones are planted with the pointed end downwards. An application of fertiliser tea during bud formation will improve flowering. These two garden favourites flower best from fresh corms each year.

AZALEA see *Rhododendron*

BEARDED IRIS (*Iris* hybrid)

PLANTING PHASE: *Full Moon*

The bearded iris (also known as the flag or German iris) is one of the most beautiful additions to gardens in Cool and Temperate Zones. It is identified by its ‘flag’ of three silky petals that stand upright in the centre of each flower above the ‘falls’ (the three lower petals which flow downwards). At the top of each fall you can clearly see a tuft of fleshy hairs, which is the ‘beard’. In suitable conditions, branched flower stems sit high above fans of grey-green, sword leaves. Bearded iris are available in every colour, and extensive breeding has produced many magnificent shades and colour combinations. Bare-rooted rhizomes of named cultivars can be ordered by mail from specialist nurseries.

The bearded iris is better suited to areas with restricted water than some other species, but it does respond well to cold winters. Dwarf bearded iris require at least two months of really cold winter. Taller cultivars require slightly less chilling. Unlike spring bulbs, you can’t trick bearded iris that winters are cooler because they have to be planted with the

tops of rhizomes level with the soil surface. In areas north of Sydney with mild winters, bearded iris may flower but stems will be very short, barely clearing the foliage and completely spoiling their appearance.

Flowers are borne in spring. Dwarf cultivars, with spikes to 40 cm, can flower as early as August. Medium growers, to 60 cm, flower a little later, and tall cultivars, over 70 cm, flower from late spring to early summer. Rhizomes can be planted in an open, sunny position from November (when their growth cycle begins) until early autumn. Bearded iris grow best in well-drained, pH-neutral soil containing plenty of humus, and can be grown as part of a herbaceous perennial border or as specimen plants. Include a handful of poultry-based organic fertiliser or worm castings per square metre when preparing soil in late winter. All organic matter must be fully composted as uncomposted manures and wet soils can cause rhizomes to rot. Where soil is heavy, raising beds by 10 cm is advised.

Rhizomes are supplied with the foliage cut to an inverted V. This shape conserves moisture but does not damage new growth in the centre of the fan. Note the position of the V carefully as you will have to trim foliage in the same manner when dividing the plants.

Planting holes for bearded iris are an odd shape — each rhizome requires an oval hole that is 2 cm deep at one end and deep enough to contain the roots at the other end. Plant each rhizome so that the top sits level with, or just above, the soil surface. Firm soil carefully around both roots and rhizome. Clumps should be positioned about 50 cm apart to allow for expansion. Labels with cultivar names should be pushed into soil beside each clump so that you will be able to identify particular cultivars when rhizomes need dividing.

For the first month after planting, water rhizomes as soon as the top centimetre of soil is dry; then water as required during dry spells to keep them growing strongly. If mulch is used to conserve water, apply only a light layer around each clump and keep it well clear of rhizomes. Each year, after flowering, apply a handful of organic complete fertiliser around the base of each clump, or apply worm liquid tea to the rhizome area only, and re-apply the tea in late summer. Regularly remove dead leaves by gently pulling them downwards and outwards. Plants require little, if any, watering during winter. If rhizomes push out of cold soil during winter, pack some light loam around their sides, and replant them properly when dividing the clump (see [chapter 8](#)).

BROMELIADS

PLANTING PHASE: *Full Moon*

Bromeliads are a group of twenty-one genera of amazing plants ranging from ‘air-plants’ (which require almost no watering) through tree-dwellers to soil-grown genera. These perennials are well known for their patterned, coloured leaves and unusual flower forms. Most grow as rosettes of spear-shaped leaves. Some have a well (cup) in the centre of each plant that collects rainwater and attracts frogs and insects. Drowned insects and falling leaves fertilise these plants in the wild. Flowers develop within the cup and rise above the water as they open.

Bromeliads can be found to suit all growing zones. Most prefer a temperature range of 10–20°C, but some will tolerate temperatures as high as 48°C. Hard-foliaged species can tolerate freezing. All bromeliads require good air circulation. Species with central ‘cups’ require that it be kept full of

water. Grey-leafed bromeliads rely mainly on atmospheric humidity for moisture, so the more grey bloom on leaves the less water the species requires.

Grey-leafed species of bromeliads grow best outdoors but can be grown as indoor plants if they are misted frequently. Bromeliads do not like ‘softened’ or filtered water, but most do like filtered sunlight. Leaves on soft-foliaged bromeliads will scorch in full sun, although a few hard-foliaged genera can handle it.

Bromeliads grown indoors also require good lighting without direct sunlight. In low-light positions colouring will be poor and new growth will be slow and weak. Potting mixes must be well drained, and the richness of the mix required will vary according to the genus. Soil-dwelling bromeliads are quite drought tolerant and will rot in over-wet soil. To induce your potted bromeliad to flower, put the pot in a large, clear plastic bag, add a ripe apple, fill the bag with air and seal the top. Remove the plant from the bag after one week; flowers should appear in about a month.

Bromeliads are not parasitic and make an interesting addition to gardens on or under trees, or in shallow wide pots. They will grow into clumps from the pups that form at the bases of plants, and these pups are easily removed to create a new clump.

Pineapple

The most well-known bromeliad is *Ananas comosus*, which produces the edible pineapple. Raw pineapple is rich in vitamin C and fibre, and contains enzymes that assist the digestion of protein. These enzymes are strong enough to prevent egg whites setting. (When using pineapple in recipes

that include eggs use cooked or canned pineapple, which has only half the vitamin C.)

Each eye on a pineapple's surface was once a pollinated flower, which means that, structurally, a pineapple is not a single fruit but about 150 separate fruits fused together. There are other decorative species of this genus with variegated leaves that are suitable as indoor, or outdoor, plants for Temperate and Warm Zones. *A. bracheatus* produces small, red decorative pineapples. All will grow easily as foliage plants in free-draining, humus-rich soil. In Temperate Zones, all *Ananas* species can be grown in pots in protected sunny areas, and some may produce fruit.

To produce edible fruit, the pineapple requires very warm temperatures and protection from frost and cold winds. Raised beds will help drainage during prolonged wet weather. Soil must be free draining, and should contain as much humus as you can spare. Pineapple plants prefer an acid soil with a pH around 5. The addition of plenty of well-rotted manure when preparing the planting area will help to lower soil pH. Pineapple are planted during warmer months. The precise timing depends on the method of propagation, but always avoid a wet season, which can induce rotting of young plants. Pineapples can be propagated from 'slips' (axillary growth shoots) and the best slips are those that form just below a fruit. They can also be propagated from the underground stolons that form pups. However, the easiest way of all is to use a top cut from a ripe pineapple. Slips and pups can be planted out when soil warms in spring; tops are planted in summer or autumn. (See [chapter 8](#) for information on propagating from pineapple tops.)

Surround plants with organic mulch and keep soil just damp. Each spring, apply half-strength seaweed tea and a mulch of well-rotted manure, then cover with a couple of centimetres of organic mulch. Top up with compost in early summer. As ethylene gas helps pineapples to flower, try planting dandelions among your pineapple plants. Fruit is ready to harvest when it starts to yellow at the base. Use a serrated knife or a coarse hacksaw blade to sever fruit from its stem.

Spanish Moss

Also known as Old Man's Beard, Spanish moss, *Tillandsia usneoides*, is an unusual and useful 'air-plant' bromeliad. It makes an excellent mulch for orchids other than cymbidiums. This plant has no roots and consists of long stems of fine silver leaves. In its natural habitat, it survives on moisture from heavy dew or fog. It is easily propagated by laying a stem horizontally in a semi-shaded position and anchoring the ends with a plant tie. New stems will form from leaf axils along the stem. By also draping this new growth horizontally, more stems will form to produce a dense plant. Pieces can then be pulled from the parent plant and wound around the surface of potted orchids. Although this plant can survive on air moisture alone, growth will be improved in plants not used as mulch if you dunk them monthly in a bucket of water during prolonged dry spells. In spring and late summer, the addition of a very weak solution of fertiliser tea to the dunking water will help produce tiny yellow-green, fragrant flowers along the stems.

BULBS

PLANTING PHASE: *Full Moon*

Spring- and summer-flowering bulbs include both evergreens and herbaceous plants. Some are quite hardy in Australian conditions, but others, including bluebells, daffodils, lily of the valley, calla and canna lilies, and Louisiana, English and Japanese iris, will not tolerate water restrictions. Hippeastrums require frequent watering in spring. Cyclamen, crocus, hyacinths, snow drops, tulips, and bearded and Siberian iris will not grow well in warm temperate areas and Warm Zones. Clivia and crinum lilies require warm conditions.

Most bulbs can be planted during autumn so planting areas should be prepared from mid to late summer with plenty of well-rotted organic matter, and a light application of worm castings or organic complete fertiliser. Be careful to avoid the use of uncomposted animal manures when preparing soil for these plants as it can cause some bulbs to rot. The nutrients available to bulbs when growth starts in spring will determine the quality of flowers the following year. Bulbs that have been left in soil through the year should be mulched in autumn with a 5-cm layer of compost and a small amount of worm castings, covered with a thin layer of fibrous mulch or wilted lawn clippings.

When flowering has finished, remove flowering stems from evergreen bulbs. Remove only the spent flower heads from herbaceous bulbs, however, as the nutrients from the foliage and stems will be absorbed into the bulbs for future growth. Leaves should not be removed, or tied up, until plants have completely died back. Some flowering bulbs, including daffodils, have slimy sap; when cutting these flowers for indoor use, wipe cut ends carefully with a paper towel before putting them into vases. Change vase water regularly.

Spring bulbs

These herbaceous bulbs can be grown in open soil or containers. (See [chapter 4](#) for suitable growing mixes.) Bulbs planted in lawn areas will require extra watering, and must be clearly marked to avoid mowing over them in early spring. Gardeners in Cool Zones and New Zealand can plant spring and freesia bulbs in March. Gardeners in Temperate Zones can plant in April, and in Warm Zones bulbs can be planted in May when soil is cooler.

Because most spring bulbs require a period of chilling before they commence growth, gardeners in Temperate and Warm Zones are advised to purchase bulbs as early as possible and store them in the vegetable crisper of the refrigerator for four to six weeks prior to planting. This practice will improve bulb growth. In Warm Zones only, a site in the coolest part of the garden with dappled shade and heavy mulching will benefit suitable spring bulbs. As a general rule, bulbs are normally planted at a depth twice the width of the bulb. In Warm Zones, however, the bases of the bulbs should be planted up to twice as deep as indicated on the packet.

After planting, mulch bulb areas early in the morning when soil is coolest. Gardeners in very cold areas should apply mulch where spring bulbs have been planted because frozen soil can push bulbs out of the ground. If bulb beds were well prepared before planting, bulbs are unlikely to require further fertiliser during the growing season. Keep soil just damp until foliage starts to appear, then water bulbs regularly until foliage has completely died down. Remove only spent flowers from spring bulbs, and apply seaweed tea when flowering has finished.

Apart from tulips and hyacinths, spring bulbs can be left in soil for three years. In Warm Zones, and other areas where summers are very hot, it is advisable to lift all spring bulbs after foliage has died back and store them in cool conditions. After three years bulbs will become crowded and flower quality will decline. If bulbs have been regularly fertilised, clumps can be lifted after foliage has died back, and replanted in autumn in improved soil or moved to another prepared site. If bulbs have to be lifted for storage, discard any damaged bulbs and lay them out on a tray indoors for a day or two. Twist off any dry foliage and brush dry soil from bulbs, then store them in a mesh bag in a cool, dry, airy place.

CAMELLIA

PLANTING PHASE: *Full Moon*

Camellias are slow-growing evergreen shrubs with attractive, glossy leaves. Many camellia bloom during winter, when the delicate flowers provide welcome colour in a range of shades from white to richest reds. Some flowers are streaked, and forms can vary from exposed stamens to ruffled petals or rosebud centres. Suitable species are available for most growing zones (except tropical areas) provided they have a sheltered position protected from severe frosts or sunburn. Both frost and sunburn encourage a fungal disease in camellia leaves.

C. japonica has a tidy, formal shape, while *C. reticulata* tends to have a more open structure. *C. x williamsi* is suited to Cool Zones, and *C. sasanqua* has perfumed flowers in autumn. There are many named cultivars available for each species. Sasanquas are faster growing with a spreading form and arching branches. They can tolerate full sun in Temperate

Zones and may be espaliered to grow flat against a fence or wall. Red-flowered camellias also tend to be more sun tolerant than other colours; lighter coloured species need at least half a day's shade in summer to perform well. However, all camellias require three hours sun a day from November to January in order to set flower buds. In hot areas, all camellias will have to be grown in a shade house and not watered with bore water which can be alkaline or saline.

All camellias require perfect drainage, a slightly acid soil rich in organic matter, and protection from early-morning sun when flowering. Frost or dewdrops on camellia petals act as a magnifying glass for the sun's rays, causing severe discoloration of the blooms. A suitable place for *C. japonica*, *C. reticulata* and *C. x williamsi* is on the south side of buildings, with low protection to the north east. Camellias will grow happily in large pots, or can share beds with rhododendrons, azaleas and some Australian natives. They are shallow-rooted plants and cannot compete with trees or shrubs that have aggressive root systems. Once you have found a suitable position, however, they are quite undemanding shrubs. They have low fertiliser requirements, require little water during winter and only a regular watering during warmer months, and very little pruning.

The best time to plant camellias is in early autumn, although most will not be in flower at that time. As camellias are slow growing, it is worthwhile purchasing an advanced shrub for feature planting. Follow good planting practice and plant camellias at the same depth as in the pot. Do not fertilise at planting time. Keep soil just damp during winter, increasing water as the weather warms. Do not use soil for growing camellias in pots. All specialist camellia nurseries have their

own potting mixes or you can make your own. (See [chapter 4](#) for potting mixes, and [chapter 8](#) for pruning camellias.)

Camellia flowers are heavy, so allow only a few to form on young plants. All camellias should be dead-headed during First Quarter phase immediately after flowering. Cut back to just above a healthy leaf bud. Apply manure tea or worm liquid tea around the base of each plant. Apply fertiliser tea at half strength to *C. reticulata*. In spring, place 2–3 cm of well-rotted cow manure or mature compost around the base of each plant and cover it with 2 cm of organic mulch or a thin layer of deciduous leaves. This will provide nutrients, prevent fluctuations in soil temperature, and protect surface roots from damage when weeding.

In February and March, apply cold, spent tea dregs around the base of each plant. Both ordinary black tea and green tea are made from *C. sinensis*, a close relative of the larger-flowered shrubs. Tea-leaves provide trace elements all camellias need to form flowers, and prevent a problem called ‘balling’, where the flowers fail to open. The application of tea-leaves year-round is not recommended as it can over-acidify soil. In March, also apply half-strength seaweed tea. Unless stressed by unsuitable conditions, camellias are relatively free of pests and diseases. If the edges of your camellia leaves look as though they have been attacked with a hole puncher, it probably indicates the presence of leaf-cutting bees (see [chapter 9](#)).

CARNATION (*Dianthus caryophyllus*)

PLANTING PHASE: *Full Moon*

The perpetual carnation *D. caryophyllus*, belongs to a large genus that includes sweet williams, dianthus, old-fashioned

and modern pinks, and bedding carnations. Larger carnations are popular as cut flowers, and have a clove fragrance. Perpetual carnations have ruffled blooms of fringed petals and flower through the year. Bedding carnations have smooth-edged petals and flower only in summer. The perpetual carnation cultivars have become more popular because of their free-flowering habit. The very large Sim cultivars are rarely perfumed.

Carnations are somewhat particular about growing conditions and may not be worth the trouble for one or two plants. They are more suited to Cool and Temperate Zones as flower quality declines in high temperatures, and hot, humid conditions encourage disease in this genus. Carnations may be grown as annuals or in pots in hot areas, and also in very cold areas where frost may kill plants. In other areas, all carnation plants should be replaced after three years to avoid a decline in flower quality. Fortunately, these perennials are easy to propagate by layering, or from tip cuttings (see [chapter 8](#)).

Carnations require a free-draining soil that contains humus and complete fertiliser, and has a close to neutral pH. They also require a sunny position, wind protection, and raised beds as they are prone to root rot during prolonged wet spells. Carnations are reputed to have a high potassium requirement, and plants will benefit from a dusting of wood ash when preparing beds. Wood ash will also increase soil alkalinity. If you do not have wood ash, water the growing area with seaweed tea as it contains a good supply of potassium. Moisten the bed until soil is dark-damp, then cover the prepared area thickly with mulch and leave it undisturbed until planting time. Autumn plantings of carnations usually

produce good results, and beds should be prepared in late summer. In cold areas, planting should be left until spring. Perpetual carnations planted in autumn will flower in spring. If planting in autumn, remove mulch from beds before planting as mulch can cause stem rot in carnations during cold weather. A light layer of mulch can be applied when the weather warms. Space plants 45 cm apart, keeping the lowest leaves clear of the soil surface.

Carnations are tall, slender perennials with brittle stems. All carnations require support; if left to their own devices, they will grow more horizontally than vertically. Perpetual carnations are usually supported with wire tubes, which surround the whole plant, rather than stakes. They also need to be 'stopped' to produce strong growth at the plant base. When a young plant has developed ten pairs of fully mature leaves, remove the growing tip above the sixth pair of leaves by snapping it sideways. Repeat this procedure with the side shoots that form, then allow the following shoots to grow to full length. After each burst of flowers, snap off unpicked flower stems close to the base of the plant to encourage further bushy growth. Each spring, a light application of worm castings or complete fertiliser, in addition to seaweed tea, will maintain good growth.

Cut flowers should be picked, in early morning, with the longest stem possible, by snapping stems at a node. Cut flowers are then re-trimmed to a suitable length just above a node before placing in water. Change vase water regularly.

CHRYSANTHEMUM

PLANTING PHASE: *Full Moon*

This large genus includes herbaceous and evergreen perennials, which require different growing conditions. Most are suitable for both open garden and pot culture.

Feverfew has been re-classified as *Tanacetum parthenium* but is still sometime called *C. parthenium*. It is a popular border plant, to 23 cm, with lacy foliage and yellow and white daisy flowers. Handling fresh leaves of this species can cause dermatitis. It should be avoided by pregnant women as it is a uterine stimulant. Another re-classified species is the pyrethrum daisy, *T. cinerariifolium*, that grows from seed sown in spring and summer when temperatures reach 25°C. This daisy also produces white and yellow flowers from early summer to early autumn. Dried flowers are the source of an insecticide that has a low toxicity for mammals, and they can be tucked under pet bedding to remove insect pests.

Marguerite, *C. frutescens*, is an evergreen perennial, to 90 cm, suitable for all but very hot and dry, or very cold, areas. It requires little care and is easily propagated from cuttings in water (see [chapter 8](#)). Foliage is feathery, and single or double daisy flowers in white, yellow or pink bloom almost year-round. Plant in a sunny position and water every few days until established; then about weekly during dry spells. Mulch plants in spring after a light application of organic complete fertiliser, and tip prune young plants regularly.

Shasta Daisy, *C. maximum*, is a herbaceous perennial that produces large white daisies on strong stems in summer. Cultivate as for other herbaceous perennials and propagate from crown division in autumn (or spring, in frost areas). Single-flowered shasta daisies can be grown from seed in spring, and transplanted at 40 cm spacings when 5 cm high.

Chrysanthemum hybrids are the plants typically sold by florists for Mother's Day in May. These produce flowers through autumn to early winter with various forms including pompom, quill, spider, reflexed and exhibition. Colours range from pure white through yellows, rusts, reds, pinks, mauves and purples. They are very hardy plants that can be grown in open soil or pots in almost all areas, except those where winters are quite warm. Tropical wet conditions can cause rust on foliage, or root rot. Small chrysanthemum plants are available from nurseries in suitable growing areas from mid to late spring. Although hardy, they do need regular watering to produce good flowers.

Hybrid chrysanthemums are herbaceous perennials that re-shoot in spring. However, some gardeners are disappointed when they find that chrysanthemums which bloomed beautifully one year perform poorly the next flowering season. This is because these hybrids grow better from cuttings taken each spring. If you want to transfer a potted chrysanthemum to your garden, see overleaf for winter care of these plants.

Prepare beds or planting areas during winter with plenty of well-rotted manure, and cover the planting area with a light layer of organic mulch. In suitable areas, grow a green-manure crop in late autumn and leave the slashed crop as mulch. In very early spring, remove remaining mulch and add some compost, worm castings or organic complete fertiliser. Add a dusting of dolomite if soil remains acidic. Liming is not necessary if using poultry manure. Re-cover the planting area with mulch. Position stakes about 60 cm apart and plant cuttings with roots, through mulch, from mid to late spring. Water plants thoroughly. It does not matter if you

plant late in spring as flowering in many chrysanthemum hybrids is initiated by shorter days and cooler temperatures as autumn begins.

Water chrysanthemums weekly, under mulch, during dry periods. Avoid overhead watering as it encourages rust in chrysanthemums. Apply seaweed tea in late spring. When plants are 20 cm high, pinch out the growing tip to produce more lateral shoots. These shoots can be ‘stopped’ at 8 cm in length to produce more flowering stems if you prefer lots of smaller flowers to fewer, larger ones. Any extra shoots that form can be gradually pinched out when 3 cm long. If growth seems slow, apply some worm liquid tea in midsummer, but do not top up mulch or apply fertiliser once buds start to form in late summer. Clusters of buds at the end of each stem will contain a larger ‘crown’ bud that will flower first. For a massed display, leave all the buds to bloom. For slightly larger flowers, you can pinch out some buds once they have separated enough to do so without damaging other buds. When de-budding, gradually work your way down the stems. For very few, but much larger blooms on each plant, gradually remove all but the crown bud. It is wise to also leave one other bud, just in case of accidents.

Chrysanthemums will grow very well in large containers with good drainage. Start them in small pots using a good quality potting mix. Lightly dust the inside of pots with dolomite before adding the mix. Gradually increase the size of the pot to about 30 cm, while also increasing the amount of fertiliser in the mix. Do not put a small plant straight into a large pot as it won’t grow very well. For 30-cm pots, use the growing mix for large pots with some extra compost or worm castings added. In warm areas, position large pots where the pots

themselves will receive some shade, to prevent soil overheating. Pot-grown chrysanthemums may require a couple of half-strength applications of worm liquid tea between late spring and midsummer. During flowering, place markers beside the plants you wish to use for cuttings next spring. After flowering has completely finished, cut selected plants back to about 15 cm, and keep just damp until spring. In cold areas, chrysanthemum 'stools' can be protected in the same way as other herbaceous perennials.

To get the best results from cut chrysanthemums, water plants thoroughly the day before cutting. Pick them in the early morning using secateurs to cut stems. Once indoors, fill your vase with clean water; then remove any leaves that would sit under water, and scrape the lower stems with a vegetable peeler. Break, rather than cut, long stems. Quickly place trimmed flowers into a vase or bucket half-filled with water. Change water in flower vases daily.

CONIFERS

PLANTING PHASE: *Full Moon*

In areas other than Cool Zones, foreign conifers generally require careful selection and regular care because they can become seriously damaged by water stress before showing any symptoms. (After drought periods, when everything else has recovered and your garden looks healthy again, a conifer may suddenly die, leaving you puzzled as to the cause of its demise.) Water-stressed conifers are very vulnerable to borers and some diseases. Keep conifers thickly mulched in summer as they like a cool root area but do not like mulch close to their trunks. Check soil moisture regularly during summer and other long periods of dry weather. Water deeply, when

required, to keep soil just damp 2 cm below the surface. They may need watering every week or ten days in dry weather but do not water conifers out of habit, and resist over-watering in winter.

Most conifers require humus-rich, well-drained soil in an area protected from hot winds. They grow poorly in soils low in organic matter, or where soil is shallow. The 'full sun' rule will not apply in many areas of Australia as some conifers will quickly deteriorate in areas exposed to hot afternoon sun. When selecting a conifer, enquire about growing requirements before purchase, then follow good planting practice.

Conifers have moderate fertiliser requirements, and many will simply require an annual application of compost or well-rotted cow manure as part of their mulch. Some conifers are pruned for special effects but most have a naturally attractive shape that requires little, if any, training. In variegated foliage, any entirely green shoots that appear should be completely removed during the growing season, preferably after Full Moon. Some conifers can be easily propagated by seed from the cone fruits they produce. Others, particularly those with variegated foliage, must be propagated from heeled cuttings.

In many parts of Australia, cypresses (apart from the Arizona, Bhutan and Mexican species) are prone to a canker produced by fungus in split bark. Because of their dense evergreen foliage, the presence of this brown, powdery fungus can go unnoticed and the first sign of it may be a branch with dead foliage. Once the fungus circles the trunk, trees die. The fungus attack usually indicates that the tree was in an unsuitable position, so do not replant a conifer in the same

site. The versatile Arizona and Bhutan cypresses are resistant to root rot.

CREPE MYRTLE (*Lagerstroemia indica rubra*)

PLANTING PHASE: *Full Moon*

Hardy, deciduous trees or shrubs, crepe myrtles are suitable for all but the coldest areas. They are grown for their long-flowering trusses of ruffled blossom from summer to autumn, and for their attractive mottled bark. Unpruned trees can grow to 6 m, but regular pruning will keep them much smaller. Dwarf cultivars are also available. Crepe myrtles grow well in a sunny position in soil that contains some humus. Plants protected from hot winds will flower longer and make faster growth. Once established, larger cultivars require only occasional watering in prolonged dry periods. For good growth, smaller plants require watering twice as frequently. All cultivars will benefit from an application of organic complete fertiliser and mulch, after pruning (see [chapter 8](#)). In late spring, an application of seaweed tea will help build resistance to mildews.

Established crepe myrtles are moderately drought tolerant, although young plants and dwarf cultivars are less so because of their smaller root ball. The only problem with the larger cultivars in drought conditions is that they develop an extensive root system and ‘sucker’ easily, so you may suddenly find you have a crepe myrtle growing in your gravel driveway. Remove suckers while they are still small, to avoid such problems. Crepe myrtles are most easily propagated from hardwood cuttings in winter.

DAHLIA

SOWING AND PLANTING PHASE: *Full Moon*

This genus of herbaceous perennials provides brilliant garden colour through summer and autumn. Their diversity of flower form and vibrant hues make dahlias very popular as cut flowers. Although they can be grown from seed or tuber, the named cultivars must be grown from tubers. However, well-grown seedlings can produce viable tubers, and new cultivars are developed this way. Dahlia plants require a lot of water when flowering and are better suited to areas with regular summer rainfall where they can be planted in raised beds. Strong summer sun can bleach dahlia flower petals so they may require protection in some areas. Plants can take up to four months to bloom after transplanting, and seed sown at the end of November will produce flowers when sunlight is less intense.

Dahlias require a sunny, wind-free position. Soil should be well drained and rich in organic matter, with organic complete fertiliser added. Heavy applications of manure will result in soft, sappy growth, and fewer flowers. Soil pH should be around 6.5. Prepared growing areas should be covered with a light mulch.

Seeds are sown 12 mm deep in seed trays and transplanted directly into the mulched bed, 45 cm apart, when seedlings are 6 cm high. Potted dahlias can be planted out, slightly deeper, when soil warms in spring. Leave a small depression in soil around each plant stem.

Dahlia tubers form at the plant 'crown' (the base of the old stem) and, by mid-spring, growth buds for new stems will have formed at the crown. To be viable, each tuber must have a portion of the old stem with a growth bud. It may be

necessary to separate tubers by cutting through the crown vertically with a sharp knife. Handle tubers carefully to avoid removing buds from the crown. Tuber pieces need not be large because new tubers will form during the current growing season.

Named cultivars will require individual stakes to support growth. Position stakes before planting —1 m apart for tall cultivars and 75 cm apart for medium cultivars. A tuber is planted beside each stake, bud upwards, so that the tuber is covered by 10 cm of soil, but the area around the growth bud is barely covered until growth is very strong. Transfer weatherproof name labels to soil beside each plant so that you will be able to identify plants not in flower.

Growth is ‘stopped’ when the growing tip is 20 cm high to encourage growth buds for lateral shoots to form in leaf axils. When lateral shoots are a few centimetres long, remove the top pair of lateral shoots. This procedure assists strong stems to form close to the base of each plant. Loosely tie developing stems to the supporting stake with strips of pantyhose, increasing the number of ties as plants increase in height. Young plants should not be over-watered, but all dahlias require regular watering from flower bud formation. An application of fertiliser tea at bud formation can also improve flowering. Flower size will be increased by the removal of some lateral buds once they are large enough to handle. Remove spent flower heads.

If planning to save tubers, allow plants to die down as much as possible so that nutrients can be absorbed into the tubers. Then cut stems 15 cm above ground in early winter. In many areas tubers can be left in soil for three years before they weaken. They (and their name label) can then be lifted

carefully with a garden fork and stored, under cover, through winter. Tubers can be divided in the following spring, and the best sections replanted. Do not remove soil from lifted tubers. In mild areas, tubers can be stored under a tree and covered with clean straw. Do not lift tubers for division in spring as you can damage growth buds.

Water plants thoroughly the day before cutting dahlia blooms. When cutting flowers for a vase, do so in early morning when stems are crisper. With a sharp blade, make a vertical slit in stem sections that will be under water. Then re-cut the bottom of the stem with a long slanting cut (just above a node) and immediately place stems into water.

DAYLILY (*Hemerocallis* spp.)

PLANTING PHASE: *Full Moon*

As the name suggests, flowers of these evergreen and herbaceous perennials last for just one day. However, flowers form as a cluster of buds that sits clear of the strappy foliage, and the large lily flowers open singly, providing a succession of blooms. The daylily is one of the most adaptable perennials for gardens. It suits all growing zones and is drought tolerant, yet grows well in wet conditions. It flowers best in full sun, but will tolerate half shade. It is almost free of pests and diseases except for snails (in foliage only) or, possibly, two-spotted mite in prolonged dry conditions.

The only real problem with daylilies as cut flowers is the pollen that falls easily and can permanently stain clothing or interior surfaces. Flowering begins in November and can occur in bursts or continually (according to the cultivar) through to late autumn in frost-free areas. Plants in flower range from 60–90 cm in height. Named cultivars in an

extensive range of colours and colour combinations are available from breeding nurseries all year, and mature crowns, which will bloom in the current year, can be ordered by mail. Miniature daylily cultivars are also available.

Prepare the planting area with plenty of compost or well-rotted manure. Planting times are not as critical for daylilies as for other perennials, but late autumn to early spring planting (depending on local climate) allows them to establish more quickly. Plant tops of crowns 2 cm below the soil surface, and 90 cm apart. Cover lightly with mulch and water frequently in dry weather until strong growth appears; then gradually reduce watering.

Apply worm castings under mulch in late winter and summer, and remove dead flower stems. Dead daylily leaves can form part of the mulch around clumps. Flowering increases in the years after planting. Daylilies multiply into clumps that can be left undisturbed for four years. After this period, they should be lifted and divided between late autumn and early spring. Divided daylilies establish more quickly if two or three crowns are planted together, rather than singly.

ELKHORN AND STAGHORN (*Platycerium* spp.)

PLANTING PHASE: *Full Moon*

Elkhorn, *P. bifurcatum*, and Staghorn, *P. superbum*, are ferns that produce both rounded fronds that form a nest at the back of the plant, and antler-like fronds at the front. Elkhorns produce offsets (pups) which can be separated from the parent to produce new plants. Staghorns are greener, with broader, more upright antlers, and do not produce offsets. Staghorns can be propagated only from spores.

Both ferns are frost tender. In all but the coldest areas, they grow naturally on trees, where falling leaves catch in the nest and break down to provide humus for the roots to grow into. In cultivation, elkhorns and staghorns are tied to boards or slabs of tree-fern trunk. A mixture of damp sphagnum moss and coconut fibre is packed behind each fern, and the mounting boards are attached to a wall or fence. Some are also grown in hanging baskets. They require a well-lit position out of direct sun and wind, and regular watering in summer to keep the nest damp. Do not apply any water during winter in cool areas. Add a small quantity of mature compost, decayed leaves, or well-rotted cow manure to the top of the nest in mid-spring.

FLOWERING ANNUALS

SOWING PHASE: *New Moon/First Quarter*

Almost all flowering annuals grown in Australia originated in areas with richer soils and higher rainfall, or milder summer conditions. Most of these plants are well suited to New Zealand’s climate. Many are perennials in their native habitat but do best when grown as annuals in harsher climates, while others do better in Australia if grown during winter months.

PLANTING TIMES FOR FLOWERING ANNUALS

Plant	Cool Zones
AGERATUM	Mid Sep-Feb
AURORA DAISY	Feb-Mar & Sep-Oct
CALENDULA	Feb-Mar & Sep-Nov

Plant	Cool Zones
CELOSIA	Oct-Dec
CHAMOMILES	Sep-Nov
CORNFLOWER	Feb-Apr & Mid Sep-Nov
COSMOS	Sep-Dec
DIANTHUS	Feb-Apr & Sep-Oct
EVERLASTING DAISY	Sep-Nov
LIVINGSTONE DAISY	Oct-Nov
LUPIN	Mar-May
MARIGOLD, African	Mid Sep-Dec
MARIGOLD, French	Mid Sep-Dec
NASTURTIUM	Oct-Nov
NEMESIA	Sep-Oct
NIGELLA	Feb-Apr & Sep-Oct
PANSY	Jan-Mar & Sep-Oct
PETUNIA	Oct-Dec
PHLOX	Mid Sep-Dec
POPPY, Iceland	Dec-Feb

Plant	Cool Zones
SNAPDRAGON	Aug-Nov
STATICE	Sep-Nov
STOCK	Jan-Mar
SUNFLOWER	Oct-Dec
SWEET PEA	Jan-Feb & Jun-Aug
VERBENA	Sep-Jan
VIOLA	Jan-Mar & Sep-Oct

Plant	Temperate Zones
AGERATUM	Aug-May
AURORA DAISY	Feb-May
CALENDULA	Jan-May
CELOSIA	Sep-Dec
CHAMOMILES	Mar-Apr & Aug-Sep
CORNFLOWER	Feb-May
COSMOS	Aug-Dec
DIANTHUS	Feb-Nov
EVERLASTING DAISY	Mid Aug-Nov

Plant	Temperate Zones
LIVINGSTONE DAISY	Late Aug-Oct
LUPIN	Mar-Jun
MARIGOLD, African	Aug-Dec
MARIGOLD, French	Aug-Jan
NASTURTIUM	Sep-Jan
NEMESIA	Feb-May
NIGELLA	Feb-May
PANSY	Jan-May
PETUNIA	Aug-Jan
PHLOX	Aug-Jan
POPPY, Iceland	Feb-Apr
SNAPDRAGON	Mar-Apr & Aug-Nov
STATICE	Feb-Sep
STOCK	Jan-Apr
SUNFLOWER	Sep-Jan
SWEET PEA	Jan-Jun
VERBENA	Aug-Feb

Plant	Temperate Zones
VIOLA	Jan-May

Plant	Warm Zones (south of Rockhampton)
AGERATUM	Aug-May
AURORA DAISY	Mar-Sep
CALENDULA	Mar-Jun
CELOSIA	Aug-Feb
CHAMOMILES	Apr-Jun
CORNFLOWER	Mar-May
COSMOS	Aug-Dec
DIANTHUS	Apr-May & Aug-Nov
EVERLASTING DAISY	Aug-Oct
LIVINGSTONE DAISY	Aug-Oct
LUPIN	Mar-Jun
MARIGOLD, African	Jul-Dec
MARIGOLD, French	Aug-Feb
NASTURTIIUM	Mar-Apr & Aug-Dec

Plant	Warm Zones (south of Rockhampton)
NEMESIA	Mar-May
NIGELLA	Apr-May
PANSY	Mar-Jul
PETUNIA	Aug-Feb
PHLOX	Jul-Oct
POPPY, Iceland	Mar-May
SNAPDRAGON	Mar-May & Aug-Oct
STATICE	Mar-Aug
STOCK	Mar-May
SUNFLOWER	Mar-May & L Aug-Nov
SWEET PEA	Mar-May
VERBENA	Mar-May & Aug-Nov
VIOLA	Mar-Jul

Plant	Tropical Zones (north of R'hampton)
AGERATUM	Apr-Dec

Plant	Tropical Zones (north of R'hampton)
AURORA DAISY	Mar-Aug
CALENDULA	Apr-Jun
CELOSIA	Jul-Feb
CHAMOMILES	May-Jun
CORNFLOWER	Apr-Jun
COSMOS	Jun-Sep
DIANTHUS	Apr-Aug
EVERLASTING DAISY	Apr-Aug
LIVINGSTONE DAISY	Jul-Aug
LUPIN	May-Jun
MARIGOLD, African	Jun-Oct
MARIGOLD, French	Mar-Jul
NASTURTIUM	Mar-Sep
NEMESIA	Apr-Jun
NIGELLA	May-Jun
PANSY	Apr-Jul

Plant	Tropical Zones (north of R'hampton)
PETUNIA	Mar-Sep
PHLOX	Apr-Sep
POPPY, Iceland	Apr-May
SNAPDRAGON	Apr-Jul
STATICE	Apr-Jul
STOCK	---
SUNFLOWER	Mar-Oct
SWEET PEA	---
VERBENA	Apr-Sep
VIOLA	Apr-Jul

The flowering annuals listed in the planting diary have adapted well to Australian conditions and require moderate watering. Marigolds, *Tagetes* spp., are an exception; they have been included because they are beneficial companion plants for some vegetables and, when grown among vegetables that are high priority for watering, their higher water consumption is not noticeable. Don't confuse them with *Calendula* spp. (sometimes called Pot Marigold), which has moderate water requirements. Dahlias can also be grown as annuals, and require lots of water when flowering. Both marigolds and dahlias are better suited to areas with regular

summer rainfall. (See [chapter 5](#) for ways to use water efficiently for flowering annuals.) Cultivation information for sweet pea, chamomile and nasturtium is listed separately because they have slightly different requirements.

All flowering annuals prefer well-drained soil that has had plenty of humus added at least a month before planting. A green-manure crop can be used to add organic matter to the soil. Most will grow better in beds covered with about 5 cm of organic mulch before planting; for Iceland poppies, mulch is essential. For convenience, flowering annual seed is usually sown in punnets or pots and transplanted when plants are about 5 cm high. Seedlings can be planted into mulch-covered beds to maintain moisture around plants.

Apply fertiliser teas, if necessary, to encourage steady growth. An application or two of seaweed tea will also help flowering annuals to be more heat tolerant and disease resistant. To prolong the flowering period, don't forget to regularly remove spent blooms before seeds set.

FRANGIPANI (*Plumeria* spp.)

PLANTING PHASE: *Full Moon*

Frangipani belong to a genus of deciduous or semi-deciduous trees that are well suited to Warm Zones and warm temperate areas. They have large dark-green, leathery leaves arranged in a spiral towards the ends of their fleshy stems. Clusters of fragrant, five-petalled flowers are borne at branch ends during summer. Colours range from white with a yellow centre, through various combinations of yellows and pinks, to a deep red.

Frangipani can grow to their full height of 5 m in tropical conditions and have proven remarkably drought tolerant when established. The common white frangipani, *P. acutifolia*, is the hardiest species, and can be grown against a north-facing brick wall in cooler temperate areas. Mature trees can tolerate the occasional light frost but young trees will require protection for the first two years. Other white frangipani, *P. cubensis* and *P. obtusa*, may not be as tolerant of cooler temperatures. The darker-flowered frangipani require warmer, completely frost-free conditions. They usually flower later than the paler cultivars.

All frangipani cultivars like a sunny position but mature trees will still flower in part-shade in warm areas if other conditions are to their liking. Their other two requirements are a well-drained soil and protection from wind. Wind protection is most important as branches of this genus are very brittle and whole trees can snap off in strong winds. For this reason, groups of frangipani do better in exposed areas.

Add some humus to the planting area to ensure easy drainage and root movement, but soil does not need to be otherwise rich in nutrients. Roots may rot in very rich loam during prolonged wet conditions. Raised beds will be beneficial in areas with prolonged rain periods. Because they are quite slow growing, frangipani can be successfully grown for some years in large tubs — the wider the container, the better. Frangipani are very low-maintenance trees, requiring only a small application of organic complete fertiliser under a thick layer of organic mulch in spring, and an occasional watering during prolonged dry spells. Trees will provide their own mulch during winter, and fallen foliage should be left to

decay under the tree. Make sure mulch does not come close to the fleshy trunks.

In Warm Zones where heavy rain is not usual in winter, frangipani can be transplanted from pots in early autumn to spring. Plant frangipani only if you can provide regular watering until trees are established. Avoid planting during the wet season. Brittle roots can be damaged when transplanting, and frangipani do not establish roots during summer flowering. In Temperate Zones, they can be transplanted after spring frosts to ensure that they are well established before plants become dormant.

Trees with flower colours other than white should be chosen while in flower because perfumes vary in different cultivars. Some pink cultivars with rounded petals and an orange centre have very little perfume, while ‘Peach’ not only has longer petals streaked with peach skin-tones, it also smells intensely of ripe peaches. Our deep lipstick-pink cultivar of *P. rubra* has a sweet citrus fragrance that reminds me of lemon coconut cake, and my husband of orange marmalade.

Frangipani require little pruning other than the complete removal of branches that overhang pathways, or for use as cuttings. (See [chapter 8](#) for information on pruning and propagating frangipani.)

GAZANIA

PLANTING PHASE: *Full Moon*

This genus is perfect for brilliant colour in hot, dry areas because gazanias thrive in these conditions and will rot if given too much water. They are not suitable for tropical gardens with a long wet season, or for cool areas with a mild

summer. Gazanias are perennials from South Africa that grow to 15 cm in height, and form a spreading clump of thin green foliage that is grey underneath. The plants are very suitable for rock gardens, shallow banks, borders and seaside gardens, and their light-sensitive flowers are produced from late spring to autumn. Flowers close at sunset, and on cloudy days.

G. hybrida grows easily from seed and the open-pollinated seedlings are rewarding to grow. Every daisy-like flower is a miniature work of art, with a bold yellow centre surrounded by black splashes that each contain a white dot. The rest of the petals look as though they have been hand-painted in dazzling colour combinations. Seed should be lightly covered in a sandy seedling mix, and kept just damp in a warm position. Don't overfeed or over-water gazanias. Seeds and plants require little care, and established plants will often self-seed in gravel pathways. Seedlings can be transplanted when 7 cm high. Mix a little humus through the planting area to encourage roots to spread. If the planting area is very hot, apply a light gravel or organic mulch around the area until plants are established. Once established, they will only need thorough watering, and a half-strength application of fertiliser tea, if they look like they are struggling. Remove spent flower stems after seed matures. Dead foliage becomes part of the mulch for these plants.

Once you have open-pollinated gazanias growing, you will be able to start new plants from the dandelion-like seed heads. Collect seed on a dry day and store it in a dark place in a screw-top jar. If you find a colour combination that you wish to propagate, established plants can be divided at the beginning of autumn. Make sure each divided section contains some healthy roots.

GERANIUM see *Pelargonium*

GERBERA

PLANTING PHASE: *Full Moon*

Gerberas are low-growing perennials, native to South Africa. The long-lasting daisy flowers in vibrant colours are favourites of florists and gardeners. Although mature plants of *G. jamesonii* can tolerate an occasional light frost, gerberas hate cold conditions and are more suited to Warm Zones and frost-free Temperate Zones where they can flower from summer to winter. Raised beds are beneficial for these plants as they must have perfect drainage — some sand worked into heavy soils will also help. They require a sunny position with wind protection. As gerberas have moderately high fertiliser requirements, a green-manure crop grown in the planting area about ten weeks before planting will provide plenty of organic matter, if you don't have a lot of compost. Soil pH should be close to neutral.

Plants can be produced from fresh seed or purchased as potted plants when flowering. Gerbera seed has a very brief viable stage; seed that matures in May should be sown, under cover, by August. Seed can be sown in trays filled with a sandy mix. Push seeds into the growing mix individually, with the fluffy end at the surface of the mix. Place trays in a cold frame, or cover with plastic (making sure that plastic is kept clear of the mix surface). Keep trays damp and warm until seed germinates two or three weeks later. As soon as seedlings are large enough to handle, transfer them into individual 8-cm pots filled with a sandy mix; then plant out when the largest leaves reach 12 cm in length. In areas with heavy summer rainfall, keep seedlings in pots until the wet season is over.

Gerberas grown from seed will not flower in the same year they are sown.

Plant seedlings and purchased potted plants so that crowns sit clear of the soil surface, and space crowns 60 cm apart. As gerberas do not like soil splashed into crowns, a light gravel or organic mulch will help prevent this. Water, as required, during dry weather. In late summer and in spring, apply worm castings under mulch, or apply a couple of doses of worm liquid tea to soil around the crowns. At the same time, also apply weak seaweed tea to soil only. Remove spent flowers and old leaves regularly. Gerbera plants will form into a clump of crowns (stool) and flower quality will decline after three years. Divide stools after soil warms in spring. (See [chapter 8](#) for instructions on dividing gerbera.)

GINKGO

PLANTING PHASE: *Full Moon*

Much admired for its large leaves that resemble maidenhair fern, and golden autumn foliage, *G. biloba* belongs to an ancient genus related to conifers and cycads. This beautiful deciduous tree has a neat pyramid shape while young. Unfortunately, however, the ginkgo is sometimes planted in unsuitable positions. Slow growing, it can take up to ten years to reach 4 m but will eventually grow into a spreading tree about 18 m high, so it is unsuitable for the average suburban garden. As it resents pruning, it saddens me to see these lovely trees planted along footpaths under power lines.

Ginkgos do not grow well in dry conditions or shallow soils. They require a reasonably sunny position with deep, well-drained, humus-rich soil, a compost-rich mulch and regular watering. Young trees also need wind protection.

Most ginkgo trees available from nurseries are males because female trees produce seeds with a disagreeable odour. In suitable areas, autumn leaves are harvested to produce a variety of medications; ginkgo contains a unique glycoside that inhibits allergic responses, and flavonoids that improve circulation.

GLOBE ARTICHOKE (*Cynara scolymus*)

PLANTING PHASE: *Full Moon*

Even if you don't enjoy eating this cholesterol-lowering vegetable, globe artichokes make a good backdrop to a herbaceous perennial border or flowering annual garden, and they like similar conditions to these plants. Globe artichokes have large, deeply cut, grey-green leaves and, as plants grow to 1.5 m tall, they can take up a lot of space in a small vegetable garden. When harvesting the flower bud (the edible vegetable part), cut them with a short stem when buds are full with tight scales. If buds are left until close to opening, the outer scales become tough and the centres become hairy. If the flower buds are not harvested, they develop into very large purple 'Scottish thistle' flowers that can be dried for indoor decoration.

Globe artichokes prefer a deep, humus-rich soil, regular watering and a moderate summer and winter climate. They will grow at sea level as far south as Christchurch in New Zealand, but they will rot where soil is both cold and waterlogged in winter. In areas with a wet summer and high temperatures, they do appreciate some shade. Globe artichokes can be grown from seed but germination and growth may be erratic, and they are slow to establish. Plants grown from suckers are available from nurseries.

Established globe artichokes need cutting back to 15–20 cm above ground level in autumn. Thin to four or five healthy suckers to provide buds for the following season. After cutting back, apply 7 cm of compost and a small amount of poultry-based organic fertiliser around the base of each plant. In areas with cold winters, pile soil and straw around the plants for protection.

About six plants would suit a family garden, and gardeners in Warm and Temperate Zones can increase plant numbers in autumn by selecting suckers with strong roots and removing them from the parent plant with a sharp knife. Suckers are then planted into a prepared bed, and protected from frost. In cooler areas, new plants can be created from suckers in spring. Globe artichoke plants older than three years should be replaced with new suckers as flowering and cropping deteriorates after this age.

HAWAIIAN HIBISCUS (*Hibiscus rosa-sinensis*)

PLANTING PHASE: *Full Moon*

Commonly known as the Hawaiian (or Chinese) hibiscus, these evergreen shrubs have a tidy shape and glossy, green foliage. Intensive breeding has led to an amazing range of colour combinations and flower forms, making them very popular in Warm Zones and warm temperate areas where they can be grown as specimens, hedges or in large pots. Many small to medium cultivars of Hawaiian hibiscus will grow happily in cooler temperate areas on a protected sunny patio, in large wide pots with good drainage. Named cultivars are available in heights from 90 cm to 6 m. Hawaiian hibiscus are usually dormant in winter but may produce flowers during

this period in Warm Zones. In other areas, flowers are produced from late spring to autumn.

Roots will rot if Hawaiian hibiscus do not have perfect drainage, so beds should be raised, with plenty of well-rotted organic matter dug into the area well before planting. For potted hibiscus, add a little bentonite to the growing mix. The planting site should receive plenty of sun but be protected from strong winds — especially cold or salty winds, as hibiscus dislike salt on their foliage. Mature shrubs can handle occasional light frosts, but young plants will require protection from both frost and cold winds (see Protecting Plants from Frost in [chapter 9](#)).

Hibiscus do not have a deep root system, and stakes will help shrubs to establish more quickly in open areas. Plants spaced about 1.2 m apart are able to establish a strong, stabilising root system. Because they become dormant in late autumn, Hawaiian hibiscus should be planted in early spring in Warm Zones and mid to late spring in Temperate Zones. After planting, water deeply, and mulch plants with well-rotted compost or manure to provide a slow release fertiliser over a period of months. Newly planted hibiscus should not be given other fertiliser until they have settled in and made some growth. With both newly planted and established Hawaiian hibiscus, check under mulch regularly and water thoroughly if surface soil is dry.

Mature Hawaiian hibiscus are heavy feeders, and regular fertilising increases plant vigour, and both the quantity and quality of flowers. After pruning, water generously and give each plant a light application of worm castings or organic complete fertiliser (see [chapter 8](#) for details on pruning). Then mulch your hibiscus plants with 5 cm of compost or

well-rotted manure, and cover compost with another 5 cm of organic fibrous mulch. Keep the mulch well back from the main stem. Heavy mulching is important with Hawaiian hibiscus as they have a lot of surface roots. Do not use pine-bark mulch because pine bark contains tannins that are toxic to these plants. In early and late summer, apply worm castings or complete organic fertiliser under the outer edge of the mulch. In early summer, apply seaweed tea if compost does not contain seaweed. For pot-grown hibiscus, a small quantity of worm castings or worm liquid tea can be given regularly from October to May.

The original, single red-flowered *H. rosa-sinensis* that modern cultivars of this species were bred from is an important medicinal herb, revered by Hindus and Polynesians. The Chinese also used juice from petals as shoe-black and cosmetic dyes. I mention this because hibiscus flowers are sometimes used as hair or clothing decorations, or scattered on table linen, and the petals crush easily, causing permanent stains. Hawaiian hibiscus have very short flower stems and flowers last for only one day, but they are almost unique in that they do not wilt out of water. These flowers can be used in taller floral decorations by inserting the point of a bamboo skewer into the calyx at the base of a flower and supporting the other end of the skewer in some florist's foam. Spent flowers can then be easily replaced in the arrangement.

Gardeners in cooler temperate areas will have more success with the Syrian hibiscus, *H. syriacus*, that grows to about 2 m and is more tolerant of cooler conditions. This species comes in a range of colours, including an unusual blue cultivar.

HERBACEOUS PERENNIALS

PLANTING PHASE: *Full Moon*

These are long-lived plants that die back in winter and re-shoot in spring because they originated in places with cold winters. As herbaceous perennials belong to a typically European type of garden where rainfall tends to be higher, they should only be attempted in our hemisphere where there is enough water to keep them growing well. Otherwise, limit your choice to plants that have adapted to Australia's high summer temperatures. For carnations, chrysanthemums, dahlias, daylilies and bearded iris, refer to separate entries. Where summers are hot and wet, many traditional herbaceous perennials are subject to fungal diseases. They also tend to age prematurely in very warm areas.

Herbaceous perennials are usually planted at the beginning of autumn, before soil cools. Some are suitable for planting during winter and, where winters are severe, some can be planted in spring. Position short stakes at planting time for those that require support. Beds should be dug over several weeks before planting with approximately one bucket of compost or well-rotted manure per square metre worked into topsoil. A couple of handfuls of organic poultry-based complete fertiliser per metre should also be raked into the bed. As the beds will last for quite a few years, it is worthwhile preparing beds properly; herbaceous perennials respond well to organic mulching and fertilisers, and mulch will save some watering.

In established beds, spent flowers should be removed regularly through spring and summer. Cut back plants to just above ground level as they die down, and dispose of any diseased leaves. Do not dig the bed — simply aerate the soil with the tines of a garden fork. Divide clumps that have

become too large or have died out in the centre. Apply compost around divided crowns. In cold areas, stem prunings or sticks can be used to protect crowns of frost-tender plants. Add a covering of leaves from deciduous trees for frost protection. Aerate the soil again in mid-spring before applying organic complete fertiliser after rain, or following a thorough watering. Re-apply a 6-cm layer of organic mulch around plants.

HYDRANGEA

PLANTING PHASE: *Full Moon*

The common hydrangea, *H. macrophylla*, has glossy, toothed leaves and produces large, globous flower heads formed by many small pink, blue or white flowers in summer and autumn. Flower colour depends on whether soil is alkaline (which produces pink flowers) or acid (which produces blue or lavender flowers). White hydrangeas remain white regardless of soil pH.

This old-fashioned species has had a recent revival due to the beautiful new cultivars of mopheads and lacecaps now available. They are deciduous shrubs that grow to 2 m, but can be kept to about half that height with pruning. Many new cultivars are smaller shrubs. All require part shade, wind and frost protection, and damp soil, which is probably why they were a familiar sight along the shady sides of houses where building foundations and concrete paths prevented soil from drying out. However, they also grow well in large reservoir pots and can therefore be enjoyed where the water supply is limited. Common hydrangeas are suitable for all conditions except those with extremes of hot or cold.

Members of this species like a soil very rich in humus and appreciate plenty of water, but soil must be well drained. They require an application of organic complete fertiliser and mulch in spring. These shrubs are most easily propagated from hardwood cuttings taken in late winter. Common hydrangeas make excellent cut flowers. They can be partially pruned, in frost-free areas, when picking flowers. (See [chapter 8](#) for autumn and late-winter pruning of hydrangeas.)

When selecting flowers for cutting, carry a bucket half-filled with water, and cut each flower with a long stem. Plunge the cut stem into water immediately after cutting. Once indoors, fill your vase with clean water, then remove a flower stem from the bucket. Remove any leaves along the stem that will be under water, scrape the lower stem with a vegetable peeler, and place it in the vase. Repeat this with the other stems, breaking, rather than cutting, stems that are too long.

JADE PLANT (*Portulacaria afra*)

PLANTING PHASE: *Full Moon*

Although also known as Chinese Jade Plant, this tough, small to medium-sized succulent shrub is an African native. The Chinese reference is not to its origin but to the artificial replicas that are created using round pieces of Chinese jade for leaves. Another name for it is Elephant's Food. Jade plants grow to about 2.4 m, are very drought tolerant, and thrive in well-drained soil in a sunny position. A light application of organic fertiliser under mulch in spring and an occasional watering will keep jade plants healthy. This shrub produces tiny pink flowers only rarely, and is usually grown for its interesting decorative shape and round, fleshy foliage. It is easy to propagate from pieces of stem in a sandy cutting

mix, and is suitable for growing in gardens or pots in all but very cold areas. Pruning is not required.

LAVENDER (*Lavandula* spp.)

PLANTING PHASE: *Full Moon*

The fragrance of lavender is very calming to the nervous system and lavender oil has a long history of use in cosmetic preparations to soothe the skin. The tranquilising effects of all species of lavender are quite strong; if you regularly have trouble getting to sleep at night, try keeping a vase of lavender beside your bed and let the warmth of your bed lamp encourage the perfume. Alternatively, add a couple of drops of lavender essential oil to a warm bath or your pillow at bedtime.

English lavender, *L. angustifolia*, (sometimes called *L. officinalis*) is cultivated in cool climates for its essential oil that is used in medicines, cosmetics, and perfumes. Only flowers of English lavender are edible, and these are used to flavour honey, biscuits, chocolates and ice cream. Flowers and foliage of other species, with slightly different perfumes, are used in aromatic or medicinal preparations, or to repel insects.

There are about twenty species of lavender, to 90 cm, ranging in colour from deep purple through lavender, to white. Most are summer flowering, but in areas with a hot, dry spring and mild winter, the best flowering may occur through winter. All lavenders are attractive feature plants or low hedges in gardens, so choose one that is suited to your climate conditions, and has a perfume that you enjoy.

Apart from English lavender, which does not like sub-tropical conditions and grows more vigorously in cooler areas, lavenders are hardy, undemanding plants. French lavender, *L. dentata*, self-seeds on our farm — not in garden beds, but on stony ridges where it receives no care at all. This genus prefers an open, sunny position with gravelly soil. Although they are quite adaptable to soil types, all species of lavender must have excellent drainage. A watering in very dry weather, a light application of organic complete fertiliser in spring, and a light mulch should keep your lavender happy. Do not practise foliar feeding with lavenders as it damages their foliage.

LAWNS

SOWING PHASE: *Full Moon*

Most lawn grasses are perennials that have a period of dormancy and do not self-seed each year. These perennial grasses will develop more drought-resistant roots if sown during Full Moon phase. Annual grasses and grains are sown before Full Moon. Your local nursery will be able to advise you on the most suitable drought-tolerant types of grass for your area. Remember when planning a lawn area that large lawns require a lot of water to remain in perfect condition.

New lawns will not tolerate water stress; before sowing seed or laying turf, make sure you have ample water for grass to establish. In Cool Zones and cool temperate areas, lawns should be started as soon as possible after risk of frost has passed to allow grass to establish before hot weather arrives. Gardeners in areas that receive plenty of summer rainfall can also start lawns in spring. In other areas, sow seed in early autumn. If possible, install an irrigation system when

preparing an area for lawn. Prepare soil carefully with mature compost or well-rotted organic matter and some complete organic fertiliser at least six weeks before sowing lawn seed or laying turf. Early preparation will allow you to check for any drainage problems after rain and make adjustments before sowing seed, to avoid spongy patches in your lawn. Fence off the prepared area from foot traffic and pets, and keep it fenced off until grass is well established.

Established lawns can be damaged by incorrect watering and mowing practices. As mentioned in [chapter 5](#), watering too often and too lightly is one of the worst things you can do to your lawn. In periods without rainfall, lawns benefit most from one good watering weekly. Many gardeners increase lawn problems by mowing lawns too closely. Mowing grass as short as possible in the hope that you will not have to do it as often is counter-productive for several reasons. As well as manufacturing food for grass plants, leaf blades shade the stems and roots, so cutting grass very short reduces photosynthesis and dries the roots. The bare spots caused by dead roots allow weed seeds to germinate. To enjoy a denser, softer lawn that requires less watering, weeding and fertilising, lift your mower blades up a notch or two. Moon planting principles apply to lawn-mowing, too. For young lawns and tired old lawns where you want to encourage growth, mow on a planting day during New Moon and First Quarter phases. For established lawns that have had plenty of rain, mow on a non-planting day in the Last Quarter phase when there is less sap flow in the green parts of grass. As a second choice, mow on a non-planting day during Full Moon phase.

Fertiliser will be required occasionally if you do not have a mulching mower which pushes clippings back into the grass to self-fertilise the lawn. Use mature compost, worm castings or a granular organic complete fertiliser in favour of nitrogen alone, which causes the soft, sappy growth most attractive to pests. Phosphorous in a complete fertiliser encourages a healthy root system. Potassium encourages healthy sap flow, making your lawn more resistant to weather extremes. Before fertilising, go over your lawn poking holes in it with a garden fork. This aerates soil and allows fertiliser to wash down closer to the root area where soil is biologically active. Fertilising is carried out after rain when soil is evenly moist, during Full Moon phase if feasible.

Never fertilise when soil is dry or in the heat of summer, or you will burn new roots and top growth. Sprinkle fertiliser over the lawn surface and always water lawn after fertilising. Skip fertilising altogether in drought conditions, and wait until conditions improve; adding fertiliser when water is restricted will do more harm than good. New lawns can be fertilised with fertiliser teas. An annual application of seaweed tea can help both new and established lawns to become more resistant to frost and help prevent disease, including rust.

Bindii or Jo-Jo, *Soliva pterosperma*, must rate as one of the worst lawn weeds. Feathery, light-green foliage is followed by seed cases covered in vicious prickles in early spring. Once prickles have formed, it is too late in the current year to treat the problem; even if you pull out or poison the weed, its seeds will remain in soil. Chipping out living bindii plants may not be completely effective as they can also propagate from any remaining foliage touching soil.

Organic control of this weed is safer for your family and the environment because the chemical used to control bindii is considered ‘moderately toxic’ and should not be applied in areas used by children or pets, or where it can wash into waterways. You can pour boiling water on bindii to kill it, but this method is very tough on earthworms and other soil life. The easiest way to get rid of this nuisance organically is to spot-water it with human urine in early winter — as soon as you notice the carrot-like foliage and before seed heads form. If the urine has developed an ammonia smell, it will be even better. Apply on a sunny morning when rain is not predicted, preferably during New Moon or First Quarter phases when sap flow is highest. Remove the sprinkler nozzle from a watering can to concentrate the liquid onto each weed. Do not water the lawn for at least three days. The urine will also burn off a small patch of lawn around each weed but the residual nitrogen from the urine will encourage grass regrowth. If you wish to remove patches of clover from lawn, use the same method.

NASTURTIUM (*Tropaeolum majus*)

SOWING PHASE: *First Quarter/New Moon*

This plant is misnamed, as the true ‘nasturtium’ is the plant we call watercress, *Nasturtium officinale*. Another common name for the herb we know as nasturtium is Indian cress. It is a highly frost-sensitive annual that can cover a lot of ground in the growing season. Some nasturtiums are perennials but most are annuals that self-seed. The yellow-orange flowers and round, young leaves of nasturtium provide a peppery taste in salads and sandwiches. This plant is useful as a ground cover, or as a deterrent for some garden pests. It is reputed to deter woolly aphid, cucumber beetle and borers, and makes a

good companion plant for many vegetables. There are named cultivars of nasturtium available for growing on sunny banks or as pot plants.

Nasturtiums grown in nutrient-rich soil will produce a lot of foliage and few flowers, so they will provide a better living mulch under trees if soil contains ample fertiliser. However, a slightly dry soil that contains some humus is suitable where flowers are important. Nasturtiums will grow in sun or dappled shade. Each plant can cover about three square metres. Sow seed 1.5 cm deep after frost, directly where you want it to grow. (Seed may be difficult to germinate in very hot weather.) These plants require very little care and, in areas with warm season rainfall, they may not need any watering at all. Nasturtiums readily self-seed; don't pick all the flowers, and you will probably find nasturtiums growing in the same position the next year.

PALMS

PLANTING PHASE: *Full Moon*

Palms lend a tropical touch to any garden and there are drought-tolerant species suitable for most areas. Slender palms look good when planted in small groups of uneven numbers, and this arrangement helps them to support each other when small. Palms planted singularly will require wind protection or staking until established as they have small root systems and no lateral growth.

Young palms require special care in the open garden as most start life in the wild protected by taller palms. Some protection from afternoon sun until they develop a trunk is advised. Regular deep watering, organic mulch and a light application of complete fertiliser in spring will help them to

establish more quickly. Young palms do not need pruning or training, other than the removal of dead fronds. Some mature palms are 'self-cleaning' and drop dead fronds, while others will need their fronds removed with a saw. Use very thick gloves when removing fronds as some have dangerously sharp spines.

Water-stressed young palms are prone to attack from the orange palmdart caterpillar which rolls a piece of palm frond around itself to hide from birds and other predators while it feeds. Its disguise is quite effective so you may not notice it until you already have a very tattered palm. As palmdart caterpillars also pupate in their 'hides' at the end of tattered sections, crush them with a thickly gloved hand, then improve your watering and mulching program to reinvigorate the palm.

PAPER DAISY (*Helichrysum* spp.)

PLANTING PHASE: *annuals First Quarter, perennials Full Moon*

These daisies are hardy ground cover or border plants that grow to 50 cm in sunny well-drained positions. Some species are annuals; others are spreading perennials. The long-lasting flowers that appear in summer or autumn may be white, yellow, pink or brown, and are popular in dried flower arrangements. Perennial species require little care other than hard pruning in spring, followed by a light application of organic fertiliser.

PELARGONIUM

PLANTING PHASE: *Full Moon*

The genus name for the perennials we call geraniums came from the Greek word for ‘stork’ because the seed capsule of these plants looks like a stork’s bill. These plants have become confused with the true *Geranium* spp. which have a similarly shaped seed capsule and are known as cranesbills.

The common (or zonal) geranium, *P. zonale*, has rounded green leaves with a dark zone and attractive clusters of five-petalled flowers in various shades through the red-purple range of the spectrum. The regal pelargonium, *P. domesticum*, has hairy leaves with ragged edges and flowers with ruffled petals. This species cannot tolerate as much heat as zonal geraniums but they don’t mind salt spray. The ivy-leaved or climbing geraniums, *P. peltatum*, are not true climbers because they require support, but they are very attractive cascading down banks, or confined to hanging baskets. Other species include an extensive range of scented geraniums that are grown more for their foliage than for their flowers. As leaves warm, aromatic oils are released from the foliage. These pelargoniums should always be planted in a sunny position where you can best enjoy the fragrance.

Pelargoniums and zonal geraniums are low-maintenance plants for the open garden, pots or hanging baskets in all growing zones, although they are better treated as annuals in very cold areas. They grow best in a sunny position with well-drained soil. Zonal geraniums will rot if soil is poorly drained. They are not particular about soil type but some humus added to the planting area is beneficial for garden plants. Plants should be spaced at least 50 cm apart. Container plants do well in a mix to suit the container size with some extra sand added (see [chapter 4](#)).

All members of this genus are drought-tolerant plants. When over-fertilised, they produce soft growth that is attractive to caterpillars. An application of organic mulch that contains some compost or worm castings after soil warms in spring is all that is required as fertiliser. For healthy growth, potted zonal geraniums and pelargoniums require a small application of worm castings in spring. Young plants respond well to regular tip pruning, which deters leggy growth.

All established plants, except scented-leaf geraniums, are pruned lightly after each flower flush during First Quarter phase. Pinch out tips of new lateral growth to encourage further branching. Tidy plants in early autumn, during Full Moon phase, when main stems can be reduced by one third. Once established, scented-leaf geraniums need only be pruned when they become straggly. The best time for this pruning is during First Quarter phase in early spring. Young, vigorous plants flower better, and plants should be replaced every four years. Scented-leaf geraniums can last a bit longer. Pelargoniums grow easily from cuttings (see [chapter 8](#)).

PIGFACE

PLANTING PHASE: *Full Moon*

Better known as Pigface (or Iceplant), *Lampranthus* species provide brilliant garden colour in Temperate and Warm Zones when water is in short supply. This genus of approximately 150 species thrives in full sun and well-drained soil, has low fertiliser requirements, and has high drought tolerance. Plants require regular watering until established, then watering only when leaves begin to droop. Most species are frost tender, although some can survive light frosts. Glossy flowers appear during winter, spring and summer. Colours range from

yellow, through orange and pink, to purple and magenta. Flowers can completely cover the grey-green foliage. These spreading succulents grow to 30 cm high by 1 m wide. Pigface are suitable for rockeries, borders and banks. They are easy to propagate from pieces of stem in a sandy cutting mix.

Giant Pigface (or Sea Fig), *Carpobrotus chilensis*, is also drought tolerant, and grows to the same size as common pigface. It has fleshy, three-sided foliage and magenta perfumed flowers in summer. This pigface is able to bind soil, which makes it useful for planting on slopes or beach fronts. Small-flowering Pigface, *Drosanthemum floribundum* grows to only 15 cm high.

PROTEA

PLANTING PHASE: *Full Moon*

This genus has produced a range of evergreen trees and shrubs with magnificent long-lasting flowers that have become very popular as cut flowers both locally and overseas. Nectar birds love them, too. Cultivars sold in nurseries as ‘proteas’ come from South Africa, although many native genera are also members of the protea family. All proteas thrive on organic cultivation. South African proteas have the same requirements as our waratahs, isopogons and lambertias, and can be grown in the same way. Proteas do not, as a general rule, do well in very cold or very humid areas. They prefer a sandy soil because they must have perfect drainage, and may die suddenly if soil is too wet. Soil should be slightly acid and contain some humus for phosphate extraction by a unique root system. Proteas dislike overhead watering, especially in summer. They all require organic mulch because they resent any root disturbance, including ‘scratching-in’ of

fertiliser. These plants are not suitable for growing in the middle of lawns.

Proteas are fussy, but the flowers are definitely worth the trouble. The easily recognised Oleander-leaved Protea, *P. neriifolia*, to 2 m, has 12-cm silvery-pink, tubular flowers that are tipped with a black fringe. The most well known is the floral emblem of South Africa, King Protea, *P. cynaroides*, a small shrub that produces huge pink and silver flowers up to 25 cm across when the plant is only 1 m high. There are many more beautiful protea cultivars available.

Protea flowers are cut with stems a suitable length for vases, according to the growth of the species. Cut to just above a healthy leaf axil on the current season's growth. If you choose to enjoy proteas in the garden rather than indoors, remove spent flower heads in the same way immediately after flowering. The removal of flower heads is necessary to promote lateral growth. Otherwise, you will have a very leggy plant, and fewer flowers. Protea plants rarely survive pruning of old wood.

RHODODENDRON

PLANTING PHASE: *Full Moon*

Rhododendrons and azaleas are members of the same genus of some 800 species, although many nurseries still divide them into two separate groups. To avoid confusion, I will describe the differing requirements of the two groups separately. Most of these beautiful shrubs and trees originated in temperate and cool regions of the world, and the rest were found at high altitudes in warmer areas. This genus does not like long periods of dry weather and can be difficult to establish, even in pots, where air humidity is low. Bell or

funnel-shaped flowers in various colours appear in a cluster at the end of stems. Foliage may be shiny or covered in fine hairs. After flowering, each stem produces three or four new shoots just behind the spent flower head. Local nurseries should carry species suited to your area. Rhododendrons, azaleas and camellias make good companions in gardens, and require a similar growing mix in pots.

All species of this genus require a well-drained, humus-rich soil with a pH between 4.5 and 6. Most prefer dappled shade or protection from sun during the hottest part of the day, and they cannot tolerate hot winds or bore water. This genus does not have a particular planting season, and planting times for potted plants are also relatively flexible, provided you avoid dry, windy weather. As plants are usually purchased in flower, and most are planted in dappled shade, spring and autumn planting will suit most species. Try to plant two or three days after rain, when soil is damp but not wet. Always check soil drainage before planting this genus, and raise the planting area if drainage is doubtful, or winters are very wet. It is very important to include some mature compost in the planting area to provide a transition area between the compost-textured mix and garden soil as these plants may not extend their roots if garden soil is very different to the pot mixture. Before planting, ‘tickle’ the root ball to free any restricted roots, and plant at the same level as in the pot. Water deeply after planting, and water regularly during dry weather to keep soil just damp. If planting in spring, surround plants with organic mulch.

After flowering, mulch all species with a 4-cm layer of well-rotted cow manure covered with 3 cm of organic mulch. This will keep soil damp and roots cool — the two constant

requirements for the genus. A preference for acid soil indicates a higher requirement for trace elements, so apply organic seaweed tea after flowering.

Rhododendrons (the group known by their genus name) have only one Australian species, *R. lochiaie*. This is a Queensland mountain shrub of variable height with red bell-shaped flowers in autumn. It requires moist soil and a partly shaded position. Most rhododendrons are evergreen trees or large shrubs. This group prefers cool, moist conditions, although a few will tolerate warmer conditions if well watered and protected from hot winds. If you have a passion for these plants but a limited water supply, some of the smaller species can be grown in large tubs with plenty of drainage holes, provided other growing conditions are suitable. This group requires no pruning. As plants produce new lateral growth immediately behind spent flower heads, tip pruning will remove next year's flowers. Some expert growers suggest that carefully breaking off spent flower heads improves flowering, but this would be near impossible with larger species that can reach 3 m, or more, in height.

Azaleas can be evergreen or deciduous. In this group, bell-shaped flowers appear in spring as singles or doubles (hose-in-hose), in yellows and a range of beautiful shades on the red-purple range of the spectrum. Flowering is profuse in many cultivars and may completely obscure foliage. Extensive breeding of this group in the Southern Hemisphere has produced a range of cultivars that can be grown in warmer areas of Australia where air contains some humidity, and the water supply is not alkaline or saline. Smaller evergreens are suited to pot culture, if pots receive some shade to keep roots cool. Deciduous azaleas, and the

small-flowered Kurume cultivars, are more suited to cooler areas. In warmer areas, azaleas are planted in early autumn to allow them time to settle in before summer.

In addition to the usual fertiliser dose recommended for this genus, plants that have been subject to pests or disease will benefit from a second application of seaweed tea in early autumn. An application of worm liquid tea in autumn can also improve flowering in azaleas. Unlike roses and camellias, azaleas benefit from having their foliage watered during dry spells (when not in flower) because they are able to absorb moisture through their leaves and distribute it to other parts of the plant resulting in healthy growth when soil may be quite dry. This practice may become necessary in areas where, in future, rain will become heavier but less frequent.

Watering azalea foliage during dry spells also eliminates two-spotted mite, a pest that often attacks plants in dry conditions (see [chapter 9](#)). Regular watering is most important for azaleas that are grown under trees as the tree canopy can reduce rainfall on azalea leaves, and tree roots are very competitive for moisture in soil. These azaleas will also require more fertiliser than those grown in an open bed. (Pruning advice for azaleas can be found in [chapter 8](#).)

ROSES (*Rosa* spp.)

PLANTING PHASE: *Full Moon*

Roses have been valued by various civilisations for over two thousand years. Their sweet, uplifting fragrance, diverse medicinal properties and lovely flowers have ensured their survival and cultivation through the centuries. The roses that occupy most gardens today are hybrids grafted onto strong rootstocks of ancient species, and the hybrids began as

mutations (sports) of those species. The French Rose, *R. gallica*, is considered to be a parent of modern roses. Apothecary's Rose, *R. gallica officinalis*, is still used for various applications including rose oil, rose water and tonic medicines. Attar of roses came from the damask (Damascus) rose, *R. damascena*, another medicinal parent of modern roses. Most modern 'rose-scented' cosmetics, however, are perfumed by *Pelargonium* species. Seed capsules (hips) from the Dog Rose, *R. canina*, are harvested for medicinal syrups and vitamin tablets because of their high vitamin C content and other beneficial properties. The name of this rose attests to its previous reputation for curing bites from rabid dogs. Petals of organically grown modern roses can be added to salads and desserts, or made into syrups, jams and cordials.

Modern breeding of roses has produced magnificent blooms far removed from the ones that adorned royal standards, although some have retained their fragrance. Hybrid teas and shrub roses, floribundas, standards and miniatures produce blooms throughout the growing season, whereas species roses, 'old' roses, climbers and ramblers may flower only in spring, or during spring and summer. Some climbers and ramblers are prone to mildew when grown against walls, but thrive when grown over pergolas and arches, or as weeping standards. Roses grow best in an open sunny position with good air circulation that is protected from strong winds. As roses are deciduous (or semi-deciduous) perennials, a bed devoted to roses can be very boring in winter months. Fortunately, roses don't mind sharing garden space with low-growing perennials or flowering annuals. Avoid planting them with only herbaceous perennials and bulbs that die down before winter, and avoid placing them near taller plants that will overshadow them or reduce airflow. Oregano and

garlic have both developed a reputation for keeping roses healthy, and it is also believed that garlic intensifies the fragrance of roses. Roses have proven to be adaptable to temperatures in both cool and hot areas of Australia, including Darwin where they are virtually evergreen. They are, however, susceptible to fungal diseases in very humid conditions. To avoid problems with roses, choose cultivars that are suited to both climate and position.

Due to their hardy rootstock, modern roses are quite adaptable, and can be grown in a range of soil types, providing the soil is well-drained. When preparing soil for roses, the addition of plenty of well-rotted organic matter is important to encourage their roots to forage deep into soil. A 5-cm layer of mature compost or well-rotted cow manure mixed into topsoil is excellent for roses. If you use only cow manure, add a light application of organic complete fertiliser. New roses should be able to grow strongly from the nutrients available in soil during their first year after planting.

Bare-rooted roses are planted during winter, except in heavy frost areas where it is advisable to plant them at the end of winter. Do not buy bare-rooted roses before the end of June because plants that have been lifted early will not grow well. Prepare planting areas towards the end of autumn. Potted roses have a protected root ball and do not need to be planted in winter at all. Spring or autumn planting is suitable for potted roses, but avoid planting in hot, windy conditions, or when soil is very wet. (The guidelines in [chapter 4](#) are helpful for planting roses.)

Standard roses will require a sturdy, single stake as most of the weight is carried high above the ground. Do not give roses fertiliser at planting time. If other roses are growing nearby,

lightly mulch new roses to prevent ‘black spot’ spores splashing onto plants. Some gardening experts advise pruning new roses hard at planting, but this can cause problems (see Pruning Roses in [chapter 8](#) for further explanation). Hybrid tea and large floribunda roses require spacings of 1 m. Standard roses can be spaced at 90 cm, small floribundas at 60 cm, and miniature roses at 45 cm apart. If you are replacing a dead or diseased rose, remove two thirds of a square metre of soil to a depth beyond the roots of the dead rose, and swap it with soil that has not grown roses before. If soil is dark-damp at planting, and mulch has been applied, roses planted in winter may need little, if any, watering until spring. Roses planted in other seasons may require watering twice weekly to keep soil dark-damp until they are growing strongly. Once established, roses require a deep watering under mulch when topsoil is dry at a depth of 2 cm. In mild growing conditions, watering may be required only every two to three weeks, (but more often in windy weather). Avoid overhead watering of roses.

All established roses should be fertilised at the end of winter and in late summer. Fertiliser can be applied at the same times as bush and standard roses are pruned (see [chapter 8](#)). Bush and standard roses are fertilised again in late summer after a light pruning to encourage autumn flowering. Roses are long-lived and moderately heavy feeders. They thrive on organic fertilisers and mulches. A 5-cm layer of mature compost under a thin layer of fibrous mulch, or an application of worm castings or organic complete fertiliser under thicker mulch, will provide a complete range of nutrients. Roses grown in light soils need slightly more fertiliser at each application. Organic mulch should be added each time roses are fertilised to maintain a good humus content in topsoil.

Keep mulch away from plant crowns. An application of seaweed tea is also beneficial to build resistance to fungal disease. This should be applied in early spring. In very humid areas, a second application together with the fertiliser in summer will be beneficial.

Dead-heading is the name given to the removal of spent flowers. Like many other flowering plants, roses benefit from regular removal of blooms. The main objective of plants is to reproduce their own kind, so when they are allowed to develop seeds, a signal is sent to the plant to end its flowering cycle. Seed heads (or, more precisely, rose hips) must never be allowed to form on roses that have been in the garden for less than two years because the energy used in producing seed weakens growth in young roses. (Rose hips are harvested from species roses that only flower in spring.) Except for water shoots (see below), roses on established plants should all be cut with the longest stem possible until late February. From then on, they are picked just above the first leaf axil with five leaflets for the rest of the growing season. Stems should always be severed with a pruning cut above an outward pointing leaf or growth bud. If blooms are allowed to remain on bushes, remove spent flowers in exactly the same manner. Dead-heading encourages vigorous growth where canes are stronger and, where possible, should be done on a fertile day before Full Moon. From March onwards, dead-head after Full Moon as new growth will not have a chance to harden before the plants become dormant. Floribunda roses should be dead-headed just above the first leaf axil, below the truss of flower heads. Young roses should always be picked or dead-headed just above the first leaf bud below the flower. (Cutting them with long stems removes the foliage required to manufacture carbohydrates for the

following year's growth.) Removing rose blooms in this manner is a long-established practice and rose bowls were invented so that we could enjoy short-stemmed roses indoors.

Ideally, roses should not be picked in the heat of the day. Using a rose de-thorner or vegetable peeler, remove thorns and leaves that would be under water in a vase. If heads droop, wrap roses in a tube of newspaper and stand them in a bucket of water for several hours. Trim stems to the correct length with a slanting cut immediately before arranging in vases or bowls. Avoid copper containers, and do not add aspirin to the water with roses.

Water shoots are long vigorous growths that occur from the base of mature canes (or crown) of rose bushes. These canes are often red in colour and always form above the graft. They will provide the future framework for the plant so they should be treated with care. Often they tower above the rest of the foliage and require staking until late winter. Water shoots are topped with a cluster of flowering stems, known as a candelabra. These flowers should not be picked except for the centre stem. Leave the rest of the flowers and dead-head them with a very short stem as they fade. Cutting into the wood of water shoots prevents them from maturing correctly.

SWEET PEA (*Lathyrus odoratus*)

SOWING PHASE: *First Quarter/New Moon*

A favourite of many gardeners, these lovely annuals are usually sown in autumn (traditionally between St Patrick's Day and Anzac Day) but this sowing period is suitable for frost-free areas only. Although pea plants are frost hardy, the flowers are not, and planting during this period can result in flower formation coinciding with frosts, which will ruin your

hard work. Sweet peas take approximately fourteen weeks from sowing to flowering, or sixteen weeks in cold conditions. In frost areas, sweet peas should be sown at least eighteen weeks before the first frosts usually occur in your area, or twenty weeks in very cold areas. Alternatively, they can be sown from twelve weeks before the last local frosts usually occur. If soil is very cold in your area during winter, a small cloche may be helpful to encourage germination and protect plants until they are 15 cm high.

Sweet peas have similar growing requirements to garden peas and are sown in the same way. They require a trellis about two metres high. Position your trellis before sowing. Garden beds allow a good airflow around climbers but a trellis against a north-facing wall has the benefit of protecting flowers in cold areas. Chicken wire is excellent as a pea trellis because it provides plenty of anchor points for tendrils. Tepees and wire hoops save space but can contribute to disease in cold, wet conditions if foliage becomes congested. Don't discard dark or wrinkled sweet pea seed. Tip out the seed onto a sheet of paper before sowing, and select a cross-section of seed shades and shapes for a better chance of obtaining a wide range of flower colours. Sow seed no deeper than 2.5 cm, at 15 cm spacings. If your sweet pea seedlings are reluctant to climb, tip prune them back to above the third leaf. (Tendrils on lateral growth can be more active.)

Plants For Shady, Dry Areas

In all established gardens there are areas that are shaded, or partly shaded, by mature trees, shrubs or buildings. These areas provide the perfect positions for understorey (shade-loving) plants that have developed the ability to manufacture enough food for growth and reproduction in

low-light conditions. Consequently, many understorey plants have foliage that will scorch if exposed to sunny conditions in the open garden, and these include plants we commonly describe as ‘indoor plants’. Tall trees and shrubs modify air temperatures in the garden and can also protect understorey plants from frost, thereby extending the range of plants suitable for these areas. However, some trees, including pines, casuarinas and walnuts actively deter the growth of other plants near their root ball. Beneath such trees, an attractive mulch and a shade-loving plant in a large tub, or a garden sculpture, can provide an interesting focal point.

In areas of regular rainfall, the choice of understorey plants is quite extensive. However, where rainfall is erratic or irrigation is limited, soil remains relatively dry because mature shrubs and trees compete for moisture, and eaves of buildings can prevent rain falling on sections of soil. These areas present a problem for gardeners who wish to avoid expanses of bare garden.

The following plants are suitable for growing in shady, dry areas if the soil surface is permanently mulched. Australian natives feature strongly in this list because they have evolved to survive on rainfall alone in bushland. Deep watering until plants are established will encourage a strong root system. Frequency of watering can be determined by pulling back a section of the mulch to check the dampness of surface soil. Once established, these plants require only natural rainfall, or an occasional deep watering in prolonged, dry conditions. Some are tolerant of heavy shade while others will grow well with a little early-morning or late-afternoon sun.

Plants grown under building eaves will require occasional watering, and can be mulched with gravel or pebbles,

materials which are both termite and bushfire-proof (see [chapter 5](#)). When planting close to buildings, avoid tall plants that can pose a risk to security and provide fuel for fires. Especially avoid plants that contain a lot of volatile oils, including many taller Australian natives. Small shrubs with a non-flammable mulch are safest for these areas.

PLANTS FOR SHADY, DRY AREAS

C Cool

T Temperate

W Warm

GROUND COVERS AND CLIMBERS

- BOTANICAL NAME: *Dampiera diversifolia*

SPREAD: 1 m

ZONE: CTW

NOTES: Spreading shrub with deep violet flowers spring-summer. Ground cover.

- BOTANICAL NAME: *Hardenbergia violacea*

SPREAD: 2 m

ZONE: TW

NOTES: False Sarsaparilla, sprays of rich purple flowers in spring. ‘Happy Wanderer’ has larger flowers.

- BOTANICAL NAME: *Kennedia nigricans*

SPREAD: 5 m

ZONE: W

NOTES: Black Coral Pea, striking black flowers with green-yellow blotch. Vigorous climber or groundcover.

- BOTANICAL NAME: *Kennedia rubicunda*

SPREAD: 3 m

ZONE: W

NOTES: Dusky Coral Pea, pairs of red pea-shaped flowers. Vigorous climber or ground cover.

- BOTANICAL NAME: *Kunzea pomifera*

SPREAD: 60 cm

ZONE: CTW

NOTES: Muntries, pale-yellow flowers and blue berries. Ground cover.

- BOTANICAL NAME: *Myoporum floribundum*

SPREAD: 1 m

ZONE: CT

NOTES: Creeping Boobiella, white star flowers and fleshy foliage. Ground cover.

- BOTANICAL NAME: *Pandorea jasminoides*

SPREAD: 5 m

ZONE: TW

NOTES: Beauty Bower Plant, white trumpet flowers streaked with pink. Showy climber for part shade.

- BOTANICAL NAME: *Pandorea pandorana*

SPREAD: 6 m

ZONE: CTW

NOTES: Wonga Vine, cream flowers spotted purple spring–summer. Attractive foliage.

- BOTANICAL NAME: *Plumbago capensis*

SPREAD: 3 m

ZONE: CTW

NOTES: Climber, clusters of sky blue flowers over long periods. Hardy in part shade. Cut back hard after flowering.

- BOTANICAL NAME: *Pultenaea pedunculata*

SPREAD: 1.2 m

ZONE: TW

NOTES: Matted Pea Bush, yellow and red long-stalked flowers. Ground cover and native legume.

- BOTANICAL NAME: *Sollya heterophylla*

SPREAD: 1.5 m

ZONE: TW

NOTES: Bluebell Creeper, clusters of bright blue bell flowers. Climber.

- BOTANICAL NAME: *Trachelospermum jasminoides*

SPREAD: 6 m

ZONE: TW

NOTES: Star Jasmine, dark foliage, fragrant white star flowers. Shade for roots. Upper foliage requires sun for flowers. Cut back by one third in autumn.

SMALL SHRUBS AND PLANTS

- BOTANICAL NAME: *Agapanthus spp.*

SPREAD: 1 m

ZONE: TW

NOTES: aka African Lily. Blue or white bell flowers. Hardy, dense ground cover. Reduced flowering in heavy shade. Pest in some areas.

- BOTANICAL NAME: *Banksia spinulosa (dwarf)*

SPREAD: 90 cm

ZONE: TW

NOTES: Hairpin Banksia, narrow leaves and deep yellow 6-cm brushes.

- BOTANICAL NAME: *Boronia crenulata*

SPREAD: 1 m

ZONE: TW

NOTES: Open pink flowers late winter to summer.

- BOTANICAL NAME: *Bromeliads*

SPREAD: 50 cm

ZONE: TW

NOTES: Exotic leaf and flower forms. Wide range of genera for under trees.

- BOTANICAL NAME: *Chorizema cordatum*

SPREAD: 1.2 m

ZONE: CTW

NOTES: Heart-leaved Flame Pea, pink and orange flowers in spring. Prune after flowering.

- BOTANICAL NAME: *Clivia miniata*

SPREAD: 50 cm

ZONE: TW

NOTES: Clusters of vermillion trumpet flowers in winter. Herbaceous perennial. Requires occasional summer watering.

- BOTANICAL NAME: *Correa alba*

SPREAD: 90 cm

ZONE: CTW

NOTES: White Correa, woolly leaves, white open flowers in spring. Very hardy.

- BOTANICAL NAME: *Crowea exalata*

SPREAD: 90 cm

ZONE: CT

NOTES: Bright pink star flowers in summer and autumn.

- BOTANICAL NAME: *Crowea saligna*

SPREAD: 90 cm

ZONE: CTW

NOTES: Bright pink star flowers in spring.

- BOTANICAL NAME: *Dianella tasmanica*

SPREAD: 1 m

ZONE: CT

NOTES: Tasmanian Flax Lily, blue flowers spring–summer, blue-purple berries.

- BOTANICAL NAME: *Epiphyllum spp.*

SPREAD: 50 cm

ZONE: TW

NOTES: Orchid Cactus, fleshy leaf-branches with short spines. Large white, apricot or red flowers last one day. Very hardy under trees.

- BOTANICAL NAME: *Freesia refracta*

SPREAD: 40 cm

ZONE: TW

NOTES: Spring-flowering bulb (self-seeding), richly fragrant tubular flowers. Protect from hot afternoon sun.

- BOTANICAL NAME: *Isopogon ceratophyllus*

SPREAD: 90 cm

ZONE: CT

NOTES: Drumsticks, yellow cone flowers spring-summer.

- BOTANICAL NAME: *Melaleuca wilsonii*

SPREAD: 1.2 m

ZONE: CT

NOTES: Red-purplish flowers along stems, citrus perfume. Lime loving.

- BOTANICAL NAME: *Nandina domestica nana*

SPREAD: 30 cm

ZONE: CTW

NOTES: Dwarf Sacred Bamboo, clump of leaves from pink through green to red.

- BOTANICAL NAME: *Pelargonium australe*

SPREAD: 30 cm

ZONE: CTW

NOTES: Storksbill, pink geranium flowers.

- BOTANICAL NAME: *Pelargonium rodneyanum*

SPREAD: 30 cm

ZONE: CTW

NOTES: Magenta Storksbill, geranium flowers.
- BOTANICAL NAME: *Pimelea ferruginea*

SPREAD: 90 cm

ZONE: CTW

NOTES: Rosy Rice Flower, pin cushion of pink flowers in spring.
- BOTANICAL NAME: *Prostanthera aspalathoides*

SPREAD: 90 cm

ZONE: TW

NOTES: Scarlet Mint Bush, tubular flowers, fragrant needle foliage.
- BOTANICAL NAME: *Prostanthera calycina*

SPREAD: 60 cm

ZONE: TW

NOTES: Red Mint Bush, orange-red spring flowers, hairy round foliage. Lime-tolerant. Also coastal positions.
- BOTANICAL NAME: *Prostanthera cuneata*

SPREAD: 90 cm

ZONE: CT

NOTES: Alpine Mint Bush, large white flowers
spring–early summer.

- BOTANICAL NAME: *Prostanthera denticulata*

SPREAD: 90 cm

ZONE: CT

NOTES: Rough Mint Bush, lilac-violet flowers in
spring.

- BOTANICAL NAME: *Prostanthera walteri*

SPREAD: 90 cm

ZONE: CT

NOTES: Blotchy Mint Bush, grey-green flowers
spring–early summer. For cooler areas.

- BOTANICAL NAME: *Pterostylis spp.*

SPREAD: 30 cm

ZONE: CTW

NOTES: Hooded Orchids, green or red-brown flowers
on single stems.

- BOTANICAL NAME: *Tetradlea thymifolia*

SPREAD: 60 cm

ZONE: TW

NOTES: Black-eyed Susan, deep pink boronia flowers with black centres.

- BOTANICAL NAME: *Westringia fruticosa x glabra*

SPREAD: 90 cm

ZONE: TW

NOTES: Violet Rosemary, lilac flowers most of year. Some watering in summer.

LARGER SHRUBS

- BOTANICAL NAME: *Acacia acinacea*

SPREAD: 2.4 m

ZONE: CTW

NOTES: Gold-dust Wattle, bright yellow spring flowers. Heavy soils, dry conditions.

- BOTANICAL NAME: *Acacia glaucoptera*

SPREAD: 1.5 m

ZONE: TW

NOTES: Clay-bush Wattle, winged leaves, flowers appear along stems in late spring.

- BOTANICAL NAME: *Acacia lanigera*

SPREAD: 3 m

ZONE: CTW

NOTES: Woolly Wattle, shrub-like growth, bright yellow flowers late winter-spring.

- BOTANICAL NAME: *Asplenium nidus*

SPREAD: 1.5 m

ZONE: CTW

NOTES: Bird's-nest Fern, falling leaves provide fertiliser. Hardy.

- BOTANICAL NAME: *Boronia denticulata*

SPREAD: 1.8 m

ZONE: TW

NOTES: Mauve Boronia, loose clusters of flowers late winter-spring. Fast growing.

- BOTANICAL NAME: *Brachysema lanceolatum*

SPREAD: 1.5 m

ZONE: TW

NOTES: Swan River Pea, red and silver pea flowers in spring.

- BOTANICAL NAME: *Correa backhousiana*

SPREAD: 1.8 m

ZONE: CT

NOTES: Cream to green tubular flowers winter-spring. Hardy.

- BOTANICAL NAME: *Dianella caerulea*

SPREAD: 2 m

ZONE: CTW

NOTES: Blueberry Lily, blue flowers spring–summer. Blue-purple berries.
- BOTANICAL NAME: *Dillwynia retorta*

SPREAD: 1.5 m

ZONE: CTW

NOTES: Eggs and Bacon, Parrot Pea, red and yellow pea flowers in spring. Native legume.
- BOTANICAL NAME: *Dodonaea spp.*

SPREAD:

ZONE: CTW

NOTES: Hopbush, small and large shrubs. Flowers spring. Hops in summer. Species to suit particular zones. All frost tender.
- BOTANICAL NAME: *Doryanthes excelsa*

SPREAD: 2.4 m

ZONE: TW

NOTES: Gynea Lily, red lily flowers on tall stem.
- BOTANICAL NAME: *Doryanthes palmeri*

SPREAD: 3 m

ZONE: W

NOTES: Spear Lily, red lily flowers on tall stem.

- BOTANICAL NAME: *Grevillea aquifolia*

SPREAD: 1.8 m

ZONE: CT

NOTES: Holly Grevillea, grey holly foliage, red flowers.

- BOTANICAL NAME: *Grevillea buxifolia*

SPREAD: 2.4 m

ZONE: T

NOTES: Grey Spider Flower, grey and red flowers, box-like foliage.

- BOTANICAL NAME: *Grevillea floribunda*

SPREAD: 1.5 m

ZONE: TW

NOTES: Rusty Spider Flower, red felt flowers and stems.

- BOTANICAL NAME: *Grevillea lanigera*

SPREAD: 1.5 m

ZONE: CT

NOTES: Woolly Grevillea, woolly stems, red or red-yellow flowers.

- BOTANICAL NAME: *Grevillea rosmarinifolia*

SPREAD: 1.8 m

ZONE: CTW

NOTES: Rosemary Grevillea, narrow foliage, red and cream flowers.
- BOTANICAL NAME: *Grevillea wilsonii*

SPREAD: 1.2 m

ZONE: CT

NOTES: Wilson's Grevillea, large red flowers, needle leaves.
- BOTANICAL NAME: *Myoporum floribundum*

SPREAD: 2.5 m

ZONE: CT

NOTES: Weeping Boobialla, tiny white flowers, weeping foliage.
- BOTANICAL NAME: *Nandina domestica*

SPREAD: 2 m

ZONE: CTW

NOTES: Sacred Bamboo, red autumn foliage and berries. Slender plants. Suit narrow beds.
- BOTANICAL NAME: *Philadelphus coronarius*

SPREAD: 2 m

ZONE: CT

NOTES: Sweet Mock Orange, deciduous shrub, fragrant white flowers in summer. Hardy in part shade.

- BOTANICAL NAME: *Phormium tenax*

SPREAD: 2 m

ZONE: CT

NOTES: New Zealand Flax, attractive foliage. Hardy.

- BOTANICAL NAME: *Prostanthera baxterii*

SPREAD: 2 m

ZONE: TW

NOTES: Baxter's Mint Bush, greyish foliage, blue flowers in spring.

- BOTANICAL NAME: *Rhaphiolepis x delacourii*

SPREAD: 1.5 m

ZONE: CTW

NOTES: Hybrid Indian Hawthorn, fragrant pink flowers, black berries. Very hardy in soil or pot.

- BOTANICAL NAME: *Viburnum tinus*

SPREAD: 3 m

ZONE: CTW

NOTES: Tiny white flowers. Slow growing. For filling in between high-branched trees. Other species need more water.

- BOTANICAL NAME: *Westringia fruticosa*

SPREAD: 1.5 m

ZONE: TW

NOTES: Coastal Rosemary, grey-green leaves, white flowers. Very hardy.

CHAPTER 8

Pruning and Propagation

Types of Pruning

Trees, shrubs, and vines are pruned for a number of reasons during the year. Pruning may be used to encourage flowering or bushier growth, to train particular plants to a desired shape, to improve airflow and prevent disease, to remove damaged or dead tissue, to remove rampant growth, or to take cuttings.

To prune effectively you will need secateurs, loppers and a narrow-bladed pruning saw, and they must all be clean and sharp. Blunt pruning tools leave ragged edges which make it easy for various diseases to enter open tissue. Secateurs and anvil loppers have one fixed blade and a movable cutting blade. When pruning, always keep the cutting blade of secateurs or loppers closest to the main stem of the plant. This will produce a clean-cut surface in your chosen position. Only use pruning saws where you can access the area without the back of the blade damaging another branch. If you are pruning more than one plant, keep some methylated spirits and a clean rag handy for wiping the blades of your pruning tools before pruning, and between pruning different plants. This practice will avoid the spread of fungus spores or bacteria from one plant to another. A long-sleeved top and thick gardening gloves will shield you from thorns or brittle twigs and from paper wasps which may nest in some shrubs, as well as protecting you from the sun.

Some gardeners approach pruning with unnecessary trepidation and, consequently, they often under-prune, with disappointing results. Understanding a few simple facts about

plant growth will make it easier to decide when, and how, to prune particular plants. New growth occurs at the tip of stems where tissue is soft and flexible. As stems lengthen, tissue at the base of the stem becomes firmer and, in trees and shrubs, woodier, to support longer stems. Leaves do not form at random intervals along stems but at the junctions of stem sections which are called ‘nodes’. Tiny growth buds form on the upper side of nodes at leaf axils, between the base of each leaf and the plant stem. The tip of each plant stem contains a plant hormone that controls the development of these tiny buds — a condition known as ‘apical dominance’. In plants that have strong apical dominance, side growth along stems rarely occurs unless the growing tip is removed by animals, insects, or pruning. In plants that have low apical dominance, such as tomatoes, side shoots form readily and are often removed to encourage the main stem to grow longer. This practice is also used to encourage climbers to reach the desired position on a support frame.

Except when cutting back herbaceous perennials, pruning cuts along stems are always made above a healthy outward-facing growth bud (or upward-facing, depending on the angle of growth of the stem) with the cut sloping away from the bud (*see* diagram below). The diagram indicates deciduous stems only because growth buds (eyes) are easier to see; growth buds on evergreen plants are hidden by foliage. However, the same pruning principles apply to both evergreen and deciduous plants, and to stems, branches and canes.

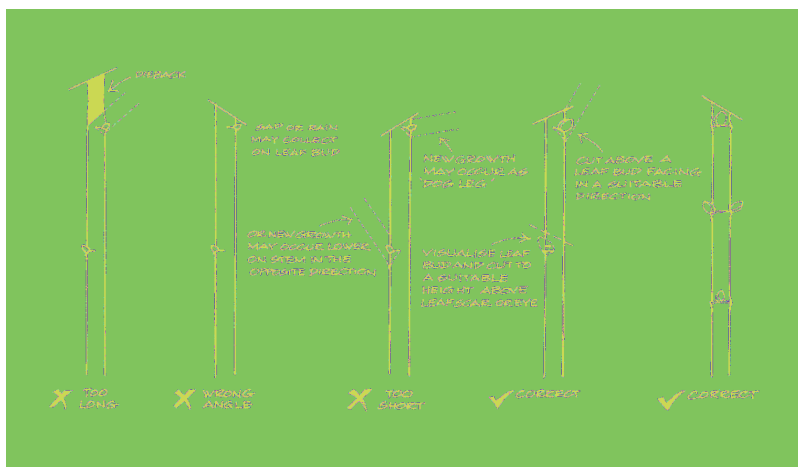


Fig. 8.1 Incorrect and correct positions for pruning cuts. The same principles apply when pruning both deciduous and evergreen plants.

When pruning a vertical stem, choose an outward-facing bud to avoid new growth pushing into the centre of the plant. As you can see from the diagram for pruning roses, cuts on vertical stems are always made at an angle to the stem, so that pruning cuts will not be horizontal to the ground. When a stem is cut, soft tissue in the stem centre contracts as it dries. On horizontal cut surfaces, this creates a depression where moisture can collect and bacteria or fungi may breed. Slant pruning cuts on vertical stems away from buds to prevent rain or sap collecting on bud surfaces and causing disease. Pruning cuts that slant towards buds can also cause secaleur damage to bud tips, or knock buds from stems. However, pruning cuts made at very sharp angles create unnecessarily large cut surfaces that take longer to heal.

When pruning a horizontal stem, choose a bud on top of the selected stem. As most plants do not grow downwards,

pruning to a bud on the underside of the stem results in looped branches; new growth starts downwards then corrects itself and turns in a vertical direction. Make a vertical cut when pruning horizontal stems, as shown in figure 8.4.

Pruning too close to buds on both vertical and horizontal stems will affect new stem growth. While growth buds form on the upper side of nodes, as new shoots grow and thicken, growth forms on both sides of nodes so that nodes on the main stem lie about two thirds down from the top edge of new shoots (This typical growth formation can be clearly seen on rose bushes.) Consequently, pruning cuts should not be too close to nodes, or pass through nodes, as this may prevent new stems forming and growth being directed to lower inward-facing buds, or new shoots growing at almost right angles to the main stem, forming ‘dog legs’. On the other hand, pruning too far above buds, or at random along stems, will result in stumpy pieces of stem, sometimes called ‘hat racks’, which die back, look ugly, and can harbour disease. As indicated in the pruning diagram, position the lowest side of the pruning cut approximately level with the top of the growth bud to allow enough room for scar tissue to form on the cut surface without blocking sap flow to the new branch or cane as it expands in diameter.

Most plants have alternate leaves (which means that single growth buds form at alternate nodes along the stem) and the pruning advice above applies to these plants. However, when pruning plants such as hydrangeas that have opposite leaves (where growth buds form on opposite sides of the same node), pruning cuts are made just above the buds with the lowest part on the cut towards the centre of the plant (as shown on the far-right stem in the diagram).

The timing of pruning varies with each genus, and pruning requirements for some popular garden plants are listed later in this chapter. As a general rule, deciduous plants are pruned in winter when they are dormant because some bleed sap if pruned when growth is active. However, some deciduous plants are prone to canker if pruned during their dormant period. Some produce flowers and/or fruit on new wood while others produce it on old wood. Some trees, such as *Ginkgo biloba*, resent any pruning at all. Ask about particular pruning requirements when purchasing a plant in order to get the best results in your garden.

According to moon-planting principles, pruning to encourage new growth or flowers is done in the phases before Full Moon when sap flow is high. Sap flow does not cease when plants are dormant — it just slows down. Pruning of mature plants is done during Full Moon phase when sap flow is not as active in foliage. Prune to deter growth during last Quarter Phase when sap flow is lowest. All pruning is done on a fertile day, when possible, to assist healing of cut surfaces. Pruning to take cuttings is best done during Full Moon phase, on a fertile day, even if the parent plant is usually pruned before Full Moon.

Tip pruning

PRUNING PHASE: *First Quarter/New Moon*

This is the simplest form of pruning and involves merely using your thumb and index finger to pinch out the growing tip at the end of a stem (*see* diagram). The technique of ‘stopping’ perennials such as chrysanthemums and dahlias is simply tip pruning. This practice encourages multiple stems to form close to a plant’s base, and can be performed

regularly on most young shrubs and some flowering annuals to encourage an attractive bushy shape. Young plants being grown as formal hedges respond well to regular tip pruning which builds a dense network of branches.

Because it encourages new growth close to ground level, tip pruning of young trees is not practised. In particular, the removal of the growing tip (leader) in eucalypts results in a shrubby plant with multiple trunks. When damage occurs to the leader of a tree, some genera are able to develop a new leader, but in other genera it can completely spoil the natural shape of a tree. Palms are never tip pruned as they do not produce side growth, and tip pruning would kill or severely damage the plant.

The exception to not tip pruning trees is pinching off new growth in the centre of trees where growth will cross established branches. This practice is easier than having to prune branches after growth has hardened. Check trees in late spring for foliage growth that may later cause problems.



Fig. 8.2 Pinching out the growing tip of a stem breaks apical dominance and stimulates lateral growth from the small buds that occur at leaf axils on stem nodes.

Pruning to encourage growth

PRUNING PHASE: *First Quarter/New Moon*

At a suitable time of year, which is determined by temperature or day length according to the genus, flowers form. General foliage growth ceases while plants are flowering, and does not recommence until pollinated flowers develop seed capsules of various kinds. This process consumes a lot of plant energy that could be used to produce growth if seed capsules are not required.

Consequently, many genera of young flowering shrubs can be pruned immediately after flowering to encourage new growth. Where the genus produces flowers at the end of branches or stems, it may only be necessary to remove the flower heads to stimulate the development of several new shoots along each branch. Proteas and a considerable number of Australian native species respond well to this type of pruning. Lavender and diosma prefer a light clipping all over with garden shears to remove spent flowers and tip prune foliage. Where flowers are mixed through foliage, it may be necessary to cut back further along the branch. This type of pruning is performed when sap flow is high so that it is quickly diverted to growth buds close to pruning cuts.

If the genus of shrub you wish to prune is not listed below, have a close look at a branch and select a position near the most developed growth buds, as these are the places where the plant would choose to produce new growth. For example, if the best buds are halfway along branches, prune the branches halfway, just above a healthy growth bud. There are entire books devoted to the subject of pruning, and these references are invaluable for advice on pruning requirements for less common shrubs and trees.

Removing branches

PRUNING PHASE: *Full Moon*

When branches or canes become unproductive, diseased or damaged, it is sometimes necessary to completely remove them. Removal is also necessary where two branches grow closely together at a very acute angle and may eventually split at the branch junction, or where branches rub against one

another, causing damage to bark. If this type of pruning is done incorrectly, it can result in further damage to your plant.

Where branches on trees and shrubs join the main stem or trunk, a small crease forms just outside the main stem bark at the origin of the new branch growth. The circumference of this crease (sometimes referred to as a collar or wrinkle) is slightly larger than the circumference of the base of the branch. The correct place to remove branches is at the outer edge of this crease.

Immediately under the bark on the main trunk is the phloem layer of tissue that carries food manufactured in foliage to the plant roots. Directly inside the phloem layer is the growth layer. The xylem layer, which carries water and minerals from roots to various parts of plants, lies on the inner side of the growth layer, and is better protected in woody plants than soft tissue species. Removing branches flush with the main trunk creates large wounds that take longer to heal and can attract borers. Scar tissue formed at the pruning site can also damage the phloem layer, affecting the overall health of the shrub or tree. Ringbarking is an extreme form of phloem damage where the removal of bark alone can kill a tree. Dieback will occur if pruning leaves a short stump, and this site can provide an entry point for disease and borers. Leaving labels on plants can also cause dieback if the label tie becomes too tight on the developing stem and restricts the phloem layer.

Before you prune, identify the outer edge of the crease. If the branch is thin but longer than 50 cm, reduce branch length by half with sharp secateurs to avoid drag or tearing when pruning at the branch crease. Positioning the cutting blade at the outer edge of the crease, cut cleanly through the branch. If the branch is too thick for secateurs, or plant tissue is dead, a

narrow-bladed pruning saw should be used. Anvil loppers are not very suitable for this type of pruning as the thicker anvil can be difficult to position at the correct angle.

This method can be used both for regular pruning and the removal of damaged tree branches. Thick branches should also be shortened to about 50 cm in length to prevent damage at the final pruning site. If a branch is broken, start the shortening process at the damage site (*see* figure 8.3). The best technique for sawing through a branch without tearing bark from the plant is to do it in two stages. First saw from underneath the branch until it is difficult to continue. Then saw through the top of the branch from above (as shown in the diagram below). Once you have removed the main weight of a branch, you can then saw carefully through the base of the branch at the edge of the crease, using the two-stage method described to leave the final pruning cut as smooth as possible.

For most plants, branches should be removed during the growing season, when cuts will heal more quickly. Growth that arises from pruned sites is unlikely to be strong. Because you don't want to encourage spindly growth, this type of pruning is best performed on trees after Full Moon. Remove damaged tree branches in Last Quarter phase in early winter if the tree is a bleeder. Don't paint pruning cuts because this practice can inhibit the tree's natural healing processes by making the pruned area sterile, or by sealing in unhealthy bacteria or fungus. Healthy, vigorous plants have the ability to seal off damaged areas and pathogens.

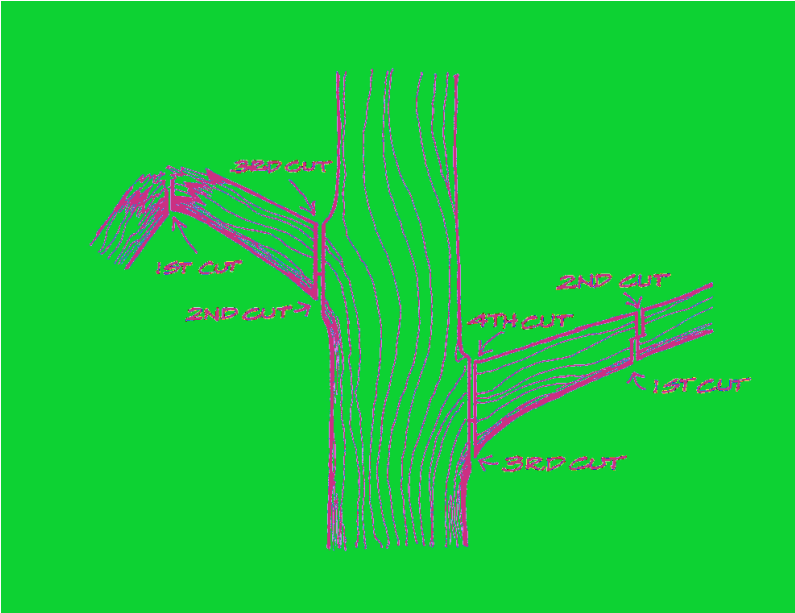


Fig. 8.3 When branches become damaged or grow in unsuitable positions, they should be completely removed at the crease that forms at the beginning of branch growth.

Shortening branches of mature trees usually results in dieback of the remaining stump. Cutting branches flush with the main trunk causes scar tissue to interfere with sap flow in the trunk.

Looking out for suckers

REMOVAL PHASE: *Last Quarter*

A ‘sucker’ is a strong new shoot that occasionally grows from the roots or main stem of a tree or shrub, often at the site of an injury to bark. Suckers present a problem when they develop on the rootstock of grafted trees and shrubs, and are more commonly seen on roses and citrus. They can originate from below ground near the base of the affected plant, or from the

stem below the graft, where the rootstock is joined with the named cultivar. Rootstocks are chosen for their vigour; if their suckers are not removed, they will grow so strongly the plant above the graft can die off. Some gardening guides advise you to remove rose suckers while pruning but, when roses are dormant, it can be very difficult to tell the difference between the unwanted sucker and a 'water shoot' which provides valuable new growth. On roses, sucker foliage and thorns look quite different to the rest of the plant so they are easier to identify during the growing season.

On citrus, the difference is not so easy to recognise. Check citrus trunks regularly through the growing season for any growth below grafts. Suckers should be promptly removed during the next Last Quarter phase. Don't try cutting them back because pruning suckers will encourage their growth. If the sucker is growing from the trunk, put on a thick glove, grasp the sucker firmly, and wrench it downwards and away from the plant. If the sucker originates underground, scrape away soil to expose the base of the sucker, taking care not to damage any roots. With a gloved hand, wrench the sucker outwards (or downwards and outwards on a vertical root) and then carefully replace soil around roots.

Deciduous fruit trees, almonds and sweet bay trees will produce suckers when roots close to the soil surface are damaged by cultivation or lawn mowers. Mulch reduces the need for cultivation and weeding around tree roots and helps prevent sucker growth. However, suckers can also be useful. Banana trees produce new fruiting plants from suckers; indiscriminate removal of suckers will destroy future crops. The pups produced by bromeliads are suckers, and many

herbaceous perennials are propagated from suckers that form on plant crowns (stools).

Pruning Fruiting Plants

DECIDUOUS FRUIT PLANTS

Blueberry

Blueberry bushes require no pruning for the first three years after planting. As second-year wood is fruiting wood, cut back no more than four of the oldest stems on mature plants to just above strong new growth near the base. Prune at the end of winter, during a First Quarter phase. If new growth is prolific, old stems can be removed at just above ground level after Full Moon.

Blackcurrant

New plants are cut back to two buds at planting time. Blackcurrants fruit on the previous year's wood so, in winter, remove any branches that would touch soil when bearing fruit the following season. On mature plants, fruited branches can also be cut back to one bud after harvest. Thin excessive growth and very weak shoots during winter. All blackcurrant pruning is performed during a Full Moon phase.

Red and White currant

These plants should have stems shortened to 25 cm at planting time. Cut just above a healthy bud, leaving four buds. The following year, shorten branches by half during a First Quarter phase to encourage further branching. This pruning should be done just before new growth begins. Mature red and white currants fruit on old wood and require less pruning than blackcurrants. Shorten leaders by 7 cm, and

prune back only new wood on healthy main branches by half (remove more if branches are weak). Remove any damaged or diseased wood. Pruning of mature plants is also performed after harvest during a Full Moon phase.

Fruiting Fig

Young trees are shaped to a vase (but slightly more open than stone fruit trees). Tip prune young trees in early summer to encourage branching. Shortening branches on mature trees also encourages lateral growth in the positions where fruit forms. This pruning can be performed in spring in frost-free areas, during First Quarter phase. In cooler areas, pruning fig trees is more complicated and detailed advice is required to prevent crop losses.

Grape

Grapes should be pruned during Full Moon phase in early winter as soon as they become dormant because vines usually bleed if pruned after the end of July. Your cultivar may need specific pruning methods — such as head, spur or cane pruning — because fruiting wood forms in different areas on particular cultivars. The Department of Agriculture will be able to provide accurate information about these requirements. The canes on newly planted grapes will form the vine trunk so it is important that growth to the fruiting wire is strong. For vines that have made strong growth of more than 6 mm thickness well past the fruiting wire, cut through the node about 10 cm below the wire and loosely attach the strongest cane, with a soft tie, to the upright support. Ties must be quite loose or new season growth will be restricted. Then remove any other canes. If vines have not made strong growth, prune back to two or four full nodes, and

start again. Food stored in the roots of well-maintained young vines will provide stronger growth the following season.

Some texts advise the removal of all but the top four buds on young vines that have reached the wire. However, if top growth is damaged by hail or a severe storm, you have no fall-back position when removing damaged growth. Grapes, generally, have strong apical dominance, and buds can be left along the cane in the first season. Any unwanted growth can be rubbed off the cane while small. In severe growing conditions, young vines will sometimes put out a more vigorous shoot near the base of the vine during the second growing season. If this shoot develops into a strong cane it can be trained as the new leader. You cannot take advantage of this opportunity if all but the top buds have been removed.

If growing vines over a pergola, don't even try to get the vine to the top in its first year. Prune vines, not higher than 90 cm, in the same manner as those grown on other supports. Pruning too high to spindly growth is counterproductive as it will result in poor lateral growth the following season.

Summer pruning involves thinning foliage around grapes after fruit-set to allow more light to reach the bunches. This process can be performed during a Full Moon phase, and is very important when growing grapes on a pergola as the fruit will hang under the foliage canopy.

Kiwi fruit

Kiwi fruit has very specific requirements for early-winter pruning (during Full Moon phase); vigorous male vines require cutting back harder than female vines, and fruit forms on a limited range of buds on female plants. Your local Department of Agriculture can provide specific information

on pruning these vines. Summer pruning consists of some foliage removal around fruit so that it receives more light. (This requirement will vary according to growing conditions.)

Pecan

Trees are usually grown with a central leader and require little pruning. Low branches of young trees are best removed in early winter during Last Quarter phase when sap flow is lowest; pecan trees have a tendency to bleed if pruned at other times.

Pomegranate

Lightly prune outer branches during the first Full Moon after harvest.

Raspberry

Diseased canes should be burnt, if burning-off is permitted in your area. Suckers growing more than 20 cm from the trellis can be cut off at ground level, or removed with some roots attached and used to establish new clumps.

Summer bearers fruit on canes produced the previous summer. Remove 15 cm from canes after the last local frost, during First Quarter phase. After harvest, remove all canes that have borne fruit, as well as any weak canes, at just above ground level, during Full Moon phase. Pinch off any flowers during the first year. (If lots of flowers form, it may turn out you have autumn-bearing raspberries instead, in which case you should leave them to fruit.)

Autumn bearers fruit on canes produced in the current season. At the end of the following winter, during First Quarter phase, canes on young plants should be shortened to just above a

node below where they bore fruit. Mature plants should have all canes removed at just above ground level. If autumn-bearing raspberries are pruned after harvest, tender new canes may be damaged by frost.

POME AND STONE FRUITS

Single-stemmed young trees traditionally had their leader shortened at planting to encourage multiple stems to form at a height which would allow fruit to be picked easily. The strict open-vase training of fruit trees was developed to encourage fruit to ripen evenly. However, it is not particularly desirable in home gardens to have fruit ripen all at once. Less rigorous pruning can allow a more gradual ripening of fruit in some species, and trees with a central leader may produce fruit earlier. Espaliered and double-grafted trees have very specific pruning requirements. Contact your Department of Agriculture or consult a pruning reference for detailed instructions and diagrams on pruning particular species of deciduous fruit trees and vines; some varieties fruit on laterals, some on new wood and others on older wood. Detailed diagrams will also help you to identify the difference between fruit buds and growth buds. Pruning all trees the same way can result in crop losses. There are, however, some guidelines for pruning pome and stone fruit trees.

Almond

Almonds fruit on one-year-old wood, which means that the following year's crop will grow on branches that formed in the current growing season. Age-appropriate pruning is performed each winter, during Full Moon, for fruiting trees. If flowering stems are cut for indoor use, trees that are grown for blossom do not require pruning. Otherwise, stems can be

shortened as though cutting for a vase during the first First Quarter phase after blossom has fallen.

Apple and Pear

These trees are pruned during Full Moon phase in winter. Both have specific pruning and fruit-thinning requirements according to cultivar and tree form. Not all apple trees produce fruit on new wood. Heavy pruning of pears can reduce yields.

Apricot

All apricot trees, and young trees in particular, are very susceptible to bacterial canker (visible as a gum that exudes from limbs and trunks). The bacteria is always present on the leaves of fruit trees and may enter injury and pruning sites when sap flow is low, but trees are resistant while growth is vigorous. Prune and remove infected sections in summer immediately after harvest, during First Quarter phase so that pruning cuts heal well before leaf fall. Sterilise pruning tools frequently.

Cherry

Because they produce flowers on old wood, cherry trees require little pruning, but, like apricot, they are very susceptible to bacterial canker. Remove infected sections and any inward-growing branches and perform any necessary pruning in summer, immediately after harvest, during First Quarter phase so that pruning cuts heal well before leaf fall. Sterilise pruning tools frequently. To encourage more branches on young fruit trees shorten their leaders at the same time. If flowering stems are cut for indoor use, trees that are grown for blossom do not require pruning. Otherwise, stems

can be shortened as though cutting for a vase, during the next First Quarter phase after blossom has fallen.

Peach and Nectarine

Some cultivars fruit at the end of branches, and incorrect pruning can cause crop loss, so consult a reference guide before pruning during Full Moon phase in winter. Flowering peaches are pruned in the same way as flowering almonds.

Plum

Plums have specific pruning requirements, so consult a reference guide before pruning during Full Moon phase in winter.

EVERGREEN FRUIT PLANTS

Avocado

Avocado require very little conventional pruning. Anthracnose spores live on dead avocado wood, and this disease can affect fruit, so dead twigs should be removed each Full Moon phase during the growing period. Lower branches on young trees may also require removal to prevent fruit-laden branches touching soil. Mature trees are pruned after harvest, if necessary, during Full Moon phase. Trees may require cutting back after hail damage, as bark is easily broken by hail, and bacterial or fungus diseases can arise in damaged areas. Apply a dose of half-strength seaweed tea to the soil immediately after a hail storm. Provided the tree responds well to this fertiliser proceed with pruning during First Quarter phase. If the tree continues to die back, remove any fruit and work on improving the tree's vigour before pruning.

Citrus

A healthy citrus tree doesn't require a lot of pruning. The Full Moon phase after harvesting is a suitable time to tidy up mature citrus trees, and will ensure that new flower buds do not form on twiggy branches. Citrus have several short growth cycles each year. Young trees require only a shortening of leader stems, during a First Quarter phase in spring, to encourage laterals to form. Aim towards a vase-shaped tree to allow balanced placement of fruit. There is no set season for pruning citrus. Various cultivars fruit in different seasons, and some citrus, such as lemons, produce two crops per year, or fruit over a long period. If you deal with pruning problems as they arise, you are unlikely to be faced with the task of rejuvenating trees. Citrus trees in containers should be clipped regularly to maintain strong lateral growth and avoid long branches splitting the tree when fruit forms.

Remove any dead or damaged branches and twigs both outside and inside the canopy, then thin out any crisscrossing or overcrowded branches. Cut back any branches that come close to touching the ground when fruit-laden. This pruning practice is called 'skirting'. Low-hanging branches commonly occur in grapefruit trees because fruit is quite heavy. While it is not common practice to 'high skirt' citrus trees in Australia, some skirting is required to prevent disease spores splashing onto leaves and fruit during rain. Skirting is also recommended when growing citrus in tubs, to allow rain to reach the growing mix. High skirting is a common practice with container-grown citrus in Europe, where tree canopies are sometimes pruned to a globe shape to provide decoration, as well as fruit, in small gardens. Thick mulching under citrus

will overcome any problems of grass and weed growth that may be encouraged by skirting.

Sometimes a very strong shoot will grow vertically in the centre of a citrus tree, far beyond the rest of the canopy, and make fruit collection difficult. If the shoot is too strong to be flexible, remove it completely. (Shortening these shoots results in very dense growth in the centre of the tree and restricts light to the fruit.)

Tropical guava

Young trees are usually trained to an open-vase shape. Leaders can be shortened to encourage lateral growth and fruiting wood during spring. In summer, shorten laterals, to encourage a strong framework. Remove inward-pointing branches. Once established, tip prune leaders and vigorous laterals after harvest, during Full Moon phase.

Passionfruit

To encourage new fruiting growth, these vines are best pruned after soil has warmed in spring, during First Quarter phase. Flowers and fruit are formed on the current year's laterals. Commence pruning by completely removing any dead or damaged shoots. Then thin any crowded laterals. This practice will help prevent fungal disease. Finally, shorten all remaining laterals to about 50 cm long to encourage more lateral growth. Vigorous vines in very warm areas may also need a light pruning as soon as the summer crop has been harvested. Do not delay summer pruning until autumn — soft new growth in cool conditions attracts pests that carry disease.

Pruning Shrubs and Trees

Camellia

Japonicas and reticulatas require little pruning other than the removal of spent flowers in early spring. Twiggy growth in the centre of the shrub, overlapping and low-hanging branches can all be removed in early autumn. Any dieback that has occurred should be cut back to a healthy stem. Autumn pruning of camellias is carried out during Full Moon phase.

Sasanquas, and occasionally other types of camellias, can put out vigorous new growth which can become very untidy. However, shortening this type of stem will only result in more strong growth. Cut the rampant stem below the start of the new growth. Side shoots will be produced in spring.

Crepe Myrtle

Crepe myrtle are pruned at the end of winter or early in spring, while the tree is still dormant and before new growth appears. Consequently, they will respond well to pruning during First Quarter phase. Young crepe myrtle require a light pruning of each stem, just above a healthy leaf bud, to promote an open-shaped tree or shrub and allow good air circulation through the plant. This genus is susceptible to powdery mildew in humid conditions where airflow is poor. Pruning the previous season's growth encourages flower-producing wood to grow.

If growing as a shrub, and the plant has only a central stem, allow it to remain through the growing season and shorten it to two buds when pruning. Established plants require all twiggy growth to be removed and the past season's growth to be cut back to two or three leaf buds.

If growing as a small tree, prune the central stem about 60 cm above ground, and allow several strong shoots to form branches during the following season. These can be shortened at the next pruning, if necessary, to produce more branches. Once the basic framework has developed, remove twiggy growth and shorten back the past season's growth, as required, to maintain a good shape.

If growing as a larger tree, established trees require only the removal of spent flower heads in autumn and the removal of twiggy growth and inward-growing branches at the end of winter, during Full Moon phase. Trees that have become too large for their space usually respond to a hard cutting-back into old wood on branches. In drastic cases, a tree can be cut back to a 60-cm trunk during First Quarter phase. This treatment should result in a mass of new shoots forming near the top of the trunk. Allow shoots to grow until the following winter; then, select the best ones for branches, remove the rest, and prune in the same manner as a small tree.

Diosma

Diosma, *Coleonema pulchrum*, is a feathery-leafed shrub with tiny pink flowers. It resents hard pruning; simply clip it with shears to remove 4 cm of growth after flowering, and again during summer.

Frangipani

Because frangipani trees bleed easily, pruning should be performed during a Last Quarter phase in winter. When sawing through branches, make sure you position the saw at the outer edge of the crease where it joins the supporting branch, leaving branch stubs on frangipani will cause dieback, while cutting flush against supporting branches will cause

these branches to rot. If you wish to grow new plants from prunings, prune towards the end of winter so that the fleshy cuttings will not be dormant for too long. Wash your hands (and your pruning saw) carefully after handling cut stems as the milky sap is poisonous, and will blacken your saw blade.

Hibiscus

Hawaiian and species hibiscus strongly resent a spell of cold weather after pruning, so pruning in Temperate Zones should not be carried out before early October. Just before Hawaiian hibiscus make new growth in spring, their lower leaves turn bright yellow and drop off, indicating a suitable time to prune. Then growth buds along branches break dormancy, giving a clear indication of suitable pruning positions. Pruning during a First Quarter phase will produce faster regrowth. Species hibiscus, except for alyogynes, can be pruned at the same time as Hawaiian hibiscus.

Start by removing all withered growth, cutting it off cleanly with sharp secateurs or loppers. Next remove any branches growing into the centre of the plant. Finally, prune back the shrub, reducing the plant size by one third to keep it bushy, and to encourage new branches.

Hydrangea

Pruning the common hydrangea, *H. macrophylla*, improves flowering, but other species require little pruning.

Flowering shoots are formed on the previous year's wood. In frost-free areas, hydrangeas can be pruned when cutting flowers by making a slanted pruning cut on the remaining stem. Leave at least three pairs of buds on the current year's growth of each stem. If possible, cut flowers after a Full

Moon as any new growth would not have time to harden before winter. The remainder of the flowered stems can be pruned in the same manner after flowering has finished. Stems that have not flowered can be left intact.

In frost areas, flower heads are left on the plant over winter to shelter young buds. As soon as the risk of frost has passed, plants are pruned as described above, during First Quarter phase. Remove any unproductive or spindly canes on established shrubs at the appropriate pruning time.

Lavender

After bursts of flowering, young plants should be given a light haircut with shears, during a First Quarter phase, to remove spent flower heads and about 2 cm of foliage. Cut flowering stems, with some foliage, to encourage new growth lower in plants, and keep them well shaped. Mature plants can be reduced by one third after the main flowering period. Most lavenders resent hard pruning into old wood. Once growth and flowering start to decline, it is much easier to propagate a new shrub from semi-hardwood cuttings than to salvage an ailing plant.

Rhododendron — Azalea group

The azalea group require little pruning, and routine pruning of azaleas can deter new growth. Tip prune young plants for the first two years to establish a well-shaped shrub. The best time to do this is during a First Quarter phase, just after flowering. Healthy azaleas usually drop spent flowers and three, sometimes four, new foliage shoots develop just behind each flower head. If spent flowers remain, pinch them out carefully to avoid damaging new growth buds (*see* [Petal blight in chapter 9](#)). Mature shrubs require no more than the removal

of dead wood and shortening of leggy shoots that extend beyond the natural foliage canopy. Cut to just above healthy new growth further down the stem. Eyes (or leaf buds) can be difficult to see on this genus, so prune just above a leaf scar or bump in the selected branch. If neglected shrubs with a lot of dead growth require severe pruning with a saw, prune it out gradually over two or three springs for the best recovery.

Pruning Roses

Have you noticed that diagrams for pruning roses invariably indicate to cut above a plump growth bud, yet the accompanying text will advise ‘cutting just above an eye pointing in the desired direction’? At the recommended pruning time, the eyes, or potential growth buds, are mere dots on stems of bush roses and standards. Following this advice often leads to pruning too close to nodes and a ‘dog leg’ formation in new growth, or growth appearing lower on the stem in a different direction. No wonder new gardeners are nervous about pruning roses.

Pruning bush roses and standards in summer

Due to their longevity, roses require regular pruning. Standard roses are hybrid teas or floribundas grafted onto a tall rootstock and are pruned in the same way as bush roses. On hybrid tea roses, flowers are produced on the current season’s wood. Older, less productive canes must be regularly replaced to provide energy for new growth, and to produce flowering stems at a height where they can be enjoyed. Every time you pick roses correctly, you are pruning the shrub and encouraging new growth to form lower on the plant where canes are thicker.

About every six weeks through the growing season, check hybrid tea, floribunda and miniature roses, and use sharp secateurs to completely remove any growth towards the centre of plants, and stems which have the potential to cross or rub on other stems. Remove dead wood, cutting above an outward eye about 5 cm below the dieback. Dieback (or rose canker) is caused by a weak fungus present on the stems of many rose cultivars which is able to enter stems through pruning cuts, or through bark damaged by friction or frost. Because the fungus is weak, vigorous roses are able to prevent or, at least, confine damage. There is no effective fungicide for rose canker. Remove any unwanted suckers as soon as they arise (*see* p. 380). Yellow stems and old canes that are not producing strong growth should also be removed at the crown, or just above a healthy cane. You may require loppers or a pruning saw for this task. During First Quarter phase in late January or early February, shorten all stems, except water shoots, to produce a fresh flush of blooms to be picked on short stems during autumn.

Pruning roses in winter

In my opinion, roses should be pruned as little as possible during winter. I came to this conclusion after observing that dieback, which sometimes occurs after winter pruning, did not occur after my plants suffered severe hail damage during the growing season, even though jagged cuts had caused extensive scarring to rose stems. Active growth allows healthy roses to seal off affected areas quickly and prevent stems from dying. While roses are dormant, healing of cut tissue is much slower. It is also easier to identify potential growth buds, suckers and unproductive canes during the growing season, and the results of your pruning are soon

evident. If regular pruning is carried out during the growing season, you will develop a sense for just where to prune dormant roses, and you are also likely to find that very little winter pruning is required.

For hybrid tea, floribunda, and miniature roses, prune ‘twiggy growth’ first. The amount of growth removed will vary depending on the rose. For example, on bushes with plenty of strong vigorous canes, all twiggy growth can be removed. However, some thinner growth may have to be left on small bushes with few strong canes. Miniatures have lots of twiggy growth but require little pruning.

The current trend in rose pruning is against hard pruning. On hybrid teas and floribundas, aim at reducing the height of existing growth by a third; on small floribundas, by a quarter. Because roses are subject to apical dominance, canes and laterals will produce spring growth towards the tip of each stem, where growth is thinnest. The removal of the top third of canes promotes stronger growth as growth buds are stimulated on lower, and thicker, parts of canes. Always cut above an eye (as indicated in figure 8.4). Strong laterals that arise from canes can be shortened to approximately four eyes, cutting to an eye in the most suitable direction. Remove the center stem of water shoots, retaining only the best two laterals. Shorten these laterals, as on other canes. If the water shoot is much higher than the rest of the plant, it can be shortened at a suitable eye, and without laterals, to make it a comparable height to other canes. Finally, completely remove any canes that have been growing for more than four years, providing you have adequate alternate strong canes.

Leave winter pruning as late as possible, which may be late July in very warm areas, early August in some temperate

areas, and as late as September in very cold areas. Pruning cuts will heal more quickly close to new growth and, in cooler areas, the risk of frost is minimal at these times (*see* Protecting plants from frost in [chapter 9](#)). Newly planted roses can also be trimmed at these times if they were not pruned before purchase. Because you are pruning to encourage new growth, prune before Full Moon phase, preferably on a fertile day. After pruning, fertilise established roses, and mulch all roses. Do not put rose prunings in the compost heap as they can spread disease, and you will still find thorns in your compost.

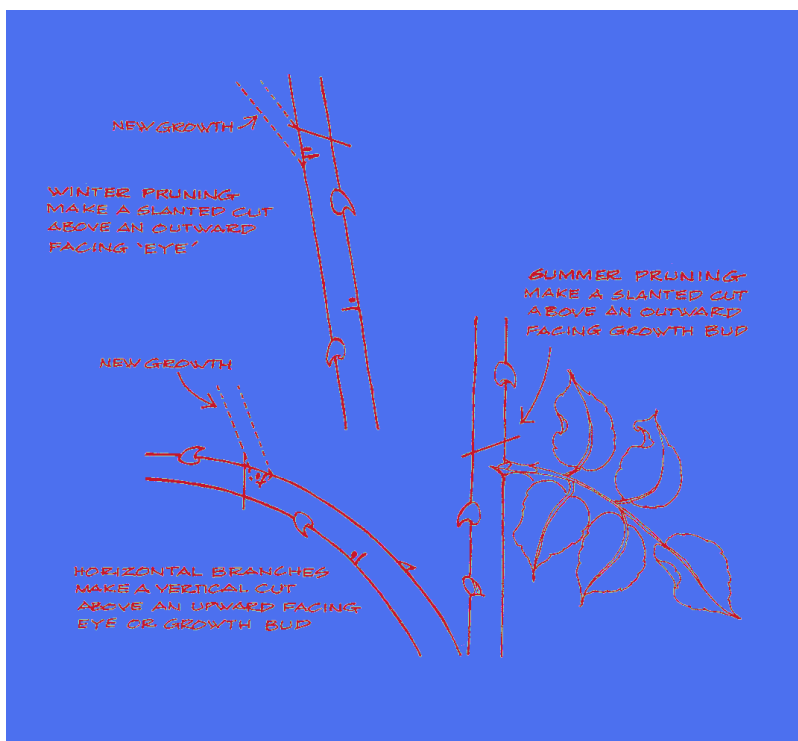


Fig. 8.4 Suitable positions for pruning cuts on rose canes in both summer and winter. When picking or dead-heading roses always cut above a healthy, outward-facing bud.

Pruning climbing roses, ramblers, and weeping standards

Climbers, ramblers and weeping standards are pruned after flowering, during First Quarter phase. Weeping standard roses are grafts of either ramblers or climbers onto a tall rootstock — your nursery will be able to tell you which type of standard you have. Prune rambler standards as ordinary ramblers, and prune climber standards as ordinary climbers. Check carefully on both types for any growth on the stem below the graft. Suckers can be more common on standards because the rootstock is exposed to more light.

Climbing roses are not pruned until the second year after planting. Climbers usually flower on two-year-old wood, unless they are vigorous sports of hybrid tea or floribunda roses. During the first growing season, tie new canes in a horizontal position while they are still supple, spaced about 60 cm apart. (Climbers produce more flowers from horizontal canes.) Remove dead or diseased wood as soon as possible through the growing season. Tips of vigorous canes can be trimmed by 20 cm, during a First Quarter phase in the growing season, to encourage lateral growth. Once established, hybrid tea and floribunda climbers can be picked and pruned in much the same way as their shrub relatives, although remaining canes are left somewhat longer on climbers. Climbers that only flower in spring are pruned after flowering, which can be any time from late October until December, depending on the cultivar. Cut back any stems that have borne flowers to a healthy, upward-pointing leaf. Strong new growth from non-flowering stems should be tied

horizontally, with the aim of providing new leaders when older canes become unproductive. Remove older canes to the strongest new growth. If a leader is not producing new shoots, cut it back by half.

New ramblers should be left to produce some healthy canes before pruning as flowers are produced on two-year-old wood. Young ramblers require only the removal of dead or diseased wood and poorly placed canes. From the second year onwards, dead-head spent blooms on a short stem to avoid seeds setting. If your established rambler produced some good new canes from its base the previous summer, you can remove some of the old ones. Try to maintain a balance between new and old canes. On less vigorous plants, shorten old canes to new growth and slightly reduce the length of the new shoots.

Banksia roses require little pruning other than the removal of spent flowers pruned after flowering. If you have a very vigorous specimen, new canes can be thinned, and the remainder used to replace old canes, after Full Moon.

Pruning species roses

Species roses flower in spring on laterals and the side shoots of laterals, called sub-laterals, of old wood. I have not found either the apothecary's rose or Hungarian rose very responsive to winter pruning. Both have very strong apical dominance, and, like climbing roses, seem more responsive to pruning during First Quarter phase after flowering. Shorten leaders by one third, and remove flower heads with a short stem. Remove any dead or diseased wood through the growing season, as for other roses.

Propagating Plants

PLANT NUMBERS ARE INCREASED by diverse methods as suited to each particular genus. Seed, division, cuttings and layering are the most common methods of propagation. Most vegetables (and those fruits we regard as vegetables) are usually reproduced from seed — information on seed saving can be found at the end of this chapter. Other genera, such as globe artichoke and raspberry, are more quickly reproduced from suckers. Division is a very easy method of propagation because divided segments will already have some roots. Plants with rhizomes can also be quickly propagated by division.

Some plants are better grown from cuttings than from seed because seedlings, like children, don't always inherit their parents' traits, whereas a cutting replicates the same plant. Many herbs, and flowering perennials, can be quickly and easily propagated from different types of cuttings. Our entire oregano crop of many hundred plants originated from a sprig used as garnish. The flavour from these plants is far better than that of the oregano we had previously grown from seed. There are various categories of cuttings: tip cuttings, which include layering; semi-hardwood cuttings, which include heeled cuttings; and hardwood cuttings, which are usually used for deciduous plants. The genera listed below are relatively easy to propagate. As your propagating skills improve with practice, you will be able to successfully reproduce a wide range of plants. For all types of propagation except seed collection, give plants a thorough watering the day before. This will give your propagation material the best chance of survival.

DIVIDING PLANTS

Herbaceous perennials, gerbera, bearded iris, daylilies, chives and lemon grass can be propagated by this method. When dividing plants, you will need a knife with a very sharp blade to separate crowns or rhizomes and foliage and roots. At a suitable time according to the genus, lift the plant carefully using a garden fork. Don't use a shovel as you might cut through the roots. Gently shake excess soil from the roots. If you can't see an obvious place to divide plants, gently hose soil away from the crown. The removal of sucker growth to create new plants from globe artichoke, raspberry crowns and bromeliads is also a form of division. Simply sever a sucker that has roots and replant it in a new position.

Bearded iris

After four years, clumps should be divided to maintain flower quality. Division can be done in summer or early autumn. Carefully lift the clump, and its label, using a gardening fork. Wear gloves when dividing bearded iris rhizomes because the sap will make you sick, if ingested. Rhizomes will have formed offsets — side growths with new roots. Carefully cut off healthy offsets where they join the parent. Trim any damaged roots and damaged, or soft, parts of the rhizomes with a sharp knife. If rhizomes have developed soft parts, make a note to include seaweed tea in your fertiliser program. Remove withered leaves and cut remaining foliage to an inverted V. Then cover new rhizomes with wet newspaper, keeping each cultivar separate and clearly labelled. The parent rhizome is discarded. Add mature compost to the growing area, and replant rhizomes. Three rhizomes of the same cultivar, planted 10 cm apart, will form a large clump more quickly than rhizomes planted separately. Bearded iris blooms last longer in the garden than as cut flowers, because

branched stems produce short-lived flowers in rapid succession in warm rooms.

Chives

Chives simply need to be gently teased apart into small clumps. Trim roots evenly and replant several stems together, or place into potting mix in 8-cm pots for planting later.

Gerbera

Where winters are warm, stools can be divided anytime when not in flower, provided plants can be established before a wet season. In other areas, spring is usually a good time to divide gerberas, once the soil warms, because they can flower through autumn. Scrape back mulch and lift stools using a garden fork. Then carefully wash soil from the roots by holding the gerbera stool in your hand and swishing the roots in a bucket of water, ensuring that soil is not splashed into the crowns. Gently tease the stool into sections, each containing at least one crown. Remove old and damaged leaves from the base of crowns with a sharp blade. Remove damaged roots and trim the rest to 12 cm in length. Keep crowns wrapped in wet newspaper while you add more mature compost to the planting area. Then plant each division, at the same depth as previously planted, with roots spread over a mound in the centre of the planting hole. Water to settle soil, and reapply mulch. Do not fertilise newly divided crowns.

Lemon grass

Lemon grass is propagated by dividing clumps of stems when soil is warm in spring. Roots form inside the base of each leaf layer. Trim tops to 3 cm above where inner leaves branch out. Peel back lower leaves carefully to expose several layers of

root buds. Trim off old, shrivelled roots, retaining the root stalk to help support the stem in the pot. Plant each stem in an 8-cm pot filled with potting mix, and keep plants in a warm protected position until strong growth is apparent. Plant out in warm weather and water thoroughly.

Taking Cuttings

NOT ALL CUTTINGS will produce roots (strike) so you will have to take more cuttings than you need. Experienced growers always take 10–30 per cent extra cuttings, but 50 per cent more is not too many when you are starting out. Extra plants are always welcome donations for school fetes, or good gifts for friends. While some cuttings require good air circulation, others need a very humid atmosphere, so it is often recommended that you place a plastic bag over the pot of cuttings. However, this type of protection collapses easily and, if the plastic touches foliage, it can become slimy and cause the cutting to fail. Collect some large, clear plastic bags for cuttings that allow you to place the entire pot inside the bag. It is much easier to keep a bag full of air when the opening is at the top. It is also easier to check cutting progress, or ventilate cuttings during the day, and then reseal the bag. Keep cuttings in a shaded position in summer as wilting foliage is more common in strong light.

After experimenting with all moon phases, we have discovered that we get the best strike rate on fertile days during Full Moon phase, and we now take cuttings only at these times. When taking eight hundred or more cuttings of a cultivar at one time, as we do, an extra 15 per cent of cuttings amounts to extra work, so it makes sense to take cuttings at the best possible time.

Before collecting cuttings, make sure that your secateurs are sharp. Then make up a suitable cutting mix and put it into pots. The less time between taking cuttings and placing them in the cutting mix, the better their chance of survival. (The exceptions to this rule include frangipani and pineapple.) When collecting plants for cuttings, try to take cuttings early in the day before leaves lose moisture. Take cuttings that are longer than you need and trim them to the correct position immediately before placing them in the mix. Carry an opaque, plastic bag with a small amount of water in it to keep your propagation material fresh as you take cuttings. Avoid taking cuttings in the middle of the day.

Cutting mix

A basic cutting mix for tip cuttings, semi-hardwood cuttings (and some hardwood cuttings) is made from equal parts of well-washed river sand and moist, shredded coconut fibre. You can add extra sand or coconut fibre to this mix, as required. Some cuttings will strike in pure sand but the coconut fibre helps to keep the mix damp and allows easy penetration of delicate roots. As a general rule, do not add compost or fertiliser to cutting mixes. It can cause rotting of some stems, and the cuttings should be moved into a potting mix as soon as they strike. If you are unable to find coconut fibre in small quantities, traditional peat can be substituted. Wet the coconut fibre or peat thoroughly first as they swell when damp. Mix the ingredients thoroughly, then mix again. (Globs of coconut fibre or peat in the mix can cause cuttings to rot.) Choose small pots with plenty of drainage holes or add lots of holes to the base of cleaned yoghurt pots, or similar containers. Fill pots to a centimetre below the top. Water the pots to settle the mix.

SEMI-HARDWOOD CUTTINGS

Propagating new plants from semi-hardwood cuttings of herbs such as lavender, lemon balm, marjoram, oregano, rosemary, sage and thyme is very easy. Wait until flowering is over and new growth is strong enough that it will not snap when pushed into the cutting mix. Select plants that have excellent colour or flavour for your cuttings.

First, prepare your cutting mixture (as above). For thyme and rosemary, I add slightly more sand to the basic cutting mix. Ideally, cuttings should be at least 10 cm long to give you excess for re-trimming. Pull out the top few leaves from the cutting. This technique will force lateral growth from the leaf axils. Retain leaves on about 3 cm of upper stem, and strip the rest by sliding your fingers down the stem. Recut the stem just below a node, leaving several nodes above the cut. Roots may form at any one of these nodes; they do not always form at the base of the cutting. For large-leaved cuttings, such as sage, cut any large lower leaves in half (*see* diagram below). Too much top growth will cause cuttings to wilt.

Push the cutting into the mixture at the edge of the pot, not in the middle. Repeat the process with the rest of the cuttings, placing them about 3 cm apart. Water gently, and place pots in a comfortably warm position out of direct sunlight. A shade house or verandah is ideal. Culinary herbs and lavender prefer not to be covered with a plastic bag. Organic seaweed products contain natural growth stimulants. To encourage cuttings to strike, you can dip them in organic seaweed tea before placing them in the pot, or water pots after filling with half-strength organic seaweed tea. Keep cuttings just damp. When white roots are visible through drainage holes at the base of the pot, or a gentle tug on the cutting gives resistance,

carefully turn the pots out and repot each cutting, individually, into a slightly richer mix containing some river sand. Cuttings can remain in these pots until they are strong enough to be planted out in open soil.





Fig. 8.5 *Left*, a semi-hardwood cutting ready for insertion into a cutting mix. *Right*, a tip cutting ready for insertion into a cutting mix or water. When taking tip cuttings of tomato or chrysanthemum, do not pinch out the growing tip.

TIP CUTTINGS

Tip cuttings are a little harder to strike than semi-hardwood cuttings because plant tissue in growing tips wilts easily. Although some tip cuttings require covering to retain humidity and prevent wilting, the tip cuttings listed below, with the exception of carnations, do not require covering.

Carnation

Use the basic cutting mix, with an extra half part of sand added, to fill 15-cm pots. Between bursts of flowering, select

strong offshoots with nodes close together. Snap off the shoots from near the base of the selected plant by pulling them downwards. Remove the lower leaves from cuttings so that only the top four pairs remain. Shorten leaves that curl backwards. If a cutting contains a heel close to the lowest remaining leaves, it can be placed straight into the mix. If the heel is some distance from the leaves, you will have to trim the cutting to just below the remaining leaves. Using a clean, sharp blade, cut through the stem, at a slight angle, just below a node. Place cuttings in the mix up to the lowest set of leaves and spaced about 5 cm apart around the pot edge. Water gently to settle the mix. Keep cuttings in a warm, protected position, out of direct sunlight. A cold frame, or miniature greenhouse, is ideal if air is dry. Mist cuttings daily, during the morning. Roots should form after several weeks. Carnation cuttings, or layered carnations (see below), can then be planted out in autumn or potted individually in a slightly richer mix. Apply liquid fertiliser, and water regularly until you are ready to plant them out.

Chrysanthemum

New shoots will form at the base of a chrysanthemum plant (stool) in early spring. When these have reached 8–9 cm in length, prepare a cutting mix and place the mixture into 8-cm pots. Using a clean, sharp blade, remove each cutting from the stool, just below a node, so that each cutting is about 7 cm long. Remove any lower leaves and place cuttings, 3 cm deep and 4 cm apart, around the edge of the pot. Record the cultivar name or flower colour on tags and insert them in the centre of each pot. Keep cuttings damp, in a warm spot out of direct sunlight, but do not cover them as they need good air circulation. After two weeks, check for root growth. When

root growth is strong, move each plant into its own 8-cm pot, or plant into the open garden in mid to late spring.

Geranium

January is a good time to take cuttings of pelargoniums and zonal geraniums. Add a half part of sand to the basic cutting mix and fill 15-cm pots. Take cuttings about 12 cm long from the top of current year's growth. Retain the smaller top leaves and remove the lower leaves. Trim the bottom of the cutting to just below a node. Bury the base of the cuttings 4 cm deep around the rim of a pot, keeping them approximately 4–5 cm apart. Place cuttings in a warm, sheltered position for several weeks, but do not cover them with plastic as they need good air circulation. Keep soil just damp. When a gentle tug on the cutting is met with resistance, it is a sign that roots have formed. Gently turn out pots and transfer rooted cuttings to individual 10-cm pots filled with good quality potting mix which has a little extra sand added to it. Give plants a light application of half-strength seaweed tea several days after repotting. In frost-free areas, they can be transplanted into the garden or permanent containers as soon as strong growth is obvious. Where winters are cold, keep new plants growing in individual pots, in a protected area, and pot-on if necessary. Plant out in spring.

Marguerites, mint and watercress

During summer months, it is quite easy to propagate varieties of mint, watercress and marguerite daisies in water. Take 10–13 cm cuttings in the morning. Collect more cuttings than you will need. Pinch out the tip of each cutting, leaving two or three sets of small leaves at the top. If there are large leaves at the top of cuttings you should cut these in half, and then

carefully strip the rest of the leaves from the cutting. Trim the bottom of the cuttings to just below a node (*see* figure 8.5). Place the cuttings in a clean glass jar filled with clean water. About fifteen to twenty cuttings in a standard 375 ml jar will keep cuttings supported and their foliage clear of the water. If you don't want a lot of cuttings, crisscross some tape across the neck of the jar to support the cuttings. Place the jar in a position where it will receive good light, but not where the water will be heated by direct sun. A brightly lit windowsill is fine, but a shade house does not allow enough light for this type of cutting. Carefully top up water as needed. Cloudy water indicates either that the foliage is underwater or that plants are not receiving enough light for root development — tip it out and replace with fresh water. In a week or so, white roots will appear from the nodes in the cutting stems. When the roots are about 2 cm long, carefully remove cuttings and place them in individual small pots, then fill the pots with moist, good quality potting mix. Water gently to settle soil around new roots. When new top growth is obvious, cuttings can be planted out. Do not allow the roots to grow too long in the jars as they are more delicate than those that form in soil, and the longer roots become tangled or snap off when potting is attempted.

Pineapple

Remove the top of a ripe pineapple with a small amount of fruit attached. Place the top in a warm, shaded, airy position to allow it to dry off. This could take a week or so, depending on air temperature. Carefully remove any remaining fruit pulp from around the fibrous core. (The core will help to anchor the plant in its pot.) Carefully remove lower leaves until you can see white root buds. Expose several layers of these buds

and place the plant in a 15-cm pot filled with free-draining mix of damp sand and coconut fibre. Firm mix around the pineapple core and keep the plant warm, just damp, and semi-shaded until a strong root system forms. Harden-off, and plant into open ground in a warm, sunny position.

Tomato

This technique is only suitable in Warm and Temperate Zones with a long growing season. Snap lateral shoots from leaf axils when shoots are 10–15 cm long. Remove lower leaves which would touch soil, and bury cuttings to a third of their length in well-drained, compost-rich soil, in a sunny position. Water and feed, as for other seedlings, until well established. Don't forget to provide a support stake.

LAYERING PLANTS

Azaleas, rhododendrons, grapes, loganberries, boysenberries, and shrubs and climbers with flexible stems can also be propagated by the layering method described for carnations below. Evergreens are usually layered in autumn and deciduous plants are layered in late spring.

Carnations

For layering plants, you will need some 25-cm lengths of wire bent into a U shape, like an old-fashioned hair-pin. Select a strong shoot that is happy to grow horizontally from the base of the plant, and has at least 1.5-cm gaps between nodes. Leaving about six sets of leaves at the tip, remove several sets of leaves from further along the stem. Dig a small hole barely 10 cm deep so that the stem will touch the soil when placed horizontally, and fill the hole with a mixture of soil, sharp sand and moist coconut fibre. If you make the hole too deep

you won't be able to anchor the 'hair-pin'. Make sure the growing area soil is dark-damp. With a clean, sharp blade, cut a 'tongue' on the underside of the stem so that the deepest part of the cut is towards the growing tip, just below a node. (Practice on a spent-flower stem first.) Gently bend the tip of the stem upward to hold the 'tongue' open and use the bent wire to anchor the stem about 2.5 cm under the soil mix. You can apply a very weak seaweed tea to encourage roots to form quickly. Keep the parent plant well watered and the soil mix damp. After about 6 weeks, lift the pin. A gentle pull on the tip of the stem will tell you if roots have formed. If there's no resistance when you pull, replace the pin. After roots have formed, sever the stem attaching it to the parent plant. Leave the new plant in position for a further two weeks before transplanting.

HARDWOOD CUTTINGS

Cuttings of deciduous plants are taken in winter. These cuttings are of 'hardwood' stems which have matured during the growing season. You can take hardwood cuttings of fig, grape, hydrangea, blueberry, raspberry, and deciduous climbers. Ungrafted rose cuttings can also be taken when dormant. Crepe myrtle cuttings are best taken just before spring growth. Hardwood cuttings generally take much longer than other cuttings to produce plants that are ready for moving into larger pots, or planting into gardens. Consequently, they should be placed in a slightly different mix. Two parts well-washed river sand, one part coconut fibre and one part crushed charcoal is a good basic mixture for slow-growing, deciduous cuttings. Place a layer of uncrushed charcoal in the base of each pot before adding the cutting mix. Some other deciduous cuttings, such as figs, grapes and

hydrangeas, strike relatively quickly and make vigorous growth. These plants can be placed in the basic cutting mix.

First, prepare a suitable mix for your cuttings; then, select prunings longer than 25 cm with at least five nodes. Using sharp secateurs, cut each pruning straight across the stem at the end nearest to the parent plant, and at an angle on the end farthest from the plant. It can be difficult to identify the base of deciduous stems after they are removed from plants. The ‘flat on the bottom — point on the top’ rule will avoid accidentally planting deciduous cuttings upside down. (If cuttings are taken at pruning time both ends could have an angled cut unless this procedure is followed.) Place flat ends of cuttings in a bucket of water after collection. Trim stem bottoms by re-cutting straight across the stem just below a node. Count upwards four nodes, then cut at an angle past the fourth node, with the lowest part of the cut 1.5 cm above a node (see figure 8.6). Push the cuttings into the mix, with the two lowest nodes covered by the mix, and keep them damp, in a sheltered, semi-shaded position where you won’t forget to water them. Don’t cover these cuttings with a plastic bag. When roots form, transfer cuttings into individual 15-cm pots filled with good-quality organic potting mix, and plant out at a suitable time.

Fruiting Fig

Figs are easy to grow from hardwood cuttings taken in winter. Take cuttings with five nodes, remembering to cut only the tops at an angle so you don’t inadvertently plant them upside down. Trim them to the best four nodes, cutting just below a node straight across the stem. Recut the top on an angle 1.5 cm above the fourth node. In warm areas, plant two cuttings directly into your chosen position about 5 cm apart, ensuring

that two nodes show above the soil. When growth commences, thin to the strongest cutting. Where winters are cooler, individual cuttings can be put in 15-cm pots and planted out, after hardening-off, when soil has warmed. I know this is not the usual way to treat fig cuttings, but I have found that they transplant well if you ensure that they don't go thirsty in their first growing season.

Frangipani

Frangipani are the exception to the rule of taking cuttings during Full Moon. Cuttings can be taken from pruned branches. We have propagated frangipani successfully from large, multi-stemmed cuttings but they are heavy and difficult to handle, require staking, and sometimes the root ball breaks off during transplanting. To avoid disappointment, it's best to start propagating with smaller branches. Select healthy stems from your prunings. Stem tips should have undamaged leaf buds, which look like red-brown cat claws. Select more stems than you will need. Trim stem bases so that each cutting is approximately 50 cm long, and allow them to dry until a fertile day during the next Full Moon phase. If weather is fine, leave them on the ground in the shade of trees: during wet weather, dry them under shelter. Add a half measure of sand to the basic cutting mix. You will require enough mix to put each cutting into a 20-cm pot. Frangipani cuttings often require staking. Position the lower quarter of each cutting in the mix, and water gently. Keep cuttings in a warm position under 50-per-cent shadecloth, or in dappled shade, until new growth is well established and a strong root system has formed. The length of time required will vary according to air temperature. Transplant very carefully to avoid damaging roots.

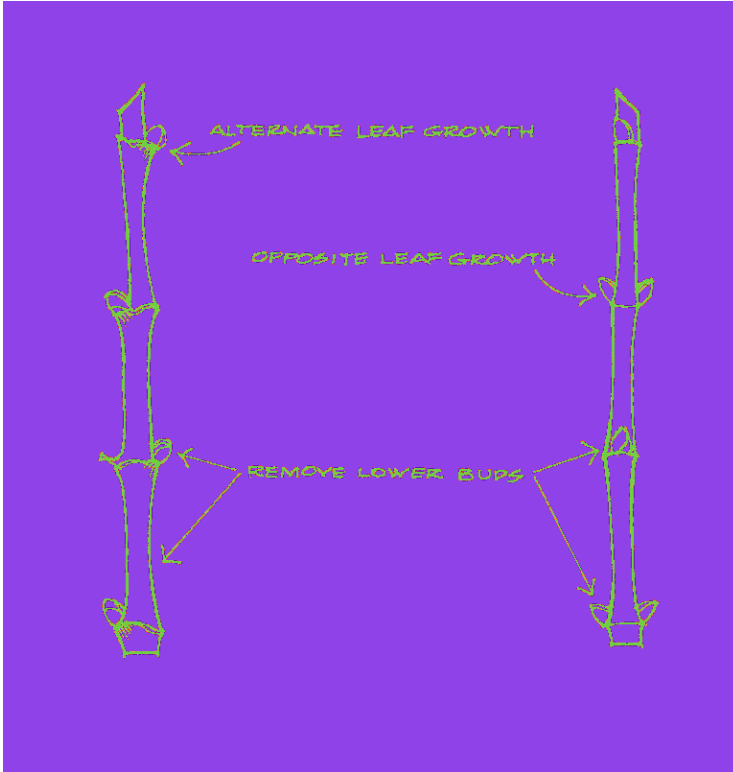


Fig. 8.6 Hardwood cuttings of both alternate-leaved and opposite-leaved shrubs ready for insertion into a cutting mix.

Saving Seed

HOME-GROWN SEED is preferable to mass-produced seed that has been treated with fungicide. While we are assured they are safe, one of the fungicides used by some companies has been found to produce embryo deformity in animal studies. Unlike open-pollinated seed saved by gardeners, a lot of seed produced by major seed companies is cleaned in a manner that removes nature's protections against seed-borne diseases, which is why those seeds have to be treated with fungicide.

For several years we have saved a range of seeds, including legumes, and have found that all the seeds remain quite healthy without the application of fungicide. The other benefit of saving your own seeds is that you will have plants which have adapted to your microclimate.

The first rule for saving vegetable seed is simple: ‘save the best and eat the rest’. This principle ensures that only the healthiest plants are used for reproduction. Tomatoes, capsicum, pumpkin, rockmelon and watermelon offer you the bonus of enjoying your produce before saving the seed. With other species, mark the best-looking plant clearly to ensure that it is not accidentally harvested. Don’t collect seed from a plant that runs to seed prematurely as the saved seed may carry the same trait. Gardeners with close neighbours will have to check their neighbour’s crops before deciding to save seed of some genera as bees are not bothered by fences and cross-pollination may occur. It requires some skill to save seed from brassicas (except rocket) because they cross-pollinate easily. *The Seed Savers’ Handbook*, by Michel and Jude Fanton (see *Bibliography*), explains in detail the requirements for saving a wide range of seed. Manila ‘pay packet’ envelopes are excellent for storing small quantities of seed. Label them with the cultivar name and date of collection. Make a habit of labeling envelopes at the same time you collect seed and keep them together with seed until storage. Place envelopes in a biscuit tin (or similar container) and store in the coolest part of the house. If particular seed keeps better in very cool conditions, place the envelope inside a zip-lock bag or airtight plastic container and store it in the fridge.

Capsicum and chilli seed

Although capsicum and chilli flowers are self-pollinating, occasional cross-pollination occurs between these two if they are planted within 50 m of each other. While this variation in flavour would probably go unnoticed in chilli species, you are likely to end up growing unexpectedly ‘hot’ capsicum. If it is not possible to separate the two types by the required distance, set up a wire hoop around your healthiest capsicum plants as flower buds start to form, and cover it with flyscreen to completely exclude insects. Harvest the first one or two fruit when fully ripe. (One is usually enough as capsicums produce a lot of seed.) You can then remove the hoop. With both capsicum and chilli, you can collect seed when preparing food. Scrape out the seed and spread it on paper. Allow several days for seed to dry indoors before storing in a labelled envelope.

Cucumber seed

To save seed from cucumber, select a healthy fruit and allow it to fully ripen on the vine — green cucumbers will turn golden brown; white cucumbers turn pale yellow. The fruit will be much larger than that of edible cucumbers. Pick the ripe cucumber and keep it indoors for a day or two. Then, cut it in half lengthwise and scoop seeds into a bowl. Leave the bowl at room temperature for several days until a mould forms on the top. This is a beneficial mould caused by fermentation which effectively kills off seed-borne diseases. Tip the seeds into a sieve, and rinse seeds clean. The jelly which surrounds seeds will come away easily. Spread seeds on a sheet of fly screen until dry. This drying process could take up to ten days. Store seed in a labelled envelope.

Legume seed

Legume seeds are easy to save. First, select strong, healthy plants that produce well-filled pods. Mark these plants so that you will know which ones to use for seed collection. Pull out any diseased plants before they have a chance to breed. Broad beans are partly self-pollinating and partly cross-pollinated by bees. Pollination in other beans and peas occurs before flowers open but the general recommendation is to keep different varieties as far apart as possible. With broad beans and climbing beans, choose plants that produce pods lower on the stem as these pods are usually larger. Ideally, seed should be collected on a non-planting day in the Full Moon phase, but don't leave partly dried pods on plants if rain is a possibility. When all seed is completely dry, store seed in envelopes in a cool, dry place. To de-pod large quantities of legume seed, place dried pods in a hessian bag, hang it up and beat the bag with a stick.

If you wish to save dried beans for use in cooking, use the method described below for saving green bean and pea seeds.

Green beans and dried beans can be picked at the yellow-pod stage and dried indoors to avoid rain damage. The whole plant of dwarf beans can be pulled out when the pods are yellow brown and the plant can be hung upside down in an airy dry place to complete drying. On larger plants, harvest the sections bearing pods. When sharp pressure with a fingernail leaves no mark on the seed, beans are ready to be removed from their pods. Discard any shrivelled or blemished seeds, and complete the drying process on a tray or plate for a further week or so before storing in a labelled envelope.

Broad beans are collected when pods are fully mature. Remove seeds and allow them to dry on a rack until sharp

pressure with a fingernail leaves no mark. Discard any damaged or undersized seed.

Peas, sweet peas and soy beans are collected when seeds rattle in the pod. Pods that have started to discolour can be collected early and dried indoors. Allow pods to dry on a rack until sharp pressure with a fingernail leaves no mark on the seed. Remove pods and discard shrivelled or blemished seeds (except for snow pea seeds, which all will tend to be shrivelled). Different coloured seeds seem to produce variations in flower colour so retain all sweet pea seed except those that are obviously diseased.

Lettuce seed

Choose a particular plant that has the desired characteristics, but not one that runs to seed first. One plant will provide plenty of seed for most gardeners. Mark the plant and leave it in the garden. It may take two months for ripe seed to form. A tall flower stalk will grow in the centre of the lettuce. This stalk produces yellow flowers which then turn to fluffy white. When more than half the flowers are fluffy, cut off the stem during dry weather and allow seed to dry completely on a large sheet of paper, indoors. Label a storage envelope with the name of the cultivar and keep it with the seed. If rain threatens, lift the whole plant and hang it upside down in a dry place, with a large sheet of paper spread underneath. Some lettuces, particularly crispheads, form such dense heads that flower stalks are unable to break through the foliage. If lettuces seem to be taking a long time to form a flower stalk, carefully break through the top of the lettuce to the heart.

Allow seed heads to ripen completely. Then rub them between your hands over the paper. Lettuce seeds are

‘spearheads’ with points at both ends. Seeds come in various shades from white to black, according to the lettuce cultivar. Tip the contents of the paper into a shallow bowl and shake gently until the seeds settle on the bottom of the bowl. Pick off the residue and store the seed in the labelled envelope. Store lettuce seed in the fridge.

Pumpkin seed

Seed can be saved from edible fruit that has been stored for a couple of weeks after harvest. Choose a fruit with a thick stem because it is unlikely to contain dry patches (bone). Do not save seed if other types of squash or pumpkin are being grown in the vicinity at the same time, and definitely don’t save seed if you are also growing giant pumpkin or you may find the following crop inedible. (The flesh from the giant pumpkin is used only as stock feed for pigs and cattle.) Pumpkin seed simply needs rinsing and drying on a sheet of paper. Store in a labelled envelope and an airtight container in a cool place.

Melon seed

Watermelon seed can be saved as you eat fruit. Wash seed clean and dry it on a paper towel before storing in a labelled envelope. Rockmelon seed is a little more difficult to save because it will cross-pollinate with other melons, except watermelon. Select a ripe fruit with the distinct sweet-honey smell. If possible, leave it for a day or two until fully mature. Then scoop out seed and rinse it in a sieve to remove debris. Spread on paper indoors for a week, to dry seed thoroughly. Store in a labelled, airtight container in a cool place.

Sweet corn and popcorn seed

Different species of corn will cross-pollinate, so they should be separated from each other by a distance of 500 m if sown at the same time. Ravens and parrots know exactly when corn is perfect for eating, so you will need to hide your seed from these birds, and from mice, while it is still on the plant. As soon as kernels are fully formed, select the best of the early cobs, and cover each one with a strong paper bag sealed below the cob base. Leave cobs on the plants for about a month after other corn is harvested, until the husks become dry and white, if weather permits. Harvest corn, peel back husks, and hang cobs indoors for a further two weeks, before storing. If rain threatens before husks dry, harvest cobs and complete the drying process indoors. Seed (kernels) will store for longer when attached to cobs. If you are collecting a large quantity of seed, kernels can be separated (shucked) by rubbing cobs against one another over a bowl. Store seed in labelled, airtight containers in a cool place. Store popcorn seed in an airtight jar and use it for popping, as required.

Tomato seed

Tomatoes rarely cross-pollinate with other tomatoes, so there is a good chance that seed will be true-to-type if you save your own. Some growers suggest that tomatoes from the lower fruit trusses are the best for seed. Unless you require a lot of seed, one or two tomatoes should provide plenty. Fruit should be kept until just past the ripe, eating stage (we have also saved viable seed from edible vine-ripened tomatoes). Spoon seeds together with their surrounding jelly into a 250 ml jar. If the seeds do not have a lot of jelly, add a small quantity of water. Leave the jar in a warm place — but don't forget about it. After about three days, beneficial mould will form on top of the pulp (*see* cucumber seed). Scoop mould

from the top and fill the jar with water. Seeds will sink to the bottom of the jar. Slowly pour off some of the dirty water, then tip the remainder of the jar contents into a sieve, and rinse the seeds until clean. Tomato seed clings to absorbent paper so spread seeds on smooth paper to dry. Rub seeds between your hands to separate clumps, then place seeds in a labelled envelope. Allow seeds to dry for another week to ten days in the envelope, before storing in a cool place.

CHAPTER 9

Solving Problems Naturally

THE USE OF CHEMICAL PESTICIDES, fungicides and herbicides to treat problems is merely a bandaid solution. Combined with unsuitable gardening and agricultural practices, these products actually contribute to pest plagues and diseased soils by killing natural predators of pests. Some pests will always escape spraying and will increase greatly in number without their natural predators. Consider locust plagues, for example. The exposure of large areas of soil in paddocks provides perfect breeding conditions for locusts which lay their eggs in bare soil. Locusts do not all hatch at the same time and birds are highly effective at devouring the nymphs as they appear. However, due to the removal of tree corridors, birds are not nearby to deal with the problem and locust nymphs are able to survive to adulthood in plague proportions, destroying vast areas of pasture and crops. As birds eat fewer adult locusts than small nymphs, a spraying program (quite often aerial spraying) is carried out in an attempt to halt these voracious pests. The problem is that the spray used to control locusts also kills the birds that feed on them, thereby allowing any dormant locust eggs a better chance of surviving to breeding stage. Locust pesticide kills predators of many other pests, too, ensuring a range of pest problems in the future. Scientists are currently considering the use of metarhizium, a beneficial fungus in humus-rich soil that parasitises plague locusts without harming the insect-eating, long-horned grasshopper. Although the fungus has to be applied to locust-infested areas by aerial spraying (as it does not thrive in herbicide-treated paddocks), this new attitude to pest control is definitely a step in the right direction.

It is not just in farming that pesticide use increases problems; birds and other natural pest-predators are also killed by poisons in the home garden. Birds are killed by fenthion, used for fruit fly; diazinon, trichlorfon and endosulfan, used for lawn grubs; and methiocarb, used for snails. One of our friends became permanently blind after walking barefoot on lawn that had just been sprayed for pests. Her doctors concluded that pesticide was to blame because her dog, who accompanied her on her walk, became blind at the same time.

Omethoate is the organophosphate ingredient in an aerosol spray used to kill both indoor and outdoor pests, and it is very toxic to birds and bees. It is also highly toxic to mammals and should never be used indoors. Dimethoate has similar properties to omethoate but is more toxic. Organophosphate research in 1961 and 1985 linked light exposure to organophosphates with asthma. Despite increased asthma occurrence in Australia, scientists are still ignoring the connection.

Carbaryl, a carbamate that has replaced DDT to treat a wide range of garden problems, is highly toxic to earthworms, bees, aquatic life, and pest predators. It has also been linked to abnormalities in animal foetuses, and to sperm reduction in humans. Dicofol, a reasonably persistent miticide, is another pesticide similar to DDT. After a spill of dicofol in Lake Apopka in 1980, Florida scientists found that alligators there had high oestrogen levels, low testosterone levels, and female alligators had 'burnt-out' egg follicles. Since the spill, numbers of young alligators in the area have reduced by 90 per cent.

An important point to remember when eating certain fruits that may have been sprayed (apart from washing them

thoroughly) is to remove the concave area around the stalk. The area adjoining the stem of apples, tomatoes, capsicum and peaches, for example, acts as a well for sprays so by eating this portion you will be ingesting higher concentrations of pesticide.

Fungicides are particularly toxic to earthworms and mycorrhiza fungi — organisms essential to the survival of many species of plants. Long-term use of the widely accepted copper oxychloride or Bordeaux sprays has also been found to reduce earthworm numbers and kill off ladybirds. Herbicides increase the incidence of soil diseases by killing off mycorrhiza and soil organisms which keep soil pathogens under control. The patent on glyphosate has now expired, allowing a number of companies to produce this very popular herbicide. Glyphosate is commonly believed to be perfectly safe. However, laboratories contracted by glyphosate's manufacturer to conduct toxological analysis on their product were documented by the US Congress in 1984 and the US Environmental Protection Agency in 1994 as falsifying data on glyphosate tests. Glyphosate's manufacturer was fined US\$50,000 by the New York Attorney General in 1996 for making claims that glyphosate broke down in soil, and was safe to use near children and pets. The amount of the fine may have been small change to a large chemical company, but the company was prevented from making such claims in the state of New York. Obviously, we can't simply rely on company advertising or government assurances that products are safe as we have learnt from examples such as asbestos, DDT and 'mad cow' disease. If we seek to avoid using products that are damaging to us and our environment, what can we do to solve problems in our gardens?

The Organic Approach

WHILE CONVENTIONAL PEST and disease control uses chemicals to only treat symptoms as they appear, the organic approach to garden problems is more holistic. The principle of this approach is that stressed plants are more vulnerable to pests and disease — and this is a point that cannot be emphasised too often. In many cases, maintaining vigorous growth, by adding organic matter to soil and avoiding herbicides and fungicides that destroy beneficial organisms in soil, is sufficient to provide pest and disease protection.

Plants grown outside their natural climate zones will become heat or cold stressed more easily, and thus more attractive to pests. Rather than persist with treating their long list of problems, it may be more prudent to replace these plants with others more suited to your conditions. Nevertheless, prolonged periods of hot, dry weather and water restrictions in many parts of Australia can create some degree of stress to gardens that is almost impossible to prevent.

The first rule of organic pest control is — don't panic! Observe the situation for a day, and see what happens. Many garden pests have natural predators that will bring the pests under control, if given the chance to respond (*see* Friend or Foe, below).

During this period, have a close look at the plant's growing conditions. Dig a small hole 12–15 cm deep near the drip line and examine the soil profile. Does it contain plenty of organic matter? Did you check drainage before you planted? Is the soil damp all the way down? If not, you need to water more thoroughly, and increase the thickness of organic mulch. Have you applied sufficient fertiliser for the requirements of

this particular plant? A lot of soft, sappy growth usually indicates that you have been too heavy-handed with nitrogen-rich fertilisers, including manure teas. Snails, slugs, citrus hoppers, aphids, scale and leaf-miners love this sort of growth. If the plant is suffering from a soil-borne disease, consider whether you have practiced suitable crop rotation. Have you been using herbicides in the garden? There will always be a biological reason for the appearance of pests in large numbers on particular plants, or for the tendency of plants in a certain area to become diseased.

Many diseases in plants are commonly treated with applications of sulphur or copper. Seaweed fertiliser supplies both these elements through the soil to plant tissue, building plants' natural resistance to disease. It also improves resistance to pests, heat and frost. Seaweeds also contain potassium and manganese, which are necessary to protect against other diseases. Applications of seaweed fertilisers to your soil at appropriate times will assist in the control of many garden problems. For some diseases a foliar spray of weak seaweed tea can be used in place of copper, sulphur or Condyl's crystals.

Friend or Foe?

TO AVOID KILLING OFF IMPORTANT wildlife in your garden, you will need to identify who is keeping whom in check before you resort to treatments. The keyword in pest control is 'control'; predators will not entirely eliminate a pest in their territory if it means cutting off a potential food source, but in a healthy garden they will keep pest numbers so low that damage is negligible. The list below is not exhaustive — careful observation will reveal other beneficial creatures in

your garden. (Some of the information contained in this section may not be relevant to gardeners in New Zealand.)

Bees

Although bees are not pest predators, they are important pollinators of plants on sunny days, and many bees are inadvertently killed by pest treatments. Bees are attracted by almost any flowering plant, together with the presence of some clean water. The leaf-cutting bee removes distinctive oval and round sections from leathery-leaved plants to build nests for its larvae (the ovals form the sides of the nests and the circles make lids). Its leaf nests are sometimes found in brickwork or cracks in fence posts. The leaf-cutting bee, which looks like a stout honeybee, does little damage and is an significant pollinator, so resist spraying plants favoured by this species.

Birds

With a diverse diet of insect pests, including slugs, snails, caterpillars, various lawn pests, beetles, flies and eave-dwelling spiders, most birds are beneficial in gardens. Some birds will eat your produce, however, and you may have to use nets to protect your crops.

It is not necessary to offer food to attract birds to your garden. Feeding kookaburras, magpies and currawongs can upset the balance of the bird population in your neighbourhood, with the larger birds driving away useful small birds that feed on aphids, mites and scale. Regularly fed meat-eaters tend to ignore their natural diet, resulting in an increase in the number of snakes and rodents. Regular feeding of rainbow lorikeets and other seed-eaters also attracts sulphur-crested cockatoos who can be highly destructive if they arrive hungry

and food is not available. Cockatoos cause extensive damage not only to gardens and crops, but to fences and house timbers, too. Sugary food or honey may transmit diseases which bees carry back to their hives. A number of different bird species will visit your garden regularly if you provide clean water, avoid using chemical poisons, and grow some nectar-producing plants. Seed-eaters also enjoy a small patch of green-manure crop that has been allowed to go to seed.

An organic garden will attract its own resident bird population, who will treat you to a daily choral concert just before sunrise. Their performance makes getting up early worthwhile. Insect-eaters become quite territorial and will band together to drive winged, itinerant fruit-pickers and strangers out of your garden, and chase eagles away from your chooks. (In severe drought conditions, however, when natural supplies of food and water become scarce it is difficult to keep starving wildlife away.)

Peewees (or magpie larks) can be a nuisance during the breeding season when they constantly crash into windows, mistakenly attacking their own reflection as a potential competitor. A reflective Christmas-tree bauble, hung from the eave in front of the window on a piece of fishing line keeps them away, and saves a lot of cleaning.

Poultry

Chooks are excellent pest controllers in orchards and around houses. Free-range chooks will seek out a variety of insects found both above and below ground, including termites, snails and slugs — but make sure you put chicken wire tunnels over young seedlings and lettuces. In ornamental gardens, ducks and geese are safer for snail and slug control

as they don't scratch soil. Geese are also effective lawnmowers and watchdogs.

Ladybirds

We all know what mature ladybirds look like but their larvae are often confused with other insect pests and many are killed unnecessarily. The larvae, which also eat aphids, mealybugs, mites, and scale, are usually found close to the base of plants, and look like scruffy tufts of white, or black and white, fabric.

Ladybirds and their larvae are excellent pest predators with enormous appetites for sap-sucking insects — except for the 26–28 spotted ladybird, which is a leaf-eating species. (You will notice these ladybirds as they are more yellow than orange; their larvae are yellow-green with black spines.)

Ladybirds are extremely vulnerable to chemical sprays and organic pest treatments including oils, copper-based sprays, clay sprays, derris dust, rotenone and pyrethrum. These manual pest treatments should only be used as a last resort — allow natural predators the opportunity to deal with the problem first.

Wasps

There is an enormous range of wasps in Australia, most of which are beneficial in gardens. Some are so small you probably don't even notice them. Adult wasps are attracted to gardens with flowering shrubs and annuals as they feed on nectar. Some species are pollinators, and multiple wasp species gather caterpillars, whitefly, thrips, mites, scale and aphids as food sources for their young. Some wasps are parasitic, laying their eggs in their prey (including the woolly aphid that causes apple canker). Parasitised scale turns black,

so don't spray scale that includes some black specimens. (You can identify the black scale that causes problems by its H-shaped ridges.) Parasitising paper wasps can be aggressive when their nest is approached.

Mud wasps use wet mud to construct egg cases of diverse shapes in areas protected from rain. Some mud wasps build sausage-shaped structures, often in the mortar joints of brickwork under eaves, or on verandahs. When the structures are complete, wasps fill them with insects, then lay their eggs and seal the structure. Avoid removing any sealed or wet nests — these wasps are very placid and do not bother humans, and they are valuable workers in gardens and orchards. (Once mature, the wasps leave the nest by breaking a large hole through the dried mud.)

Flies

Although flies are considered undesirable in gardens, and are especially unwelcome guests at barbeques, some species are invaluable pest predators. Lacewings (or golden-eyed flies) grow to 12 mm, have eyes with a gilt shine and large, multi-veined wings with a metallic sheen. The larvae, better known as ant lions, consume a variety of insects that fall as prey into their deep-sided pits. Adults feed on aphids, small caterpillars, mealybugs, mites, scale and thrips, and lay their eggs individually on stiff stalks. Hoverflies, which are wasp-like in appearance and hover like helicopters mid-flight, have a similar diet to that of lacewings. You can attract these flies by planting nectar-producing flowers.

Frogs and Toads

The only toad in Australia, the poisonous Queensland Cane Toad, *Bufo marinus*, is a foreign species and a nasty intruder

in any Australian garden. Frogs, however, are highly desirable garden residents as they are very valuable pest predators. A single frog can consume large quantities of slugs, snails, beetles, moths, flies and mosquito larvae. Australia has almost two hundred species of frogs, some of which are now endangered. As the use of chemical sprays increases and habitats are destroyed, frog numbers permanently decline. Some cats and dogs, depending on their breed or training, will cause injuries to frogs by attempting to play with them, but most household pets will leave them in peace. Humans present a grave danger to frogs when they open glass sliding doors quickly at night — tree frog species cling to the glass with the suction pads on their toes, waiting patiently for the insects that are attracted to interior lights.

Frogs are a key sign of ecological health; you know you are on the right track to a healthier environment if you have attracted a variety of frogs in your garden. Identify any frogs in your area so that you can try to provide suitable breeding conditions for them (*see* [chapter 5](#)). Some species require permanent water; some are trees dwellers; and some burrow into soil or live under mulch in dry conditions. A word of caution, though — sub-tropical areas with large numbers of frogs tend to attract more snakes because frogs comprise part of a snake's diet.

Lizards

Lizards devour insects, spiders, snails and slugs. There are five families of lizards found in Australia: skinks, which include the 60-cm blue-tongue lizard; geckos, whose tails store food reserves for drought conditions; legless, which grow to 75 cm and are often confused with small snakes; dragons, which include the frill-necked lizard; and monitors

or goannas, which can vary in size from 25 cm to 2.5 m. Species from the skink, gecko and legless lizard families are more commonly found in gardens where they can find shelter in cool, shady crevices.

Praying mantids

These insects sit patiently with their front legs folded in a prayer-like manner waiting for their prey to wander within reach. Both small and large specimens of the many mantid species found in Australia consume a wide range of diurnal and nocturnal insect pests.

Spiders

Many Australians are wary of spiders due to fear of our notoriously venomous red-back and funnel-web species. Funnel-webs require some humidity, and are sometimes found in swimming pools in prolonged dry weather. Be cautious when removing them from pools because they can survive for considerable time under water. Don't use household sprays on funnel-webs — it only makes them angry and more aggressive. Red-backs thrive in drought conditions and dry areas (including sheds and outdoor toilets and in plant foliage). Webs are usually spun within 1 m of ground level, and are untidy but incredibly strong and sticky. These spiders are fairly slow moving, so use a long stick to remove the entire web, spider and round, white egg case, and crush them on a hard surface.

Spiders can be helpful in the garden, trapping insects, including flies and mosquitoes, in their webs and capturing insects in shrubs and trees. If you have ever examined the debris under a spider web you will know that one spider can

consume a lot of insect pests. Don't remove spider webs in corn plants as spiders prey on grubs that attack corncobs.

Always check for spiders in boots that have been left outside, and never put on gardening gloves before pressing each glove finger firmly because spiders, especially red-backs, like to make their homes in these places. To keep your gloves safe, place the wrists of both gloves together after you remove them, fold them over a couple of times and secure with a strong peg. (Don't store gloves in a plastic bag — they are likely to go mouldy.)

Ants

Some ants nurture aphids and scale but they also consume various pest larvae in, and on, the ground, and in trees, as well as cleaning up general debris. Ants are natural enemies of termites. The presence of ant nests in garden beds is a sign that your garden is too dry. Rather than destroy ant nests, use trees bands to keep them out of trees and shrubs where they may contribute to the problem of sooty mould (*see* Sooty mould, later in this chapter).

Snakes

Australia has a number of highly venomous snakes. They are attracted to buildings during droughts when food and water are in short supply in their natural habitat. Gardeners in some warm, dry areas say that dripping garden taps close to houses can also attract snakes on summer nights. As this migration can occur in metropolitan as well as rural areas, we should make it a habit to fully close all doors. The best deterrent is to become a noisy gardener. Use a long-handled pitchfork (or similar tool) to flip over hay or mulch bales before lifting them, and to remove the covers of compost heaps. Be

cautious when entering sheds and chook yards because snakes like both eggs and rodents. Check children's play areas before allowing children out to play because snakes like to doze on warm concrete paths. Most snakes would rather flee than strike, unless they are cornered. If you do confront a snake in a confined area, close the door, and phone your local wildlife rescue agency (they have experts in snake removal).

Mice and Rats

Although Australia has a remarkable range of native rat and mice species, most native rodents are rarely sighted due to their preference for uninhabited parts of the country, or a limited habitat in rural areas. Only a few have adapted to built-up areas. Apart from the Canefield Rat and Grassland Melomys, which severely damage crops, and the Yellow-footed Marsupial Mouse, which will come indoors, most native rodents do little harm, and some are predators of garden pests. The diet of carnivorous marsupial mice includes grasshoppers, cockroaches and other pests, such as house mice. If you see a rodent in your garden or in bushland close to your home, try to identify whether or not it is a native species. The three problem rodents are those that arrived with the early settlers: the Black Rat, the Brown Rat and the House Mouse.

The Black Rat (also called 'roof rat' due to its climbing ability) and the Brown Rat (sewer rat) are both scavengers and may carry serious communicable diseases that can be transmitted to humans. The sewer rat is inclined to be very aggressive if cornered. House mice can cause serious damage to stored food, seed crops, and electrical wiring. They also reproduce quickly, reaching breeding age at eight weeks old. Gestation lasts about three weeks. Mouse plagues occur when

a temporarily abundant food source, combined with suitable weather conditions, leads to prolific breeding. When the food supply is exhausted, mice move to new territory.

If using rat poison, please note that warfarin, the active ingredient, is extremely toxic to children, domestic pets and any animals that consume poisoned rodents. Rodents in some areas have already developed a resistance to warfarin. Small invasions can be treated with traps. Rockmelon seeds are excellent for baiting traps with metal tongues because you can jam seed onto the spikes. The less efficient plastic traps can be baited with peanut butter, or peanut butter mixed with rolled oats. Large infestations require treatment by professionals because foreign rodent species breed quickly.

Organic Pest Control

THE NEXT STEP in treating an unidentified plant problem is to take a specimen of the 'pest' or plant foliage along to your local nursery. Good nurseries have staff who can diagnose the problems and advise suitable treatments. You don't have to follow their advice if they recommend chemical sprays.

There are many home remedies for treating pests organically if predators are absent or unable to control pest populations. Some treatments act as deterrents while others will also kill pest predators. Some are less effective in hot, dry conditions. Cooking flour will kill caterpillars but can be a disaster if applied to plants whose leaves have a matte surface. Nicotine spray is an old pest remedy but must never be used on tomato, potato, capsicum or eggplant as they are all related to tobacco. Tobacco plants are also very efficient at absorbing cadmium from soil so I don't recommend nicotine spray. Derris dust will kill off frogs and goldfish as well as ladybird larvae. A

variety of organic pest treatments and pest control equipment, including possum repellent, tree bands and fruit-protecting bags, can be purchased from Greenpatch or Green Harvest seed suppliers.

Always wear thick gloves when removing insect pests because some are slimy, and others have stink glands or spines, or excrete a substance that can burn skin.

Clay spray for pest control

When present in large numbers, aphids, scale, thrips and mites can be suffocated with a spray containing very fine potter's clay. Dilute just enough clay in water to make it cloudy — too much clay will clog the spray nozzle. Take great care to spray only the pests because this spray will also suffocate predators of these pests. Aphids and scale produce honeydew, which causes sooty mould (see below).

COMMON GARDEN PESTS

Scale

Various types of scale can be a problem in dry conditions. Scale may occur in large numbers where chemical poisons or copper sprays have been used. The usual treatment for scale is spraying with white oil or sulphur. However, I do not recommend either of these substances because both the oil and sulphur kill predators and will damage plant foliage when temperatures are over 24° C. Improved plant vigour, particularly through the use of seaweed fertilisers, will reduce scale infestation. Despite the fact that some scale occurs in already dusty conditions, potter's clay spray is an effective treatment. Scale can be divided into two types: hard and soft.

California red scale (hard scale) are orange-pink dots on fruit and foliage that has been exposed to light. A native wasp is a natural predator for this scale. Red scale is common in dusty orchards. Growing a cover crop can reduce infestations.

White louse scale (hard scale) are moth larvae which appear as a white powdery coating on trunks of citrus. Unless treated, the scale will spread to branches and twigs, weakening trees. This scale has natural predators. Use potter's clay spray for severe infestations.

Black scale, soft brown scale, pink wax scale, cottony-cushion scale and white wax scale are all examples of soft scale. Soft scale produce the honeydew that causes sooty mould.

Sooty mould

This mould looks as though someone has tipped powdered charcoal all over the plant. A heavy infestation of sooty mould prevents a plant making food through its leaves, and looks very ugly. This problem occurs in dry conditions, usually on isolated plants within a garden. The most common cause is water stress. If an ants' nest is under the affected plant you can be sure the soil is far too dry.

Wherever this hard, black mould appears you will find aphids or scale because these pests produce 'honeydew' in which sooty mould grows. You will also find ants that treat the aphids and scale as dairy cows and harvest the honeydew. The ants also fend off natural predators of aphids and scale to protect their herd, and will transfer their herd to other plants.

To solve the problem of sooty mould, you have to remove the ants from the plant. This can be done by banding the stem of

the plant — not an easy task with shrubs that branch out from just above ground level. You may have to remove some lower branches if the problem is serious. For affected trees, you will also have to band adjoining trees whose foliage touches the affected plant, as well as any supporting stakes if ants can use the ties as bridges to reach foliage.

Aphids can also be removed with jets of water. Use a misting bottle, and adjust the nozzle to a single stream. A light scale infestation can be removed with your thumbnail. Clay spray is only to be used as a last resort for heavy infestations. Once the ants are removed the sooty mould will flake off with regular watering and rain.

Passion-vine hoppers and whiteflies are both honeydew producers but rarely occur in large enough numbers to cause problems.

Fruit fly

The Queensland and Mediterranean species of fruit fly have become a serious problem in some parts of Australia. In some areas, it is a legal requirement to control these pests. Fruit flies are not the tiny creatures occasionally found hovering around your fruit bowl — they are ferment flies (or vinegar flies), and their presence indicates that fruit is ready for the chook bucket or compost heap. Queensland fruit flies are brown with yellow markings. The Mediterranean fruit fly is yellow with brown bands on the wings. Both are slightly smaller than houseflies and keep their wings outstretched after they land. Fruit flies lay eggs in numerous species of ripening exotic and native fruits, including tomatoes, eggplant, capsicum, olives, and also in walnuts. Eggs laid in immature avocado and passionfruit will not develop because

the fruit forms a woody barrier around the eggs, but the fruit will be damaged if eggs are laid close to the time of maturation. Fruit fly can attack citrus in late August as fruit starts to colour. Cucumber fly attacks fruit of stressed watermelons, tomatoes and pawpaws, but has not yet become a serious pest.

I recall a television program in which the presenter strolled through a fruit-littered orchard discussing different methods for controlling fruit fly without once mentioning the most obvious way to control these destructive pests. The simple method is to pick up fallen fruit. This practice is essential in fruit-fly control because the maggots must pupate in soil before emerging as adults to reproduce the next generation of fruit fly. If fruit is left on the ground to rot, the adult flies emerge from soil directly beneath the trees in which their eggs are to be laid. Fly-damaged fruit tends to drop early and should be picked up daily in a heavy-duty, black garbage bag. Don't drag your plastic bag behind you when collecting fruit; you will tear tiny holes which allow the maggots to escape. Place the bag in a large garbage bin and deposit the fruit directly into the bin. To hasten the process of fruit collection, leave overlapping pieces of black plastic around bases of fruit trees. Pick up each plastic sheet by its corners, and tip fruit into the bag. (This is also an efficient way to harvest olives.)

To properly treat a fruit fly problem, you need to break the breeding cycle. Do not bury or compost fly-damaged fruit. If you can't burn the fruit immediately, seal the bag tightly and leave it in direct sun for at least a week to cook the maggots. Encourage your neighbours to follow the same practice as it will benefit all growers in your community. Chooks are excellent for controlling both maggots and pupae of fruit fly.

Consequently, some enterprising orchardists are fencing orchards and raising organic poultry in them as a secondary business.

The second most important way to control fruit fly is to examine the plants under attack. Can you provide optimal conditions for the healthy growth of these plants? In our area, fruit fly attack particular tomato cultivars that are more suitable for late summer and autumn growth, and sometimes tomatoes and capsicum in very dry conditions, but they do not attack any of our citrus, avocado, passionfruit or grapes. Our peach tree was repeatedly attacked by fruit fly so we removed it, deciding that we prefer mountain views to tasteless peaches. We chose not to replace it in a different position because our mild winters and rainfall patterns are not suitable for stone fruit, so peach trees will always have problems in our conditions.

Fruit fly adults may live for several seasons and can survive mild winters by feeding on the honeydew produced by scale and aphids. It will help if you keep these other pests under control where fruit trees are grown. Remove loquat trees if fruit fly is a serious problem; loquats fruit early and the smell attracts fruit fly from a considerable distance. Avoid using sprays. These products, including organic sprays, also kill beneficial insects, and some sprays also damage fruit or buds. Where winters are cold, remove mulch in autumn from under trees that are vulnerable to attack by fruit fly. Cold soil can help to break the breeding cycle.

Alternatives to spraying are fruit bags, lure traps and splash-on baits containing a suitable pesticide such as pyrethrum. Never hang baits or traps in the fruit trees you are trying to protect as you will only be attracting the flies

straight to the target. Fruit fly lures only give an indication of the numbers of male flies near your trees and won't control fruit fly. Relying solely on lures that attract only males is going to make the control of this pest an almost impossible task.

Making a closed fruit-fly trap

MATERIALS

a collection of 1.25 L plastic soft-drink bottles

a collection of mesh onion or citrus bags

overripe fruit (or unsweetened fruit juice)

a small quantity of beer (for yeasty odour)

Pyrethrum powder

METHOD

- Soak chopped fruit in water for several hours. (Alternatively, add a little water to the fruit juice.)
- To each bottle, add a cup and a half of the liquid.
- Add a small dash of beer and three level teaspoons of pyrethrum powder. (Do not add sugar or honey, or you will kill more bees than fruit fly.)
- Replace the bottle lid and punch some holes in the bottle, along one side only, so that you can change the bait without spilling liquid. Position the lowest hole well above the liquid. (If using mesh bags, the mesh will usually prevent bees from accessing the

bait. Otherwise, try to make the holes smaller than the width of a bee.)

- Place each bait in a mesh bag and hang baits in non-fruiting trees throughout the garden, out of reach of children or pets.
- Change pyrethrum baits weekly — this insecticide breaks down more quickly than chemical pesticides. Pyrethrum will break down even more rapidly if you hang the baits on posts in full sun, but the trap will still drown fruit fly as they are attracted to the yeasty smell of beer and fermenting fruit.
- Spent baits should be poured down the drain; earthworms do not like beer added to topsoil.

A theory that fruit fly will not lay their eggs over water inspired the idea of suspending long strips of laser wrapping paper or aluminium foil from branch tips of fruit trees as a deterrent to fruit fly. The reflections cast by the metallic paper or foil resemble reflections off water.

Codling moth

This is a serious pest that feeds on the pulp in the core area of fruit and causes it to drop early. Fruit with holes should be removed daily and treated in the same way as fruit damaged by fruit fly.

The codling moth is a small insect with a wingspan of 20 mm. Eggs are laid at dusk on leaves close to developing fruit and larvae burrow into fruit after hatching. Larvae may damage several fruits before pupating. Apples, crabapples, pears and quinces are favourites of the codling moth but they will also

attack other fruit. Hawthorns, *Crataegus* spp., are hosts to codling moth and pear slug and should be removed where codling moth is a problem. In cool climates codling moth may only breed once per year but in warmer areas up to three generations can breed annually. Avoid commercial sprays; they kill many natural predators and, if used on apple trees, a mistimed application can result in crop loss.

Codling moths are grey-brown and tips of the uppermost wings have a circle with a metallic sheen. Moths are attracted to trees grown in unsuitable conditions. Larvae pupate in loose bark on fruit trees or in debris under trees, so try to keep fruit trees impeccably clean. Remove flaking bark, litter or debris in branch forks, and remove damaged branches. Clear any rubbish (including packing cases) from under trees. When ready to pupate, the larvae can drop to the ground on a thread or travel down the trunk looking for a hiding place. Corrugated cardboard or hessian bands around the trunk and main branches can trap many pupae. Inspect bands regularly and crush pupa cases. Chooks are an excellent control measure for this pest, particularly if they remain in orchards during winter, as they will clean up pupae that reach the ground.

Dipel is an acceptable organic spray that targets caterpillars of the codling moth. This product is not a poison but contains a bacteria, *Bacillus thuringiensis*, that kills small caterpillars when they consume it as they burrow into target fruit. Spray fruit as soon as you notice eggs on leaves. (It is not suitable for treatment of fruit fly because they lay their eggs within the fruit.) This bacteria breaks down quickly in hot, well-lit conditions so timing is critical in applying the spray. It should

be applied to fruit in two applications, one week apart. If rain intervenes, spraying will have to be repeated.

The codling moth does not lay its eggs until night temperatures reach 15° C. You can tell when eggs are due to be laid by catching male moths in jars containing cheap sherry or port. You will not catch the females as they are poor flyers and remain close to preferred fruit trees for their life cycle, but male moths are readily attracted by the smell of these alcoholic liquids. Cover the tops of jars with pieces of coarse netting secured with an elastic band. (Make sure the holes of the netting are small enough that you will not accidentally trap bees.) Place bait jars in non-fruiting trees through the garden, out of reach of children or pets. Empty the trap and replace the bait weekly.

Snails and Slugs

These creatures are a nuisance in damp conditions as they target young seedlings, leafy greens and strawberries. A hedge of coffee-grounds, about 2 cm high, around the perimeter of these plants can keep snails out of the growing area. Don't use snail baits as they will kill birds. Snails are very attracted to the yeasty smell of beer, and snails and slugs can be dispatched simply, and organically, using the following method.

In the late afternoon, place half a cup of beer into a 375 ml jar and partially bury the jar at an angle in garden soil so that the lip of the jar is close to the soil surface but the pests have to venture well into the jar to reach the liquid. (Use only plastic jars or wide-mouthed bottles as hail can smash glass or ceramic containers.) Pull the mulch on the bed back to the edges. Many snails or slugs who did not enter the jar will be

found hiding under the nearby mulch early next morning. Flip the mulch over and allow birds to clean up the remaining snails and slugs, or dispose of them yourself. Repeat the procedure for several days. (If you make your own beer, this solution is not only easy but economical, too.) Another easy trap for snails and slugs is made by placing a moist earthenware plant pot on its side under mulch. Remove your catch in the morning.

Snails and slugs are also fond of citrus and other fruit trees, and can often be found sheltering among their foliage or hiding in the mulch beneath them during the day. You can prevent snails and slugs from climbing a tree by wrapping a strip of flywire around the trunk. Using the long side of a rectangle of flywire, create a 4-cm fringe on the lower edge. Secure the top edge of the flywire strip only, using a piece of stretchy fabric to avoid damaging the bark. If snails are already in your trees, cut two vertical slits, 4 cm apart, half-way up the side of a plastic drink bottle. Join the slits, at the top only, by making a curved cut to form an arch. Pull the arch outwards and downwards to form a ramp for the snails to enter the bottle. Put some beer in the bottle and suspend it in the affected tree so that snails can reach the trap from a branch but it is out of the way of children and pets. (You may drown fruit fly this way, too.)

CITRUS PESTS

Stressed citrus trees can accumulate a variety of other pests, some of which can cause fruit-drop. The more common citrus pests are included here below.

Citrus gall wasp affects citrus in coastal NSW and Qld by laying eggs in young stems. In September or October, small,

black adult wasps emerge from galls that appear as bulges on stems of citrus trees, especially rough lemons, grapefruit and native citrus species. Older galls are riddled with small holes. As the wasps are poor flyers, they tend to re-infest the same trees repeatedly, thus damaging productivity. Citrus gall wasp can be blown by wind into new areas or introduced through the purchase of infected plants. In areas where these wasps are proclaimed pests, it is a legal requirement to prune galls and burn the prunings before the end of August. However, we can all help prevent the spread of this pest by pruning citrus galls. Dispose of the prunings in a tightly sealed plastic bag if you are not permitted to burn rubbish in your area.

Bronze orange bug can cause serious crop losses because this pest sucks sap from citrus stalks, causing shoots to wither and die. Bugs can be present in large numbers, and are active from summer to autumn; but high temperatures, combined with prolonged periods of dry weather, will kill them off. Don't water foliage in dry weather as it encourages this pest. The adults are almost black and about 25 mm long, and they can be found sheltering at the base of trees on hot days. The green nymphs, about 6 mm long, are found under leaves. Knock them into a tin of methylated spirits, using a stick to avoid contact with the fetid secretion produced by both adults and nymphs.

Spined citrus bug is easily identified by the green horn on each shoulder. Adults are about 20 mm. The nymphs can be yellow, orange or black. Bugs suck sap from inside fruit, leaving flat dry patches on fruit skin. A light infestation can cause serious crop damage. To avoid contact with their horns, use a stick to knock them into a tin of methylated spirits.

Harlequin bug is a 12-mm beetle with black, red and yellow triangle patterns on its back. They arrive in swarms to suck sap from new growth and damage fruit with their excrement. Remove weeds in the garden area, particularly along fence lines where these bugs like to hide. Knock bugs to the ground and squash them.

Large citrus butterfly and small citrus butterfly belong to the same genus but are separate species, and wing markings in black, white, red and blue form different patterns on females of each species. The large butterfly has a wingspan of 120 mm while the smaller one measures 75 mm. Small larvae of these pests look like bird droppings on leaves, where they feed on tender foliage. They are not usually found in large numbers but both species can do considerable damage, particularly on young trees. Both have stink glands, so use a stick to knock them to the ground for squashing. You should also remove the pale yellow spherical eggs, which are laid individually on branches or leaves.

MINOR PESTS

Leaf-miner

Larvae leave waxy ‘scribbles’ on young leaves, causing leaves to pucker and growth to slow. The parent is a tiny, nocturnal moth with a 5 mm wingspan. Eggs are laid on leaf midribs and the hatched larvae tunnel through young leaves for 5–6 days before rolling a leaf in which to pupate. This cycle is repeated every two weeks. Remove and destroy eggs, tunnelled leaves and rolled leaves. Although this process will retard new growth slightly, it is necessary to remove all damaged leaves as they do not drop naturally. Use well-rotted compost as mulch under affected trees.

Mealybug

Sap-sucking mealybugs like warm, humid conditions and are commonly found on indoor plants that have been regularly sprayed for other pests. They look like small, pale slaters with a white fringe. Infestations on indoor plants can be removed by dabbing each bug with a cotton bud dipped in methylated spirits. For outdoor infestations, avoid spraying and allow ladybirds and lacewings to control this pest for you. Apply tree bands because these bugs also produce honeydew (see Scale).

Two-spotted mite

Two-spotted mite (or red spider mite) can do a great deal of damage in hot, dry weather. They are tiny creatures, barely visible to the eye, and yellow-green in colour. (As the females only develop their orange-red colour in winter, the name two-spotted mite is now preferred to prevent confusion when diagnosing the problem.) These little pests cause a silver-bronze mottling as they attack leaves from beneath. They produce fine webs in winter. An infestation of these sap-sucking mites dries leaves and weakens plants by preventing the plant from making food. Check for damage by two-spotted mite on azaleas, beans, strawberries, orchids, fruit trees and vegetables. Azaleas growing under trees are particularly vulnerable. Fortunately, two-spotted mites have numerous natural enemies, and long periods of rain deplete their numbers. Destroy badly affected leaves, and water foliage of affected plants regularly until they show signs of improvement. (Avoid watering azalea foliage when they are in flower, however, as this practice can encourage petal blight, especially when plants are stressed.) Try to control

weeds that are hosts to the mites. Avoid spraying two-spotted mite as sprays will also kill natural predators.

Weevil

The larvae of these beetle-like pests can do significant damage before being noticed as they feed on roots or under bark. Adults feed on foliage and green stems. The elephant weevil (so-called because of his trunk, not his size!) attacks a range of common fruit trees and vines, as well as native plants. Spread some pieces of plastic around a plant you suspect has weevils. Then go away for an hour and return with a bucket. Weevils usually drop to the ground when they hear you. Otherwise, give the plant a shake and collect the weevils in the bucket. Weevils should be crushed on a hard surface such as a concrete path. Don't attempt to crush weevils underfoot on soil as they are protected by their tough outershells — when you walk away, so do they. The turquoise and black weevil favours acacias but does not do much damage. Plants that are growing vigorously are more resistant to weevil attack.

Red-shouldered leaf beetle

This small native beetle, *Monolepta australis*, is yellow with a red band across the shoulders and a red spot on each wing. Although the adult beetles are only 6 mm long, they arrive in a large swarm and skeletonise a narrow corridor of plants before leaving as quickly as they arrived. Don't use carbaryl (the spray recommended by pest companies) as it will also kill off most beneficial insects in your garden. We discovered by accident that these beetles are attracted to the colour white, so we use white containers of water to drown them in large quantities.

Spittlebug

These pests are nymphs of sap-sucking hoppers which usually attack Australian natives. Spittlebugs become noticeable during summer when they surround themselves with patches of what looks like frothy ‘spit’ to prevent dehydration in hot, dry conditions. They are easily removed with a strong jet of water.

OTHER PLANT PROBLEMS

Root rot

Phytophthora root rot is a fungus disease that affects root hairs. Plants may die quickly or deteriorate over a long period, depending on the severity of the disease. Many plants are susceptible to this disease including some Australian natives. It commonly occurs in poorly-drained soil but can also be caused by excessive watering. The active spores remain in soil and can be transferred to potting mixes when soil is added, killing potted plants. The standard treatment for this disease is to improve drainage and avoid over-watering. Adjust soil pH to a suitable range for the plants you are growing, if necessary. Add mature compost or well-rotted manure to the soil surface regularly and cover fertiliser with an organic mulch. Keep mulch clear of plant stems as this disease can also enter trunks at ground level (trunk canker).

Conventional texts will advise you to remove and destroy affected plants, and then drench soil with fungicide — I suggest you ignore the last part of this advice as fungicide will also kill the beneficial organisms in humus that control this disease. The fact that this disease is less common where soil is well drained and rich in humus is a fair indication that it is organic matter rather than fungicide that is beneficial.

Fusarium wilt

This serious disease is caused by a soil-borne fungus, *Fusarium oxysporum*. Fusarium wilt is difficult to eliminate if infected plant material is introduced to the garden, but can be avoided in organic gardens by practising a suitable crop rotation. A wide range of plants can be affected by fusarium diseases. Common symptoms include slow growth and rapid wilting in hot weather, or bleached dry patches. This disease does lead to plant death. The disease can be identified by a pink or red-brown colouring on the inside of stems near the base of plants. Do not compost diseased plants; dispose of them in a sealed plastic bag. Place infected plant material into a plastic bag immediately when removing plants as spores can be spread by soil that drops from roots. Spores can also be spread on gardening tools — sterilise your tools immediately after use if the disease is present.

Most plant species are infected in warm weather but the sub-species that affects cucurbits is more active in cool conditions. Another species of this fungus can infect grasses in Cool Zones. Potassium helps lawns to build resistance to this form of the disease — apply seaweed tea in early autumn.

Petal blight

Petal blight is a fungal disease that affects azaleas and rhododendrons in humid conditions. Flowers develop circular spots that can spread to cover the whole flower. Affected flowers do not usually drop, but will remain on plants, turning papery as they dry.

Prune affected flower heads from plants and place them in a plastic bag, together with any flowers that have fallen to the ground and any remaining mulch. Seal the bag and dispose of

it with garbage. Do not put azalea flowers in your compost heap, and avoid overhead watering of azaleas while flowering. Give soil one application of seaweed tea after pruning, and another in autumn. Provide weekly applications of chamomile tea to foliage of plants that have previously been affected by petal blight for three weeks during formation of flower buds.

Black spot

This fungus affects leaves of roses growing in unsuitable conditions. Shading, reduced air circulation due to crowding, and watering of foliage (especially late in the day), can all contribute to the conditions that encourage this fungus. Well-fed roses are more resistant to the disease. You can treat black spot by misting foliage with seaweed tea or by using a 10-per-cent milk and water solution with a good pinch of bicarbonate of soda added. Spray the solution on plants early in the day. Do not make spray any stronger than 10 per cent. Full cream milk adheres better to foliage. Powdered milk may also be used. While the disease is present, the chosen treatment should be repeated at fortnightly intervals in prolonged humid conditions when air temperatures are moderately warm (13–24°C).

Downy mildew

Downy mildews are caused by a group of fungi that produce a similar furry covering on plants in humid weather. The fungi infect a wide range of plants but do not occur in dry weather unless excessive overhead irrigation has been applied. Down consists of close, branched stems with spores at the ends. Three conditions are required for the germination of downy mildew spores — 10 mm or more of rain, a temperature of

10° C or above, and 24 hours of wet foliage. If rain splashes soil onto foliage or wind blows spores from affected plants onto foliage towards the end of the 24 hours period, plants can become infected with downy mildew. A spray of 10-per-cent milk and water solution to affected parts, and a soil application of seaweed fertiliser, is an effective treatment for these mildews.

Powdery mildew

Powdery mildews are caused by different fungi (mostly *Oidium* spp.) that germinate in humid, but not wet, weather, usually in an air-temperature range of 11–28°C. Like downy mildews, the fungi infect a wide range of plants. The infection starts as powdery spots that spread to form larger patches. Once established, infection continues even when air becomes dry. Low levels of potassium and other trace elements in soil are thought to make plants more susceptible to these fungi. Ensure plants are adequately fertilised, including applications of seaweed fertiliser. Remove affected parts and spray plants with chamomile tea (see [chapter 4](#)).

Blossom-end rot

Calcium is essential in all plants for the healthy growth of tips and fruit. Insufficient calcium causes blackening of young growth or dark areas on fruit. Erratic watering can cause calcium deficiency by undersupplying this element from soil to fruit at critical stages of development. This deficiency is more likely to occur if fruit maturation occurs during heat-wave conditions.

In tomatoes, capsicum, eggplant, cucumber, pumpkin, watermelon and zucchini this condition, in which the side of the fruit opposite the stem forms dark brown, sunken patches,

is known as ‘blossom-end rot’. In apples, the condition is known as ‘bitter pit’, and in celery, it is called ‘black heart’. Blossom-end rot is more common in tomatoes and capsicum where fertilisers with a high nitrogen or potassium content are used. It is believed tomato and capsicum plants absorb those elements before they absorb calcium.

Treatment is the same for all plants. Ensure soil pH is not too acid for the species. Water plants thoroughly and regularly. Mulch soil around plants to prevent soil drying too quickly, keeping mulch well clear of plant stems.

Leaf curl

This fungal disease affects almond, apricot and peach trees. The fungus is transferred to the leaves at bud burst. Leaves on almonds and peaches are puckered, curled and thicker than normal, with a pink or purplish tinge. Leaves form a white bloom before dying. Curled apricot leaves remain bunched together. Apply seaweed tea at the end of summer — copper and other trace elements build resistance to this fungus. Also apply seaweed tea and manure tea to soil at the end of winter at the first sign of buds becoming plumper (bud-swell), and improve your fertilising program for affected fruit trees. Vigorous spring growth is more resistant to this fungus. For almonds, teas will have to be applied in early winter as almonds flower early.

Passionfruit woodiness virus

This virus (sometimes called ‘bullet’) is spread by aphids. It causes a thick pith and small seed area in fruit. Woodiness virus is most easily controlled by maintaining vigorous growth with regular watering and organic fertilisers. Avoid pruning vines in autumn as this practice promotes soft, sappy

growth in cool conditions and attracts aphids. If you have had persistent problems with woodiness virus, try purchasing grafted vines that are resistant to the virus.

Bushfire Season

WHILE IT IS WONDERFUL to live close to nature, it is not without risks, particularly as many of our native plants burn easily (being rich in volatile oils). However, we can take steps to protect our properties from bushfire and to make life a little less painful, should the worst happen.

Bushfire season commences officially in Australia on 1 October, but bushfire-prone conditions may start as early as August. Prolonged drought lowers the soil's watertable considerably. While the watertable remains low, trees and shrubs shed leaves, and sometimes branches, to conserve moisture. If initial drought-breaking rains are not followed by regular showers, the small undergrowth plants and grasses, which appeared after rain, will suffer water stress and struggle to survive. Discarded leaves and semi-dry undergrowth provide a wealth of fuel for potential fires. Until rainfall can restore the watertable to pre-drought levels we all must be extremely vigilant, especially during very hot and windy weather.

- In Australia, it is now recommended that you phone 000 to report a fire rather than your local fire brigade or rural fire service.
- Regularly clear piles of dry leaves, twigs and any other potential fire fuel from around buildings on your property where windborne embers can generate

spot fires — don't assume you will always be there to extinguish them.

- Regularly clear leaves and debris from roofs and gutterings. You will be surprised at how much litter can accumulate in a couple of weeks, especially in windy conditions.
- Prune back branches overhanging your roof, and keep foliage away from windows.
- Keep buckets, hoses and material to block down-pipes in strategic positions.
- Make sure gas cylinder release valves are directed away from buildings and foliage.
- Have a 'bushfire plan' so that everyone in the family knows what they have to do in the event of bushfire.
- Place photo albums and essential papers in a box, and keep pets' travel baskets handy in case you need to evacuate in a hurry.
- Keep keys, a radio, a couple of torches (with fresh batteries) and some bottled water in a separate box.
- If you have to extinguish sparks and embers from nearby fires, wear cotton clothing that covers your arms and legs, and solid footwear with non-slip soles. Shorts and thongs are not suitable bushfire attire, even in the hottest weather.

- Remove straw or hay mulch from gardens along house walls before going on holidays during bushfire season. Left unattended, these materials can provide fuel for fires to reach under eaves. Gravel mulch is safer for gardens in this position. If you use these beds for annuals, leave them unmulched while you are away; it is cheaper to replace plants than replace your house.
- If you live in a bushfire area and have a pool or dam, a petrol-fueled fire-fighting pump may prove a worthwhile investment. Electrically operated pumps are not reliable during fires as power lines may be damaged. Water pressure can slow to a trickle when local demand is high. Petrol-fueled pumps can be fitted with hoses larger than your garden hose and can deliver a lot of water very effectively. You will have to prime your pump occasionally to ensure that it remains in good working order.

Protecting Plants from Frost

DO NOT PUT frost-tender plants in the lowest part of your garden. Cold air tends to pool in these areas unless there is an open fence or shrubbery where air can drain away. Some shrubs and trees can handle frosts when mature, but are very sensitive while young. These specimens, and seedlings that have been planted out too early, can be covered with a cloche (see below). For occasional light frosts, cover frost-tender shrubs at night with a hessian bag, or similar material. Completely cover small, frost-tender plants with dry, fluffed up straw. The moisture in mulch may help frost form on the surface of mulch, but covered plants will be protected.

If frost has damaged some of your plants, do not prune them until all risk of frost has passed. Damaged portions can be removed during First Quarter phase after weather has warmed in spring. Leaving frost-burnt parts on plants will protect them from further frost damage. Additional protection can be provided for badly damaged plants with the use of cloches and cold frames. Be aware that crisp, clear nights in winter can produce frost in some areas not normally affected.

Cloches

Cloches are covers to protect plants from cold conditions, or frost, in open soil. The word *cloche* is French for ‘bell’, and originally covers were bell-shaped but the term has been extended to include tunnel-shaped covers. If frosts are a regular occurrence, place a chicken-wire hoop around a sensitive plant and cover it with plastic. The hoop must prevent foliage from touching the plastic. Where frosts are a serious problem in spring, tunnel cloches require heating, usually with kerosene lanterns. Commercial cloches are available for these conditions. Very large cloches are sometimes called igloos.

In Australia, spring can become very warm for a short period before reverting to cool temperatures. In this situation a simple homemade cloche is usually adequate. You will require a piece of wide, heavy-duty, clear plastic two metres longer than the length of your seedling row, and some medium-gauge fencing wire. (Suitable plastic is sold by the metre at gardening centres.)

Using the wire, make a series of hoops large enough to allow for future growth by sitting well clear of your seedlings, and extending into the soil 10 cm. Position a hoop at each end of

the seedling row, and space the rest of the hoops evenly between them. The spacings will depend on the size of the hoops but they must be close enough to prevent the plastic sagging between hoops.

Position the plastic over the hoops, allowing close to a metre to extend at each end. Anchor the sides of the plastic by laying garden stakes or pieces of timber on top of the overhanging plastic. Tie the plastic at each end of the cloche into a loose knot, and secure the knots to the soil with U-shaped pieces of fencing wire.

The cloche can be ventilated, if required, by removing the stakes and raising the sides of the plastic, or opening the ends. Seedlings in cloches usually require less watering than those in open ground, but do not use this type of cloche in hot conditions to save water, or you may cook your seedlings. When the cloche is no longer needed, fold up the plastic cover and tie hoops into a neat bundle, then store until the following winter.

Cold frames

Cold frames are structures that absorb heat and allow you to sow seed early in the growing season. There are various forms of cold frames, from more permanent hothouses to a pit dug in the ground and covered with plastic. For those gardeners who do not require the use of a permanent cold frame, a simple, easy-to-dismantle version can be made from a recycled window and bricks. Clay bricks are able to absorb the sun's heat and release the stored heat slowly during the night, thus maintaining a more constant temperature for germinating seeds, and window glass also allows heat and daylight to enter the cold frame. These materials can be

obtained from council tips or building-material recycling centres. You will also need some hessian or fertiliser bags, or pieces of weed mat.

Choose a window with a suitably sized fixed panel, depending on the number of plants you want to get started. First, clean the window glass with a 10-per-cent methylated spirits and water solution to prevent paint flaking. Then, paint the window glass with a coat of very diluted white paint. You can use a sheet of heavy-duty white plastic as a cover if you are unable to find a suitable window but the plastic will require more insulation at night, and is not as easy to prop open. The cold frame needs to be just three courses high and large enough to support your window on four sides. As an example, a small cold frame that uses an old-style timber sash window frame uses thirty-six bricks.

Choose a very sunny position for your cold frame. A position against a north-facing wall is good because late-winter sun is very weak. Build your frame by stacking bricks (without mortar) to a size that will support the lid. The frame can be built on concrete, gravel, mulched soil or bare soil.

Place your watered seedling trays or pots in the cold frame and lay the window on top. Cover the window (or plastic sheet) at night with enough bags or weed mat to insulate seedlings; heat escapes very quickly through glass or plastic when the air temperature is very cold. Anchor the cover, if necessary, to prevent it blowing off the frame during the night.

As soon as seedlings germinate, use a small block of wood under the front of the window frame to ventilate seedlings during the day. Fully close and re-cover the lid at night. Tend

your seedlings as normal. Once garden soil has warmed and seedlings are large enough to plant out, the cold frame can be dismantled. Prop the window against a wall in your shed, and stack bricks in convenient place for use again the following winter.

Repairing Hail-damaged Plants

HAIL IS VERY DESTRUCTIVE in gardens and unfortunately there is very little we can do to prevent the damage it causes. Usually, the only indication of approaching hail is a sudden chill in the air, or the rapid pinging of a metal roof as it cools quickly. The protection of motor vehicles and glass houses are higher priorities, and warnings do not come early enough to protect the garden. If you have adequate warning, first protect any cycads growing in the open and then avocado trees, by throwing tarpaulins or old blankets over them.

Damage to crops such as vegetables, rose blooms and fruit trees will be apparent immediately, but sometimes the worst damage from hail will not be noticed for some time. When hail hits branches, jagged edges of hailstones make almost invisible cuts in plant stems. Disease can enter plants through injured areas. Apricot, avocado, cherry and pine trees are most vulnerable to infection.

As shrubs or trees heal their injuries, scar tissue can block, or reduce, sap flow further along stems. Growth beyond the damage becomes distorted or weakened. Watch carefully for any signs of this type of damage, and prune behind the hail-damaged sites (which will be more visible at this stage) to above a healthy growth bud. Avocado, rosemary and grapes are just a few plants that can show symptoms of poor

sap-flow after hail. Small to medium avocado trees take a long time to recover from hail damage.

Cycads are almost permanently disfigured by hail because they grow so slowly. Large hailstones cause sections of fronds to become tattered or die, while small hailstones cause ugly ‘rust’ spots on fronds. Don’t remove damaged fronds, even if they look unattractive; removing fronds deprives the plant of the ability to manufacture food as new fronds may only be produced every year or so.

Organic Weed Control

IT IS OFTEN SAID that weeds are merely opportunistic plants growing in the wrong place. As soon as soil is disturbed, weeds appear as nature works to protect topsoil from erosion. Some weeds are hosts to pests such as aphids and thrips that spread viruses. Shepherd’s purse, wild turnip and wild radish are hosts to pests that can affect brassicas. Nightshade and cobbler’s pegs (or farmer’s friends) are hosts to pests that can affect tomatoes, potatoes, and related plants. These weeds should be removed promptly, before they become established.

Some weed seeds are viable for up to fifteen years, so allowing weeds to go to seed will allow them to regenerate for many years to come. Although some thistles seem to thrive in manure-enriched paddocks, most grow best in impoverished soils. Some soil experts can diagnose which minerals are lacking in your soil from the species of weeds growing on your property.

For several years after we moved to this property we harvested narrow-leaf plantain (or ribwort), *Plantago lanceolata*, a weed that grew vigorously whenever we disturbed soil to prepare beds. This weed has multiple

medicinal uses and is closely related to the plant that produces the laxative psyllium. Ribwort is commonly found beside roadways and paths, but it can be polluted in these areas, so we sold our organically grown plants to pharmaceutical companies. Because this weed contributed to our income, I collected seed and proceeded to increase our stock. It was only then I discovered that ribwort does not grow as well in healthy soil with regular fertilising and care as it does in unimproved soil. We no longer harvest ribwort. It is still around but, as it is harder to find vigorous specimens, it's not worth the effort. As soil improved in our vegetable garden, the opportunistic, self-seeding plants have gradually become those that appreciate healthier soil, such as parsley, lettuce and coriander. A little further advice about ribwort: this herb is a host for aphids that transmit a virus to broad beans, sweet peas and peaches. We found no aphids on seed heads of this herb but if you have problems with aphids, remove ribwort from the growing area or, at least, keep it slashed regularly to prevent the formation of seed heads.

Start a weed control program early in the growing season as you won't feel like weeding in hot weather — and by then many weeds will have set seed. Small weeds can be removed with a shuffle hoe, and left to wilt on garden beds before covering with mulch. Deep-rooted weeds can draw minerals from soil and these make a valuable contribution to the compost heap. Avoid bare soil in your garden areas. Use cover crops or mulch to reduce future weeding. As you improve your soil, you will create conditions that are disagreeable for many weeds. Some vegetables have natural weed-suppressant properties; these vegetables include the cucurbits or pumpkin family, sunflowers, potatoes and brassicas. These useful properties are reduced in hybrid seed.

Oxalis, onion weed, kikuyu and couch grass

Most couch grass infestations can be choked out by a green-manure crop of thickly sown rye but, in some situations, these common weeds may all need a more determined approach before an area is suitable for garden beds. Both oxalis and onion weed grow from bulbs which are surrounded by small bulbils. When these weeds are pulled from soil the bulbils are released, resulting in six or eight extra weeds for every one removed. The best time to tackle these weeds is spring and summer while they are actively making food; when they become dormant during winter bulbs will have already stored food for spring growth. Kikuyu will re-shoot from the smallest piece of stem containing a node. We have not yet found an organic herbicide that will kill kikuyu.

These problem weeds are killed by denying them the light to make food — a process that will take some weeks depending on the amount of sunlight the area receives. Covering the weed area with sturdy black plastic will best achieve light deprivation. Clear or light-coloured plastic can act as a cloche in some conditions, and actually increase weed growth. You can also use spread out cardboard cartons for oxalis and onion weed, but kikuyu and couch require black plastic — even weed mat is not suitable. First mow or slash the weedy area so that plastic or cardboard will lie flat on the ground. Oxalis can be a problem around trees. The temporary use of black plastic as a mulch in these areas will not harm trees, but should not be used as a long-term mulch in garden beds.

To replace lawn with garden beds

- Mow the area with the lawnmower on its lowest setting, to slow regrowth.
- Mark the outer borders of your garden beds, including pathways.
- Spread black plastic across the entire bed area. Anchor the plastic with stones, bricks or planks to prevent it blowing away.
- For kikuyu and couch, go around the entire border of the plastic with a spade, cutting through any runners that continue under the plastic. Use as much weight as possible to cut deeply into topsoil, and repeat the exercise weekly. (If you do not trim the edges, runners that receive light will continue to feed grass under the plastic.)
- Check regularly after two weeks to see if weeds are completely dead. Any surviving oxalis or onion weed will grow less vigorously, and eventually die out, when garden beds are mulched and other plants are competing with it.
- When reclaiming areas of dead kikuyu and couch to prepare new beds, beds should be dug over with a mattock to remove all runners, in case some runners have survived the treatment.

Chicken tractors

Chooks are very good at weeding. They feed on foliage and scratch in soil as they look for insects, working the topsoil like small tractors. Where large areas require weeding and

you are allowed to keep chooks, a mobile hen house may be the answer to weed control. My husband built one in an old box trailer, which we move from place to place behind the tractor. The door of the hen house doubles as a ramp for the chooks, and nest boxes are positioned over the drawbar of the trailer with a hinged lid to allow for easy removal of eggs. A temporary fence is set up around the hen house and weed area, and the chooks are left to do their work. The area underneath the trailer provides shade for the chooks and their water dispenser, and they are shut in the hen house at night to protect them from foxes.

Testing suitability of soil for gypsum application

Before purchasing mined gypsum to improve soil drainage, it is wise to determine whether the expense is warranted by testing the soil; not all soils are responsive to the application of gypsum. Mined gypsum is usually not sold in small quantities, so an off-cut of wall plasterboard can be used to test for gypsum suitability (but never use this type of gypsum in your garden). The following test is similar to one suggested by the NSW Department of Agriculture. Topsoil and subsoil are tested separately.

MATERIALS

2 soup tins of equal size

a utensil for punching holes in the base of the tins

a small piece of hessian, knitted shade cloth, or similar fabric

2 bottles or jugs, each containing 1 litre of water

1/4 cup (85 g) of gypsum, or a small piece of wall plasterboard

a watch or clock that can measure seconds

a disposable paper mask

METHOD

- Take a shovelful of topsoil and spread it to dry on a hard surface. Then break the dry soil into crumbs no larger than 5 mm.
- Punch an equal number of holes in the base of each tin, and place a piece of coarse fabric in the tins to cover the holes.
- Fill both tins three-quarters full with dry soil. Tap each tin on a hard surface several times to settle soil.
- Holding a tin in one hand, pour water from one container to fill it, and then time the flow of water from the base of the tin.
- Add gypsum to water in the second container. If using plasterboard, put on the mask, remove the cardboard coating and crush the plasterboard with a hammer. Measure one-quarter cup of powder and add it to the container. Stir or shake well to mix gypsum evenly through the water.
- Fill the second tin with the gypsum solution, and time the flow of water from the base of the tin. If the flow of the gypsum solution is more than three times faster than the flow of plain water, your soil is likely to respond well to the application of gypsum.

You can repeat the test on a sample of subsoil, using the remaining gypsum solution.

A blend of agricultural lime (calcium carbonate) and mined gypsum is recommended for soils with a soil pH of 6 or lower. Using gypsum does not replace the need for good levels of organic matter in your soil. (Your state Department of Agriculture can supply fact sheets for using lime and gypsum to treat your soil.)

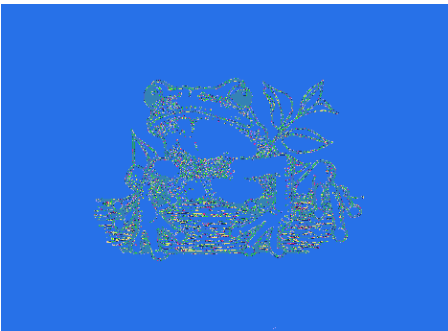
Summer and Winter Projects

ANYTIME IT IS TOO HOT or cold to garden is the perfect time to catch up on the small maintenance tasks that will save you time, work, and frustration in the garden.

- Tidy up your garden shed. Allocate a place for each tool so that you will know if a tool is missing before it gets lost. A board with nails or hooks to support tools and an outline of small tools is a good way to keep track of your equipment.
- Sharpen tools, and make sure all equipment is in good working order. Secateurs and clippers require regular sharpening to avoid damage to plants. Shovels, (which have a straight edge on the bottom of their blade) will be easier to use if sharpened with a metal file or grindstone.
- Oil wooden handles of gardening tools with an equal mixture of linseed oil and mineral turps to prevent them splitting.
- Make a diagram that indicates where you have planted different cultivars of roses, fruit trees,

hibiscus etc. and keep it in a safe place. Plant labels deteriorate or get lost and knowing exactly where plants are will help if you want to propagate or replace a particular cultivar.

- Keep a calendar in your gardening shed and highlight the best planting and pruning days so that you can plan ahead.
- Set up a potting bench in a shady spot that allows you to work at a comfortable height.
- Get a compost factory working through winter months to provide humus and fertiliser for melons, cucumbers, zucchini, pumpkins or tomatoes in spring. Where winters are cold, use a black plastic cover, add a good measure of manure to generate heat, and turn it frequently. Turning the compost will keep you warm, too!
- Seek out a comfortable weatherproof chair for your favourite shady spot where you can relax and enjoy the healthy environment you've created.



CHAPTER 10

Moon Phases and Best Gardening Days to 2017

THE TABLE BELOW provides the precise time for each change of moon phase because certain practices — sowing seed, transplanting seedlings and taking cuttings — are not recommended in the twelve hours immediately before or after the phase change. The best sowing or planting days listed are those days when the Moon is in a fertile sign. During New Moon and First Quarter phases, fertile days are especially good for sowing seed and grafting plants. Fertile days also encourage fast recovery in transplanted seedlings, and stronger regrowth after pruning. During Full Moon phase, fertile days are excellent for sowing root crops and perennial seed, and for taking cuttings. They are also good for planting and dividing perennials, and pruning of some dormant plants. (Best days are rounded to the nearest five minutes.)

Barren days during Full Moon phase are best for harvesting plants for storage or drying. Barren days during Last Quarter phase are considered the best days for weeding, digging and ploughing. Eclipses have been included to assist biodynamic farmers — solar eclipses are indicated by S/E, and lunar eclipses, by L/E.

Please note that each change of moon phase is given in Australian Eastern Standard Time (AEST). South Australia and Northern Territory time are one half-hour behind AEST, and Western Australia is two hours behind AEST. New Zealand Standard Time is two hours ahead of AEST. Consequently, 10:00 am in Sydney, Melbourne, Brisbane, and Hobart corresponds to 9:30 am in Adelaide and Darwin; 8:00 am in Perth; and 12:00 noon in Auckland and Wellington.

Time adjustments may be required for your area and can be noted on your personal calendar. Daylight Saving Time has not been included because it is not observed in all states of Australia, and can be varied by government decision.

Key


 NEW MOON

 FIRST QUARTER


 FULL MOON

 LAST QUARTER


2012

 *April 21st at 5:20 pm.* (No sowing on 21st.)

Best sowing/planting days: all day on 22nd and 23rd; from 3:45 pm on 26th, all day on 27th and 28th.


 *April 29th at 7:59 pm.* (No sowing from 8:00 am on 29th to 8:00 am on 30th.)

Best sowing/pruning days: from 12:05 pm on May 3rd, all day on 4th and 5th.

 *May 6th at 1:36 pm.* (No sowing on 6th.)

Best sowing/pruning days: to 11:40 am on 7th; from noon on 9th, all day on 10th, to 3:05 pm on 11th.

Best harvest days: from 11:40 am on 7th, all day on 8th, to noon on 9th; from 3:05 pm on 11th, all day on 12th.

 *May 13th at 7:48 am.* (No sowing between 13th and 20th.)

Best weeding days: all day on 13th; all day on 16th, 17th and 18th.

●●○○○ *May 21st at 9:48 am.* (No sowing on 21st.) (S/E)

Best sowing/planting days: all day on 24th and 25th.

●●○○○ *May 29th at 6:17 am.* (No sowing on 29th.)

Best sowing/pruning days: all day on 31st, June 1st, 2nd and 3rd.

●●○○○ *June 4th at 9:13 pm.* (No sowing from 9:15 am on 4th to 9:15 am on 5th.) (L/E)

Best sowing/pruning days: all day on 6th and 7th; all day on 10th.

Best harvest days: all day on 4th and 5th; all day on 8th and 9th.

●●○○○ *June 11th at 8:42 pm.* (No sowing between 8:40 am on 11th and all day on 19th.)

Best weeding days: from 2:20 pm on 12th, all day on 13th and 14th; all day on 18th and 19th.

●●○○○ *June 20th at 1:03 am.* (No sowing before 1:05 pm on 20th.)

Best sowing/planting days: from 1:05 pm on 20th, all day on 21st, to 1:50 pm on 22nd.

●●○○○ *June 27th at 1:31 pm.* (No sowing on 27th.)

Best sowing/pruning days: all day on 28th, 29th and 30th; from 8:50 am on July 3rd.

●●○○● *July 4th at 4:53 am.* (No sowing from 4:55 pm on 3rd to 4:55 pm on 4th.)

Best sowing/pruning days: to 10:25 am on 5th; from 2:30 pm on 7th, all day on 8th and 9th.

Best harvest days: from 10:25 am on 5th, all day on 6th, to 2:30 pm on 7th; all day on 10th.

●●○○● *July 11th at 11:49 am.* (No sowing between 11th and 18th.)

Best weeding days: all day on 15th and 16th, to 10:30 am on 17th.

●○○○○ *July 19th at 2:25 pm.* (No sowing on 19th.)

Best sowing/planting days: from 8:40 am on 24th, all day on 25th.

●○○○○ *July 26th at 6:57 pm.* (No sowing on 26th.)

Best sowing/pruning days: all day on 27th, to 3:20 pm on 28th; all day on 31st.

●●○○● *August 2nd at 1:29 pm.* (No sowing on 2nd.)

Best sowing/pruning days: all day on 4th and 5th; to 4:55 pm on 9th.

Best harvest days: all day on 2nd and 3rd; all day on 6th and 7th, to 5:30 pm on 8th.

●●○○● *August 10th at 4:56 am.* (No sowing between 4:55 pm on 9th and all day on 17th.)

Best weeding days: all day on 11th, 12th and 13th; all day on 16th and 17th.

●○○○ *August 18th at 1:56 am.* (No sowing before 1:55 pm on 18th.)

Best sowing/planting days: from 2:45 pm on 20th, all day on 21st, 22nd and 23rd, to 11:55 am on 24th.

●○○● *August 24th at 11:55 pm.* (No sowing from 11:55 am on 24th to 11:55 am on 25th.)

Best sowing/pruning days: all day on 27th and 28th; from 8:30 am to noon on 31st.

●○○● *August 31st at 11:59 pm.* (No sowing from noon on 31st to noon on September 1st.)

Best sowing/pruning days: from noon on September 1st, to 3:40 pm on 2nd; all day on 5th and 6th, to 2:10 pm on 7th.

Best harvest days: from 3:40 pm on September 2nd, all day on 3rd and 4th; from 2:10 pm on 7th.

●○○● *September 8th at 11:16 pm.* (No sowing between 11:15 am on 8th and all day on 15th.)

Best weeding days: all day on 8th and 9th; from 1:00 pm on 12th, all day on 13th, 14th and 15th.

●○○● *September 16th at 12:12 pm.* (No sowing on 16th.)

Best sowing/planting days: all day on 17th, 18th, 19th and 20th.

●○○● *September 23rd at 5:42 am.* (No sowing from 5:40 pm on 22nd to 5:40 pm on 23rd.)

Best sowing/pruning days: all day on 24th; from 3:25 pm on 27th, all day on 28th and 29th.

●○○● *September 30th at 1:20 pm.* (No sowing on 30th.)

Best sowing/pruning days: from 9:25 am on October 2nd, all day on 3rd and 4th; from 10:45 am on 7th.

Best harvest days: all day on 30th and October 1st; all day on 5th and 6th, to 10:45 am on 7th.

●●○●○ *October 8th at 5:34 pm.* (No sowing between 8th and 14th.)

Best weeding days: all day on 10th, 11th, 12th and 13th, to 9:00 am on 14th.

●●○●○ *October 15th at 10:04 pm.* (No sowing before 10:05 am on 16th.)

Best sowing/planting days: from 10:05 am on 16th, all day on 17th, to 10:25 am on 18th; from 11:40 am on 20th, all day on 21st.

●●○●○ *October 22nd at 1:33 pm.* (No sowing on 22nd.)

Best sowing/pruning days: all day on 25th and 26th.

●●○●○ *October 30th at 5:51 am.* (No sowing from 5:50 pm on 29th to 5:50 pm on 30th.)

Best sowing/pruning days: all day on 31st; all day on November 4th and 5th.

Best harvest days: all day on November 1st and 2nd, to 5:45 pm on 3rd; all day on 6th.

●●○●○ *November 7th at 10:37 am.* (No sowing between 7th and 13th.)

Best weeding days: all day on 7th, 8th, 9th and 10th.

●●○●○ *November 14th at 8:09 am.* (No sowing on 14th.) (S/E)

Best sowing/planting days: all day on 17th and 18th.

●●○○● *November 21st at 12:33 am.* (No sowing from 12:35 pm on 20th to 12:35 pm on 21st.)

Best sowing/pruning days: from 12:35 pm on 21st, all day on 22nd, to 11:15 on 23rd; all day on 26th and 27th, to 11:00 am on 28th.

●●○○● *November 29th at 12:47 am.* (No sowing from 12:45 pm on 28th to 12:45 pm on 29th.) (L/E)

Best sowing/pruning days: all day on December 1st and 2nd, to noon on 3rd.

Best harvest days: all day on 29th and 30th; from noon on December 3rd, all day on 4th, 5th and 6th.

●●○○● *December 7th at 1:33 am.* (No sowing between 1:35 pm on 6th and all day on 12th.)

Best weeding days: all day on 7th; from 8:25 am on 12th.

●●○○● *December 13th at 6:43 pm.* (No sowing before 6:45 am on 14th.)

Best sowing/planting days: from 6:45 am on 14th, all day on 15th; from 10:50 am on 18th, all day on 19th.

●●○○● *December 20th at 3:20 pm.* (No sowing on 20th.)

Best sowing/pruning days: all day on 23rd and 24th, to 5:15 pm on 25th.

●●○○● *December 28th at 8:22 pm.* (No sowing from 8:20 am on 28th to 8:20 am on 29th.)

Best sowing/pruning days: from 8:20 am on 29th, to 5:45 pm on 30th.

Best harvest days: all day on 31st.

2013

●●○○● *continues January 1st to 4th.*

Best sowing/pruning days: from 11:15 am on 4th.

Best harvest days: all day on 1st, 2nd and 3rd, to 11:15 am on 4th.

●○○○○ *January 5th at 1:59 pm.* (No sowing between 5th and 11th.)

Best weeding days: all day on 9th and 10th.

●●○○● *January 12th at 5:45 am.* (No sowing before 5:45 pm on 12th.)

Best sowing/planting days: all day on 15th and 16th.

●●○○● *January 19th at 9:46 am.* (No sowing on 19th.)

Best sowing/pruning days: all day on 20th and 21st; from 1:00 pm on 24th, all day on 25th and 26th.

●●○○● *January 27th at 2:39 pm.* (No sowing on 27th.)

Best sowing/pruning days: from 4:35 pm on 31st, all day on February 1st and 2nd, to 11:55 am on 3rd.

Best harvest days: all day on 27th, 28th, 29th and 30th, to 4:35 pm on 31st.

●○○○○ *February 3rd at 11:57 pm.* (No sowing between noon on 3rd and all day on 9th.)

Best weeding days: all day on 5th and 6th; all day on 9th.

●●○○● *February 10th at 5:21 pm.* (No sowing on 10th.)

Best sowing/planting days: all day on 11th and 12th, to 11:50 am on 13th; all day on 16th, to 6:30 pm on 17th.

●●○○● *February 18th at 6:32 am.* (No sowing from 6:30 pm on 17th to 6:30 pm on 18th.)

Best sowing/pruning days: all day on 21st and 22nd.

●●○○● *February 26th at 6:27 am.* (No sowing from 6:25 pm on 25th to 6:25 pm on 26th.)

Best sowing/pruning days: all day on 28th, all day on March 1st, 2nd and 3rd.

Best harvest days: all day on 26th and 27th; all day on March 4th.

●○○○○ *March 5th at 7:54 am.* (No sowing between 5th and 11th.)

Best weeding days: all day on 5th, to 10:15 am on 6th; from 1:05 pm on 8th, all day on 9th, to 4:20 pm on 10th.

●○○○○ *March 12th at 5:52 am.* (No sowing before 5:50 pm on 12th.)

Best sowing/planting days: all day on 15th and 16th, to 4:10 pm on 17th.

●●○○● *March 20th at 3:28 am.* (No sowing from 3:30 pm on 19th to 3:30 pm on 20th.)

Best sowing/pruning days: from 3:30 pm on 20th, all day on 21st, to 4:50 pm on 22nd.

●●○○● *March 27th at 7:28 pm.* (No sowing from 7:30 am on 27th to 7:30 am on 28th.)

Best sowing/pruning days: from 7:30 am on 28th, all day on 29th and 30th, to 1:15 pm on 31st; from 3:35 pm on April 2nd.

Best harvest days: from 1:15 pm on 31st, all day on April 1st, to 3:35 pm on 2nd.

●●○○○ *April 3rd at 2:38 pm.* (No sowing between 3rd and 9th.)

Best weeding days: all day on 5th and 6th; all day on 9th.

●●○○● *April 10th at 7:36 pm.* (No sowing before 7:35 am on 11th.)

Best sowing/planting days: from 1:25 pm on 11th, all day on 12th and 13th; from 12:50 pm on 16th, all day on 17th, to 10:30 am on 18th.

●●○○● *April 18th at 10:32 pm.* (No sowing from 10:30 am on 18th to 10:30 am on 19th.)

Best sowing/pruning days: all day on 24th and 25th.

●●○○● *April 26th at 5:58 am.* (No sowing on 26th.) (L/E)

Best sowing/pruning days: all day on 27th; all day on 30th and May 1st.

Best harvest days: all day on 28th and 29th.

●●○○○ *May 2nd at 9:15 pm.* (No sowing between 9:15 am on 2nd and all day on 9th.)

Best weeding days: all day on 2nd and 3rd; from 11:05 am on 6th, all day on 7th and 8th.

●●○○● *May 10th at 10:30 am.* (No sowing on 10th.) (S/E)

Best sowing/planting days: all day on 14th and 15th.

●●○○● *May 18th at 2:36 pm.* (No sowing on 18th.)

Best sowing/pruning days: all day on 21st, 22nd, 23rd and 24th.

●●○○● *May 25th at 2:26 pm.* (No sowing on 25th.) (L/E)

Best sowing/pruning days: from 7:30 am on 27th, all day on 28th; from 10:30 am on 31st.

Best harvest days: all day on 25th and 26th; from 7:50 am on 29th, all day on 30th, to 10:30 am on 31st.

●○○○○ *June 1st at 4:59 am.* (No sowing between 1st and 8th.)

Best weeding days: all day on 3rd and 4th; from 1:35 pm on 7th, all day on 8th.

●○○○○ *June 9th at 1:57 am.* (No sowing before 2:00 pm on 9th.)

Best sowing/planting days: all day on 10th and 11th, to 3:00 pm on 12th.

●●○○● *June 17th at 3:25 am.* (No sowing from 3:25 pm on 16th to 3:25 pm on 17th.)

Best sowing/pruning days: from 3:25 pm on 17th, all day on 18th, 19th, 20th and 21st.

●●○○● *June 23rd at 9:33 pm.* (No sowing from 9:35 am on 23rd to 9:35 am on 24th.)

Best sowing/pruning days: from 9:35 am on 24th, all day on 25th; all day on 28th and 29th.

Best harvest days: all day on 26th and 27th.

●●○○○ *June 30th at 2:55 pm.* (No sowing between 30th and July 7th.)

Best weeding days: all day on 30th and July 1st; all day on 5th and 6th.

●●○○○ *July 8th at 5:15 pm.* (No sowing on 8th.)

Best sowing/planting days: all day on 9th; all day on 15th.

●●○○○ *July 16th at 1:19 pm.* (No sowing on 16th.)

Best sowing/pruning days: all day on 17th and 18th; all day on 21st, to 4:15 pm on 22nd.

●●○○○ *July 23rd at 4:17 am.* (No sowing from 4:15 pm on 22nd to 4:15 pm on 23rd.)

Best sowing/pruning days: all day on 25th and 26th.

Best harvest days: all day on 24th; all day on 27th and 28th, to 2:45 pm on 29th.

●●○○○ *July 30th at 3:45 am.* (No sowing between 3:45 pm on 29th and all day on August 6th.)

Best weeding days: all day on August 1st and 2nd, to 2:30 pm on 3rd; all day on 6th.

●●○○○ *August 7th at 7:52 am.* (No sowing on 7th.)

Best sowing/planting days: all day on 11th, 12th and 13th, to 9:00 am on 14th.

●●○○○ *August 14th at 8:57 pm.* (No sowing from 9:00 am on 14th to 9:00 am on 15th.)

Best sowing/pruning days: from 9:00 am to 11:05 am on 15th; from 1:25 pm on 17th, all day on 18th, to 2:10 pm on 19th.

●●○○● *August 21st at 11:46 am.* (No sowing on 21st.)

Best sowing/pruning days: all day on 22nd, to 5:15 pm on 23rd; all day on 26th and 27th.

Best harvest days: all day on 24th and 25th.

●○○○○ *August 28th at 7:36 pm.* (No sowing between 7:35 am on 28th and all day on September 4th.)

Best weeding days: all day on 28th, 29th and 30th; from 10:00 am on September 2nd, all day on 3rd and 4th.

●○○○○ *September 5th at 9:37 pm.* (No sowing before 9:35 am on 6th.)

Best sowing/planting days: all day on 7th, 8th, 9th and 10th, to 4:35 pm on 11th.

●○○○○ *September 13th at 3:09 am.* (No sowing from 3:10 pm on 12th to 3:10 pm on 13th.)

Best sowing/pruning days: all day on 14th and 15th; all day on 18th.

●●○○● *September 19th at 9:14 pm.* (No sowing from 9:15 am on 19th to 9:15 am on 20th.)

Best sowing/pruning days: from 8:35 am on 22nd, all day 23rd, to 5:35 pm on 24th.

Best harvest days: all day on 20th and 21st; all day on 25th and 26th.

●○○○○ *September 27th at 1:57 pm.* (No sowing between 27th and October 2nd.)

Best weeding days: all day on 30th, October 1st, 2nd and 3rd, to 1:00 pm on 4th.

●●○○● *October 5th at 10:36 am.* (No sowing on 5th.)

Best sowing/planting days: all day on 6th, 7th and 8th; all day on 11th.

●●○○● *October 12th at 9:03 am.* (No sowing on 12th.)

Best sowing/pruning days: from 7:10 am on 15th, all day on 16th, to 11:20 am on 17th.

●●○○● *October 19th at 9:39 am.* (No sowing on 19th.) (L/E)

Best sowing/pruning days: all day on 20th and 21st; from 1:40 pm on 24th, all day on 25th and 26th.

Best harvest days: to 5:30 pm on 19th; all day on 22nd and 23rd, to 1:35 pm on 24th.

●●○○● *October 27th at 9:42 am.* (No sowing between 27th and November 2nd.)

Best weeding days: all day on 27th, 28th, 29th, 30th and 31st.

●●○○● *November 3rd at 10:51 pm.* (No sowing before 10:50 am on 4th.) (S/E)

Best sowing/planting days: from 10:50 am on 4th; from 7:45 am on 7th, all day on 8th, to 9:30 am on 9th.

●●○○● *November 10th at 3:58 pm.* (No sowing on 10th.)

Best sowing/pruning days: from 12:35 pm on 11th, all day on 12th, to 5:40 pm on 13th; all day on 16th, to 1:15 pm on 17th.

●●○○● *November 18th at 1:17 am.* (No sowing from 1:15 pm on 17th to 1:15 pm on 18th.)

Best sowing/pruning days: all day on 21st and 22nd, to 10:00 am on 23rd.

Best harvest days: from 10:10 am on 18th, all day on 19th and 20th; from 10:00 am on 23rd, all day on 24th and 25th.

●○○○○ *November 26th at 5:29 am.* (No sowing between 5:30 pm on 25th and all day on December 2nd.)

Best weeding days: all day on 26th and 27th, to 8:00 am on 28th; from 4:30 pm on December 2nd.

●○○○○ *December 3rd at 10:23 am.* (No sowing on 3rd.)

Best sowing/planting days: from 4:50 pm on 4th, all day on 5th, to 4:55 pm on 6th; to 1:15 pm on 9th.

●○○○○ *December 10th at 1:13 am.* (No sowing from 1:15 pm on 9th to 1:15 pm on 10th.)

Best sowing/pruning days: from 1:15 pm on 10th; all day on 13th and 14th, to 4:40 pm on 15th.

●●○○● *December 17th at 7:29 pm.* (No sowing from 7:30 am on 17th to 7:30 am on 18th.)

Best sowing/pruning days: from 7:30 am on 18th, all day on 19th, to 4:50 pm on 20th.

Best harvest days: all day on 17th; from 4:50 pm on 20th, all day on 21st, 22nd, 23rd and 24th.

●○○○○ *December 25th at 11:49 pm.* (No sowing between 11:50 am on 25th and all day on 31st.)

Best weeding days: all day on 30th and 31st.

2014

●●○●○ *January 1st at 9:15 pm.* (No sowing before 9:15 am on 2nd.)

Best sowing/planting days: from 9:15 am on 2nd; all day on 5th and 6th.

●●○●○ *January 8th at 1:40 pm.* (No sowing on 8th.)

Best sowing/pruning days: from 12:25 pm on 9th, all day on 10th and 11th; from 10:25 am on 14th, all day on 15th.

●●○●○ *January 16th at 2:53 pm.* (No sowing 16th.)

Best sowing/pruning days: all day on 22nd and 23rd.

Best harvest days: all day on 17th, 18th, 19th, 20th and 21st.

●●○●○ *January 24th at 3:20 pm.* (No sowing between 24th and 30th.)

Best weeding days: from 1:15 pm on 26th, all day on 27th, to 3:05 pm on 28th; from 2:35 pm on 30th.

●●○●○ *January 31st at 7:40 am.* (No sowing on 31st.)

Best sowing/planting days: from 1:45 pm on February 1st, all day on 2nd, to 2:55 pm on 3rd; to 5:25 pm on 6th.

●●○●○ *February 7th at 5:23 am.* (No sowing from 5:25 pm on 6th to 5:25 pm on 7th.)

Best sowing/pruning days: from 4:35 pm on 10th, all day on 11th and 12th.

●●○●○ *February 15th at 9:54 am.* (No sowing on 15th.)

Best sowing/pruning days: all day on 18th, 19th, 20th and 21st, to 3:15 pm on 22nd.

Best harvest days: all day on 15th, 16th and 17th.

●●○○○ *February 23rd at 3:16 am.* (No sowing between 3:15 pm on 22nd and all day on 28th.)

Best weeding days: all day on 23rd and 24th; all day on 27th and 28th.

●●○○● *March 1st at 6:01 pm.* (No sowing on 1st.)

Best sowing/planting days: all day on 2nd; all day on 5th and 6th, to 12:35 pm on 7th.

●●○○● *March 8th at 11:28 pm.* (No sowing from 11:30 am on 8th to 11:30 am on 9th.)

Best sowing/pruning days: all day on 10th and 11th, to 12:10 pm on 12th.

●●○○● *March 17th at 3:09 am.* (No sowing from 3:10 pm on 16th to 3:10 pm on 17th.)

Best sowing/pruning days: from 3:10 pm on 17th, all day on 18th, 19th, 20th and 21st.

Best harvest days: to 10:45 am on 17th; all day on 22nd and 23rd.

●●○○○ *March 24th at 11:47 am.* (No sowing between 24th and 30th.)

Best weeding days: from 8:40 am on 26th, all day on 27th, to 10:10 am on 28th.

●●○○● *March 31st at 4:46 am.* (No sowing before 4:45 pm on 31st.)

Best sowing/planting days: from 3:20 pm on April 1st, all day on 2nd and 3rd; from 7:40 am on 6th.

●●○● April 7th at 6:32 pm. (No sowing on 7th.)

Best sowing/pruning days: all day on 8th; all day on 14th.

●●○○● April 15th at 5:43 pm. (No sowing on 15th.) (L/E)

Best sowing/pruning days: all day on 16th and 17th, to 7:45 am on 18th; from 11:30 am on 20th, all day on 21st.

Best harvest days: from 7:45 am on 18th, all day on 19th, to 11:30 am on 20th.

●●○○● April 22nd at 5:53 pm. (No sowing between 22nd and 28th.)

Best weeding days: from 2:20 pm on 22nd, all day on 23rd, to 4:55 pm on 24th; all day on 27th and 28th.

●●○○● April 29th at 4:15 pm. (No sowing on 29th.) (S/E)

Best sowing/planting days: all day on 30th; from 4:15 pm on May 3rd, all day on 4th and 5th.

●●○● May 7th at 1:16 pm. (No sowing on 7th.)

Best sowing/pruning days: all day on 11th, 12th and 13th and 14th.

●●○○● May 15th at 5:17 am. (No sowing on 15th.)

Best sowing/pruning days: all day on 18th and 19th.

Best harvest days: from 3:45 pm on 15th, all day on 16th and 17th; all day on 20th.

●●○○● May 21st at 11 pm. (No sowing between 11:00 am on 21st and all day on 28th.)

Best weeding days: all day on 24th and 25th; from 2:50 pm on 28th.

●●○○● *May 29th at 4:41 am.* (No sowing before 4:40 pm on 29th.)

Best sowing/planting days: all day on 31st and June 1st, to 11:45 am on 2nd.

●●○○● *June 6th at 6:40 am.* (No sowing on 6th.)

Best sowing/pruning days: from noon on 7th, all day on 8th, 9th, 10th and 11th.

●●○○● *June 13th at 2:13 pm.* (No sowing on 13th.)

Best sowing/pruning days: all day on 14th and 15th; all day on 18th and 19th.

Best harvest days: from 2:15 pm on 13th; all day on 16th and 17th.

●●○○● *June 20th at 4:40 am.* (No sowing between 4:40 pm on 19th and all day on 26th.)

Best weeding days: from 7:30 am on 20th, all day on 21st, to 1:05 pm on 22nd; all day on 25th and 26th.

●●○○● *June 27th at 6:10 pm.* (No sowing on 27th.)

Best sowing/planting days: all day on 28th and 29th; to 10:00 am on July 5th.

●●○○● *July 5th at 10:00 pm.* (No sowing from 10:00 am on 5th to 10:00 am on 6th.)

Best sowing/pruning days: from 10:00 am on 6th, all day on 7th and 8th, to 11:25 am on 9th; from 1:25 pm on 11th, to 9:25 am on 12th.

●●○○● *July 12th at 9:26 pm.* (No sowing from 9:25 am on 12th to 9:25 am on 13th.)

Best sowing/pruning days: from 9:25 am to 1:10 pm on 13th; from 12:40 pm on 15th, all day on 16th, to 2:10 pm on 17th.

Best harvest days: from 1:10 pm on 13th, all day on 14th, to 12:40 pm on 15th; from 2:10 pm on 17th, all day on 18th.

●●○○○● *July 19th at 12:09 pm.* (No sowing between 19th and 26th.)

Best weeding days: from 12:10 pm on 19th; all day on 22nd and 23rd, to 1:00 pm on 24th.

July 27th at 8:43 am. (No sowing on 27th.)

Best sowing/planting days: all day on August 1st, 2nd and 3rd.

●●○○○● *August 4th at 10:51 am.* (No sowing on 4th.)

Best sowing/pruning days: all day on 5th; all day on 8th and 9th.

●●○○○● *August 11th at 4:10 am.* (No sowing from 4:10 pm on 10th to 4:10 pm on 11th.)

Best sowing/pruning days: all day on 12th and 13th; all day on 16th, to 10:25 am on 17th.

Best harvest days: all day on 11th; all day on 14th and 15th.

●●○○○● *August 17th at 10:27 pm.* (No sowing between 10:25 am on 17th and all day on 25th.)

Best weeding days: from 8:40 am on 18th, all day on 19th and 20th; all day on 23rd, 24th and 25th.

●●○○○● *August 26th at 12:14 am.* (No sowing before 12:15 pm on 26th.)

Best sowing/planting days: from 7:55 am on 28th, all day on 29th, 30th, 31st and September 1st.

●●○○● *September 2nd at 9:12 pm.* (No sowing from 9:10 am on 2nd to 9:10 am on 3rd.)

Best sowing/pruning days: from 8:15 am on 4th, all day on 5th, to 10:00 am on 6th; from 9:50 am on 8th.

●●○○● *September 9th at 11:39 am.* (No sowing on 9th.)

Best sowing/pruning days: to 9:35 am on 10th; from 11:20 am on 12th, all day on 13th, to 4:25 pm on 14th.

Best harvest days: from 9:35 am on 10th, all day on 11th, to 11:20 am on 12th; from 4:25 pm on 14th, all day on 15th.

●●○○● *September 16th at 12:06 pm.* (No sowing between 16th and 23rd.)

Best weeding days: all day on 16th; from 1:10 pm on 19th, all day on 20th, 21st, 22nd and 23rd.

●●○○● *September 24th at 4:15 pm.* (No sowing on 24th.)

Best sowing/planting days: all day on 25th, 26th, 27th and 28th, to 8:50 am on 29th.

●●○○● *October 2nd at 5:34 am.* (No sowing from 5:35 pm on 1st to 5:35 pm on 2nd.)

Best sowing/pruning days: all day on 3rd; all day on 6th and 7th.

●●○○● *October 8th at 8:52 pm.* (No sowing from 8:50 am on 8th to 8:50 am on 9th.) (L/E)

Best sowing/pruning days: all day on 10th and 11th; from 9:30 am on 14th, all day on 15th.

Best harvest days: all day on 8th and 9th; all day on 12th and 13th, to 9:30 am on 14th.

●●○○● *October 16th at 5:13 am.* (No sowing between 5:15 pm on 15th and all day on 23rd.)

Best weeding days: all day on 17th, 18th, 19th, 20th and 21st.

●○○○○ *October 24th at 7:58 am.* (No sowing on 24th.) (S/E)

Best sowing/planting days: all day on 25th, to 2:40 pm on 26th; all day on 29th and 30th.

●●○○● *October 31st at 12:49 pm.* (No sowing on 31st.)

Best sowing/pruning days: all day on November 2nd and 3rd; from 7:35 am on 6th.

●●○○● *November 7th at 8:24 am.* (No sowing on 7th.)

Best sowing/pruning days: to 11:45 am on 8th; all day on 11th and 12th.

Best harvest days: from 11:45 am on 8th, all day on 9th and 10th; all day on 13th and 14th.

●●○○● *November 15th at 1:17 am.* (No sowing between 1:15 pm on 14th and all day on 21st.)

Best weeding days: all day on 15th, 16th and 17th.

●○○○○ *November 22nd at 10:33 pm.* (No sowing before 10:35 am on 23rd.)

Best sowing/planting days: all day on 25th and 26th.

●●○○● *November 29th at 8:07 pm.* (No sowing from 8:05 am on 29th to 8:05 am on 30th.)

Best sowing/pruning days: from 8:05 am on 30th, to 11:15 am on December 1st; from 3:15 pm on 3rd, all day on 4th and 5th.

●●●○○● *December 6th at 10:28 pm.* (No sowing from 10:30 am on 6th to 10:30 am on 7th.)

Best sowing/pruning days: all day on 8th and 9th, to 1:15 pm on 10th.

Best harvest days: all day on 6th and 7th; from 1:15 pm on 10th, all day on 11th, 12th and 13th.

●●●○○● *December 14th at 10:52 pm.* (No sowing between 10:50 am on 14th and all day on 21st.)

Best weeding days: all day on 14th, to 2:05 pm on 15th; from 7:55 am on 20th, all day on 21st.

●●●○○● *December 22nd at 11:37 am.* (No sowing on 22nd.)

Best sowing/planting days: all day on 23rd, to 12:50 pm on 24th; from 2:10 pm on 26th, all day on 27th, to 4:35 pm on 28th.

●●●○○● *December 29th at 4:33 am.* (No sowing from 4:35 pm on 28th to 4:35 pm on 29th.)

Best sowing/pruning days: all day on 31st.

2015

●●●○○● *continues January 1st to 4th.*

Best sowing/pruning days: all day on 1st; from 11:10 am on 4th.

●●●○○● *January 5th at 2:54 pm.* (No sowing on 5th.)

Best sowing/pruning days: all day on 6th; all day on 12th, to 7:50 am on 13th.

Best harvest days: all day on 7th, 8th, 9th, 10th and 11th.

●●○○○ *January 13th at 7:48 pm.* (No sowing between 7:50 am on 13th and all day on 19th.)

Best weeding days: all day on 17th and 18th.

●●○○○ *January 20th at 11:15 pm.* (No sowing before 11:15 am on 21st.)

Best sowing/planting days: all day on 23rd and 24th.

●●○○○ *January 27th at 2:50 pm.* (No sowing on 27th.)

Best sowing/pruning days: all day on 28th, to 8:35 am on 29th; from 5:10 pm on 31st, all day on February 1st and 2nd.

●●○○○ *February 4th at 9:10 am.* (No sowing on 4th.)

Best sowing/pruning days: all day on 8th, 9th, 10th and 11th.

Best harvest days: all day on 4th, 5th, 6th and 7th.

●●○○○ *February 12th at 1:51 pm.* (No sowing between 12th and 18th.)

Best weeding days: all day on 13th and 14th, to 8:25 am on 15th; from 10:15 am on 17th, all day on 18th.

●●○○○ *February 19th at 9:48 am.* (No sowing on 19th.)

Best sowing/planting days: all day on 20th, to 9:15 am on 21st; from 10:30 am on 23rd, all day on 24th, to 2:55 pm on 25th.

●●○○○ *February 26th at 3:15 am.* (No sowing from 3:15 pm on 25th to 3:15 pm on 26th.)

Best sowing/pruning days: all day on 28th; all day on March 1st, to 9:35 am on 2nd.

●●○○● *March 6th at 4:07 am.* (No sowing from 4:05 pm on 5th to 4:05 pm on 6th.)

Best sowing/pruning days: from 10:55 am on 7th, all day on 8th, 9th, 10th and 11th.

Best harvest days: all day on 6th, to 10:55 am on 7th; all day on 12th and 13th.

●○○○○ *March 14th at 3:49 am.* (No sowing between 3:50 pm on 13th and all day on 19th.)

Best weeding days: to 4:40 pm on 14th; all day on 17th and 18th.

●○○● *March 20th at 7:37 pm.* (No sowing before 7:35 am on 21st.) (S/E)

Best sowing/planting days: all day on 23rd and 24th.

●●○○● *March 27th at 5:44 pm.* (No sowing on 27th.)

Best sowing/pruning days: all day on 28th, to 3:50 pm on 29th.

●●○○● *April 4th at 10:07 pm.* (No sowing from 10:05 am on 4th to 10:05 am on 5th.) (L/E)

Best sowing/pruning days: from 10:05 am on 5th, all day on 6th and 7th, to 3:10 pm on 8th; all day on 11th.

Best harvest days: from 3:10 pm on 8th, all day on 9th and 10th.

●○○○○ *April 12th at 1:46 pm.* (No sowing between 12th and 18th.)

Best weeding days: all day on 13th and 14th; from 7:00 am on 17th, all day on 18th.

●●○○○● *April 19th at 4:58 am.* (No sowing on 19th.)

Best sowing/planting days: all day on 20th; from 2:30 pm on 23rd, all day on 24th and 25th.

●●○○● *April 26th at 9:56 am.* (No sowing on 26th.)

Best sowing/pruning days: all day on May 1st, 2nd and 3rd.

●●○○● *May 4th at 1:43 pm.* (No sowing on 4th.)

Best sowing/pruning days: all day on 5th; all day on 8th and 9th, to 9:25 am on 10th.

Best harvest days: all day on 6th and 7th; from 9:25 am on 10th.

●●○○● *May 11th at 8:37 pm.* (No sowing between 8:35 am on 11th and all day on 17th.)

Best weeding days: all day on 11th, to 12:55 pm on 12th; from 3:15 pm on 14th, all day on 15th and 16th.

●●○○○● *May 18th at 2:14 pm.* (No sowing on 18th.)

Best sowing/planting days: all day on 21st and 22nd.

●●○○● *May 26th at 3:20 am.* (No sowing from 3:20 pm on 25th to 3:20 pm on 26th.)

Best sowing/pruning days: from 7:45 am on 28th, all day on 29th, 30th, 31st and June 1st.

●●○○● *June 3rd at 2:20 am.* (No sowing from 2:20 pm on 2nd to 2:20 pm on 3rd.)

Best sowing/pruning days: from 10:50 am on 4th, all day on 5th, to 3:05 pm on 6th; to 1:45 pm on 9th.

Best harvest days: all day on 3rd, to 10:50 am on 4th, from 3:05 pm on 6th, all day on 7th and 8th.

●●○○○ *June 10th at 1:43 am.* (No sowing between 1:45 pm on 9th and all day on 16th.)

Best weeding days: all day on 11th and 12th; all day on 15th and 16th.

●●○○● *June 17th at 12:07 am.* (No sowing before 12:05 pm on 17th.)

Best sowing/planting days: from 12:05 pm on 17th, all day on 18th, to 4:25 pm on 19th.

●●○○● *June 24th at 9:04 pm.* (No sowing from 9:05 am on 24th to 9:05 am on 25th.)

Best sowing/pruning days: from 9:05 am on 25th, all day on 26th, 27th and 28th, to 1:20 pm on 29th.

●●○○● *July 2nd at 12:21 pm.* (No sowing on 2nd.)

Best sowing/pruning days: all day on 3rd; all day on 6th and 7th.

Best harvest days: all day on 4th and 5th; all day on 8th.

●●○○○ *July 9th at 6:25 am.* (No sowing between 9th and 15th.)

Best weeding days: all day on 9th; from 10:20 am on 12th, all day on 13th, to 4:15 pm on 14th.

July 16th at 11:25 am. (No sowing on 16th.)

Best sowing/planting days: all day on 22nd and 23rd.

●●○○● *July 24th at 2:05 pm.* (No sowing on 24th.)

Best sowing/pruning days: all day on 25th and 26th; all day on 29th and 30th.

●●○○● *July 31st at 8:44 pm.* (No sowing from 8:45 am on 31st to 8:45 am on August 1st.)

Best sowing/pruning days: from 8:35 am on August 2nd, all day on 3rd; from 11:30 am on 6th.

Best harvest days: all day on 31st and August 1st; all day on 4th and 5th, to 11:30 am on 6th.

●●○○● *August 7th at 12:04 pm.* (No sowing between 7th and 14th.)

Best weeding days: from 3:40 pm on 8th, all day on 9th and 10th; all day on 13th and 14th.

●●○○● *August 15th at 12:55 am.* (No sowing before 12:55 pm on 15th.)

Best sowing/planting days: all day on 18th, 19th, 20th, 21st and 22nd.

●●○○● *August 23rd at 5:32 am.* (No sowing on 23rd.)

Best sowing/pruning days: from 2:25 pm on 25th, all day on 26th and 27th.

●●○○● *August 30th at 4:36 am.* (No sowing from 4:35 pm on 29th to 4:35 pm on 30th.)

Best sowing/pruning days: from 4:35 pm on 30th, all day on 31st; all day on September 3rd and 4th.

Best harvest days: all day on September 1st and 2nd.

●●○○● *September 5th at 7:55 pm.* (No sowing between 7:55 am on 5th and all day on 12th.)

Best weeding days: all day on 6th; from 12:40 pm on 9th, all day on 10th, 11th and 12th.

●○○○○ *September 13th at 4:42 pm.* (No sowing on 13th.) (S/E)

Best sowing/planting days: from 12:45 pm on 14th, all day on 15th, 16th, 17th and 18th, to 1:30 pm on 19th.

●○○○○● *September 21st at 7:00 pm.* (No sowing from 7:00 am on 21st to 7:00 am on 22nd.)

Best sowing/pruning days: from 7:00 am on 22nd, all day on 23rd; all day on 26th and 27th.

●○○○○ *September 28th at 12:52 pm.* (No sowing on 28th.) (L/E)

Best sowing/pruning days: all day on 30th and October 1st; from 10:25 am on 4th.

Best harvest days: from 1:00 pm on 28th, all day on 29th; all day on October 2nd and 3rd, to 10:25 am on 4th.

●●○○● *October 5th at 7:07 am.* (No sowing between 5th and 12th.)

Best weeding days: all day on 7th, 8th, 9th, 10th and 11th.

●○○○○ *October 13th at 10:07 am.* (No sowing on 13th.)

Best sowing/planting days: all day on 14th, 15th and 16th; all day on 19th and 20th.

●●○○● *October 21st at 6:32 am.* (No sowing on 21st.)

Best sowing/pruning days: from 3:20 pm on 23rd, all day on 24th, to 4:20 pm on 25th.

●●○○● *October 27th at 10:06 pm.* (No sowing from 10:05 am on 27th to 10:05 am on 28th.)

Best sowing/pruning days: from 10:05 am on 28th, to 4:25 pm on 29th; all day on November 1st and 2nd.

Best harvest days: from 4:25 pm on 29th, all day on 30th and 31st; to 10:35 am on 3rd.

●●○○● *November 3rd at 10:25 pm.* (No sowing between 10:25 am on 3rd and all day on 11th.)

Best weeding days: all day on 4th, 5th, 6th and 7th.

●●○○● *November 12th at 3:48 am.* (No sowing before 3:50 pm on 12th.)

Best sowing/planting days: from 10:25 am on 15th, all day on 16th, to 5:25 pm on 17th.

●●○○● *November 19th at 4:28 pm.* (No sowing on 19th.)

Best sowing/pruning days: all day on 20th and 21st; all day on 24th and 25th.

●●○○● *November 26th at 8:45 am.* (No sowing on 26th.)

Best sowing/pruning days: all day on 28th and 29th, to 10:45 am on 30th.

Best harvest days: all day on 26th and 27th; from 10:45 am on 30th.

●●○○● *December 3rd at 5:41 pm.* (No sowing between 3rd and 10th.)

Best weeding days: all day on 4th; from 8:25 am on 10th.

●○○○○ *December 11th at 8:30 pm.* (No sowing before 8:30 am on 12th.)

Best sowing/planting days: from 4:50 pm on 12th, all day on 13th and 14th; all day on 17th, to 1:15 pm on 18th.

●○○○○ *December 19th at 1:15 am.* (No sowing from 1:15 pm on 18th to 1:15 pm on 19th.)

Best sowing/pruning days: from 10:15 am on 21st, all day on 22nd, to 12:30 pm on 23rd.

●○○○○ *December 25th at 9:13 pm.* (No sowing from 9:15 am on 25th to 9:15 am on 26th.)

Best sowing/pruning days: from 9:15 am on 26th, all day on 27th.

Best harvest days: all day on the 28th, 29th, 30th and 31st.

2016

●●○○● *continues January 1st.*

Best sowing/pruning days: from 4:40 pm on 1st.

Best harvest days: nil.

●○○○○ *January 2nd at 3:32 pm.* (No sowing between 2nd and 9th.)

Best weeding days: from 4:55 pm on 6th, all day on 7th and 8th.

●○○○○ *January 10th at 11:32 am.* (No sowing on 10th.)

Best sowing/planting days: from 9:55 am on 13th, all day on 14th, to 12:50 pm on 15th.

●●●○● *January 17th at 9:27 am.* (No sowing on 17th.)

Best sowing/pruning days: all day on 18th and 19th; all day on 22nd and 23rd.

●●●○● *January 24th at 11:47 am.* (No sowing on 24th.)

Best sowing/pruning days: all day on 29th, 30th, and 31st.

Best harvest days: all day on 24th, 25th, 26th, 27th and 28th.

●●●○● *February 1st at 1:29 pm.* (No sowing between 1st and 8th.)

Best weeding days: all day on 3rd and 4th, to 10:45 am on 5th; from 4:00 pm on 7th, all day on 8th.

●●●○● *February 9th at 0:40 am.* (No sowing before 12:40 pm on 9th.)

Best sowing/planting days: all day on 10th and 11th; all day on 14th.

●●●○● *February 15th at 5:48 pm.* (No sowing on 15th.)

Best sowing/pruning days: all day on 18th and 19th, to 12:20 pm on 20th.

●●●○● *February 23rd at 4:21 am.* (No sowing from 4:20 pm on 22nd to 4:20 pm on 23rd.)

Best sowing/pruning days: from 8:45 am on 25th, all day on 26th, 27th, 28th and 29th.

Best harvest days: all day on 23rd and 24th, to 8:45 am on 25th; from 10:00 am on March 1st.

●●○○○● *March 2nd at 9:12 am.* (No sowing between 2nd and 8th.)

Best weeding days: from 9:10 am on 2nd, all day on 3rd; all day on 6th and 7th.

●●○○○● *March 9th at 11:56 am.* (No sowing on 9th.) (S/E)

Best sowing/planting days: all day on 12th and 13th, to 7:05 am on 14th.

●●○○○● *March 16th at 3:04 am.* (No sowing from 3:05 pm on 15th to 3:05 pm on 16th.)

Best sowing/pruning days: from 3:05 pm on 16th, all day 17th, to 5:55 pm on 18th.

●●○○○● *March 23rd at 10:02 pm.* (No sowing from 10:00 am on 23rd to 10:00 am on 24th.) (L/E)

Best sowing/pruning days: from 10:00 am on 24th, all day, on 25th, 26th and 27th, to 4:45 pm on 28th; all day on 31st.

Best harvest days: from 4:45 pm on 28th, all day on 29th and 30th.

●●○○○● *April 1st at 1:18 am.* (No sowing between 1:20 pm on 31st and all day on 7th.)

Best weeding days: from 11:40 am on 2nd, all day on 3rd, to 3:45 pm on 4th; from 4:45 pm on 6th to 9:25 am on 7th.

●●○○○● *April 7th at 9:25 pm.* (No sowing before 9:25 am on 8th.)

Best sowing/planting days: from 4:15 pm on 8th, all day on 9th, to 4:00 pm on 10th; all day on 13th.

●●○○○● *April 14th at 2:00 pm.* (No sowing on 14th.)

Best sowing/pruning days: all day on 20th and 21st.

●●○○● *April 22nd at 3:25 pm.* (No sowing on 22nd.)

Best sowing/pruning days: all day on 23rd and 24th; from 9:55 am on 27th, all day on 28th and 29th.

Best harvest days: all day on 25th and 26th; to 9:55 am on 27th.

●○○○○ *April 30th at 1:30 pm.* (No sowing between 30th and May 6th.)

Best weeding days: from 1:30 pm on 30th, all day on May 1st; all day on 4th and 5th.

●○○○○ *May 7th at 5:31 am.* (No sowing before 5:30 pm on 7th.)

Best sowing/planting days: all day on 10th and 11th.

●○○○○ *May 14th at 3:03 am.* (No sowing from 3:05 pm on 13th to 3:05 pm on 14th.)

Best sowing/pruning days: all day on 17th, 18th, 19th, 20th and 21st.

●●○○● *May 22nd at 7:16 am.* (No sowing on 22nd.)

Best sowing/pruning days: from 3:35 pm on 24th, all day 25th and 26th.

Best harvest days: from 7:15 am on 22nd, all day on 23rd, to 3:35 pm on 24th; all day on 27th and 28th.

●○○○○ *May 29th at 10:13 pm.* (No sowing between 10 :15 am on 29th and all day on June 4th.)

Best weeding days: from 11:10 am on 31st, all day on June 1st, to 12:50 on 2nd; from 1:05 pm on 4th.

●●○○●● *June 5th at 1:01 pm.* (No sowing on 5th.)

Best sowing/planting days: from 1:40 pm on 6th, all day on 7th, to 4:50 pm on 8th.

●●○○●● *June 12th at 6:11 pm.* (No sowing on 12th.)

Best sowing/pruning days: from 10 :35 am on 13th, all day on 14th, 15th, 16th and 17th, to 11:35 am on 18th.

●●○○●● *June 20th at 9:03 pm.* (No sowing from 9:05 am on 20th to 9:05 am on 21st.)

Best sowing/pruning days: from 9:05 am on 21st, all day on 22nd; from 12:30 pm on 25th, all day on 26th and 27th.

Best harvest days: all day on 23rd and 24th, to 12:30 pm on 25th.

●●○○●● *June 28th at 4:20 am.* (No sowing between 4:20 pm on 27th and all day on 3rd.)

Best weeding days: all day on 28th and 29th; all day on July 2nd and 3rd.

●●○○●● *July 4th at 9:02 pm.* (No sowing before 9:00 am on 5th.)

Best sowing/planting days: from 9:00 am on 5th; all day on 11th.

●●○○●● *July 12th at 10:53 am.* (No sowing on 12th.)

Best sowing/pruning days: all day on 13th, 14th and 15th; all day on 18th and 19th.

●●○○● *July 20th at 8:58 am.* (No sowing on 20th.)

Best sowing/pruning days: all day on 23rd and 24th.

Best harvest days: from 1:10 pm on 20th, all day on 21st and 22nd; all day on 25th and 26th.

●○○○○ *July 27th at 9:01 am.* (No sowing between 27th and August 2nd.)

Best weeding days: all day on 29th and 30th; from 11:15 am on August 2nd.

●○○○○ *August 3rd at 6:46 am.* (No sowing on 3rd.)

Best sowing/planting days: all day on 7th, 8th and 9th, to 4:20 pm on 10th.

●○○○○ *August 11th at 4:22 am.* (No sowing from 4:20 pm on 10th to 4:20 pm on 11th.)

Best sowing/pruning days: from 2:10 pm on 14th, all day on 15th and 16th.

●●○○● *August 18th at 7:28 pm.* (No sowing from 7:30 am on 18th to 7:30 am on 19th.)

Best sowing/pruning days: from 7:30 am on 19th, all day on 20th; from 7:20 am on 23rd, all day on 24th.

Best harvest days: all day on 21st and 22nd.

●○○○○ *August 25th at 1:42 pm.* (No sowing between 25th and 31st.)

Best weeding days: from 1:45 pm on 25th, all day on 26th, to 1:05 pm on 27th; all day on 30th and 31st.

●●○○● *September 1st at 7:04 pm.* (No sowing from 7:05 am on 1st to 7:05 am on 2nd.) (S/E)

Best sowing/planting days: from 11:00 am on 3rd, all day on 4th, 5th, 6th and 7th, to 11:20 am on 8th.

●●○○● *September 9th at 9:50 pm.* (No sowing from 9:50 am on 9th to 9:50 am on 10th.)

Best sowing/pruning days: all day on 11th and 12th, to 7:30 am on 13th; from 12:25 pm on 15th, to 5:05 pm on 16th.

●●○○● *September 17th at 5:06 am.* (No sowing from 5:05 pm on 16th to 5:05 pm on 17th.) (L/E)

Best sowing/pruning days: from 3:00 pm on 19th, all day on 20th, to 3:55 pm on 21st.

Best harvest days: from 2:25 pm on 17th all day on 18th, to 3:00 pm on 19th; from 3:55 pm on 21st, all day on 22nd.

●●○○● *September 23rd at 7:57 pm.* (No sowing between 8:00 am on 23rd and all day on 30th.)

Best weeding days: all day on 26th, 27th, 28th, 29th and 30th.

●●○○● *October 1st at 10:13 am.* (No sowing on 1st.)

Best sowing/planting days: all day on 2nd, 3rd, 4th and 5th; from 6:40 am on 8th.

●●○○● *October 9th at 2:34 pm.* (No sowing on 9th.)

Best sowing/pruning days: to 4:35 pm on 10th; all day on 13th and 14th.

●●○○● *October 16th at 2:24 pm.* (No sowing on 16th.)

Best sowing/pruning days: all day on 17th and 18th; all day on 21st, to 5:15 pm on 22nd.

Best harvest days: from 2:25 pm on 16th; all day on 19th and 20th.

●●○○○ *October 23rd at 5:15 am.* (No sowing between 5:15 pm on 22nd and all day on 30th.)

Best weeding days: all day on 23rd, 24th, 25th, 26th and 27th.

●●○○● *October 31st at 3:39 am.* (No sowing before 3:40 pm on 31st.)

Best sowing/planting days: from 3:40 pm on 31st, all day on November 1st; from 1:05 pm on 4th; all day on 5th and 6th.

●●○○● *November 8th at 5:52 am.* (No sowing from 5:50 pm on 7th to 5:50 pm on 8th.)

Best sowing/pruning days: from 7:45 am on 9th, all day on 10th, to 11:45 am on 11th; from 12:25 pm on 13th.

●●○○● *November 14th at 11:53 pm.* (No sowing from 11:55 am on 14th to 11:55 am on 15th.)

Best sowing/pruning days: from 11:00 am on 17th, all day on 18th, to 1:15 pm on 19th.

Best harvest days: from 11:25 am on 15th, all day on 16th, to 11:00 am on 17th; from 1:15 pm on 19th, all day on 20th, to 6:35 am on 21st.

●●○○○ *November 21st at 6:34 pm.* (No sowing between 6:35 am on 21st and all day on 29th.)

Best weeding days: all day on 21st, 22nd and 23rd; to 10:20 am on 29th.

●●○○● *November 29th at 10 :19 pm.* (No sowing before 10:20 am on 30th.)

Best sowing/planting days: all day on 2nd and 3rd; from 2:30 pm on 6th.

●●○○● *December 7th at 7:04 pm.* (No sowing from 7:05 am on 7th to 7:05 am on 8th.)

Best sowing/pruning days: from 7:05 am on 8th; all day on 11th and 12th.

●●○○● *December 14th at 10:07 am.* (No sowing on 14th.)

Best sowing/pruning days: all day on 15th and 16th.

Best harvest days: all day on 17th, 18th, 19th and 20th.

●●○○● *December 21st at 11:57 am.* (No sowing between 21st and 28th.)

Best weeding days: from 1:20 pm on 26th, all day on 27th and 28th.

●●○○● *December 29th at 4:54 pm.* (No sowing on 29th.)

Best sowing/planting days: all day on 30th, to 11:30 am on 31st.

2017

●●○○● *Continues January 1st to 5th.*

Best sowing/planting days: all day on 3rd and 4th.

●●○○● *January 6th at 5:48 am.* (No sowing from 5:50 pm on 5th to 5:50 pm on 6th.)

Best sowing/pruning days: from 6:20 am on 7th, all day on 8th, to 8:05 am on 9th; from 8:50 am on 11th.

●●○○○● *January 12th at 9:35 pm.* (No sowing from 9:35 am on 12th to 9:35 am on 13th.)

Best sowing/pruning days: all day on 18th and 19th.

Best harvest days: from 10:10 am on 13th, all day on 14th, 15th, 16th and 17th.

●●○○○● *January 20th at 8:15 am.* (No sowing between 20th and 27th.)

Best weeding days: all day on 23rd and 24th, to 8:45 am on 25th.

January 28th at 10:08 am. (No sowing on 28th.)

Best sowing/planting days: all day on 30th and 31st, to 7:50 am February 1st; from 11:50 am on 3rd.

●●○○○● *February 4th at 2:20 pm.* (No sowing on 4th.)

Best sowing/pruning days: to 2:45 pm on 5th; from 5:05 pm on 7th, all day on 8th and 9th.

●●○○○● *February 11th at 10:34 am.* (No sowing on 11th.) (L/E)

Best sowing/pruning days: from 6:45 am on 14th, all day on 15th, 16th and 17th, to 5:35pm on 18th.

Best harvest days: from 10:35 am on 11th, all day on 12th and 13th.

●●○○○● *February 19th at 5:34 am.* (No sowing between 5:35 pm on 18th and all day on 26th.)

Best weeding days: all day on 19th and 20th, to 5:10 pm on 21st; all day on 24th and 25th, to 10:35 am on 26th.

●●○○● *February 27th at 0:59 am.* (No sowing before 1:00 pm on 27th.) (S/E)

Best sowing/planting days: from 1:00 pm on 27th to 2:55 pm on 28th; all day on 3rd and 4th.

●●○○● *March 5th at 9:34 pm.* (No sowing from 9:35 am on 5th to 9:35 am on 6th.)

Best sowing/pruning days: all day on 7th and 8th.

●●○○● *March 13th at 0:55 am.* (No sowing from 12:55 pm on 12th to 12:55 pm on 13th.)

Best sowing/pruning days: from 3:30 pm on 13th, all day on 14th, 15th, 16th and 17th, to 1:00 pm on 18th.

Best harvest days: from 1:00 pm on 18th, all day on 19th and 20th.

●●○○● *March 21st at 1:59 am.* (No sowing between 2:00 pm on 20th and all day on 27th.)

Best weeding days: from 12:30 pm on 23rd, all day on 24th and 25th.

●●○○● *March 28th at 12:58 pm.* (No sowing on 28th.)

Best sowing/planting days: all day on 30th and 31st; to 4:40 pm on April 3rd.

●●○○● *April 4th at 4:41 am.* (No sowing from 4:40 pm on 3rd to 4:40 pm on 4th.)

Best sowing/pruning days: all day on 10th.

April 11th at 4:09 pm. (No sowing on 11th.)

Best sowing/pruning days: all day on 12th, 13th and 14th; from 9:05 am on 17th, all day on 18th.

Best harvest days: all day on 15th and 16th, to 9:05 am on 17th.

●●○●○ *April 19th at 7:58 pm.* (No sowing between 8:00 am on 19th and all day on 26th.)

Best weeding days: all day on 20th and 21st; from 10:35 am on 24th, all day on 25th.

●○○○○ *April 26th at 10:17 pm.* (No sowing before 10:20 am on 27th.)

Best sowing/planting days: from 10:20 am on 27th, to 11:40 am on 28th; from 11:50 am on 30th, all day on May 1st, to 2:10 pm on 2nd.

●○○●○ *May 3rd at 12:48 pm.* (No sowing on 3rd.)

Best sowing/pruning days: all day on 7th, 8th, 9th and 10th.

●○○○○ *May 11th at 7:44 am.* (No sowing on 11th.)

Best sowing/pruning days: from 3:40 pm on 14th, all day on 15th and 16th.

Best harvest days: all day on 12th and 13th, to 3:40 pm on 14th; all day on 17th and 18th.

●●○●○ *May 19th at 10:34 am.* (No sowing between 19th and 25th.)

Best weeding days: all day on 22nd and 23rd.

●○○○○ *May 26th at 5:46 am.* (No sowing on 26th.)

Best sowing/planting days: all day on 28th and 29th.

●●○○● *June 1st at 10:43 pm.* (No sowing from 10:45 am on 1st to 10:45 am on 2nd.)

Best sowing/pruning days: from 10:05 am on 3rd, all day on 4th, 5th, 6th and 7th.

●●○○● *June 9th at 11:11 pm.* (No sowing from 11:10 am on 9th to 11:10 am on 10th.)

Best sowing/pruning days: all day on 11th and 12th, to 9:45 am on 13th; all day on 16th.

Best harvest days: all day on 10th; from 9:45 am on 13th, all day on 14th and 15th.

●●○○● *June 17th at 9:34 pm.* (No sowing between 9:35 am on 17th and all day on 23rd.)

Best weeding days: all day on 18th and 19th; from 8:45 am on 22nd, all day on 23rd.

●●○○● *June 24th at 12:32 pm.* (No sowing on 24th.)

Best sowing/planting days: all day on 25th, to 8:10 am on 26th.

●●○○● *July 1st at 10:52 am.* (No sowing on 1st.)

Best sowing/pruning days: all day on 3rd and 4th, to 3:10 pm on 5th; all day on 8th.

●●○○● *July 9th at 2:08 pm.* (No sowing on 9th.)

Best sowing/pruning days: to 3:35 pm on 10th; all day on 13th and 14th, to 9:55 am on 15th.

Best harvest days: from 3:35 pm on 10th, all day on 11th and 12th; from 9:55 am on 15th, all day on 16th.

●●○○● *July 17th at 5:27 am.* (No sowing between 17th and 23rd.)

Best weeding days: to 3:05 pm on 17th; all day on 20th and 21st.

●○○○○ *July 23rd at 7:47 pm.* (No sowing before 7:45 am on 24th.)

Best sowing/planting days: all day on 28th and 29th, to 1:25 pm on 30th.

●○○○○ *July 31st at 1:24 am.* (No sowing from 1:25 pm on 30th to 1:25 pm on 31st.)

Best sowing/pruning days: from 1:25 pm on 31st, all day on August 1st; from 10:40 am on 4th, all day on 5th and 6th.

●○○○○ *August 8th at 4:12 am.* (No sowing from 4:10 pm on 7th to 4:10 pm on 8th.) (L/E)

Best sowing/pruning days: from 8:00 am on 9th, all day on 10th, to 3:25 pm on 11th; all day on 14th.

Best harvest days: all day on 8th; from 3:25 pm on 11th, all day on 12th and 13th.

●●○○● *August 15th at 11:16 am.* (No sowing between 15th and 21st.)

Best weeding days: all day on 16th and 17th; all day on 20th, to 4:30 pm on 21st.

●○○○○ *August 22nd at 4:31 am.* (No sowing before 4:30 pm on 22nd.) (S/E)

Best sowing/planting days: from 11:05 am on 24th, all day on 25th, 26th, 27th and 28th.

●●○○● *August 29th at 6:14 pm.* (No sowing on 29th.)

Best sowing/pruning days: all day on September 1st and 2nd; from 3:30 pm on 5th.

●●○○● *September 6th at 5:04 pm.* (No sowing on 6th.)

Best sowing/pruning days: all day on 7th; all day on 10th and 11th.

Best harvest days: all day on 8th and 9th; all day on 12th.

●●○○● *September 13th at 4:26 pm.* (No sowing between 13th and 19th.)

Best weeding days: from 11:10 am on 16th, all day on 17th, 18th and 19th.

●●○○● *September 20th at 3:31 pm.* (No sowing on 20th.)

Best sowing/planting days: all day on 21st, 22nd, 23rd and 24th, to 2:00 pm on 25th.

●●○○● *September 28th at 12:55 pm.* (No sowing 28th.)

Best sowing/pruning days: all day on 29th, to 2:40 pm on 30th; all day on 3rd and 4th.

●●○○● *October 6th at 4:41 am.* (No sowing from 4:50 pm on 5th to 4:50 pm on 6th.)

Best sowing/pruning days: from 10:00 am on 7th, all day on 8th, to 11:45 am on 9th; from 1:40 pm on 11th.

Best harvest days: all day on 6th, to 10:00 am on 7th; from 11:45 pm 9th, all day on 10th, to 1:40 pm on 11th.

●●○○● *October 12th at 10:27 pm.* (No sowing between 10:25 am on 12th and all day on 19th.)

Best weeding days: from 4:45 pm on 13th, all day on 14th, 15th, 16th and 17th.

●●○○○ *October 20th at 5:13 am.* (No sowing before 5:15 pm on 20th.)

Best sowing/planting days: all day on 21st and 22nd; from 10:15 am on 25th, all day on 26th and 27th.

●●○○● *October 28th at 8:23 am.* (No sowing on 28th.)

Best sowing/pruning days: from 9:45 am on 30th, all day on 31st, to 4:45 pm on November 1st.

●●○○● *November 4th at 3:24 pm.* (No sowing on 4th.)

Best sowing/pruning days: all day on 5th; all day on 8th and 9th.

Best harvest days: all day on 6th and 7th; all day on 10th.

●●○○● *November 11th at 6:38 am.* (No sowing between 6:40 pm on 10th and all day on 17th.)

Best weeding days: all day on 11th, 12th and 13th, to 9:25 am on 14th.

●●○○○ *November 18th at 9:43 pm.* (No sowing before 9:45 am on 19th.)

Best sowing/planting days: from 5:15 pm on 21st, all day on 22nd and 23rd.

●●○○● *November 27th at 3:04 am.* (No sowing from 3:05 pm on 26th to 3:05 pm on 27th.)

Best sowing/pruning days: from 3:05 pm on 27th, all day on 28th; all day on December 1st and 2nd, to 7:20 am on 3rd.

●●○○● *December 4th at 1:48 am.* (No sowing from 1:50 pm on 3rd to 1:50 pm on 4th.)

Best sowing/pruning days: from 6:40 am on 5th, all day on 6th.

Best harvest days: all day on 4th; from 6:40 am on 7th, all day on 8th and 9th.

●●○○● *December 10th at 5:52 pm.* (No sowing between 10th and 17th.)

Best weeding days: to 3:00 pm on 11th; from 11:10 am on 16th, all day on 17th.

●●○○● *December 18th at 4:32 pm.* (No sowing on 18th.)

Best sowing/planting days: all day on 19th and 20th, to 12:30 pm on 21st; all day on 24th and 25th.

●●○○● *December 26th at 7:21 pm.* (No sowing from 7:20 am on 26th to 7:20 am on 27th.)

Best sowing/pruning days: from 4:25 pm on 28th, all day on 29th, to 6:30 pm on 30th.

Glossary

aerobic: In horticulture, that which occurs in the presence of free oxygen.

aerobic compost: Rapidly decomposed organic matter that contains nutrients required by plants, in addition to humus.

aflatoxins: A type of fungi that forms on mouldy foods of plant origin. Aflatoxins are carcinogens and very toxic to animals and humans. Milk from cows which have consumed mouldy feed can also contain aflatoxins. A compound in cruciferous vegetables assists the safe excretion of aflatoxins from the body.

anaerobic: In horticulture, that which occurs in the absence of free oxygen.

annual: In horticulture, a plant that completes its entire life cycle within twelve months.

anthocyanosides: Health-protecting compounds that also form the deep colouring in some fruits, such as berries.

anti-oxidant: A substance that destroys oxidising agents in the body. An example of oxidation is the brown colouring that appears on the surface of cut fruit.

apical dominance: The presence of a plant hormone at the apex (growing tip) of a stem that deters the development of lateral shoots.

barren day: In horticulture, when the Moon is in the primary barren signs of Aries, Leo or Sagittarius, or the secondary barren signs of Gemini, Virgo or Aquarius.

biennial: In horticulture, a plant that completes its entire life cycle in its second year of growth.

bract: A modified leaf, often brightly coloured and petal-like in appearance. Bougainvillea and poinsettia ‘flowers’ are composed of bracts that surround the insignificant true flowers.

Brassica: A genus of cruciferous plants that includes broccoli, Brussels sprouts, cabbage, Chinese cabbage, cauliflower, kale, kohlrabi, mizuna, mustard greens, swede, tatsoi and turnip. Brassicas share the same diseases and pests.

calyx (*pl. calyces*): The lowest part of a flower, often green in colour, consisting of sepals.

chitting: The practice of exposing seed potatoes to light before planting, in order to toughen them and reduce the potential for fungal disease.

cloche: Originally, a bell-shaped cover used to protect plants from frost; now used to include tunnel-shaped covers used to protect seedlings. Large cloches are usually called igloos. From the French *cloche* ‘bell’.

cold frame: A structure, ranging from the simple to elaborate, designed to trap heat and allow the growth of plants when outdoor conditions are too cold.

corm: A small swollen underground stem base that stores food in winter and produces roots and new growth in spring.

cotyledon: The first leaf or pair of leaves produced by a seed; also called seed leaves. Plants are classified as monocotyledons or dicotyledons.

crucifer, cruciferous: A member of the family *Cruciferae* (named for the cross formation of their flower petals) that contain compounds beneficial to health. This group includes the *Brassica* genus, horseradish, radish, rocket and watercress, as well as alyssum, shepherd's purse, stock and wallflower. Cruciferous plants are susceptible to similar diseases and pests.

cucurbit: A group of plants that includes melons, squash, cucumber, pumpkin, and gourd. From the Latin *cucurbita* 'gourd'.

cultivar: In horticulture, a cultivated plant with a distinguishing name. A cultivar name is indicated in single inverted commas after the species or genus name.

dark-damp: Soil that contains enough moisture to darken soil particles but is not saturated with water.

dead-head: The removal of spent flowers, usually before seed sets.

drip-line: The area of soil directly below the outer edge of plant foliage where rain runs from the canopy. Feeder roots that absorb water and nutrients lie beneath the drip-line because little, if any, rain falls closer to the trunk or main stem.

ecliptic: The apparent 'annual path' of the Sun as viewed from Earth. Eclipses occur when the Moon's orbit crosses or nears the ecliptic.

equinox: A semi-annual event when the Sun reaches the point where the ecliptic intersects with the celestial equator (a projection into space of the Earth's equator). So called because day and night are of equal length at the equinoxes. In

the Southern Hemisphere, the autumn equinox occurs on March 21 or 22, and the spring equinox occurs on September 23 or 24.

ethylene: A hydrocarbon produced by some plants, mature fruit and wood smoke that accelerates maturity, flowering or ripening in other plants.

eye: Dormant beginning of a growth bud at a node on a stem or tuber. Each tiny bud with a curved leaf scar underneath looks like an upside-down eye.

exotic: In horticulture, any plant that is not native to one's own country. Exotics may have evolved in different climate and soil conditions to those in the Southern Hemisphere and therefore require different treatment to native plants.

faba beans: An alternative name for broad beans, *Vicia faba*. In Australia, this term is usually reserved for cultivars that are grown only as inoculated green manure crops. Broad beans will be able to fix nitrogen efficiently once the rhizobium for faba beans has been introduced to soil. These beans have a reputation for inhibiting the soil fungus that causes fusarium wilt.

fertile day: In horticulture, when the Moon is in the primary fertile signs of Cancer, Scorpio or Pisces, or the secondary fertile signs of Taurus, Libra or Capricorn.

First Quarter: At approximately seven days after New Moon, the Moon is at ninety degrees to the alignment of Sun and Earth and half of the sunlit surface of the Moon can be seen from Earth. This is the equivalent of one quarter of the entire lunar surface, and is called First Quarter. Over the

following six days, more of the sunlit surface becomes visible.

Full Moon: When Earth is between Sun and Moon the full area of the Moon's sunlit surface can be seen from Earth. When Earth is exactly between Sun and Moon, a lunar eclipse can occur as Earth prevents sunlight reaching the lunar surface. Over the following six days, we can observe a decreasing area of the sunlit surface of the Moon.

genus (*pl. genera*): In horticulture, a major division to distinguish a group of plants from other members of the same family that have certain characteristics. A genus name forms the first part of a plant's botanical name.

hardening-off: The gradual exposure to sunlight of seedlings grown under cover in preparation for planting in open ground. The process will take several days.

hardwood: Perennial plant tissue that has stiffened, or matured.

herbaceous: A plant that is not woody, or one that has the texture of foliage. Herbaceous perennials usually die back in winter.

humus: The end result of the decomposition of organic matter containing beneficial micro-organisms, including mycorrhiza.

hybrid: In horticulture, the progeny resulting from the cross-pollination of two related plants with different characteristics. A hybrid plant will have different foliage, flowers or fruit to its parents. Hybridisation is usually a deliberate breeding process but it can occur accidentally.

inoculant: In horticulture, a compound containing a particular rhizobium bacteria that is used to coat legume seed before sowing.

Last Quarter: At approximately seven days after Full Moon, the Moon is at ninety degrees to the alignment of Sun and Earth and half the sunlit surface of the Moon can be seen from Earth. This is called Last Quarter. Over the following six days, less of the sunlit surface becomes visible until the lunation cycle starts again at New Moon.

lateral: In horticulture, a side growth from a thicker stem. Side growths from laterals are called sub-laterals.

leader: In horticulture, a stem that will determine the framework of a young tree; also the outer end of a main stem on a mature tree or perennial plant.

leaf axil: The portion between the upper side of a leaf and a node on a plant stem; where new lateral growth can form.

lectin: A naturally occurring food toxin found in small quantities in beans and some other foods. Not usually hazardous unless the particular food comprises a large part of a diet.

legume: Any plant belonging to the large family *Leguminosae*. Many legumes are useful as food or for fixing nitrogen in soil.

lignin: Stiffening material in cell walls of woody tissue.

lunation cycle: The passage of the Moon from New Moon through First Quarter, Full Moon, and Last Quarter phases to New Moon.

monoculture: The practice of concentrating agriculture on a single type of crop, such as cotton farming or rice farming.

moon phase: A period of approximately one week that commences from New Moon, First Quarter, Full Moon, or Last Quarter.

mycorrhiza: A beneficial fungus in humus that acts as root hairs for many perennial plants, enabling them to absorb nutrients and water from soil. Mycorrhiza-dependent plants do not thrive when soil is deficient in humus.

New Moon: When the Moon is between Sun and Earth, only the unlit half of its surface can be seen from Earth. When Sun and Moon are exactly aligned in orbit, a solar eclipse can occur as the Moon blocks light from our Sun. Over the following six days, we can observe an increasing amount of the sunlit lunar surface.

node: In horticulture, the junction of two stem sections. Leaves or new growth can only occur on stems at nodes, within leaf axils on current growth, or from eyes in deciduous plants or mature wood.

pathogen: An organism that can cause disease.

perennial: A plant that normally lives for more than two years.

pH: A scale measurement that rates a substance from 1 (extremely acid) to 14 (extremely alkaline), with 7 being considered neutral (neither acid or alkaline).

pheromone: A natural hormone exuded by animals, insects or plants to deter or attract other animals, insects or plants.

phytochemical: A natural chemical produced by plants.

pistil: The female reproductive parts of a flower consisting of an ovary, style and stigma.

potting-on: Repotting a plant into a slightly larger pot instead of planting into open ground.

pup: In horticulture, a new growth shoot on a plant that will form roots and grow into a separate plant. An equivalent new growth on an orchid is called a *keiki* .

rhizobium: One of a group of soil bacteria that improve germination and nitrogen fixation in particular legumes.

rhizome: A thickened, horizontal (usually underground) stem of some perennial plants that stores food in winter and produces roots and new growth.

semi-hardwood: Tissue of woody perennials in the current year's growth that has started to stiffen.

sepal: An individual segment of the calyx. Sepals cover and protect developing flower buds.

skirting: Pruning of lower branches that would touch the ground when laden with fruit.

solanum: Any plant or weed belonging to the family *Solanaceae*, including tomato, capsicum, chilli, aubergine, potato, nightshade, and farmer's friends (cobbler's pegs). Solanums are susceptible to the same diseases and pests.

solstice: A point on the ecliptic where the Sun is furthest north or south of the equator and appears to stand still. The solstice positions are marked by the tropics of Cancer and Capricorn. In the Southern Hemisphere, the summer solstice (longest day) occurs on December 21 or 22 when the Sun is at

0 degrees Capricorn, and the winter solstice (shortest day) occurs on June 21 or 22 when the Sun is at 0 degrees Cancer.

species: In horticulture, divisions within a genus that show variations in growth compared to other members of the genus. The species name forms the second part of a plant's botanical name.

stamen: The pollen-bearing male reproductive part of a flower.

station: In horticulture, a position in gardens for sowing seed or planting seedlings, where close spacing would restrict the growth of plants.

stool: In horticulture, a clump of perennial plant crowns that produce new plants by division, or by taking cuttings of new growth from the crowns.

stopping: In horticulture, removing growing tips of small plants in one or more stages to produce multiple main stems.

sucker: In horticulture, a vigorous growth originating from damaged stems or roots that can overtake the growth of a grafted species or form a thicket. Also used to refer to a new growth shoot on some plants that will form roots and grow into a separate plant. These suckers are often called 'pups' to distinguish them from unwanted suckers.

surfactant: An ingredient that acts on the surface of another substance. Commonly used to improve wetting properties

synodic period: A period of 29.531 days which is the average time the Moon takes to move from New Moon to New Moon. Also known as a synodic or lunar month.

Tagetes: A genus of plants that all have pest-deterrent properties, including African, French and Mexican marigolds, and khaki weed. Some species of this genus also have culinary or medicinal uses.

true leaf: Any leaf that forms on a seedling after the cotyledons (seed leaves). Stages for transplanting or thinning seedlings are calculated from the number of true leaves, ignoring the seed leaves.

tuber: A fleshy outgrowth from a subterranean stem that can store food manufactured by the plant, and produce roots and new growth.

vermicide: A product that kills worms.

vermifuge: A product that expels parasites from the intestine.

waning moon: The period between Full Moon and New Moon when the clearly visible surface of the Moon is gradually decreasing in size.

water shoot: A particularly vigorous stem growth originating near the base of a rose plant that will form a future cane.

watertable: In soil, the uppermost level of soil saturated with water.

waxing moon: The period between New Moon and Full Moon when the clearly visible surface of the Moon is gradually increasing in size.

zodiacal belt: A celestial band, extending 8.5 degrees either side of the ecliptic, that contains the orbits of all bodies in the solar system and the constellations of the zodiac. The word ‘zodiac’ is derived from a Greek term meaning ‘circle of animals’.

Bibliography

Abbott, T. S. & McKenzie, D. C. 'Improving soil structure with gypsum and lime', *Agfact AC 10*, NSW Agriculture, 1996.

Adams, Pru. 'GM Australia', *Landline*, ABC TV, 31 October 2004.

—— 'GM United States', *Landline*, ABC TV, 7 November 2004.

—— 'GM Canada', *Landline*, ABC TV, 14 November 2004.

Agnote: DPI-327. 'Protect your land — use cover crops', NSW Department of Primary Industries, 2004.

AQIS Organic Produce Export Committee. *National Standard for Organic and Bio-dynamic Produce*, Australian Government, 2002.

Australian Bureau of Meteorology. Daily temperatures and rainfall 2003–2004.

Australian Grains, Morescope Publishing, Melbourne, 1994.

Australian Pesticides and Veterinary Medicines Authority. *Special report on glyphosate*, 1996.

—— Media Release 0501: *CCA treated timber*, March 2005, <http://www.apvma.gov.au>

Australian Plant Study Group. *Grow What Where*, Australian Plant Study Group, Victoria n.d..

Beers, Les & Howie, Jim. *Growing Hibiscus*, Kangaroo Press, Sydney, 1985.

Bennett, Peter. *Organic Gardening*, National Book Distributors & Publishers, Sydney, 1995.

Biodynamics: New Directions for Farming and Gardening in New Zealand, Random House, Auckland, [1989] 1993.

Blombery, Alec. *What Wildflower is That?*, Paul Hamlyn, Sydney, 1974.

Bown, Deni. *Encyclopedia of Herbs And Their Uses*, RD Press, Sydney, 1995.

Boyd, Jessie. *The Complete Book of Australian Gardening*, Paul Hamlyn, Sydney, 1970.

Brickell, Christopher. *Pruning & Training*, RD Press, Sydney, 1996.

Briggs, David & Wahlqvist, Mark. *Food Facts*, Penguin Books Australia, Melbourne, 1984.

Brown, Dr Frank. *Bio-cycles: Oysters*, Northwestern University, Evanston, IL, USA, 1954.

Burke, Don. *Growing Grevilleas*, Kangaroo Press, Sydney, 1984.

Carter, Charles E. *The Principles of Astrology*, Theosophical Publishing House, London, 1963.

Chase, Helen. *Flower Arranging: a practical guide to arranging fresh and dried flowers*, Octopus Books, 1975.

Coleby, Pat. *Natural Farming: a Practical Guide*, Scribe Publications, Melbourne, 2004.

Cox, Caroline. 'Glyphosate Fact Sheet', *Journal of Pesticide Reform*, Vol 11, No 2, 1991. NCAP, Eugene, OR., USA.

Cronin, Leonard. *Key Guide: Australian Reptiles and Amphibians*, Envirobook, Annandale NSW, 2001.

Cunningham, Donna. *Moon Signs: the key to your inner life*, Random House of Canada, Toronto, 1988.

Curwin, Lesley, BBC Television. 'Bitter Harvest: the History of GM Foods', *Landline*, ABC Television, 24 October 2004.

Davis, Margaret. *Gardening in Pots for Indoors and Outdoors*, Ure Smith, Sydney, 1973.

De Vore, Nicholas. *Encyclopedia of Astrology*, Crown Publications, New York, 1947.

Fanton, Michel & Jude. *The Seed Savers' Handbook*, The Seed Savers' Network, Byron Bay NSW, 1994.

Fletcher, Kim. *The Penguin Modern Australasian Herbal*, Penguin Books, Melbourne, 1991.

Florence, T. M. & Setright, R. T. *The Handbook of Preventative Medicine*, Kingsclear Books, Sydney, 1994.

Folley, Tom. *The Book Of The Moon*, New Burlington Books, London, 1997.

French, Jackie. *Organic Control of Common Weeds*, Aird Books, Melbourne, 1997.

—— *Jackie French's Guide to Companion Planting in Australia and New Zealand*, Aird Books, Melbourne, 1997.

French, Jaqueline. *Organic Gardening in Australia*, The Currawong Press, Sydney, 1986.

—— *Natural Control of Garden Pests*, Aird Books, Melbourne, 1993.

Gardening Australia: Flora, ABC Books, Sydney, 2003.

Goulart, Frances, S. *Super Healing Foods*, Pentice Hall, New Jersey, USA, 1995.

Hadlington, Phillip. *Termites and Other Common Timber Pests*, NSW University Press, Sydney, 1992.

Hamblin, A. and Kyneur, G. *Trends in wheat yields and soil fertility in Australia*, Australian Government Publishing Service, Canberra, ACT, 1993.

Kelly, Stan. *Eucalypts*, vols I & II, Thomas Nelson Australia, Melbourne, 1984.

Koepf, H. H. *Compost*, Bio-dynamic Farming & Gardening Association, Kimberton PA, 1988.

Kurz, Lorenz. *How To Propagate Plants*, Ure Smith, Sydney, 1976.

Larkcom, Joy. *The Salad Garden*, Angus & Robertson, Sydney, 1994.

Lord, Ernest E. *Trees And Shrubs for Australian Gardens*, 11th edn, Lothian Books, Melbourne, 1977.

Macoboy, Sterling. *What Flower Is That?*, Paul Hamlyn, Sydney, 1976.

McMaugh, Judy. *What Garden Pest or Disease Is That?*, Lansdowne Press, Sydney, 1985.

Michelson, Neil. *The American Ephemeris for the 21st Century: 2001 to 2050 at Midnight*, ACS Publications, San Diego CA, 1992.

Mindell, Earl. *The Herb Bible*, Vermillion, London, 1994.

—— *The Vitamin Bible*, Arlington Books, London, 1982.

Mollison, Bill. *Introduction to Permaculture*, Tagari Publications, Tyalgum NSW, 1995.

National Toxics Network Australia. *Media Release: 'CCA treated timber'*, March 2005.

Northern Wheat Belt SOIL pack, Department of Agriculture, Canberra ACT, 1994.

OGA Organic Standard: revised edition January 2003, Organic Growers of Australia, Lismore NSW, 2003.

Peatling, Stephanie. 'Deluges and drought risk as state sweats', *Sydney Morning Herald*, Sept 2004.

—— 'Six degrees of separation — by 2070 we'll be hotter, drier and thirstier', *Sydney Morning Herald*, Sept 2004.

Phelps, Bob. *GeneEthics Network: Press Releases and newsletters*, 2003–04.

Reader's Digest Illustrated Guide to Gardening, Reader's Digest Services, Sydney, 1979.

Rogers, Jo. *What Food Is That?, and How Healthy Is It?*, Weldon Publishing, Sydney, 1990.

Rogers, Paul. *Safer Pest Control for Australian Homes & Gardens*, Kangaroo Press, Sydney, 1986.

Rose, Penny & John. *Australian Natives for Your Garden*, Kangaroo Press, Sydney, 1984.

Savell, Bob & Andrews, Stan. *Growing Camellias in Australia & New Zealand*, Kangaroo Press, Sydney, 1985.

Scammell, R. B. *Practical Australian Gardening*, Paul Hamlyn, Sydney, 1975.

Seaborn, Bill. *Bromeliads: Tropical Air Plants*, Gick Publishing Inc., CA USA, 1976.

Seale, Allan. *Australian Women's Weekly Gardening Book*, Golden Press, Sydney, 1971.

Smith, Keith. *The Australian Organic Gardener's Handbook*, Lothian Books, Melbourne, 1994.

Stuart, Malcolm ed. *The Encyclopedia of Herbs and Herbalism*, Macdonald and Co. and Istituto Geografico De, Spain, 1989.

Swane, Valerie. *Australian Gardening Guide*, Universal Press, Sydney, 1985.

The Angus & Robertson Concise Australian Encyclopaedia, Angus & Robertson, Sydney, 1984.

The Australian Museum. *The Complete Book of Australian Mammals*, Angus & Robertson, Sydney, 1983.

The Good Wood Guide. *Toxic herbicides: glyphosate*, <http://rainforestinfo.org.au>, 2003.

The Standards for Organic Agricultural Production, The National Association for Sustainable Agriculture Australia (NASAA), Stirling SA, 2003.

Todd, Mark. 'Ecological engineering taps into flower power to control pests', *Sydney Morning Herald*, 17 August 2004.

Welcome To The Worm Factory: Instruction Manual, ReIn Worm Factory, 1995.

Whitten, Greg. *Herbal Harvest*, Bloomings Books, Hawthorn VIC, 1997.

Yates, Arthur & Co. *Yates Garden Guide*, 12th edn, William Collins, Australia, 1976.

—— *Yates Garden Guide*, 41st edn, Angus & Robertson, Sydney, 2002.

Zimmer, Thomas. *Astrological Calendar & Moon Planting Guide*, Tallebudgera Valley, Qld, 2000–2004.

Seed catalogues

Donovan, Neville. *Greenpatch Non-hybrid Organic Seeds 2003–04*, Greenpatch Organic Seeds, Taree, NSW.

Finch, Alf. *Eden Seeds and Books 2004–05: including Select Organic*, Eden Seeds, Lower Beechmont, Qld.

Michaels, Jeff & Frances. *Australian Organic Gardening Resource Guide 2004–05*, Green Harvest, Maleny, Qld.

Self, Michael. *Phoenix Seeds 2003–04*, Phoenix Seeds, Snug, Tas.