ORGANIC GARDENING
in tropical climates

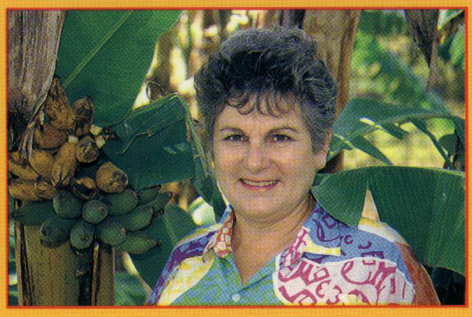
LIZ SINNAMON

From the publishers of *EARTH GARDEN* magazine

This book is a step-by-step guide to establishing and maintaining an organic fruit and vegetable garden. It is written specifically for Australians in warmer climates — not adapted from cool climate organic growing information.

Liz Sinnamon is one of Australia's leading writers on tropical organics. She has written and lectured on organic gardening for nearly 10 years. Liz's passionate concern for planet Earth is clear: this book demonstrates the personal and planetary benefits of organic gardening.

Liz Sinnamon lives on a four acre farm at Kenilworth in the Sunshine Coast Hinterland. She keeps a house cow, nanny goat and poultry. Her daughters Alana and Olivia (pictured with Liz on the front cover) also have two pet donkeys. Liz grows her own fruit, vegetables and herbs organically, and follows a self-sufficient lifestyle on her permaculture-style property. She writes regularly for EARTH GARDEN magazine and several other publications.



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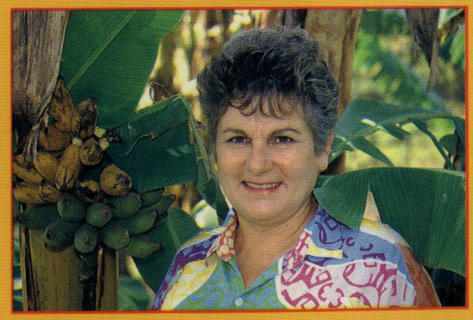

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ILLUSTRATIONS BY BRONWYN HALLS

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INTRODUCTION

I have written this book in response to a need by even the least experienced gardeners for a simply written organic gardening manual for sub-tropical and tropical climates. Many of my students have pestered me for years about helping them by writing such a book.

I have outlined clear information and instructions on all aspects of growing fruit, vegetables, herbs, and other plants organically, adding my own tips and helpful hints.

As a keen gardener for over 25 years, and having grown my vegetables and fruits organically since 1984, I have come to the following conclusions.

The laws of Nature affect all living things in exactly the same way. In the wild, where animals live close to Nature, a natural selection takes place. Predators attack and kill weak or sick animals, leaving the strong and healthy to reproduce the species.

Human beings, if stressed or unhealthy, are attacked by bacteria and viruses causing disease and sometimes death.

Unhealthy or weak plants are attacked by insects or disease, destroying them, and leaving only the strong and healthy to reproduce.

It is up to us — to each individual — to live as closely as possible to Nature. In this way we can ensure that our beautiful and unique planet Earth will remain a balanced and healthy place to live, for the generations of humanity which will follow us.

Liz Sinnamon.

SECTION ONE

ORGANIC GROWING

PRINCIPLES AND PRACTICE

CHAPTER ONE

A LIVE SOIL

What is organic growing?

Organic gardening means growing high quality, delicious and nutritious food in an ecologically balanced way. Organic gardeners respect the Earth and work within the cycle of Nature. Organic gardening and farming *improves* the 'living soil' with its myriad of microbes and earthworms, rather than *degrading* the soil by saturating it with artificial and toxic chemicals.

When we begin to understand Nature we see that there is a balance and harmony between living things. Insects, plants, trees and even small animals balance each other. Sick plants are attacked by pests, healthy plants live and thrive. To grow organically we will work in a similar way. *With* Nature, not *against* her. The soil will be viewed as a living organism — not the sum of a few unrelated and separate parts. We will learn to respect and understand insects and pests so that we can even avoid the use of naturally-occurring biodegradable insecticides.

When we look closely at a forest, we see the natural mulch that has formed on the forest floor. This provides, food, shelter, and an even temperature for the insects, fungi and plants that live there. This mulch slowly breaks down with the addition of bird and animal droppings, fertilising the soil and feeding the plants and trees.

When plants are grown conventionally, petro-chemical fertilisers are used to feed the plant directly, which can result in excessive growth and poor cell structure, which in turn can increase attacks by insects.

With organic growing, organic matter and natural minerals in the soil feed the soil micro-flora and worms which in turn feed the plants by releasing the essential nutrients that the plants need. This gives sustained, regulated growth and strong cell structure.

The most important tool for the organic gardener is patience. It will take time for soil fertility to build up and a balanced ecology to develop. It will take time before the damage caused by insects becomes minimal. So be prepared for a few failures in the early stages.

We are only caretakers of our land and to pass this land onto future generations fertile, productive and 'clean' would be the greatest gift of all.

A live soil

To grow organically we need to develop a 'live' soil: soil that is rich in organic matter and natural minerals. A soil that is teeming with life. Fertile soil contains nitrogen (N), phosphorus (P), and potassium (K) plus trace minerals.

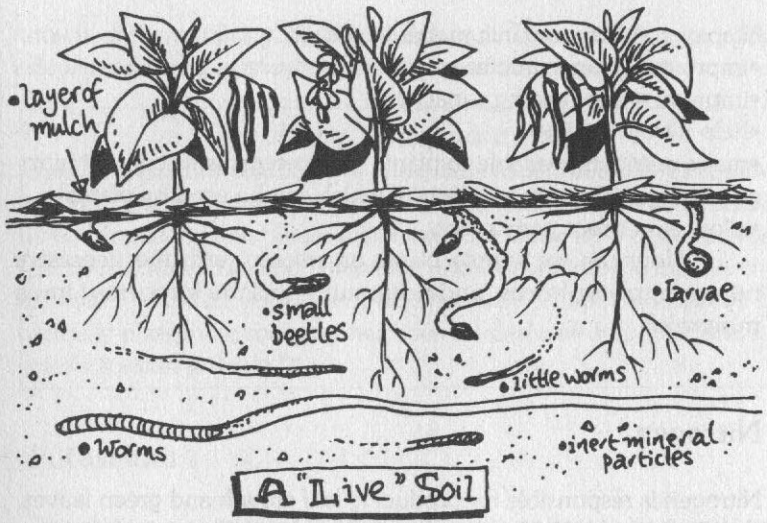
All soil is composed of four parts:

1. Inert mineral and organic particles that make up the soil mass and serve as a reservoir of plant foods. These mineral particles contain potassium and phosphorus, as well as many trace minerals such as calcium, magnesium and boron.

2. The teeming bio-portion composed of busy bacteria, algae, fungi, tiny worms, bigger worms, beetles, larvae, bugs and many other live things. These organisms process and decompose the inert mineral and organic particles, thereby feeding the plants.

3. Water. The field capacity of a piece of land is the amount of water it can hold without run-off, making it available to plants. The permanent wilting point is the amount of water in the soil when plants can no longer live and they die of drought. Fifteen percent organic matter in the soil is ideal for field capacity.

4. Air. Soil bacteria, worms, algae, bugs and other soil dwellers need a good supply of air (oxygen) although some microscopic creatures prefer carbon dioxide.



Let's look at different soils

Sandy soil is composed of large irregular particles that permit water to enter between them and pass through so quickly that it dries out rapidly. Sandy soils are also quite susceptible to leaching. The addition of large amounts of organic matter is especially important in improving the structure of sandy soils.

Clay soil contains about 40 percent or more clay, less than 45 percent sand and less than 40 percent silt. A typical clay soil may be composed of approximately 60 percent actual clay, 20 percent sand and 20 percent silt. Such a soil tends to compact, which makes cultivation difficult and interferes with the oxygen supply for plant roots. It is difficult for water to enter the impervious clay soil and runoff is very common during rainfalls.

Organic matter added to clay soil will make the soil more friable and easier to work. It will promote a crumbly structure and stabilise soil crumbs so that they are held together under the slaking action of water. As a result, the soil can absorb water more rapidly. Runoff and erosion decline.

Adding Organic Matter to Soil

Organic matter is a mixture of naturally-occurring materials such as plant and animal remains, manures, compost, cover crops (chopped down before seeding and added to the soil), wood ashes and lawn

clippings. Adding organic matter to soil will:
- improve tilth and structure
- improve water-holding capacity
- help nitrogen fixing
- make nutrients available to plants (micro-organisms convert nitrogen in organic matter to 'nitrates' which can be used by plants)
- allow easier root penetration.

How can we supply plants organically, with the necessary nitrogen, phosphorus, and potassium plus the important trace minerals?

Nitrogen

Nitrogen is responsible for producing leaf growth and green leaves. A deficiency results in yellow leaves and stunted growth. An excess of nitrogen produces over-abundant growth of foliage with delayed flowering. The plant is also more susceptible to disease, and bears poorer-quality fruit. Nitrogen-rich organic fertilisers are:
- poultry manure
- blood and bone (this can be contaminated by chemical residues).

Nitrogen undergoes many changes when associated with organic matter. Proteins in organic matter are decomposed and finally the nitrogen is changed into a nitrate that higher plants or soil micro-organisms can use. Legumes also have the ability to fix nitrogen in the soil from the vast quantities of atmospheric nitrogen available.

Poultry or duck manure should be applied at the rate of 33 to 50 kg per nine square metres of garden area.

Phosphorus

All growing plants need phosphorus. It hastens maturity, increases seed yield and fruit development, and increases resistance to disease and the vitamin content of plants. A deficiency can result in stunted growth and seed sterility.

You can add phosphorus to your soil in the form of phosphorus rock. This is a natural rock product containing from 28 to 30 percent phosphorus. The rock is finely ground and the phosphate is available to the plants as they need it. Phosphate rock is especially effective in soils containing plenty of organic matter. The bacteria which thrive in such humus-rich soils secrete organic acids that promote the breakdown and availability of the phosphorus. Humus forms its acids slowly, releasing nutrients to the plants as they need them.

Applying phosphate rock

Spread approximately 500 g of phosphate rock to every three square metres of garden area every three to four years. It is most effective when applied in combination with manure at the ratio of about one part phosphate to two parts manure, and worked into the top five cm of soil. Phosphate rock is not water-soluble. (Super phosphate is actually phosphate rock that has been treated with sulphuric acid to make it water-soluble.)

Potassium

This third major nutrient is often referred to as potash or potassium oxide. It helps in the formation of carbohydrates and is necessary for photosynthesis. It also promotes early growth, improves stem strength and contributes to cold hardiness. It also improves the longevity, colour and flavour of fruit. Deficient plants are usually stunted and have poorly developed root systems. Leaves are usually spotted, curled or mottled and may even appear 'burnt' around the edges.

Most soils contain some potassium but it is bound up in mineral form unavailable to the plants. Thus we need to add organic sources of potassium, such as wood ash, hay, leaves or granite dust.

An organic fertiliser

1 part poultry or duck manure
1 part phosphate rock
4 parts wood ash.

Apply the fertiliser with as much animal manure or plant residue (such as lawn clippings) as possible.

Trace Minerals

The chemical minerals which plants require in small amounts are called trace elements or minerals, or micro-nutrients. In all, there are 96 elements known to be essential for plants to grow and reproduce. The major trace elements are carbon, hydrogen, oxygen, sulphur, calcium, magnesium, boron, manganese, iron, copper, molybdenum, zinc and chlorine. These chemical elements are necessary only in small amounts.

While it is important that the micro-nutrients be present and available in the soil, they must not be overabundant. Too much will mean toxic conditions developing in plants, and sickness in animals and humans. A soil which is rich in organic matter will supply plants with adequate amounts of most trace elements. Trace elements can also be supplied by seaweed fertiliser or sea minerals. Fresh seaweed can be applied as a mulch, added to the compost heap, or simply forked into the soil however, it must be washed to remove the salt.

Foliar fertilisers

Trace minerals can also be supplied to plants by foliar (leaf) application. This method is know as foliar fertilisation.

Plants have a remarkable ability to absorb nutrients through their leaves as well as their roots. In fact foliar fertilisation of plants may be three to five times more efficient than providing the same nutrients by soil applications. Quite often when you apply mineral nutrients to the soil (lime or dolomite), chemical reactions occur before plant roots have a chance to contact and absorb the new food supply.

In the past, it was commonly thought that providing large amounts of the major plant foods (nitrogen, phosphorus, and potassium), or an abundance of nitrogen, would automatically produce a good crop. It is now known that growth is regulated by the nutrients in least supply, rather than those in relative abundance. Even when they're well fertilised at planting time, plants can gradually move into conditions of marginal nutrition after fewer than 60 days of growth.

Foliar fertiliser

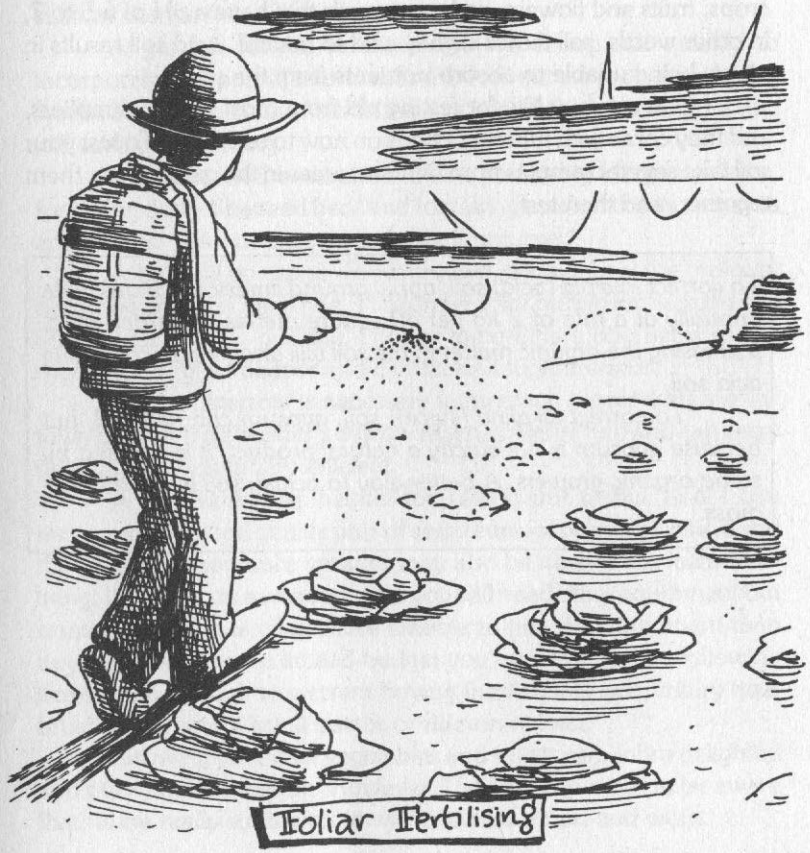
An excellent foliar fertiliser is a combination of 75 percent fish emulsion and 25 percent seaweed extract. This combination supplies plants with all necessary trace minerals essential for strong growth and plant health. Foliar fertilisation also:

- *increases frost resistance*
- *increases drought resistance*
- *helps to control moulds and mildews*
- *increases fruit set.*

Totally healthy plants also have a greater resistance to pests and diseases. Apply this mixture to plant foliage after 4 pm unless it is a cloudy day. (Plants have small openings in their leaves, called stomata, which close up in bright sunlight to prevent moisture loss.) If a rainstorm is forecast, wait until it passes, or your good fertiliser could be washed away. Plants will absorb the necessary nutrients in about four hours. Apply it when your plants are half-grown, then again when they're flowering. Spray it on house plants (especially ferns) to improve their health and vigour. Give seedlings a good soaking or spray before planting them out — it will help to prevent transplant shock.

A friend who knew absolutely nothing about gardening was helping me in the garden for a day or two. I asked him to foliar fertilise my plants one afternoon. The next day he was quite amazed at the result. He just couldn't believe the difference. All the plants were so much greener. The silver beet leaves, in particular, had become crisp and strong.

Seaweed and fish emulsions are usually applied in a 50 to 1 combination with water. An easy way to measure these fertilisers is simply by the capful. Three capfuls of fish emulsion to one capful of seaweed.



Ph testing

Australia is a very old continent, and after aeons of rainfall, much of the natural limestone has been leached from the soil. Native trees and plants have adjusted to the acid conditions and grow vigorously without needing any modification of the natural pH level. However, because many of our vegetables, fruits and ornamentals originated from Europe these plants prefer soil conditions similar to those of their homeland.

The term pH is the measure of soil acidity or alkalinity. The acidity-alkalinity scale ranges from 1 to 14. The low end of the scale indicates acid, the high side is alkaline. Neutral soils have a pH of 7. Soils are usually between pH 4.5 and pH 8.5.

Soils between 4 and 5 are very acid or sour, and relatively few plants will tolerate them. Similarly, soils of over 7.8 are too alkaline for most plants to thrive. In general, most common vegetables, field crops, fruits and flowers, do best on soils that have a pH of 6.5 to 7, in other words, soil that is slightly acid to neutral. Acid soil results in plants being unable to absorb nutrients from the soil.

You can buy kits for testing pH from most garden suppliers, and they come with full instructions on how to use them. To test your soil take several samples from different areas in the garden, mix them together, and then test.

To correct low pH (acid) soil, apply ground limestone or dolomite annually at a rate of 2 kg per 30 square metres of garden area. Increasing the organic matter in the soil will also help in correcting acid soil.

To correct alkaline (sweet) soil, gypsum can be used, but because gypsum is not strictly a natural product, it is avoided by some organic growers. A better way to acidify soil is to add peat moss.

CHAPTER TWO —

GETTING STARTED

The following are the essential tools you will need to begin an organic garden.

A **spade** for digging the soil and digging in manure. A long handle will be easier on your back and a spade with a lip or tread will protect your feet or boots from the sharp edge of the blade.

A **wide-bladed shovel** is useful for relocating piles of material such as compost and ash.

A **garden fork** is invaluable to loosen up soil quickly to incorporate compost or manures and to fork out the roots of creeping weeds like couch grass. As with the spade and shovel, a long handle will save you bending.

A **rake** is another essential tool — preferably a large steel one, for raking down fine seed beds and for raking up such things as leaves and stones. Take care never to leave it upturned!

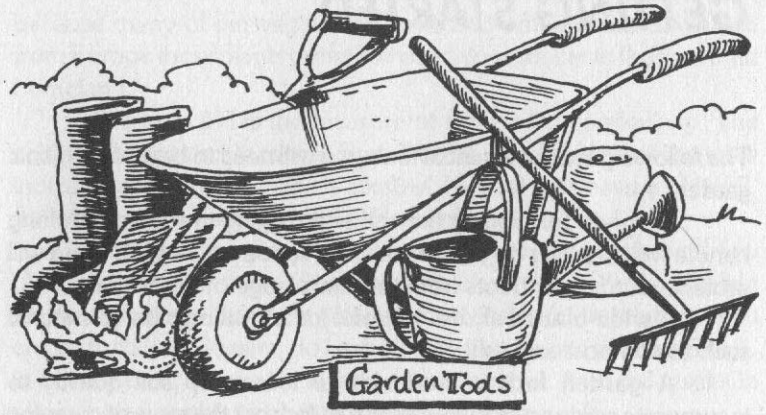
A **hoe** will be useful. There are two kinds of hoe: the ordinary draw hoe and the Dutch hoe. The former is for pulling through the soil and the latter is for pushing. I prefer the ordinary hoe because it is much faster, goes deeper and can tackle tougher weeds.

A **wheelbarrow** is necessary in anything bigger than a small town garden. The builder's barrow that has a large tyre and can carry quite large loads is very efficient.

A **trowel** will be helpful for setting out plants, and I can recommend a good quality **pair of secateurs** for pruning jobs around the garden. A **pressure sprayer** may also be needed for foliar fertilising. If you are on a small acreage you will need other equipment but remember that it is often more feasible to hire this equipment than buy it. If you are on a limited budget you mightn't use the following items often enough to warrant buying them: chain saw, rotary hoe, brush-cutter and a small tractor or ride-on mower.

Growing your own vegetables and fruit is certainly a delightful and satisfying occupation. However, I feel it is important to be aware that, to be really successful, it will take time, effort and work.

If possible, allow about two hours per day to spend in the garden — maybe an hour in the early morning and an hour in the afternoon or evening. Most dedicated gardeners really enjoy their work in the fresh air and sunshine — I certainly do! If I haven't been able to get into the garden for a few days, I tend to suffer from 'cabin fever'.



Developing the vegie patch

Many people feel reluctant to start a vegetable garden because of the initial heavy digging. However, an easy, simpler alternative is to establish a NO-DIG garden. This method can be used by elderly people and is especially suitable for stony or gravelly areas.

First select the area for your vegie patch. It doesn't matter if it's a grassed or weedy area as long as the ground is reasonably level. Try to select a place which will make the most use of the sun, particularly in winter. It should preferably face north-east with protection from cold southerly winds.

Next mow the area; sprinkle manure plus lime or dolomite. Then cover the ground with several thicknesses of newspaper. Apply more manure and lime liberally over the newspaper. Then spread over 8 to 15 cm of straw (not hay because this can contain seeds and will quickly turn your new vegie patch back into lawn or weeds!).

Water it daily for seven days. This will settle down the straw and start off the bacterial action in the patch. Worms will also move in and together with microscopic insects, they will release nutrients to feed your plants.

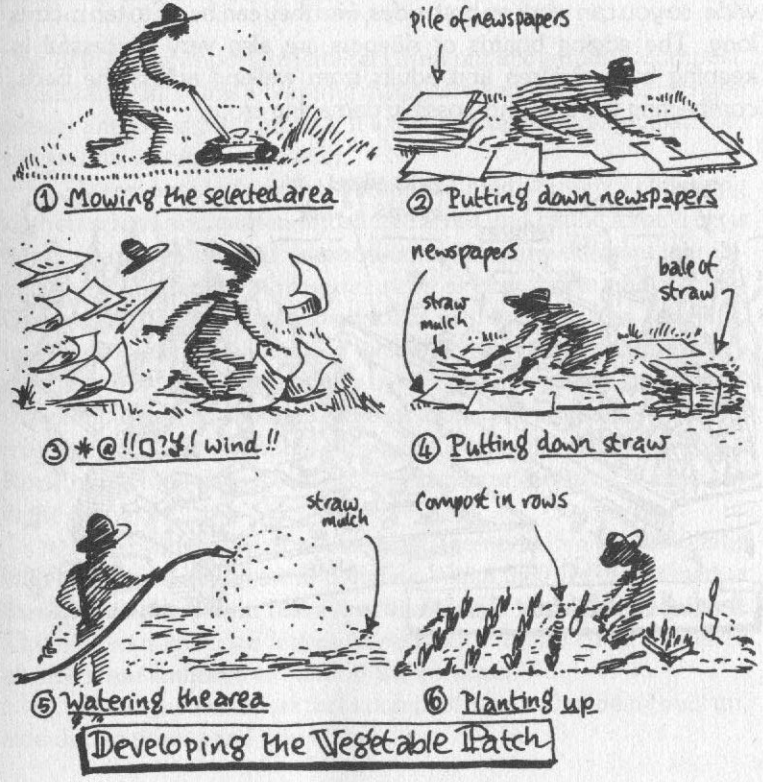
To plant up, simply open up holes or lines in the mixture and fill with compost or organic fertiliser mixed with equal parts of soil.

Place seedlings or seeds firmly into these areas and water them. The newspaper will slowly break down, killing the grass or weeds underneath and incorporating the remains into the soil.

Lucerne hay can also be used with (or in place of) the straw although it is more expensive.

If you prefer to DIG over your new vegetable garden do not dig too deeply because most micro-organisms in the soil are contained in the top few inches. Digging too deeply will simply bury live soil and bring the less fertile soil to the surface. Grass or weeds on the surface can be removed and this will make the patch easier to dig. Or, after mowing the grass closely the weeds can simply be incorporated into the soil.

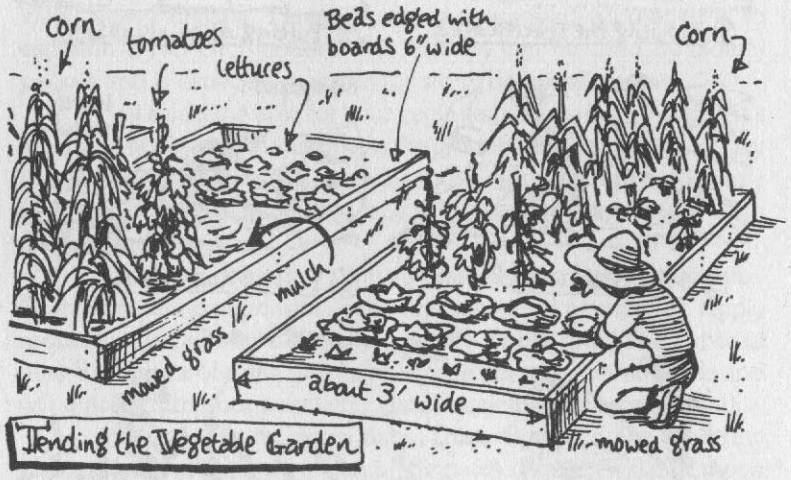
After the initial digging over, fork in lime or dolomite, rock phosphate, animal and bird manures, and as much compost as you have available. Rake over the patch to remove any large clods and water it well for a few days. Now you're ready to start planting with either seedlings or seeds.



In the past, I have experimented with different types of paths in the vegetable garden. Mulched paths have the advantage of being soft to walk on, control weed growth, and need only to be topped up regularly with extra mulch material. However, after trying out several types of garden design, I now find that if the garden beds are edged with hardwood boards or secondhand railway sleepers, the best paths are grassed ones.

Although these paths need to be mowed regularly, and the edges trimmed, grass paths have several advantages. After heavy tropical rainfall, the grass absorbs the excess water, leaving the surface reasonably firm and clean. Mulched paths become soft and slippery after heavy rain, and the earth underneath turns into sticky mud. Walking around the garden, either to collect vegetables or to work, becomes quite treacherous. Mulched paths can also be a problem to maintain, because plentiful supplies of mulch are necessary to keep up a depth of at least 15 cm to suppress weeds and grasses effectively.

Garden beds can be approximately one and a half metres wide, so you can work on both sides, and they can be up to ten metres long. The edging boards or sleepers are also very successful in keeping both children and adults from walking across the beds, compacting the soil, and possibly damaging crops.



Tending the Vegetable Garden

CHAPTER THREE —

COMPOST, MULCH AND MANURE

ALL ABOUT COMPOST

One of the most important fertilisers in an organic garden is compost. A small amount of this wonderful material mixed with the soil can give greatly improved plant growth. It will promote the biological activity so essential in organic growing.

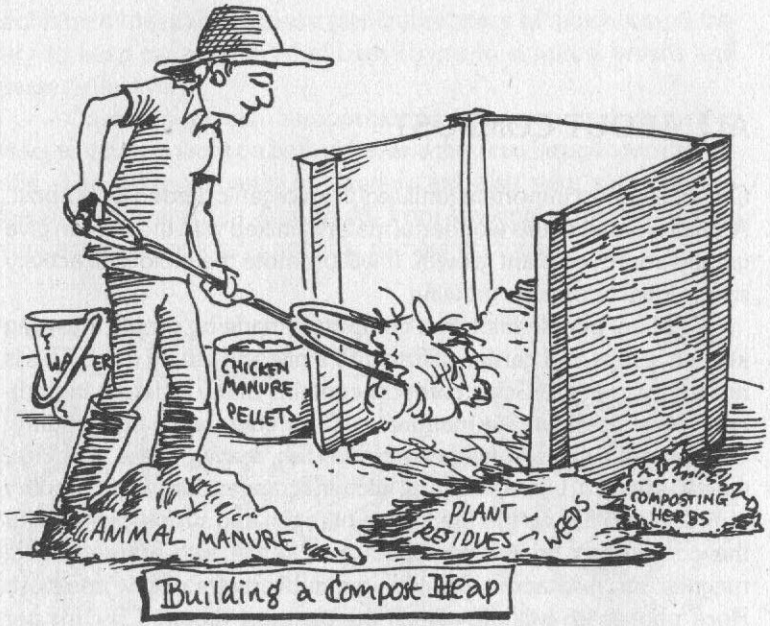
Many people think that compost is made by simply throwing kitchen scraps and garden refuse into a pile and letting it rot. This is not the case at all. Good compost contains many different ingredients. Most essential are manures such as cow, horse and poultry. Other ingredients are feathers, blood, fish, leaves, grass clippings, weeds, sawdust, wood shavings, kitchen scraps and seaweed. Poultry manures and fish wastes are high in nitrogen and supply proteins for the composting organisms. Lime or dolomite also adds valuable magnesium. Add about 2.5 cups per cubic metre of raw compost. Rock phosphate will also enrich the compost (about 1.5 cups per cubic metre).

To speed production and decay, compost can be inoculated with herbs such as yarrow or comfrey. When they are used together these special herbs can halve the time it takes to produce compost. Three or four chopped leaves of each herb to two cubic metres of compost are sufficient to start off the compost.

Some gardeners use three compost heaps. One being built up, one decomposing and one in use.

To build a compost heap

First spread over the ground a 15 cm layer of plant wastes such as hay, straw, leaves or woodchips. Add a five cm layer of manure. On top of this place a two cm layer of garden soil. Sprinkle on lime, dolomite and rock phosphate. Earthworms will quickly move in, adding their valuable castings to the heap. Every 24 hours, earthworms eat more than their own weight in dead organic matter and mineral soil. Continue to build up the heap in layers until it's about one and a half metres high. Keep the heap moist (not wet) at all times because this will lead to a rapid breakdown of the plant material. Cover the finished heap with a thick layer of mulch.



Building a Compost Heap

Compost should be ready to use in ten to 12 weeks in the summer months, or three to five months during winter. In colder areas compost can take longer. If you're adding seaweed to the compost heap it should be washed first with a garden hose or else leave this job to the rain. Seaweed contains an excellent assortment of secondary and trace elements.

To be ready to use, the compost should be cool, dark, friable in consistency and sweet smelling! Add compost to your garden at a rate of one bucketful to each 30 square metres of soil area. This amount is quite sufficient to promote strong, healthy growth. Apply it approximately four times per year. Spread it around fruit trees and your favourite plants and bushes and use it as a side dressing for vegetables — they love it!

Compost water can be used for sick plants and seedlings. Fill a large bucket half full of finished compost, add water to the top and stir it gently. Use the residue as a mulch. Compost can also be used as a valuable top dressing for house plants — every time you water the plants they will receive essential nutrients promoting health and vigour.

I have found it a good idea to set aside time for actually 'putting together' the compost ingredients. Quite often, without thinking, large amounts of green material (like spent crops and weeds) are placed onto a heap without adding manures, herbs, lime and soil. These should be added in the correct sequence to achieve a good, well-balanced final result. Pile up the green material near the heap, and at a convenient time, place the material on the heap in the correct thickness of layers, taking care to add the other necessary ingredients.

I always say to my girls: "I'm making puddings today".

Mulch

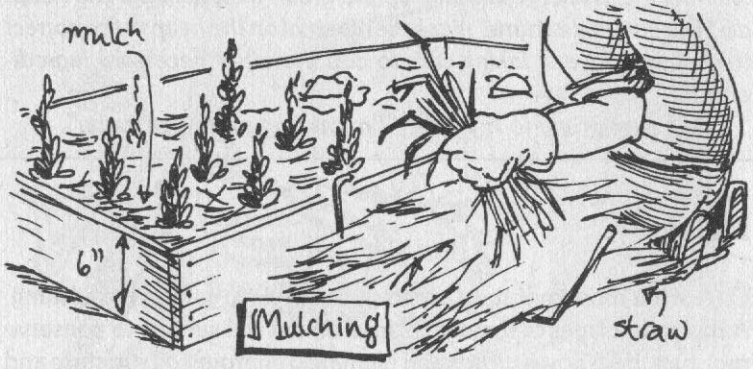
One of the most important aspects of an organic garden is mulching. A mulch is a layer of material placed on the soil surface to conserve moisture, hold down weeds and ultimately improve soil structure and soil fertility. Mulching, like composting, is a basic practice of organic gardeners. Remember the forest floor: fertile, moist and seething with activity. Nature hates bare earth and will cover it as quickly as possible to conserve the soil.

Mulching offers several advantages. For example, a mulched plant is not subjected to the extremes of temperature that affect an exposed plant. Mulch keeps the soil warmer in winter and cooler in summer. Mulch applied to the soil during the spring and summer can be turned in the autumn, thereby enriching the garden soil. Also, certain materials used for mulch contain rich minerals. These break down gradually, and work into the soil to feed the roots of plants, soaking into the ground during the first heavy rain. So, mulch fertilises the soil while it remains on the soil surface as well as after it decays.

For the busy gardener, mulching is a boon. Many back-breaking hours of weeding and hoeing are practically eliminated and cultivation is not necessary. Weeds do not have the chance to get a foothold, and the few that do can be pulled up easily. There is no need for cultivation because the mulch helps keep the soil loose.

The mulch also keeps the wind and the hot, drying sun from evaporating soil moisture. A few good soakings during a long growing season will tide the plants over a long, dry spell. Mulched plants will often endure a long dry season with little watering. The soil underneath the mulch remains cool and damp to the touch.

At harvest time, vegetables that sprawl on the ground, such as cucumbers, squash and unstaked tomatoes, keep clean and dry. Mulched rows are also easier to walk on and low growing vegetables are not splashed with mud. Seedlings planted in very moist soil should not be mulched immediately but after the seedlings are established. This practice will help avoid 'damping off' — a fungus disease of the young seedlings.



Suitable Mulching Materials

Alfalfa hay has a high nitrogen content and is suitable for mulching fruit trees although rain-spoiled hay can still be used. Shredded cornstalks will make an excellent mulch as will grass clippings, sawdust or wood shavings. If you use sawdust or wood shavings, mix it with a little chicken manure to combat nitrogen deficiency.

Cover Crops and Green Manures

To prevent or reduce erosion, certain plants can be grown as a cover crop and can be used as green manure. These crops are turned into the soil when they're 75 to 100 cm high. This method is perfect for growers who cannot produce enough compost or have difficulty obtaining large quantities of animal manures.

Cover crops also offer protection from plant diseases and insects after seasonal crop rotation. They are excellent for areas of the vegetable garden that are not in use because they bind the soil (reducing the impact of raindrops) and prevent erosion in heavy rainfall areas. Plant roots open up the soil channels, penetrating deep into the earth to improve soil porosity and allowing water to run slowly downwards to prevent soil run-off. These crops can also be used for making compost.

The two types of cover crops grown are legumes and non-legumes. Legumes are plants which can take nitrogen from the air and add it to the soil via nodules on the plants' root systems. The following are plants suitable for cover crops.

LEGUMES

Alfalfa

Alfalfa is a deep-rooted legume grown throughout the world. This crop does well in all but very sandy, clay, acid or poorly drained soils. It has a high protein and nitrogen content and also contains calcium, magnesium and potassium.

Cowpea

Cowpea is a fine soil builder with powerful roots that will grow through the hardest soils. It is also a very quick grower.

Fenugreek and Lupin

Fenugreek is a winter legume that needs a fairly rich, loamy soil. Sour, sandy soils can support lupin. Grow this crop during winter.

Sweet clover

This legume will grow in just about any soil if it's reasonably well supplied with lime. It is fast growing and can be turned under in the autumn. Plant it in early spring in temperate climates, and early summer in warmer areas.

NON-LEGUMES

Buckwheat

Buckwheat is one of the best choices for rebuilding poor or acid soils. It has an enormous and vigorous root system and is a good bee-attracting plant. You can plant it during spring and summer, and it is possible to grow three crops in a season.

Oats and Millet

Oats are a winter plant and can be grown on almost any soil provided the climate is cool and moist. Millet grows better on poor soil than many forage or green manure plants. It should be planted thickly for the best results.

Soybeans

Soybeans are planted in the summer and thrive in nearly all kinds of soil including sour soils where other legumes may fail. They can also stand considerable drought.

Always cut your cover crops before they flower or seed because at this stage of growth the plants contain maximum nutrients.

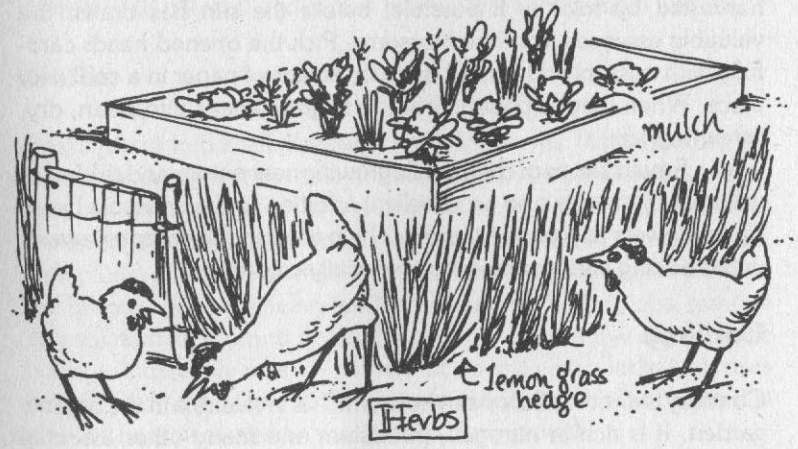
CHAPTER FOUR —

HERBS IN THE ORGANIC GARDEN

You should grow a wide selection of herbs in the tropical organic garden both for their value as companion plants and as a food source of essential vitamins and minerals. The following herbs are among the most popular.

Basil

Basil is a delightful herb which originated in India. The leaves release a lovely perfume into the air without the need to be bruised or touched. There are two main varieties. **Sweet basil** has large, bright green leaves and a spicy, clove-like aroma; and **Greek or bush basil** has much smaller leaves and a compact growing habit.



Basil must have warm conditions because it is frost tender and grows poorly in cold weather. Seed should not be sown until the weather has really warmed up: well into spring or summer. If the soil is sour, lime it well two weeks before planting, making sure the bed is well broken up and the soil is as fine as possible. Add some compost or well-rotted cow manure and sow the seed just below ground level. Thin the plants out to 30 cm apart. Basil is an annual, so seed must be sown every year, although in warmer climates it can be pruned back at the end of autumn and will regrow in warmer weather.

Basil's mouth-watering aroma makes it a versatile herb to use in many different types of food. It has a special affinity with tomatoes and tomato-based dishes and is excellent with eggplant, zucchini, marrow, squash and spinach. It is also delicious in all pasta dishes.

Basil plants help to enliven and stimulate vegetables growing in the garden — especially tomatoes and cucumbers. If basil is planted near cucumbers, when the basil is in flower the many bees attracted to the plentiful blossoms will fertilise the cucumber flowers resulting in a bumper crop. Basil also appears to combat downy mildew when planted near zucchinis.

Chamomile

Chamomile originates in Europe and has been used in folk medicine in Britain for centuries. The fragrance of chamomile has been likened to fresh apples. The most popular variety is the German chamomile for use as a herbal tea. Chamomile grows quickly into a small bush and bears flowers profusely for quite some time. It can be raised from seed or by root-division. The flowers that are used for tea should be harvested by midday if possible, before the sun has drawn the valuable essences from the blossoms. Pick the opened heads carefully with scissors and spread them on sheets of paper in a cool, airy place. When they're papery, put the fragrant heads into clean, dry, screw-top jars.

Small clumps of chamomile growing near onions and cabbages will help them. It is also an excellent addition to the compost heap. Spent flowers as well as foliage will help to keep the compost sweet, whilst adding various minerals, especially calcium.

Comfrey

Comfrey is another European herb which is invaluable in the organic garden. It is rich in nitrogen, potassium and many other essential minerals and is valuable as a green manure as well as to add to the compost heap.

The best method of propagation is by root division. A small piece of root will quickly grow into a well-established plant. Comfrey is a perennial and will grow into a thick-set, busy plant with large, green, slightly hairy leaves. If comfrey grows near strawberries it will improve their size and flavour. A liquid fertiliser can be made from old comfrey leaves which have been left to rot in water. This fertiliser can be applied to the roots of plants.

Chives

Onion chives resemble tufts of fine grass when they're young but as they mature the leaves become circular and hollow with the distinct taste of onion. Garlic chives look very much like onion chives but as they mature the leaves become broad and flat, and a light green colour. The flavour is characteristic of garlic but much milder.

Both varieties of chives can be grown from seed, although propagation is quicker and easier by division of established clumps. If it is grown from seed, sprinkle it thickly where they are to grow permanently, cover them with a fine layer of soil and thin them out when they're about 50 cm high.

Chives can be used in almost every savoury dish. Chop them finely and sprinkle on potatoes cooked in their jackets, on green salads or add them to egg dishes and cream cheese dips.

Chives will help reduce scab when grown near the roots of apple trees. A chive tea made into a spray is helpful in combating downy and powdery mildew. Chives have a beneficial effect on carrots, and planted under rose bushes will help combat aphids.

Garlic

Garlic grows into a tall plant with long, flat leaves. When mature the leaves die down and the bulb underneath can be harvested. It is easy to grow: simply plant one of the segments of the bulb. Plant garlic in the spring in temperate climates, and mid-autumn in warmer areas. Add plenty of animal manure and compost to the soil before planting out because garlic is a heavy feeder. To harvest, dig the bulbs, remove any soil and lie them to dry in a sunny place for a few days. Garlic bulbs — if carefully dried — will last for up to a year. Garlic and roses benefit each other, and garlic helps to reduce aphids but when it is planted near peas and beans, it will reduce growth.

Mint

There are many varieties of mint although the most commonly used are English mint and peppermint. Mint grows best in rich, moist soil in a semi-shaded position. It is usually propagated by root division because even the smallest piece will grow. Mint loves plenty of water. Grow it in a secluded area or in a large pot because some varieties can 'take over' a garden. Spearmint is an excellent insect repellent and will help to keep away black flea beetles, cabbage butterfly, ants, fleas and, to a certain extent, aphids.

Parsley

There are two varieties of parsley: curled, and Italian or plain-leaf parsley. To propagate sow seed in spring in temperate areas, and autumn in warmer climates. Curled parsley is the most difficult to grow. Seeds sometimes take two weeks to germinate, during which time the bed must never be allowed to dry out or the seeds will cease germinating. Plain-leaf or Italian parsley will germinate in four to five days and has a slightly stronger flavour than the curled variety.

Parsley is a biennial and will seed in the second year. Grow it under shadecloth in warmer areas because parsley prefers a cool, moist spot. Roses and tomatoes benefit from parsley planted nearby.

Rosemary

Rosemary is a beautiful aromatic herb which only needs to be brushed by hand to release its fragrance. It is probably the most popular of all herbs. Rosemary originates in the Mediterranean region. It prefers an open, sunny spot with average, well-drained soil. It will not tolerate wet roots.

Rosemary is easy to propagate by eight cm tip cuttings or by layering. Simply place several cuttings into a pot, water them well and cover them with a plastic bag until the new roots have formed. Re-pot each tiny plant into individual pots to allow a strong root system to develop before planting them out in the garden.

Thyme

Thyme is easy to grow and there are many varieties to choose from. Garden thyme and lemon thyme are the most popular and well

known. Thyme is happy in fairly poor soil in a dry, hot position although well-rotted manure or compost will keep the plants healthy and growing well.

Garden thyme can be grown from seed but the small seedlings grow slowly and it takes considerable time to establish a small clump. Propagating by root division is simple, easy and the plants grow quickly to maturity. New plants can be planted out in the spring. The special fragrance of thyme can be blended with other herbs such as parsley, marjoram and a bay leaf to enhance the flavour of many dishes.

Coriander

Coriander imparts a unique flavour to Indian curries and oriental dishes, and is a valuable herb in the organic garden. Coriander has a lacy, feathery foliage with an aroma quite different from any other herb. Coriander is easy to grow from seed. Choose a position which is both sunny and sheltered. Sow the seeds in autumn and winter in sub-tropical and tropical areas, and in spring and autumn in temperate zones. Sow the seed directly into the soil 12 mm deep, 30 cm apart. If they're planted during hot weather, the plants will quickly go to seed producing few sprays of foliage.

Horseradish

Horseradish has large, dark-green leaves resembling spinach. Under ideal conditions it can grow up to 60 cm high. The root system comprises a main tap root with several smaller roots branching out from it at different angles. It is white, and rather like a radish but more wrinkled and hairy. Horseradish is propagated by root cuttings, and prefers a shady position and rich, moist soil. Place cuttings in a large hole in the garden and pour a little sand around the sides of the root before covering them with soil.

Mulch the plants lightly with grass clippings or straw and keep them watered so that the roots do not become coarse. To cut the roots for use, scrape the soil away from the main one. This can be done at any time. Every two years it is advisable to pull out the whole plant keeping the long main roots for replanting. Horseradish assists fruit trees and helps prevent brown rot on apple trees. If it is kept restricted to the corners of a potato bed it will assist the potatoes to be more healthy and resistant to disease.

Lemon grass

Lemon grass is an unusual herb which resembles the flax plant family in appearance and habit of growth. The leaves are long straps of fresh bright green which grow from a fleshy base. The plant is quite decorative and in one growing season should make a clump about 15 cm across the base and 60 cm high. It will thrive in the hottest position if it's given plenty of water.

Lemon grass is propagated by lifting a clump and pulling away rooted pieces from its outside edges. Simply plant the pieces in their permanent position. Lemon grass planted closely in clumps will provide an excellent, poultry-proof hedge around the vegetable patch. It can also be used to keep couch grass and other creeping grasses out of the garden.

To gain the greatest advantage from herbs, plant the different varieties in odd spots around the garden. They can grow in between crops, as a border, in clumps, circles or rows. Leave one or two herbs to go to seed at the end of each season and add them to the compost heap. This results in herbs germinating at random everywhere in the garden where compost has been added. Dill and fennel are particularly suitable for this method. Coriander also germinates well with this method. Remember: in Nature it is common for many different plants to grow together.

CHAPTER FIVE —

CROP ROTATION AND COMPANION PLANTING

CROP ROTATION

The logic behind the idea of crop rotation is that different plants extract nutrients in different combinations from the soil. By rotating the types of plants the soil is allowed to rebuild while still producing.

No hard or fast rules can be offered for the rotation of crops. So much depends on the suitability of particular crops to the area — this will obviously limit the selection. However, there are five different groups of annual vegetable plants and these should be rotated and intercropped.

These crops are classified according to their native characteristics and physical form:

Tuberous - potatoes, carrots, beetroot etc
Surface - lettuce, cabbage, spinach, celery
Shrubs - tomatoes, capsicums, beans, peas, eggplant
Grains - corn, millet, rye, wheat, oats, etc
Vines - cucumbers, zucchini, melon, pumpkin.

The selection of crops for successive planting can follow this sequence of groupings. For example celery could perhaps follow potatoes, then capsicums, then sweet corn, and so on. After harvesting a crop such as beans or peas (being legumes they add nitrogen to the soil) carrots, parsnips, turnips or beetroot can be grown without the need to add any more fertiliser to the soil.

Companion planting

A study of plant companionship reveals that if specific varieties are intercropped (two or three in alternating rows in the same plot of soil) they will encourage each other to better production. Many scientists and horticulturists are prepared to completely ridicule the concept of companion planting yet you can undertake your own experiments to prove its validity.

Plants that make good neighbours

beans and brassicas*
lettuce and beetroot
brassicas and beetroot
tomatoes and parsley
tomatoes and onion
tomatoes and brassicas
carrots and onions
lettuce and radish
lettuce and beans
lettuce and cucumbers
lettuce and beetroot
peas and brassicas
peas and celery
cucumbers and brassicas
potatoes and peas
potatoes and broad beans.

**brassicas are members of the cabbage family: broccoli, cauliflower, brussels sprouts etc.*

There are also some combinations of plants that are quite *incompatible* and growth can actually be hindered. These combinations are:

beans and onions
cabbages and onions
cabbages and tomatoes
beetroot and tomatoes
potatoes and onions.

CHAPTER SIX —

WEED AND PEST CONTROL

You can control the weeds in your garden quite easily if you follow these guidelines. Mulching is most important for good weed control. A good thick mulch will suppress many weeds although some strong-growing species will push through the thickest mulch with comparative ease. These weeds should be pulled out by hand before seeding and should be added to the compost heap because most weeds contain valuable mineral nutrients. You should mulch not only in the vegetable garden but around fruit trees and in ornamental gardens as well.

Weeds in lawn areas can be killed easily by applying undiluted household ammonia. Simply drop a small amount (half a teaspoon) into the centre of each weed. Weeds can also be killed by applying undiluted urine! Weeds in the orchard can be controlled by mowing. Mow frequently in heavily infested areas. Property boundary areas and around ornamental gardens can be kept clear by using a small mower or brush cutter.

PEST CONTROL IN THE ORGANIC GARDEN

Plants and insects have travelled down the long pathways of development together for over 500 million years. The insects did not wipe out the plants. Rather each form of life made accommodations for the other. It is a mistake to assume that all insects are natural enemies of all plants in sight.

Why do insect groups undergo population explosions and chew up or suck dry our cherished plants? Do plants invite these attacks? Do they relax their ancestral defence mechanisms? Can plants 'signal' their vulnerability to pest attack?

Consider the normal behaviour of the female corn earworm moth when she emerges from her larval stage into adulthood. Her life expectancy is about eight to 15 days so she immediately gets down to business — attracting a male moth and finding a host plant such as corn on which to lay her eggs. Annually this insect destroys over $1 billion in crops. It is among the top ten most destructive pests in the world.

To make certain that the male moth quickly gets to his mate to do his duty the female emits an irresistible hormone-like pheromone (scent molecules). When plant tissue breaks down it gives off more ammonia and ethanol than a healthy plant. Both ammonia and ethanol appear to act as energisers for pheromones. So, sick, weak or diseased plants are more likely to be attacked by insects. If plants are growing strongly and receiving plenty of natural nutrients, pests and diseases will not be a serious problem.

PEST CONTROL METHODS

The following are the most popular methods of non-toxic pest control.

Pyrethrum

Pyrethrum is derived from the plants of the chrysanthemum family. It is a broad-spectrum insecticide, non-toxic to animals and it is safe to use close to cropping times. It will also kill a wide range of predators. If it is used in the evening it will not affect bees who will have left the garden by this time.

Derris dust

Derris dust is an effective, all-purpose insecticide that has a longer toxicity than other organic sprays (about 48 hours). It is effective against hard-backed insects (beetles and bugs) as well as soft-bodied bugs (such as caterpillars) but use it carefully because it will kill ladybird larvae, lace-wing, some predatory wasps, flies and bees. Derris dust also kills fish.

Dipel

Dipel *(Bacillus thuringiensis)* is a naturally occurring component of the environment. It kills only caterpillars on brassicas, grape vines and fruit trees. It will not harm other insects, birds, fish or warm-blooded animals.

Garlic spray

To make garlic spray use 90 g of chopped garlic and two teaspoons of mineral oil or liquid paraffin. Add this to half a litre of water with 25 g of grated pure soap. Soak the mixture for 24 hours then strain it and store it in the refrigerator until it's needed. To use the spray, dilute it using one part solution to 99 parts water (it can be strengthened if necessary). This is effective against snails, aphids, codlin moth, white butterfly, caterpillars and wireworm.

Bug juice

To make bug juice gather half a cup of insect pests, cover them with water and liquify them in the blender. Strain this through cheesecloth, then dilute. All insects carry their own pathogenic diseases which, when juiced and sprayed on infected plants, are an effective form of pest control.

Diatomaceous earth

Diatomaceous earth comes from silicified marine skeletons, and attacks the wax coating of insects. The resultant puncturing causes moisture loss and finally death. It also interferes with breathing, digestion and mobility. Use it against slugs, snails, soft-bodied insects and larvae.

African marigolds

African marigolds combat nematodes (tiny microscopic worms that attack plant roots). They can be planted in odd spots around the garden. These marigolds excrete a substance from their root hairs that helps control nematodes as well as other root-attacking pests such as wireworms, centipedes and some fungi.

Wettable lime

Wettable lime (sulphur) can control brown mite and red spider mite. Use it carefully because this solution will also kill predators.

White oil

White oil is effective against sucking insects such as scales and mites.

Controlling Fruit fly Organically

It is possible to control fruit fly organically. There are two sorts of fruit fly common in Australia: the Queensland fruit fly and the Mediterranean fruit fly. Both have similar life cycles and you are required by law to control them.

In areas with cold winters prevention may be all that is required. The fruit fly dies off in winter, and garden and orchard hygiene may prevent them from building up to problem proportions until your summer crops are harvested.

Even if you have fruit like citrus ripening through winter, prevention should still be the cornerstone of your fruit fly program. Fruit fly mature mostly in fallen fruit and ripe fruit. A bad fruit fly problem is a sign of bad management. Never leave fallen fruit on the ground. Pick it up every day or better still have chickens or animals browsing under the trees to eat it. Fruit-fly infected fruit often falls before it is quite ripe. Having it pass through an animal gullet is a simple way of interrupting the breeding cycle.

Don't bury or compost fallen fruit or ripe vegetables. Don't take them to the dump either! Stew them, feed them to the chickens or leave them in a sealed bucket under water for three weeks before composting. Alternatively place them in a sealed plastic garbage bag to turn them into anaerobic compost in the sun for a few days.

In bad fruit fly areas avoid early ripening crops like loquats that may attract the fly to your later crops, and avoid maturing varieties which fruit when large numbers of fruit fly are likely to be around. Also be careful of late summer fruits like quinces or figs. They can host fruit fly and provide a 'bridge' for the fruit fly to breed, ready to infect winter crops like citrus. A 'fruit fly gap' of six to eight weeks may be enough to save later crops from infection.

Fruit Fly Repellent

This is not strictly an organic fruit fly repellent but it is better than alternatives. Mix a litre of kerosene, a litre of creosote and a packet of mothballs. The result will really smell! Place it in tins about ten metres apart hung from fruit trees or in the vegetable garden.

Fruit Fly Baits

Fruit fly can be controlled organically. Baits can include:

- *bran, sugar and hot water*
- *orange peel in water*
- *vegemite and water*
- *vegemite, banana peel, urine and water*
- *a banana peel in water*
- *orange rind, human urine and water*
- *molasses, flour and water or various combinations of the above (wet, sweet and yeasty).*

You can make 'splash on' bait with 50 g of sugar in one litre of water. Add 7 ml of concentrated pyrethrum or nicotine. Splash it on trees but don't spray it because the result will be too dilute to be effective. Apply the mixture two weeks before the known fruit fly dates in your district and then until two weeks after the last fruit has been harvested. Re-apply it at least every week because pyrethrum breaks down on contact with light and nicotine is only effective for a few days.

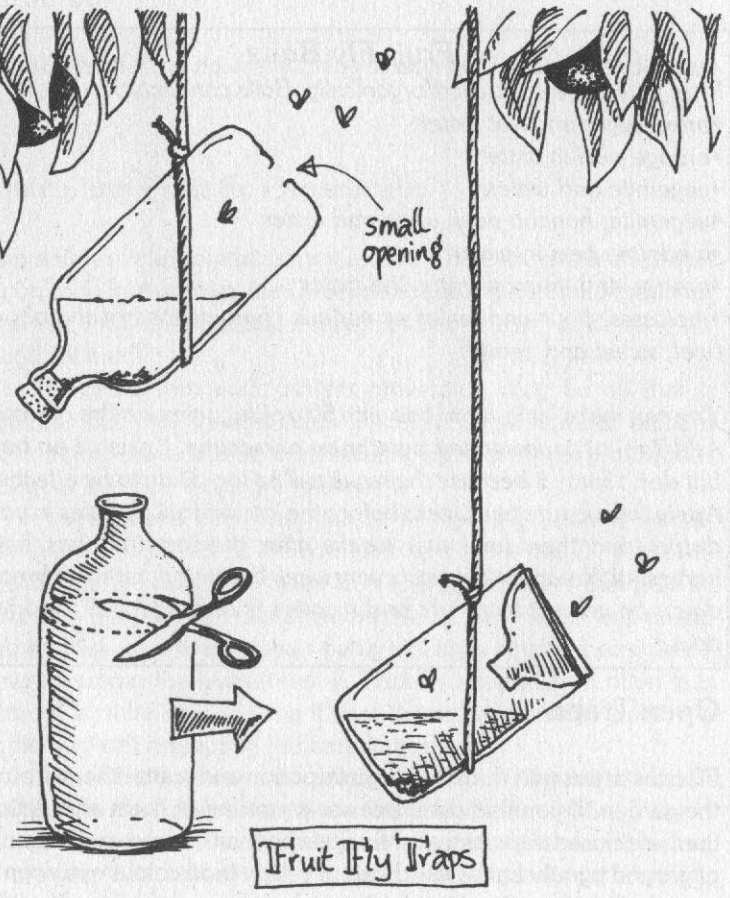
Open Traps

Fill cans or jars with the following trap potion and scatter them around the garden. If you find dead bees or wasps inside them after a time then use closed traps instead. Mix a teaspoon of molasses with a pinch of ground pyrethrum. A few drops of yellow food colour or a drop or two of oil of citronella will make the mixture more attractive to fruit fly.

Closed Traps

Take an empty plastic soft drink bottle, cut off the top at the shoulders, turn it around so that the spout is sticking into the bottle, and tape the edges firmly. Fill the bottle a third full of bait, cover the hole with mosquito netting and suspend this from trees or stakes in the garden. Or, just fill a plastic bottle half full of bait, hang it spout downwards and punch a few very small holes in what is now the top.

Fruit fly can fly for about a week before they mate and lay eggs. If you can kill them in this time you'll break the breeding cycle. Bait and traps are very effective and provide the continuous control needed. Their main disadvantage is that they may attract fruit fly into your area before they would normally appear.



Controlling Disease in the Organic Garden

The main diseases in the organic garden are fungi, moulds and mildew, and rust. To control potato and tomato blight, black spot on roses, beans and peach leaf curl use Bordeaux mixture.

Bordeaux fungicide was discovered in 1882. In Medoc in southern France, many acres of grapes are grown. Little boys used to snatch and carry off the grapes which grew by the roadside. (They were hungry little boys.)

The owners of the vineyards, becoming increasingly annoyed, had resorted to spattering the broad green leaves of the vines with a lime and water slurry to resemble bird droppings in the hope that this would give some protection from the 'light-fingered' boys. Some owners, a little more vindictive, added some bluestone, a substance well-known to be poisonous. This blue-white, sickly-looking concoction would stick to the grapes and foliage even through the heaviest rainstorms.

The summer of 1882 was particularly wet, and mildew rotted the grapes, threatening to destroy the very vines themselves. Late that season, Dr Pierre Millardet, a professor of botany, was inspecting the devastated vineyards in the area. He noticed that a few plants near the roadway were healthy, and heavy with well-ripened grapes. Those farther back in the vineyard were defoliated, and the grapes were shrivelled, rotten, or unripened.

Dr Millardet learned of the composition of the concoction that remained splattered on the sound leaves and fruit. During the next two years, he experimented with mixtures of lime, iron, and copper salts but found that the original combination was best. He then worked out the most effective proportions and published his findings in 1885, naming the new spray 'Bordeaux mixture'.

The new fungicide was later improved with the addition of copper sulphate. Although found by chance, it is of course still in use today.

Baking soda in a mixture of 250 g of soda and 125 g of pure soap dissolved into 11 litres of water will control most mildews and rusts.

Potassium Permanganate (Condy's Crystals)

This is a useful general insecticide and fungicide acting as a contact poison. It will last for four hours only. Use 25 g to eight litres of water.

If moulds and mildews on plants are not particularly severe some plants will simply 'grow out' of the disease. An example is zucchini that constantly grows new leaves.

Building the Natural Ecology in your garden

Although there are quite a few non-toxic methods of pest and disease control available to the organic gardener, it is essential to understand that all living things have a purpose and a right to life.

As time passes without using any pesticides a balanced ecology will develop where natural predators will increase their numbers. If a plant is weak or growing poorly it will be attacked by insects. Don't remove the plant. Give the insect a home and a place to reproduce. It will be happy and leave other plants alone. Remember that a well grown, well-nourished plant growing strongly will have a built-in resistance to disease and insect attack.

Predators always follow pests and if you notice a pest infestation, wait a day or two to see if a natural predator has come to your aid. Lizards, frogs and birds will feed happily on caterpillars, slugs and other 'pests'. Learn to accept some damage to crops — the leaves of silver beet are just as nourishing with a few holes in them.

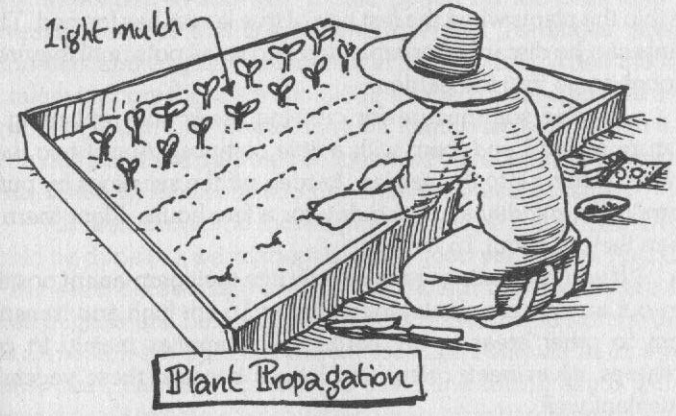
Make time for a daily walk in the garden, or every second day if time is short. Inspect trees and crops for insect damage or disease because early attention can often save serious problems later. I love observing plants developing and fruits ripening. Picking a delicious broccoli head or a plump, healthy cabbage or some juicy strawberries can also become part of your daily garden walk.

CHAPTER SEVEN —

PLANT PROPAGATION AND SEED SAVING

Seedlings

You can buy seedlings of many vegetables from nurseries. However, there are several disadvantages. Many varieties suitable for your own area will not be available, and only a limited variety of plants will be available as seedlings. Also, seedlings are usually grown under shade cloth and are often difficult to transplant. Plants grown from seed into their permanent positions are usually much stronger when they're young, and they mature more quickly than bought seedlings.



Growing Plants from Seed

Wherever possible, always select non-hybrid seed to grow. These plants will produce 'true to type' and you can save the seeds for the following season. Second generation seed grown with organic methods will also give better, healthier fruit and vegetables.

Hybrid seed is developed by the repeated crossing of two or more lines of parentage for larger and bigger crops. Seeds saved from hybrids are usually sterile. However, if they do germinate the plant may not resemble its mother plant in any way. Hybrids are also often specially bred for use with petro-chemical fertilisers and pesticides although some hybrid types respond quite well to organic growing techniques.

Many hardy plants can usually be started in beds in the garden. Corn, pumpkin, cucumbers, zucchini, carrot, beetroot, lettuce, beans and peas can be grown this way. More tender plants, slow growing plants and those which require a long time to germinate are usually planted in seed containers where they can be more closely monitored. Eggplant and capsicum are best started in containers.

Seed planting depth

The depth of planting depends upon the size of the seed and the season of the year. The usual rule is to plant a seed at a depth that is three to four times the size of its diameter.

Seeds need air as well as water during germination so don't plant them too deep. Fine seed can simply be sprinkled onto the top of the soil and firmed down with a board. When you're planting in containers thin the plants when the first pair of true leaves has formed. These plants can be discarded or replanted into small pots until they're big enough to go into the garden.

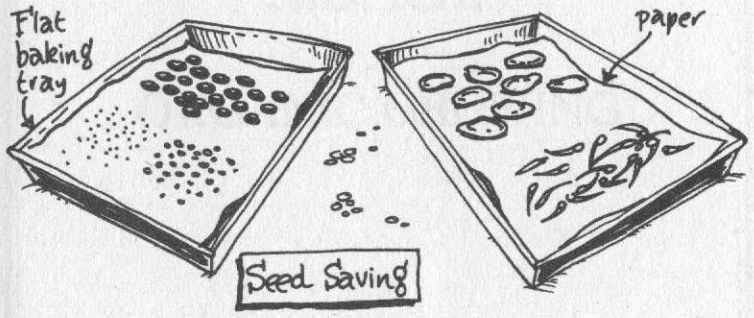
A good soil mixture for growing seeds and replanting is a mixture of sand and loam with a little compost. About two weeks before planting into the garden, harden off the seedlings by putting them in the midday sun each day for a few hours. Plant them out when they're about 16 cm high.

If you're planting seeds directly into their permanent positions thin out any excess plants when they're 16 cm high and transplant them to other areas in the garden. This applies mainly to corn, tomatoes, silver beet, celery and lettuce because these vegetables transplant well.

Saving Seed

When you're growing plants for seed, it's important to allow only the best plants to set seed. The plant that produces the largest seed pod is not necessarily the one with the best seed. Plants that grow as you want next year's crop to grow should be chosen for seed. Silver beet and spinach which produce the most leaves should be used. If you want an early crop of plants like corn and tomatoes then you should save the first fruits.

Some vegetables such as the root vegetables, parsley, cabbage and brussels sprouts are biennials and will not produce seed the first year. Wherever possible seeds should be allowed to dry on the plant. This is important with beans and peas, corn, root vegetables and spinach.



Fruit seed

Seed embedded in soft fruit should be left on the plant and not harvested until the fruit is somewhat overripe. Tomatoes, squash, cucumbers and eggplant are treated in this way too. When the fruits are taken indoors the seeds should be scraped out and soaked a day or more in water. Like berries they will start to ferment. When it has fermented a little the pulp may be loosened by rubbing it between the hands. Then lift the seeds and dry them on sheets of paper.

All seed should be thoroughly dry before it is stored. Drying should be done in a warm room that has good ventilation. As it dries stir the seed occasionally to prevent mould. Most seeds are best stored in glass jars. Storage in the dark is preferable to storage in the light. Onions, leeks, parsnips and corn seeds are only viable for a year. Beans, peas, cabbage up to three years and melon seeds will still germinate and produce up to seven years after harvesting.

Seeds for your region

Some plants, vegetables, fruit trees and ornamentals seem to prefer certain areas. Check around your area and see which plants are doing well in neighbourhood gardens and orchards. Persisting with a plant that is difficult to grow in your area will put it under stress and it mightn't thrive as it should. Choose plants that grow easily and commonly in your own area and you will have effortless gardening and a great deal of success.

SECTION TWO

TROPICAL ORGANIC GROWING

CHAPTER 8 —

UNDERSTANDING TROPICAL SOILS AND RAINFALL

Australia is an ancient continent, with soils leached through the ages by sun and rain. In the tropics particularly, where heavy seasonal rains are commonplace, many essential nutrients can be leached from the soil.

Most soils in Australia are acid but in the sub-tropics soils tend to be even lower on the pH scale, due to the excessive leaching which takes place. Soils are usually in the range of 4.5 to 5.0 and, without some adjustment to correct this acidity, plants will have difficulty thriving and growing. Lime or dolomite must be applied constantly to adjust the pH level and after heavy rain extra lime should be added to the garden.

With combined heat and moisture organic matter in the soil breaks down more rapidly than in more temperate climates. In warmer areas always be extra generous with the amount of organic matter you add to the soil because during the hot summer months it will virtually 'vanish'.

If decomposition is taking place rapidly you should apply a good top-dressing of compost (plus extra mulch) around vegetables, fruit trees and other plants to add nutrients and keep plants growing strongly.

Coping with heavy sub-tropical rainfall

You should apply granite dust or rock phosphate more often if the season has been excessively wet, together with good quantities of animal manure, green manures or compost. Although rock phosphate is not water soluble, the important micro-organisms, which are essential for the release of phosphorus to the plants, may be depleted due to the excess moisture in the soil. The manures will supply these tiny creatures with much needed nourishment.

If your garden is a wet soggy mess after heavy rainfall there is a solution to this problem. Heavy, wet soils should not be dug over — the result will be large sticky clumps of soil which will dry out into hard, rock-like lumps. If the wet weather has passed and you wish to plant some more crops, simply pull out the old crop together with weeds, spread animal manure, lime and compost, and mulch heavily with blady grass hay, lucerne or straw.

Make 'holes' or 'lines' in the mulch, fill these with compost, and plant up with seeds or seedlings. When the roots of the plants have reached down to the wet soggy soil, it will have drained enough for them to penetrate. Crops grown this way are quite successful. This method is of course similar to no-dig gardening, where the ground does not have to be dug over.

Waterlogged plants can become very susceptible to insect and disease attack. If the plant roots have started to rot, they can be left in place, and when the soil dries out, amazingly, they will develop a new root system and grow vigorously once again. Sometimes however, it is easier to pull some crops out and begin again.

When you're establishing a vegetable garden in warmer climates, always ensure that the garden has adequate drainage. A slight slope is ideal because most plants do not like 'wet feet'.

Before planting fruit trees or ornamentals, check the land to see where the excess water drains or lies on the ground. Plant trees on high mounds of soil if there are no suitable high areas, or select the higher parts of the garden for planting.

When I first moved to my own property I was anxious to begin planting my fruit trees. I chose a suitable slope for growing citrus, and soon oranges, mandarins and limes were becoming established. It seemed a perfect place — until the first heavy seasonal rains. The area became a huge drain for the land bordering my own orchard. Within weeks, most of my citrus had died, leaving one lonely orange tree together with one lime. This area is now planted up with Australian native trees and shrubs particularly selected to withstand 'wet feet'.

CHAPTER NINE —

NO-DIG GARDENING IN THE TROPICS

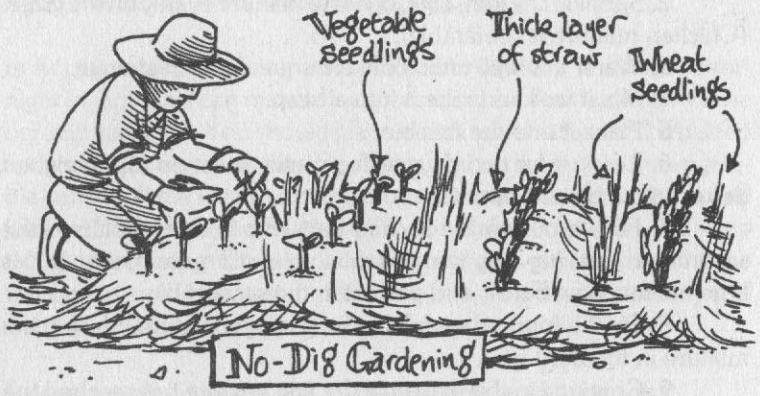
Before beginning your new vegetable garden, it is a good idea to have some well-made compost available to give your seeds or seedlings a good start. When you're selecting a suitable site be sure that the area is free from vigorous weeds or grasses (nut grass will penetrate a layer of plastic without any problems at all). Remove any larger weeds or grasses by hand before mowing the area. A site which is gently sloping is best, so that excess water from seasonal rains will drain off easily.

Follow the guide in the previous section on no-dig gardening, however, extra thicknesses of newspaper can be used because decomposition is much faster in warmer climates than temperate zones.

A good mulch hay available in some areas is blady grass hay. This consists of good, strong grass with no seed at all. A layer up to 20 cm thick can be used: it is amazing how quickly it will break down. Some straws can contain wheat seeds, which can be quite a nuisance when they germinate and grow through the mulch. Ask your supplier which type of straw you are purchasing.

After the no-dig garden is in place, water it for three or four days only. This will be quite sufficient to start decomposition. Mix the compost with equal amounts of soil from another part of the garden. After placing the mixture in 'holes' or 'lines' you can begin planting up.

Establish a small area first, growing a few of your own favourite vegetables. Maintain this initial garden for a few weeks before extending. If you feel you can manage a larger area, you can enlarge a small vegie garden with minimum effort using the no-dig gardening method.



Advantages and problems with compost-making in tropical climates

In hotter areas, where the sun's rays are actually much stronger than in more temperate climates, it is important to establish the compost heap in the coolest, shadiest place possible. The heap must not be allowed to dry out, especially in hot weather. Plan to water the heap when you're watering the garden.

If your district is expecting extended heavy rain, cover the heap with a piece of heavy plastic because wet soggy compost will encourage anaerobic bacteria (tiny creatures which live without air) to breed. These organisms will tend to make the compost smelly and heavy, and normal decomposition will be incomplete.

Compost can be made in warmer climates in six to eight weeks. During the winter months it should be ready to use in ten to 12 weeks. Always cover the compost heap with a thick layer of mulch to keep it cool and moist.

Fourteen day compost

You can make compost in 14 days, using the following method.

You'll need seven or eight wooden open bins. They can be built using old tin or boards but if they are made with slats and bolted together they can be moved to another position in the garden. Small sheets of tin can be placed at the front of the bins to keep the mixture in and the weather out.

1. Spread cut grass on the ground (near the bins). Short lengths of grass are best (for example grass clippings).

2. Sprinkle chicken, cow, or horse manure evenly on the grass. (Chicken manure is preferable).

3. Water this well until it's like a squeezed out sponge.

4. Mix it well and rake it into a heap.

5. Place it into the first bin.

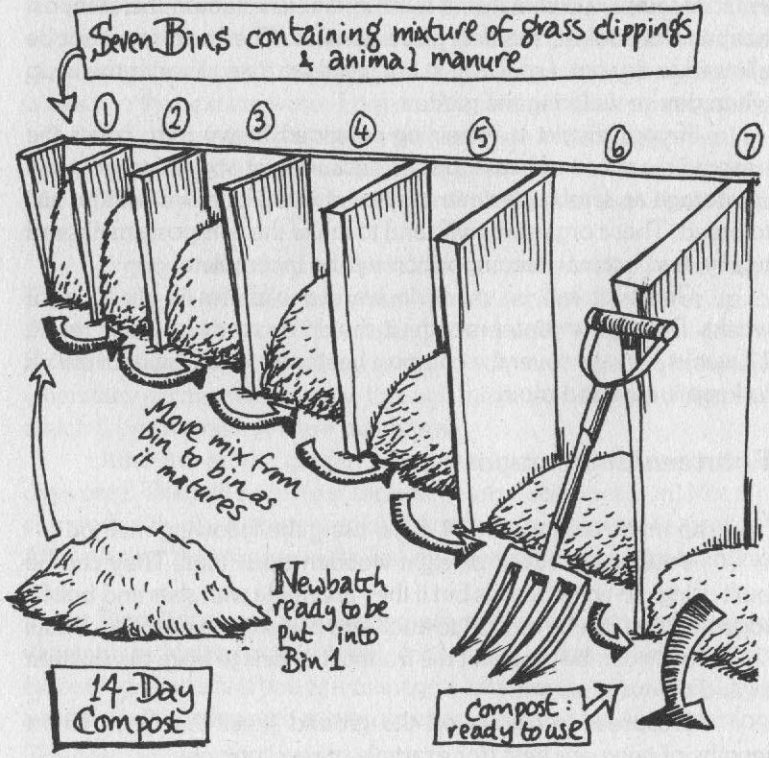
6. Leave it for two days with a plastic sheet on top (weighed down with a block of wood).

7. Fork it out on the second day, mix it, and put it into the second bin, making sure that the mixture is still quite moist. At this time make a new batch, and place it in the second bin.

8. On the fourth day, follow the same procedure, placing the mixture in the third bin.

9. Continue in this way until the first mixture has reached the seventh bin. By this time the compost should be cool to touch, sweet-smelling, and ready to use.

You can use this method of compost-making if you need compost quickly, or if you need a continuous supply.



MULCHING IN WARMER AREAS

In hot climates, weeds can grow incredibly quickly — almost overnight in fact. This can make a lot of hard, back-breaking work for the organic gardener. You should place a thick mulch at least 20 cm deep around fruit trees, ornamental gardens and particularly in the vegetable garden. If the weather is dry and hot, the mulch should be pulled back before you water. If you do this you'll conserve water and keep the ground cool and moist. Some strong growing weeds will push through even the thickest mulch. However, they'll pull out easily and quickly so you can enjoy other more interesting activities.

Layer mulching in the sub-tropics and tropics

Layer mulching was developed in the sub-tropics and is extremely useful for making 'compost' right where you're going to establish a garden. You place various materials (see below) in layers, although the method of applying the mulch layers is the reverse of that used in building the compost pile, where the heaviest material is on the bottom.

With layer mulching you need the lightest material available for the speediest breakdown. This happens when a concentration of micro-organisms, bacteria, and earthworms are attracted to the soil's surface. These minute creatures will move upwards into the second layer of material after ingesting the first layer.

Of course, the easiest way to apply mulch is on unplanted soil. However, if you're converting an orchard or plantation to enjoy the numerous advantages of layer mulching, obviously you must mulch around the existing plants. When you do this be especially careful to maintain a clearance of about ten cm from tree trunks to allow air to circulate.

Layer mulch

Layer 1. The first layer of material should be readily compostable, and comprise matter such as vegetable refuse and leaf compost, finely chopped clippings and peat moss. (A mixture of sawdust and leaf compost would be fine.) You should apply it to a depth of four to eight cm over the full area, depending on the type of crop, season and rainfall.

Layer 2. Now apply a liberal sprinkling of dolomite, somewhat

heavier if Layer 1 comprises the maximum eight cm of compost. Broadcast this by hand.

Layer 3. This is a medium, heavy layer of grass clippings, wood scrapings or shavings, coarser vegetable refuse or similar material. A small crop of beans or peas grown the previous season could supply this material. A layer six cm deep is preferable.

Layer 4. The heaviest material, such as longer grasses or hay, makes up the top layer. It should be applied to a thickness of eight to 15 cm, again depending on the crop, season and rainfall.

If you get no rainfall within a week of the mulch being laid, a good watering is advisable. It will probably be the only watering necessary unless a drought occurs. Don't layer mulch in cold weather — this will only trap the coldness in the soil.

If you do it correctly, mulching will successfully maintain a reasonable residue of summer warmth in the soil throughout the winter. Layer mulching should not be applied when the soil is saturated with moisture, such as during times of heavy rains. Allow a reasonable amount of evaporation to occur before applying your mulch cover. The best time to apply it is several days after good soaking rains when the soil is warm, and before planting.

You then plant your crops through the mulch by parting the covering to soil level, to provide only sufficient space for the actual seed or seedling. This can happen year after year because your soil will never again become exposed to the light, except after very heavy rains, when the mulch should be raked off and the soil allowed to partially dry out.

QUICK COVER CROPS

Cover crops will grow quickly in warmer climates. A quick growing cover crop can smother weeds and provide green manure when turned back into the soil. If an area of the garden has got out of hand with a heavy weed infestation, simply mow the weeds down and sow a cover crop directly into the weed mulch. If sown thickly, the plants will smother the weeds quite easily as they grow. Oats in winter and buckwheat in summer are suitable cover crops for this job.

Summer planting

Buckwheat is a good crop to grow in warm areas. It grows quickly and up to four crops can be harvested in a season. Sow seed thickly.

Mung beans are vigorous growers and can develop thick stems which are impossible to dig into the soil. Cut down the plants when they're 20 cm high.

Millet is a good crop for poor soils.

Winter planting

Oat seed is simply scattered onto the soil surface where it will germinate in five to six days. Cut it down when it's 15 cm high.

Fenugreek seed will germinate quickly and will cover bare soil in three to four weeks.

Field peas are a legume and a good crop to grow, although the seed must be covered with a fine layer of soil or mulch for good germination.

All plants contain the most nutrition when they're approximately two-thirds grown. If cover crops are allowed to go to seed, the nutrients in the plant leaves and stems will be contained in the seed. Never allow a cover crop to seed if it is to be used for green manure.

IRRIGATION AND WATERING

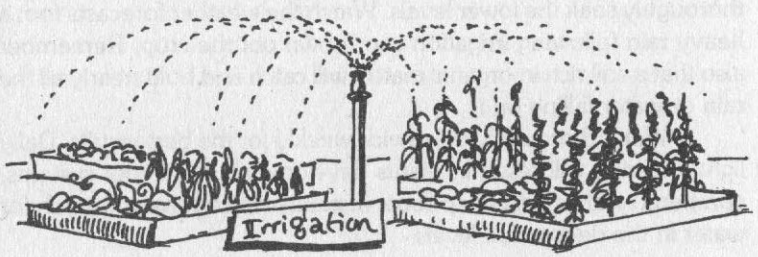
Irrigation is of vital importance in the garden, especially when water is in short supply. The following is a comparison of various systems.

Flood irrigation

When water is applied to an average garden using the flood irrigation method, only about half of the water actually gets to the plants' roots.

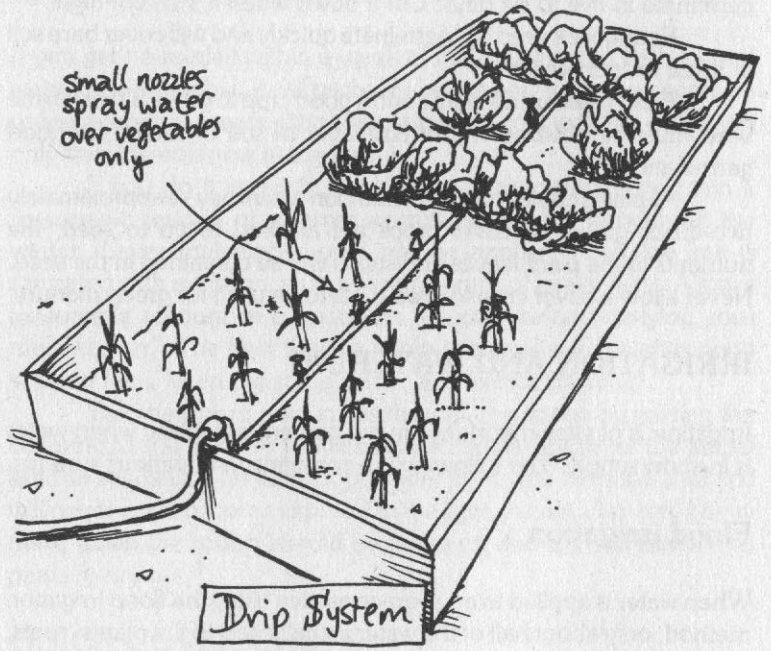
Sprinklers

This system rates only slightly better, delivering about 75 out of every 100 litres to the target area.



Drip system

A properly installed drip system can direct 90 to 95 percent of the water applied to precisely the right place. Before installing an irrigation system, it would be wise to talk it over with a competent irrigation company. Such people have a great deal of experience and can advise you about the best and most economical system for your garden or growing area.



Some tips about watering

You should water a crop when it normally makes its most rapid growth. Don't water faster than the soil can absorb it but be sure to thoroughly soak the lower levels. Watch the weather forecasts too: a heavy rain following irrigation can drown out the crop. Remember also that a soil rich in organic matter will catch and hold nearly all the rain or water falling on it.

Water thoroughly only twice weekly for the best results. Daily light watering will result in plants developing surface root systems, compared with strong deep roots of plants which have to search for water in the deeper soil levels.

HERBS THAT LOVE HEAT OR HUMIDITY

Basil loves the heat, and warm sunny days. Let a few plants go to seed in the garden, and each season new plants will grow again in spring. Prune back healthy plants and they will make new growth for the following summer. Grow it in frost free areas only.

Borage is an annual plant that will readily self seed. It grows to one metre, has large, green, hairy leaves and a taste of mild cucumber. The attractive blue flowers can be used to decorate food dishes. It's also a good animal fodder — goats love it!

Dill grows all year round and will self seed readily. Dill can be cooked with cabbage: it will eliminate the strong odour. It is excellent with fish and seafood. In the garden it helps cabbage, corn, lettuce and cucumber.

Rosemary loves hot sunny days, and prefers a dry, hot position in the garden. Although it grows slowly it is very ornamental and does not die down during the cooler months.

Thyme is a pretty herb that really does enjoy basking in the sun. Plant it around ornamental gardens, on patios, and beside swimming pools.

The following are herbs which are extremely difficult to grow in warm, humid areas.

Sage definitely dislikes humidity, and is very susceptible to root rot in warmer areas.

Chervil is a very delicate herb which also prefers a cool, moist climate.

Marjoram and oregano. For happy and healthy plants, grow these herbs in a cool, shady spot.

Mint can tolerate warmer areas, however it needs a cool, shady, and very moist area to thrive.

French tarragon is delicate and fragile, and is difficult to grow in hot, humid conditions.

CHAPTER 10 —

THE TOP TEN OF VEGETABLES

You can get more essential nutrition from your garden by growing the vegetables ranked highest in vitamins and minerals.

A fascinating study undertaken at a Californian university has revealed that many of our most popular vegetables are the lowest in nutritive values. Researchers studied 39 of our most popular vegetables and the following ten were selected as the highest in essential nutrients. For the home gardener, perhaps the best way to use a small area would be to grow vegetables specially selected for their high nutritional qualities.

Broccoli

At the top of the list of highly nutritional vegetables is broccoli. This green giant scores in the top ten for every single one of the vitamins and minerals included in the Californian study. Broccoli boasts more than twice as much vitamin C as an equal amount of orange. It is also a very rich source of vitamin A, both the major B vitamins, riboflavin, and the vital mineral calcium (it contains as much as whole milk). Broccoli also has plenty of iron, potassium, niacin and thiamin — quite a nutritional package.

Grow broccoli from May to September, depending on local climatic conditions.

Spinach (not silver beet or Swiss chard)

It seems that Popeye was even smarter than we thought, for spinach earns a top spot on the list. It emerges number one for iron content, second in calcium and riboflavin, and third in potassium and vitamin A.

New Zealand spinach is often used as a hot weather substitute for spinach. This type belongs to a different plant family and has much less vitamin A, C, calcium and iron. However, neither type contains oxalic acid as does silver beet or chard. Spinach is a cool weather vegetable so grow it only in the coolest months.

Brussels Sprouts

These miniature cabbages are third on the list. They stand a classy third for vitamin C, fourth for both iron and riboflavin, and also make the top ten for potassium, niacin, thiamine and calcium. Brussels sprouts need a long, cool, growing season of over five months, making them unsuitable to grow in warmer areas.

Lima Beans

This native of tropical America is fourth in rank, but provides the best source of potassium, out-ranking even watermelon in this vital mineral. The mighty lima also scores second in iron and thiamin, fourth in calcium, fifth in niacin and sixth in riboflavin. Plant lima beans during early spring in warmer areas.

Peas

Peas are fifth on the list. This soil-enriching legume scores highly in the various B vitamins and in iron. Peas are first in both niacin and thiamin, fifth in riboflavin and third for iron. Some varieties also have a high vitamin C content. Edible podded types contain more vitamin A and calcium than ordinary peas, but only half as much iron and potassium.

To squeeze in two crops of this cool season vegetable, sow them in autumn, then again in early spring, using a heat-resistant variety.

Asparagus

Asparagus is a dependable perennial that needs replacing only every 15 years or so. It is high in the three Bs, niacin, riboflavin and thiamin, and contains ample quantities of iron, vitamin A and vitamin C. Asparagus can be grown in some areas, providing the winter months are reasonably cool.

Artichokes

Artichokes are seventh on the list for nutritional value. These tasty thistles are comparatively rich in potassium, calcium, iron and niacin. Artichokes are a highly ornamental plant which you can landscape into shrub or flower borders. They prefer frost-free locations in winter and cool and foggy spots in summer.

Cauliflower

Cauliflower is eighth on the top ten list. One 100 g serving contains 66 mg of vitamin C, and valuable amounts of essential minerals. Cauliflower is easy to grow providing it has a deep, rich soil. Early maturing varieties can be grown in sub-tropical areas.

Sweet potato

The sweet potato is also very nutritious, and is an important food in many tropical regions of the world. It is extremely rich in vitamin C and contains more vitamin A than most other vegetables.

Fifty to 100 plants will produce an ample supply for the average family. Sweet potatoes are extremely sensitive to frost, although they will tolerate light frost damage. Sweet potatoes can be stored and enjoyed for several months. Place them in a well ventilated place, where temperatures are fairly high for ten to 15 days.

Carrots

Number ten on the list is the humble carrot. It is the highest in vitamin A, and ninth for both potassium and calcium. To get the greatest amounts of calcium, calories and vitamin A, let your carrots mature right in the ground, and dig them up only when you need them. Grow carrots during the cooler months.

SECTION THREE

GROWING POPULAR VEGETABLES AND FRUIT

CHAPTER 11 —

LET'S GROW SOME VEGETABLES

The following list covers the most popular and easy to grow vegetables for warmer climates. When sowing seeds, it isn't that important to place the seeds in a straight row. I remember when I was a child, watching my father plant his seeds. He would put two wooden pegs into the ground, then tie string from one peg to the other in order to have an absolutely straight row of plants! Seeds can be planted in circles, curved rows, or 'almost straight' rows. It really doesn't matter. In Nature, seeds usually grow best in the most suitable spot — never in a straight row.

Try not to grow plants out of season: peas in the warmer months or in areas too warm and humid for them to thrive. Remember a plant under stress will invite attack. Many crops grown during the summer months in temperate zones, can be grown during the

winter months in warmer climates. Tomatoes, beans, lettuce, shallots, radish and eggplant are just a few of the 'summer' vegetables that can be grown during late autumn and winter.

There are some vegetables that cannot be grown in warmer areas. Broad beans will grow beautifully and flower, but will fail to set more than a few pods. The extremes of day and night temperatures often experienced in sub-tropical and tropical areas inhibit fruit setting. Brussels sprouts need a long cool to cold growing season (up to six months), and will not tolerate warm weather. When growing cabbage or cauliflowers, choose varieties that mature quickly and are fast growing.

During the summer months, when the heat and humidity are at their peak, some areas of the garden can be rested. Remove spent crops and weeds, and cover the beds with a thick mulch. Leave them until the weather has cooled down before re-planting. The combination of moisture and the hot sun can cause fruit such as tomatoes, cucumbers and capsicums to literally 'boil' in their skins, and they can rot on the plant.

Smaller vegetables, such as lettuce, parsley or 'bush' tomatoes, can be covered with shade cloth to protect them from the hot sun. A light frame built over the garden bed and covered with a good shade cloth can be quite efficient, and will enable gardeners in hot climates to grow some cooler weather vegetables during the warmer months.

Alternatively, vegetables can be grown in a shady part of the garden. Many areas have totally different micro-climates. For example, a coastal area might be hot, humid and frost free, whereas the hinterlands are cooler in summer and winter, with some frosts. The tablelands are cooler and with quite different growing conditions to adjacent coastal regions.

Study the vegetables that friends or neighbours grow successfully in your own area.

Asparagus

It is possible to grow asparagus from seed, but an established planting reaches the cutting stage much earlier if you buy and plant one year old crowns.

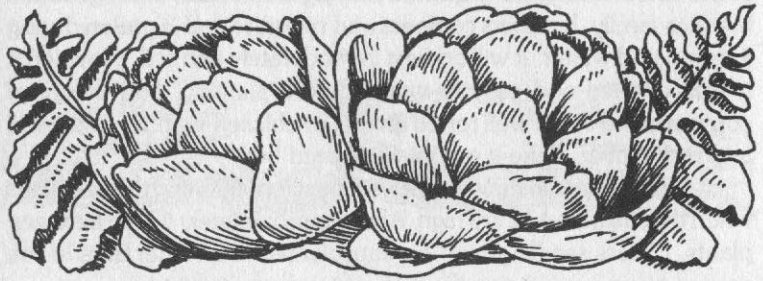
Select a special area in the garden because these plants will

stay in their permanent position for up to 20 years. The crowns should be planted in the spring. Dig a trench approximately 40 cm deep and about 25 cm wide. In the bottom of the trench place an eight cm layer of rich, well-made compost. The rows should be one and a half metres apart. Place the crowns into the trench half a metre apart and 25 cm below ground level.

Cover them with a good eight cm layer of compost and water them in thoroughly. During the summer, the trench should be slowly filled with a mixture of fine topsoil and composted material. Do not fill the trench too quickly, or the plants will be stifled. Asparagus develops powerful fleshy roots, which can spread downwards and outwards to a distance of nearly two metres. This is why they require quite a lot of space in the garden and an ample supply of food.

Mulch the asparagus twice yearly with compost and well rotted animal manure for approximately two years. At this stage the feathery foliage should be cut down to ground level in late autumn and the plants mulched thickly with this material, together with straw or hay. In the following spring, shoots can be harvested when they are about 15 cm high.

Shoots can be cut below ground level, or at the surface. All shoots can be harvested for about 12 weeks. After this the plants should be allowed to develop foliage until late autumn, when once again, the foliage is cut down. Asparagus is not affected by many pests and diseases so normal garden hygiene should ensure healthy plants.

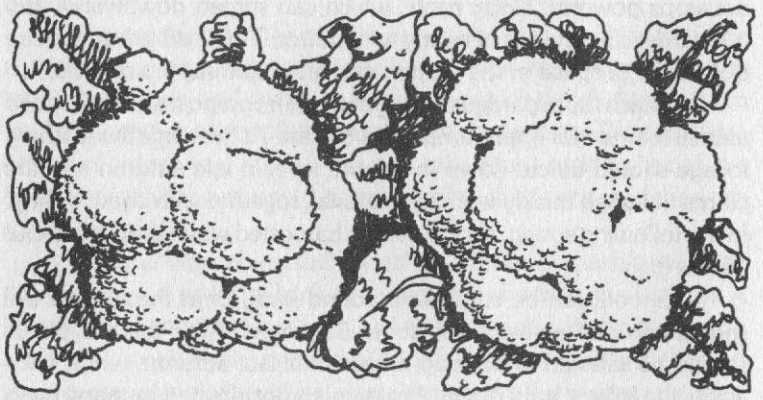


Globe artichokes

Artichokes are a herbaceous perennial, growing one to one and a half metres tall. They have large lobed leaves and good sized heads that take on a violet shade as they ripen. The base of the scale of the unripe flower head, along with the bottom part of the artichoke, can be eaten either cooked or raw.

Plant them as started seedlings in trenches 20 cm deep, lined with three cm of compost or well rotted manure. Plant them 15 cm below the surface, cover them with soil and tamp down firmly. When the plants are 15 cm high, mulch them heavily to preserve moisture.

Cut away all but six of the suckers that develop at the base, and transplant the suckers to a new row. Protect the artichokes with shade cloth until they're established. Cut the plants down to ground level in the autumn. During dry weather, water them thoroughly, and supply a thick mulch of half rotted manure between the rows.



Broccoli

Broccoli is a hardy, fairly quick maturing crop which belongs to the brassica family. It prefers coolness and moisture and is grown during autumn and winter. It will do best in moderately rich soil, provided it is well drained and easy to work. Before planting, add plenty of compost, and some well rotted animal or chicken manure to the soil and fork it over. Rake it out to a fine seed bed.

Plant seeds in their permanent position, thinning the seedlings when they're about 12 cm high. Allow approximately 45 cm between plants. Excess seedlings can be transplanted to another area in the garden or you could give them to a friend or neighbour.

After the main head has been cut, small lateral shoots will develop in the axils of the remaining leaves. These small shoots are delicious in stir-fries or salads, and should be picked regularly to promote new growth. In this way broccoli can be harvested for up to four months in some areas.

Bacillus thuringiensis (Dipel) can be used to control cabbage butterfly, which may attack some plants.

Beans

French beans are always a great favourite with every family and are easy to grow. Both dwarf and climbers can be grown, although the climbing varieties do require the extra work of building a trellis or similar climbing structure. Beans require a pH of about 7, and will not tolerate acid soils. Add lime or dolomite before planting. A generous amount of compost should be added, although this is not necessary if you're growing beans after a heavy feeding crop.

Place two seeds to each hole about 10 cm deep, and approximately 10 cm apart. Mulch lightly with straw or dried grass clippings. As the plants grow, add mulch right up to the first leaves, as this will help to combat bean fly, and also support the plants as they grow. Foliar fertilise the plants with any good liquid fertiliser every 14 days, and when they begin flowering.

Pick the pods regularly while the seeds are still small, to keep the plants producing. Two rows three metres long will be quite adequate for the average family. Seed should be planted every 14 days to ensure a continual supply. In hotter areas, choose the 'snake bean' variety.

Beetroot

Beetroot grows best in soil that has been well manured for a previous crop. Plant the seeds from March to October. A beetroot seed is actually a cluster of seeds, so several seedlings will grow from one seed. Sow them in rows about 15 cm apart. Thin them when they're 10 cm high, removing any weak plants. Beetroot transplant easily, so any strongly growing seedlings can be planted elsewhere in the garden.

Pull them by hand when the globe-shaped roots have reached a reasonable size. If they're left to grow too large they will become woody and tough. Twist off the leaves, because cutting will result in the root 'bleeding'. Beetroot can be cooked as a hot vegetable, cold, sliced in vinegar for salads, or eaten raw. It can be picked from the garden as needed, but the roots will become tough and stringy in hot, dry weather.

Cabbage

Cabbage grows well where there is a good supply of moisture and the weather is cool. It can thrive in almost any kind of soil, but prefers one enriched with well rotted animal and chicken manure. The Sugarloaf and small hearting varieties are the best to grow because they will mature in ten to 12 weeks.

Sow the seed two cm deep, with 30 cm spacings. Rows should be approximately 40 cm apart. Because the seed is small, it is difficult to sow to the exact spacing necessary therefore, when the seedlings are about 10 cm high thin them out or transplant them to the correct spacing.

Foliar fertilise cabbages regularly to promote health and uninterrupted growth. Cutworm, which can cut off young seedlings at the base, can be controlled by placing a match into the soil next to the stalk of the plant. Protect them from cabbage butterfly with Dipel. Cabbage is an excellent source of vitamins and minerals, and was used in ancient times because of its health-giving qualities.

Chinese cabbages can be grown if you want a quick crop — they are excellent in stir-fries.

Carrots

Carrots need a deep, friable soil and a sunny position. Sow the seed directly into their permanent position three to six mm deep. Rows

should be approximately 23 cm apart. Thin the young seedlings to seven cm apart to allow the carrots space to grow and develop. Carrots can be grown after peas or beans without any additional fertiliser being added to the soil. Choose a medium length variety for best results. Sow the seed in autumn or during the cooler months. Mulch lightly for good germination, because it is essential that carrot seed be kept moist. Carrots respond extremely well to moon planting.

Cauliflower

Cauliflower needs a humus-rich soil if it is to produce well. It also prefers a soil pH of 6.5 to 6.8. Before planting, add lime and large amounts of animal and chicken manure because cauliflowers are an extremely heavy feeder. Sow seed or seedlings from March to May. Keep them moist during all stages of growth. When the curds form, bend a few leaves over them to protect them from the sun and to keep the curds white. Select a variety which will mature in ten to 12 weeks or earlier. Protect them from cabbage butterfly with Dipel.

Celery

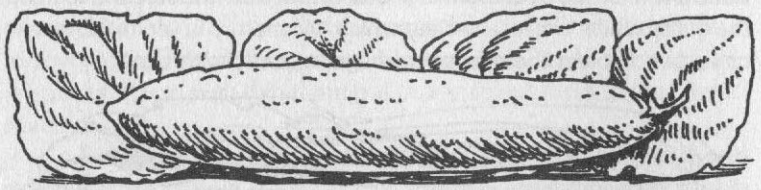
Celery is a popular salad and soup vegetable but is not the easiest vegetable to grow. With lots of care and attention it can be grown successfully. Although celery has traditionally been grown in deep trenches to produce white stalks, there are varieties now available which do not need this special treatment.

Because celery seed is tiny and slow to germinate, sow it in seed trays and then transplant the seedlings into the garden when they're 15 cm high. Alternatively, you can buy established seedlings. Celery must have constant moisture so add plenty of compost and well rotted manure to the soil before planting to increase the water-holding capacity of the soil. Do not add lime because celery prefers a pH of 5.8 to 6.0 (slightly acid).

Plant out celery into the garden between March and April, placing the plants approximately 30 cm apart. Mulch them well. Stalks can be harvested when fully developed. Leaf spot is the main disease to affect celery — control it with Bordeaux mixture.

Choko

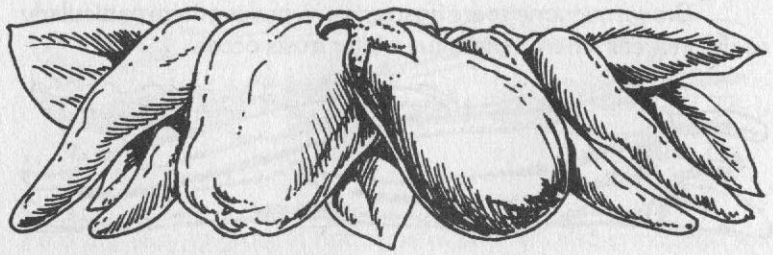
Choko is a useful climbing plant to grow over the chicken yard, or on a trellis or fence. It will produce well if planted in a sunny spot in medium-rich soil. Start from a sprouted tuber which should be placed eight cm below the soil level. Water it regularly and the fruits should be ready for picking in four to five months. One plant is generally sufficient for the average family. Years ago, poor families cooked sliced choko in sugar and water to produce 'mock stewed pears'. The result does actually taste like pears.



Cucumbers

Cucumbers are a welcome addition to summer salads and they're easy to grow in the home garden. Crystal apple is a heavy yielder with apple shaped fruit. Green gem also produces well. Allow quite a large area for this crop because, being a vine it will spread rapidly as it grows. In the centre of the bed dig a hole 30 cm square and fill it with a mixture of compost and well rotted manure.

Sow four to six seeds in this prepared area and apply a light mulch. Thin out the weaker seedlings when they're 10 cm high, leaving three plants to grow on. Plant seeds from September to December. When the vines are well established mulch them heavily to keep the fruit clean. Foliar fertilise them with seaweed every two weeks to help control moulds and mildews. Delicious cooked in stir fries!



Eggplant and Capsicum

Both these vegetables love hot conditions, and will thrive in even very hot areas. Sow the seed from August to December in rich, well-drained soil. Transplant the young seedlings into their permanent positions when they're approximately 10 cm tall. Plant them 75 cm apart. Both of these vegetables will crop over quite a long period, usually about five months. Mulch them well with compost and straw or hay.

The seeds of both eggplant and capsicum are very slow to germinate, and also grow very slowly into a reasonably sized seedling. It may be an alternative for impatient gardeners to buy established seedlings.

Lettuce

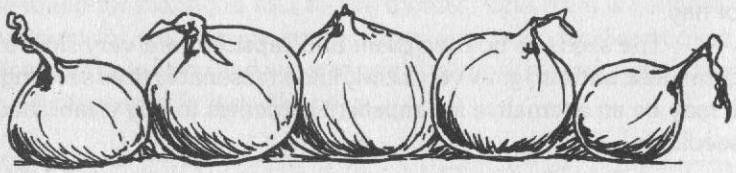
Lettuce is the most popular of all salad vegetables and can be grown all year round in most gardens. There are many varieties available, ranging from the large, solid-hearting lettuce to the small mignonette, with its fine, soft textured leaves. Lettuce enjoys a soil rich in organic matter, with good water-holding capacity for constant moisture. It prefers a pH of 6.5, so add some lime to the soil before planting.

It is best to sow lettuce seed in their permanent positions in the garden because seedlings are very delicate. Thin them out to 25 to 30 cm apart when they're five cm high. For a continuous supply sow little and often. Mulch with hay or straw to conserve moisture. During hot summer weather avoid watering in the heat of the day to reduce the likelihood of internal slime. This condition makes the lettuce unsuitable for use while the outer leaves appear unaffected.

Brown mignonette are frost resistant, making them particularly useful in areas where occasional winter frosts occur.

Okra

Okra is a good vegetable to grow in the hot summer months and thrives in humid conditions. This plant needs a rich soil and seed should be planted from August to December. Plant them approximately 45 cm apart as the bushes can become quite large. The pods will be ready to pick in six to seven weeks. Use okra in stir fries and soups.



Onions

As there are many different varieties of onions available, choose one which will suit the climatic conditions of your own area. An early maturing variety would be best for warmer areas. Prepare the onion bed at least two months before planting. Dig it over thoroughly, adding compost, lime and well rotted manure. After raking the bed to a fine tilth, make shallow drills 30 cm apart. Sow the seed thinly in rows and just cover the seed with soil or sifted compost, firming the rows with the back of a rake. Mulch lightly. Use a compost mulch when the seedlings are established taking care not to bury the swelling bulb which need the sun to mature.

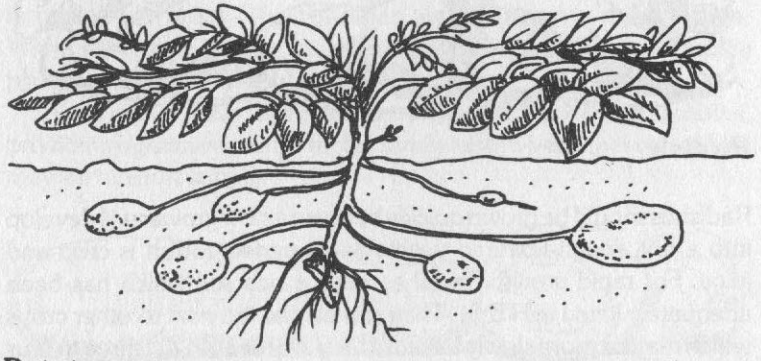
Thin out the seedlings in two stages, the first to five cm apart and the second to 10 to 15 cm apart. The thinnings can be used like spring onions or shallots. Plant the seed during July and August. Do not plant onions out of season because the onions will bolt to seed and fail to form satisfactory bulbs. When the leaves have turned yellow and shrivelled, they are ready to harvest. Choose a dry day and pull them out by hand. Dry them in the sun until the leaves are brittle. Store them in a cool, dry place.

Peas

Peas are easy to grow in hot climates and will also enrich the soil because they are a legume. Plant them after a heavy-feeding crop such as cauliflower or sweet corn. All peas need is a little compost and lime added to the garden bed before sowing the seed. Peas prefer a pH of 6.5.

Peas are a cool season crop and sowing times should be based on local conditions. There are many types to choose from, dwarf or climbing, or edible podded peas such as snow or snap. Plant seed directly from May to July either in rows or circles, tamping the soil down firmly over the seeds. When the plants are about eight cm high give them a little support with twigs or pieces of cane. Mulch them lightly. Pick the pods regularly from the bottom of the plants as they fill. Snow peas or climbing peas will need a trellis to grow on.

Heavy frost will prevent flowers from setting pods so in areas prone to frost, sow when flowering will not coincide with a high risk of frost. High day temperatures will also prevent the flowers from setting. When the first pods are ready to pick, don't let the children know (most kids love 'em raw), because very few pods will find their way into the kitchen!



Potatoes

Potatoes should be grown in the ground in warm climates. Mulching is satisfactory only in cooler areas because warmth heats up the mulch and rots the potato stems.

For the best results, tubers (seed potatoes) should be encouraged to sprout before you plant them. Buy your tubers early to allow six weeks for good sprouting. Used egg cartons are good for this. Place the tubers in them with the 'eyes' of the potatoes at the top. Place the boxes in the light, but not in the sun. When the shoots are about two cm long, plant them into the garden.

The planting area should be carefully prepared, adding well rotted manure and compost. Make V-shaped drills at least 12 cm deep and 60 cm apart. Plant the tubers with care with the sprouted end uppermost, discarding any which are weak or diseased. Gently cover them with soil and tamp down. Mulch the area with a five cm layer of mulch.

When the plants are 15 cm high, loosen the soil between the rows with a fork and draw the soil towards the plants from each side of the row. Repeat this when the plants are 30 cm high. Early varieties will be ready approximately ten to 12 weeks after planting. When the flowers are fully open dig up a root to see if the potatoes are large enough to eat. Plant them in frost free areas in late autumn.

Always choose early varieties, because these will mature before the hotter weather. Never dig up more potatoes than you need for one or two meals. While they are still in the ground they will continue to grow. It is best to grow several successive crops for a continuous supply because potatoes do not store well in warm areas.

Radish

Radishes should be grown quickly because a slow grower will develop into a hot, rough-textured vegetable. A perfect radish is crisp and juicy. For rapid growth, radishes need a rich soil which has been adequately limed (pH 6.5). They can be planted next to other crops which mature more slowly because they are ready to eat three to four weeks after sowing.

In mid-summer, grow radishes in a shady spot in the garden. In some areas they can be grown all year round. Sow the seed thinly in a shallow drill and cover with soil. Allow 15 cm between rows. Pull radishes while they're young, when they are about the size of a 20

cent piece. This tasty, quick and easy to grow salad vegetable is great for children's gardens — it gives them quick results. Small, round, red radishes stay crisp longer than the longer rooted varieties.

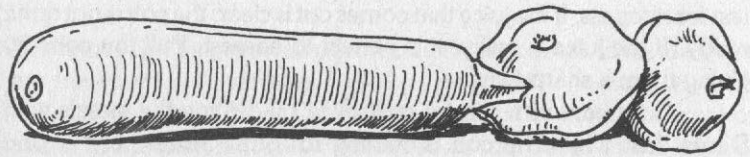
Shallots and Spring Onions

There are two main varieties: bunching onion and spring onions. Spring onions mature quickly and can be pulled as needed. Bunching onions grow more slowly but as the name suggests, they grow in a small bunch. To harvest onions, pull them from the outside of the main stem. Plant the seed from February to September into a light, well drained, rich soil. It is not necessary to thin them out.

Silver beet or Swiss chard

Silver beet grows in the tropics as a replacement for spinach, which prefers cool conditions. Silver beet is easy to grow from seed, and requires a rich soil to produce successfully. Sow the seed direct three cm deep, five cm apart. Thin the young seedlings when they're 10 cm high to a spacing of approximately 30 cm. May to June is the best time in most warm areas. Silver beet can also be grown in a shady area. When harvesting, the leaves should be pulled off at the base of the plant to prevent rotting of the central stem.

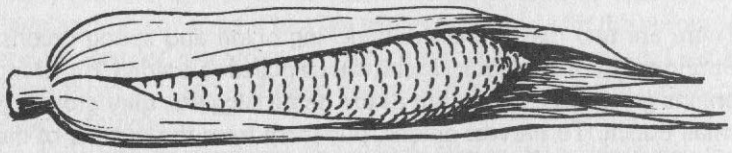
In cooler areas silver beet can produce for up to eight months, providing a green vegetable for the family table when other vegetables may be in short supply.



Squash and Zucchini

Squash and zucchinis are heat-loving vegetables and can be planted from May to February in sub-tropical and tropical areas. Prepare the

bed the same way as for cucumbers, allowing plenty of room: the vines can grow up to six metres long! Six seeds should be planted in each area. When they're 10 cm high, discard the weaker plants leaving two vines to keep growing. Pick the fruit when it's young. These two vegetables are very subject to mildews, especially in warm, humid weather. Remove any infected leaves and burn them. The plants will usually 'grow out' of the problem.



Sweet corn

Sweet corn is an extremely heavy feeder and the garden area for sweet corn should be thoroughly forked over, with generous amounts of compost, animal and bird manure incorporated into the soil. Sweet corn also requires lime because it prefers a soil pH of 6.5 to 6.8. Planting time depends on each particular region. Corn is a warm weather crop, needing a temperature range of 10° C to 35° C. However, air temperatures over 35° and hot drying winds can cause poor pollination and rapid maturity.

You can make a succession of plantings throughout the season to ensure a continuous harvest. Plant the seed in blocks in a number of short rows 60 cm apart. This increases the chance of pollination — the male flowers are at the top of the plant and the pollen has to fall, or be carried by the wind onto the silks of the female cobs lower down. Mulch corn lightly at first, increasing the mulch thickness as the plants grow.

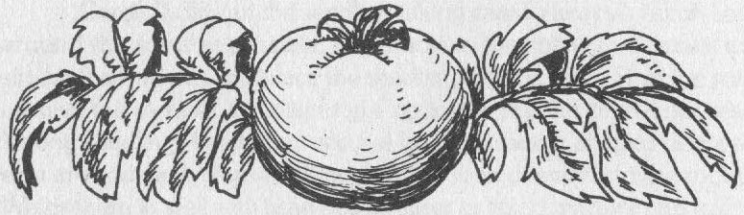
Apply liquid manure occasionally to encourage strong growth. Cobs should be ready to harvest in approximately ten weeks. When the silks turn brown and wither press one of the sweet corn seeds to test for ripeness. If the juice that comes out is clear, the cob is not quite ready. If the juice is milky, it is perfect to harvest. Pull the cobs by giving them a sharp twist.

Corn earworm can be controlled by dusting the tassels with Derris dust when the cob is starting to form. Sweet corn is one vegetable which should be picked and cooked within a few hours (or even minutes) of harvesting. The natural sugars in corn quickly change to starches after picking, resulting in a dry flour-like flavour and consistency. Corn, straight from the garden — absolutely delicious!

Sweet Potato

Sweet potato can be grown successfully in most warm areas because it enjoys lots of moisture and heat. It will be damaged by heavy frost although sweet potatoes will tolerate light frosts. Because these tasty tubers are deep rooting, thorough preparation of the soil is necessary. Humus-rich sandy soils are ideal. Dig plenty of well rotted manure and compost into the soil before planting. Stem cuttings or shoots from a root are planted out from October to November, 30 cm apart. Rows should be one metre apart. There are two main varieties of sweet potato: orange and white fleshed. Individual flavour is a personal preference. The tubers can be harvested 16 weeks after planting.

Select a special area in the garden and edge it with old railway sleepers (or similar) because runners can tend to spread very quickly. Any runners that grow over the edge can be cut off and put on the compost heap (or fed to the goats — they love 'em!).



Tomatoes

Tomatoes can be grown all year round in most areas. Because there are many different varieties available, be sure to choose one which will suit your area. Place stakes approximately 60 cm apart in rows or circles in medium rich soil. Place three or four seeds at the base of each stake and cover them with soil or sieved compost. When the seedlings are 10 cm tall, discard the weaker ones leaving the strongest to grow on. Tie up the young plants as they grow, and pinch out the tips of all leaf-forming side laterals to leave a central upright stem.

Apply water without spraying the foliage. Successive plantings of ten to 15 plants will ensure a continuous supply. Remember, tomatoes are not frost hardy. Mulch them thickly to suppress weeds.

I have tried growing tomatoes without using stakes, but the fruit tends to rot very quickly when it rests on the ground. Mosaic virus, which affects tomatoes, is also a disease of tobacco. If you are a smoker, always wash your hands thoroughly before handling tomato plants. Fungus diseases in the soil which can kill tomato bushes can be controlled by ensuring that plenty of organic matter has been added to the soil before planting.

Cherry tomatoes grow extremely well in hot areas and seem to be resistant to most pests and diseases. However, if they're not handled correctly they can become quite a problem in the vegetable garden. If they're allowed to 'seed' in the garden or if spent plants are added to the compost heap, the following season tomato plants will come up everywhere in the garden like an unwanted weed infestation. Hundreds of plants can germinate almost overnight and removing them by hand is the only solution. Place the spent plants in a separate area in the garden. Do not add them to the compost heap.

Tomato seeds will also remain viable after passing through the human body. A friend of mine used sewage sludge to establish his garden and literally hundreds of tomato plants germinated everywhere creating a huge 'weed' problem.

CHAPTER 12 —

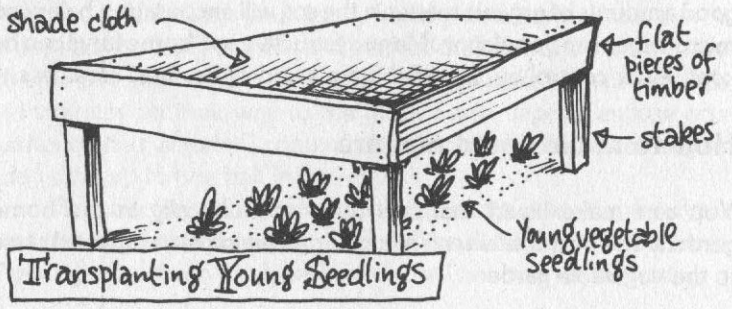
IN THE VEGETABLE GARDEN

Transplanting young seedlings

If you've bought vegetable seedlings they have most probably been grown under shade cloth. Many gardeners find that these seedlings wilt and die within a day or two of planting out into the garden, not realising that the tiny plants are not able to stand the hot sun. A temporary shaded area should be constructed over the transplanted seedlings for seven to ten days until they are well established.

The best time for transplanting is during late afternoon. Before removing them from their container or from garden soil, give them a good soaking with liquid manure or seaweed fertiliser. This will help them to combat transplant shock.

Carefully lift out the seedling taking care to keep as much soil around the roots as possible. Dig a hole in the soil with a trowel or similar instrument, and place the seedling into the hole. Firm the soil around the stem of the plant right up to the first set of true leaves. Young seedlings like to feel secure! Leave a saucer-shaped depression around each plant to allow water to soak directly into the roots. Water them in well with seaweed fertiliser or liquid manure and keep them moist for several days.



In the vegetable garden

Absolute cleanliness in the garden is essential to minimise the many pests and diseases which will attack vegetables at every opportunity! Remove spent crops or discarded leaves from the vegetable garden because these will attract 'pests'. Rotting vegetation gives off large amounts of both ethanol and ammonia, attracting many insects.

Mould and mildews can spring up, almost overnight, in warm humid weather. Check the garden every day or so — many diseases can be treated in the early stages. You should avoid overhead watering (especially in the evening) because this will leave plant foliage damp during the night hours, and will increase their susceptibility to fungus and mould. If overhead watering is unavoidable, water the garden in the early morning: the sun will dry the foliage thoroughly before nightfall.

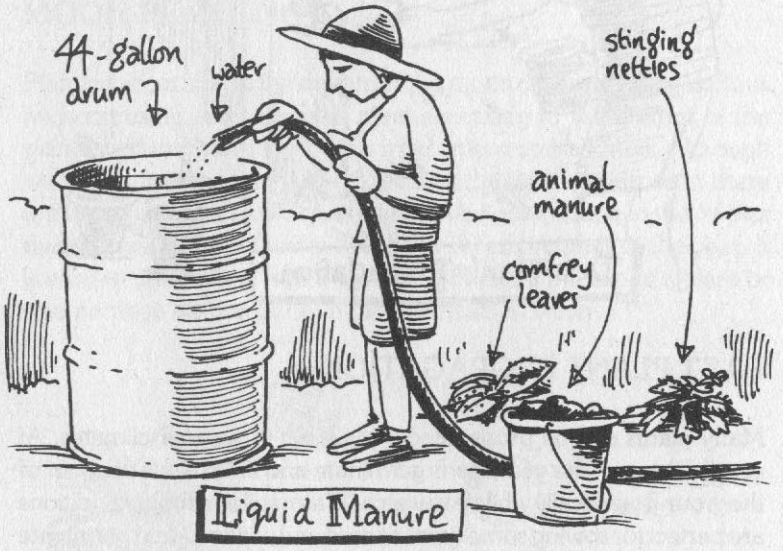
Establish a small, safe area in the garden for burning off materials that should not be composted (such as citrus leaves infected with leaf curl, or mildewed leaves from squash, zucchini and cucumber). Add the ashes to the compost heap when they're cold. Maintaining good amounts of organic matter in the soil will encourage a balanced micro-organism population. Many destructive soil-borne fungi can be kept under control by 'friendly' fungus and other small creatures.

How to make liquid manure

You can make liquid manures quite economically in the home garden. The best container is a large drum which can be placed close to the vegetable garden.

Place into the drum approximately two buckets of either cow, chicken or horse manure. Add a few handfuls of comfrey and some leaves of stinging nettles, if they're available. Wear gloves to handle these. Top up the drum with water and mix it all well. Leave the mixture for four to six weeks before using it. The mixture will smell quite unpleasant for the first two to three weeks so make sure it's not too near the house!

When it's ready to use, it should only have a slight smell. Use it diluted on young seedlings to give them a boost along or on any weak or spindly plants. This method of feeding plants should only be used as a periodic growth booster. If you use it excessively it will create unhealthy growth.

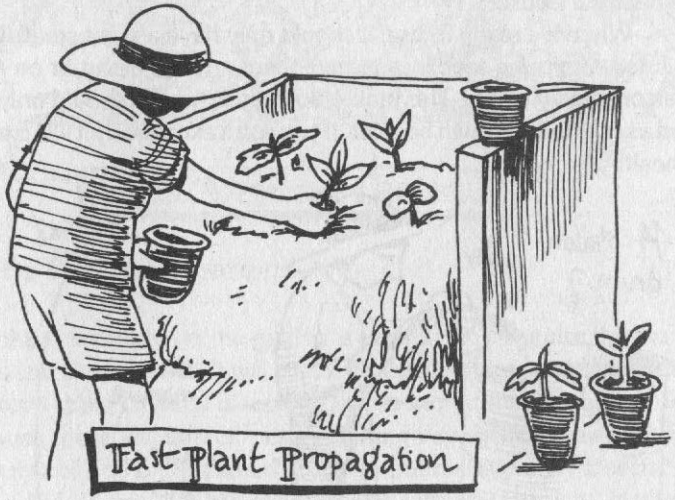


Harvesting and preserving vegetables

Growing vegetables and harvesting them fresh from the garden is a great way to help keep your family healthy and happy. However, a lot depends on how you store and prepare these foods because under adverse conditions they can lose up to ten percent of their minerals and vitamins on their way to the table. Fresh vegetables lose one quarter of their vitamin C content when left in the refrigerator for just a day, and up to one half in five days.

Try to arrange for successions of plantings at ten day intervals to ensure a continuous supply. Doing this will help you to eat more of your garden-fresh foods within minutes or hours of harvesting.

For long term storage, freeze vegetables rich in vitamin C, remembering to blanch them first to retain high vitamin A levels. Think twice before you choose to cook high-nutrient vegetables, for that simple act can claim up to 25 percent of their raw food value. This is a practical reason to enjoy the crunchy texture and novel taste of raw silver beet, cauliflower, broccoli and others in hearty salads.



FAST PLANT PROPAGATION

Many plants can be propagated very easily in warmer climates. At certain times of the year seeds germinate and little plants pop out of the ground practically while you watch! Warm soil and moist conditions are perfect for sowing some types of seed and seeds should germinate quickly and easily if they're planted at the correct time. Most home gardeners will have noticed how pumpkin vines 'appear' in the garden or in the compost heap in mid-summer, together with other herbs and vegetables.

Seeds planted at the wrong time, such as carrots in summer, will not germinate. The seed seems to 'know' that conditions are not favourable for good growth. Peas and beans are two types of seed that will drown and die if planted before heavy rain or if pre-soaked.

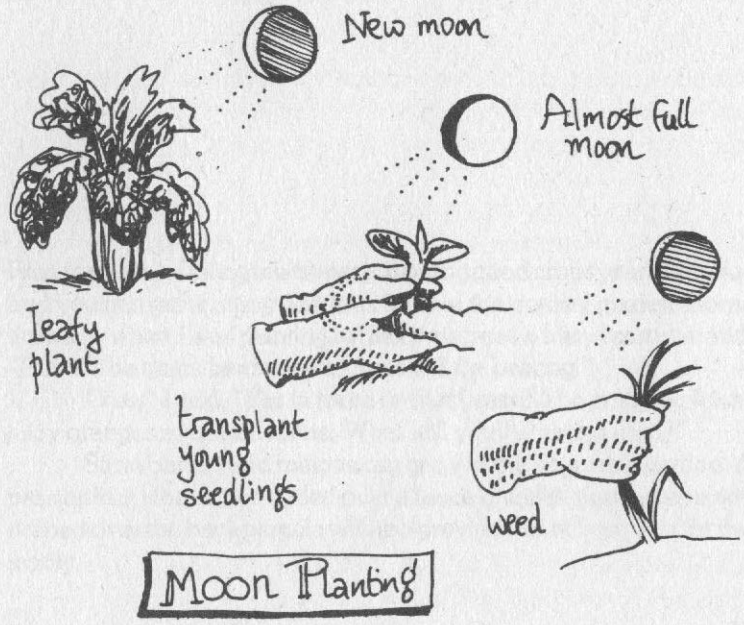
Propagating fruit trees

Figs, mulberries and blueberries are easy to propagate. Simply take a 30 cm cutting from an established tree during late spring or early summer and plant it in its permanent position. Place the cutting in a mixture of coarse sand and soil. It will quickly grow a root system and become established. Frangipani and monstera deliciosa can also be propagated this way. Cuttings for hibiscus and other similar plants will quickly grow a root system if you place 15 cm cuttings in pots and keep them moist.

Avocadoes and mango seed added to the compost heap will germinate and grow naturally and quickly. They can be carefully transplanted into pots when they're 15 cm high. Passionfruit vines will 'appear' in shady places because the seed will have been dropped by birds who have been feeding on local fruit.

MOON PLANTING

Planting according to the rhythm of the moon can be both mysterious and confusing. You can also plant according to the rhythm of the planets although this method is much more complicated. Although we are aware that the moon influences the tides of the ocean there are inland tides as well. These tides can be quite strong in the tropics due to the amount of water in the soil at certain times of the year. It is easy to understand that the moon influences the sap of a plant or tree because 88 percent of a plant consists of water.



Simple moon planting guidelines

1. The best time of the month to plant seeds of leafy plants such as lettuce, cabbage and silver beet is at new moon — the first quarter.
2. Transplant seedlings and seeds of root vegetables (such as carrots) three to four days before the full moon.
3. Fruit-bearing crops such as beans and peas are best planted a few days after the full moon.
4. You should not pick fruit and vegetables for storage at full moon because of the excess moisture in the tissues of the plants.
5. If it rains at full moon seeds could become too moist and eventually rot in the ground.
6. The best time to weed is during the few days covering the new moon when the water content in the soil is low.

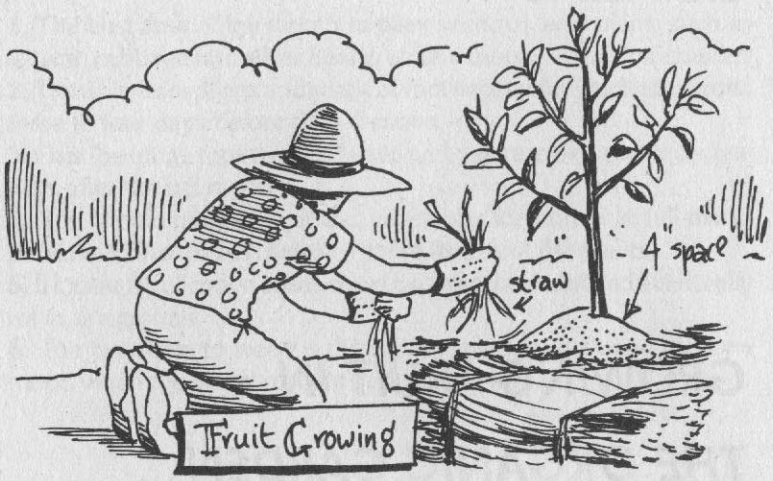
CHAPTER 13 —

GROWING FRUIT IN THE ORGANIC GARDEN

Fruit trees are a lasting investment, bearing good crops year after year and you can grow many delicious fruits in the tropical garden. Some time ago when I was planting some citrus trees a friend commented, "But it'll be years before these trees will be bearing."

"Yes," I said, "But in three or four years I'll be enjoying fresh, juicy oranges and mandarins. What will you be eating then?"

Strawberries and melons can grow in the vegetable garden. A passionfruit vine or two trailed over a fence or trellis, and a grapevine draped over the back pergola will also provide lots of fresh fruit for the family.

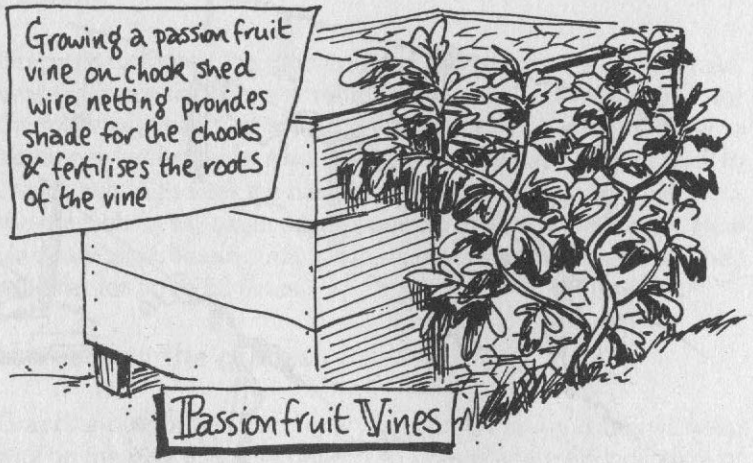


Melons

Rock melons and honey dew melons love warm sunny weather and should be planted in mid to late spring (depending on your particular area). These sensitive vines will not grow at all if the weather is cool and cloudy. Melons prefer a sandy-loam soil and love to grow on slopes or hills facing north or north-east.

Prepare their soil beds by making small hills and, because melons are heavy feeders, add plenty of well-rotted manure to the soil before planting the seeds. Melons do not transplant well so plant seed directly, about six to eight seeds in each hill. When they're 10 cm high thin them to three plants per hill. They will require lots of moisture so mulch them heavily.

Water your melons thoroughly at least once each week as the fruits begin to form but allow the ground to dry out a little as they approach maturity. Place a board under the developing fruit to prevent rotting. Harvest the ripe melons when small cracks appear in the stem where it joins the fruit. The melon should break off with a light twist. If more than light pressure is necessary to pick the fruit, it's not ripe and should be left on the vine.



Watermelons

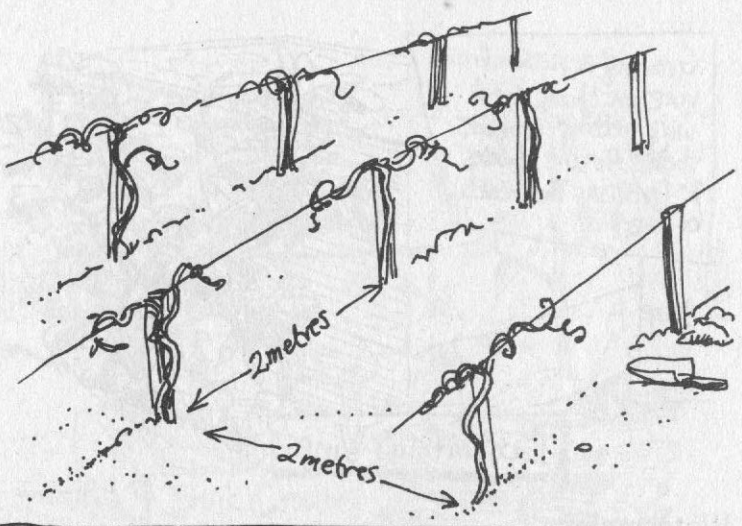
Watermelon are a member of the cucumber family. They are native to tropical Africa and need a long, warm, growing season. Prepare their beds as for rock melons and plant the seed from mid to late spring.

Melons have far more flavour if they're left to ripen on the vine. Experience is the best judge of ripeness, although a good indication is when the underside turns from white to yellow and at least three tendrils on each side of the melon are dead. There is nothing more delightful than a large slice of cold, juicy watermelon on a hot day!

Passionfruit

These climbing vines take up little garden space if they're grown on a fence or a trellis. The vines are quite attractive and the fruit is delicious. Passionfruit do best in a humid sub-tropical or warm climate because they love sunshine. They are rather greedy feeders and generous amounts of well-made compost and manures should be added to the soil before planting. Top dress the vines regularly with compost, and mulch them well.

Pollination has to be left to a good supply of busy bees because the flowers open for only a few hours each day. If you have no bees hand pollinate the flowers using a feather or light paintbrush to mingle pollen on the stamens of the flowers. Prune back rampant growth after harvest to encourage new fruit-bearing arms.



Space the grapevines 2 metres by 2 metres apart

GRAPES

Grapes are one of Nature's oldest and most healthy fruits and are quite easy to grow. No other fruit offers so many different flavours or is more delicious. You can even make your own wine!

Grapes love full sun and will grow well in almost any type of soil, provided they are well drained and fairly deep. A slightly acid soil of average fertility is preferable because soils which are too rich will stimulate cane growth, and result in poorly formed clusters of grapes.

An environment which attracts a balanced population of insects and small creatures will in turn attract a residential population of birds who will assist in pest control and drive off nomadic fruit eaters at harvest time.

You can plant grapevines either in spring or autumn. The usual spacing is two metres by two metres, and holes for the plants should be 35 cm deep and 50 cm in diameter. To prevent the roots from drying out, leave a slight depression around the stalk to hold rainwater.

First year growth can be allowed to trail over the ground. In the winter months place posts about every four metres along the row with two wires, one about 50 cm off the ground and the other two metres above the ground. Train the vines to grow on these wires.

Pruning

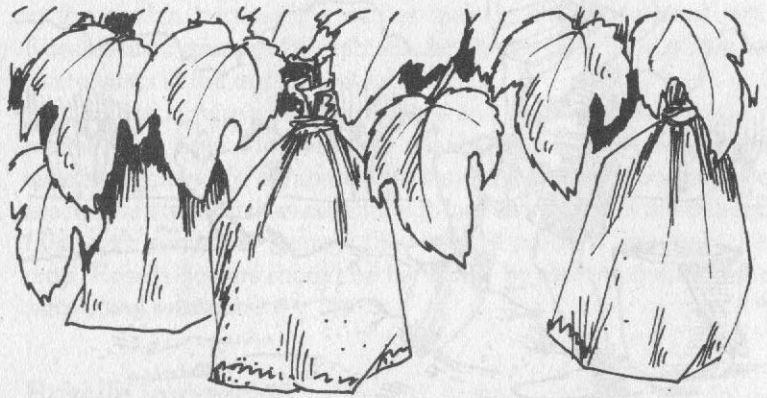
Grapes develop on the growth of the current year, leaving a new, year-old arm near the main trunk. This cane will provide the fruit for the following year. Cut back the branching vines at every node to about one or two buds. Also, leave a vine that has been cut back to one or two buds near the base of the arm. From this vine will grow the cane which will be saved next year for the following season. New vines will begin bearing fruit five to six years after being set out. They will bear for up to 50 years.

Harvesting the grapes

Grapes should be harvested only when they're ripe and they will keep well on the vine if they're not picked immediately. An indication of ripe fruit is a browning of the stem of the bunch. Varieties which are suitable for your area are usually available at local plant nurseries.

Diseases and Pests

Grapes are much less subject to insect attacks and diseases than most other fruits although birds can be a major nuisance. For the home gardener, a good solution to this problem is placing paper bags over the grape clusters when they have developed, and rubber banding the free end. This will protect the fruit from pecking birds.

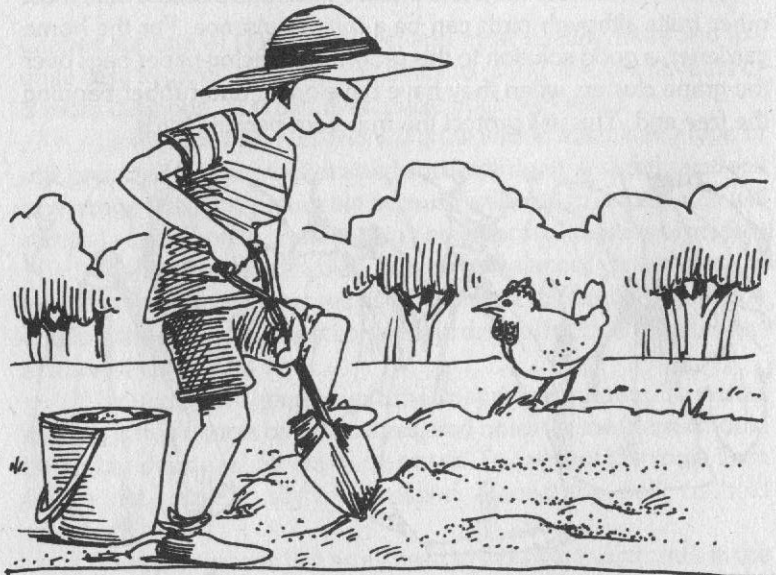


Paper bags placed over the ripe bunches of grapes will protect them from birds....

Black rot, visible as tiny spots appearing on green grapes, can be controlled by effective pruning which permits good aeration. Pick off any dried fruit (this disease overwinters in old dried fruit) and add it to the compost heap. Compost made from diseased fruit will help the vines resist black rot fungus. Resistant varieties are available to combat mildews and rot. If downy and powdery mildew do develop, these diseases can be controlled by spraying with Bordeaux mixture.

Strawberries

My grandson — aged 14 months — once discovered the strawberry patch. He would race out there at every opportunity, stuffing as many ripe juicy strawberries into his mouth as he possibly could. Luckily for him, strawberries are quite easy to grow and using natural methods gives them a distinctive full flavour and firm texture. The most important aspect of strawberry growing is thorough fertilisation of the soil at least four to five months before planting out the young runners. Add nitrogen in the form of chicken manure, or chicken pellets. Alternatively, a green manure crop of field peas can be turned into the soil. Rock phosphate should also be raked in, together with wood-ash



Dig chicken manure into your strawberry patch five months before planting the young strawberry runners

or charcoal to supply necessary potassium. Compost, that wonderful, natural, all purpose fertiliser, should also be incorporated into the soil. Use as much as you can spare.

Select runners of the strawberry variety that grows well in your own area. They can be planted out from mid-March to mid-April and will begin bearing in late July, finishing in mid-December. Silver plastic sheeting should be laid over the prepared beds and pricked every 15 cm with a garden fork to allow for water penetration. This type of sheeting deters fruit fly and keeps the fruit clean and dry. Alternatively, a thick straw mulch can be placed around the young plants.

Irrigation can be either by drip irrigation, installed under the plastic, or by overhead or direct watering. The young runners will need daily watering until they're well established.

You can control diseases like powdery mildew by spraying a solution of potassium permanganate (Condy's Crystals) at the rate of 30 g per nine litres of water. Leaf spot, leaf scorch and leaf blight can be treated with copper oxychloride. Red spider mite and two spotted mite can also be controlled with a weak solution of potassium permanganate. Seaweed extract used as a foliar spray will help control all mildews and fungus diseases. It will also supply necessary trace minerals and keep the strawberries in optimum health.

Rosellas

In the past it was common practice for many people to grow rosellas in the garden because the berries make a cheap, delicious jam. Rosellas are a relative of the hibiscus family and have been grown for many years in the tropics and sub-tropics.

They require a medium rich soil and seed or seedlings can be planted from August to December. Plant them in rows 150 cm apart, spacing the plants 60 cm apart. Rosellas thrive in a sunny position and are resistant to most diseases although leaf-eating insects relish them. Even with some leaf damage they will still produce an acceptable crop. Rosella flowers should be harvested by clipping them off the stem using secateurs.

Rosella jam recipe

Rosella jam is not made commercially so I have included the following 90 year old recipe. It's absolutely infallible.

Strip the outer petals and set aside the inner berry. Cover the berries with water and add the juice of two lemons. Simmer this mixture for approximately one hour, cool, then strain the liquid from the berries which are then discarded.

Add the outer petals to the remaining liquid and cook them until they're soft and 'mushy'. Measure the mixture and add the same quantity of sugar. Stir this until the sugar has dissolved then boil the mixture quickly for ten to 15 minutes to obtain a setting consistency. Pour it into warm clean jars and seal.

CHAPTER 14 —

GROWING FRUIT AND NUT TREES IN TROPICAL CLIMATES

Acerola cherry

Acerola cherry is the amazing vitamin C tree. This relatively small tree (two to five metres high) is known throughout the Caribbean as the tree of life and is one of the richest sources of vitamin C. Between 1,000 and 4,700 mg of this important vitamin are contained in each 100 g of fruit.

The plant is extremely attractive with dark green leaves and pink or white flowers. When the acerola is in fruit the bright red berries are quite eye-catching. It can be pruned to bush size or used as a hedge plant. The acerola cherry is relatively small and compact so you can also grow it in a corner or in a shrubbery close to the house.

Acerolas will do well in a fairly wide range of climatic conditions. Propagation can be by seed but germination is poor because very few seeds are viable. You're most likely to have success growing acerolas from cuttings. The plants are frost tender when they're young but will survive light frost once the growth has become woody. They are relatively drought resistant but will produce higher yields in high rainfall areas or if the trees are irrigated during fruit development. Mulching with straw or spoilt hay is most beneficial, as is fertilising in spring and autumn with a high nitrogen fertiliser such as chicken manure.

The acerola will not tolerate wet feet for more than a few days. Flowering can start in the second year of growth with fruit maturing

in as little as three to four weeks. Four or five crops may be borne in one year. There are a number of varieties of acerola. California Honey and Florida Sweet are much sweeter than other varieties.

Acerolas have no serious insect pests, but the soil should be free of nematodes. To combat these plant African marigolds around the base of the tree. The flavour of this fruit can be compared to a crab-apple, a plum-quince flavour and the taste of a ripe red cherry. One acerola fruit will provide the average daily requirement of an adult.

AVOCADOES

The avocado, sometimes known as the avocado pear, is a large evergreen native of Central America and the West Indies. Mature trees may reach a height of 20 metres with a diameter of 13 metres! Avocadoes have a very high food value due to a substantial amount of poly-unsaturated oil. They have a higher protein content than most sub-tropical fruits and contain appreciable amounts of vitamins.

Fruits mature on the tree but remain hard and inedible until they have been kept at room temperature for seven to 14 days after harvest. During this time the flesh softens and develops a buttery texture. If you harvest the fruit too early it will shrivel rather than softening and retaining its shape. The different varieties vary considerably in reaching maturity and cropping times. Some trees can begin bearing fruit in three to four years, others up to six years, with seedling trees taking ten years to produce fruit.

The major varieties are Fuerte, Hass, Sharwil and Reed. They are selected to be grown together because their maturity times follow in sequence, giving a constant supply of avocadoes for most of the year.

Fuerte

This variety of avocado produces fruit of excellent quality and it matures in early winter. The fruit is pear-shaped with green skin which peels readily when mature. The tree is wide spreading and may reach a diameter of ten metres and a height of five metres over ten years. Fuerte is one of the most cold tolerant varieties of avocado and can withstand temperatures as low as -3° C for a few hours without serious damage. A disadvantage with this variety is that it does have a tendency towards biennial bearing.

Hass

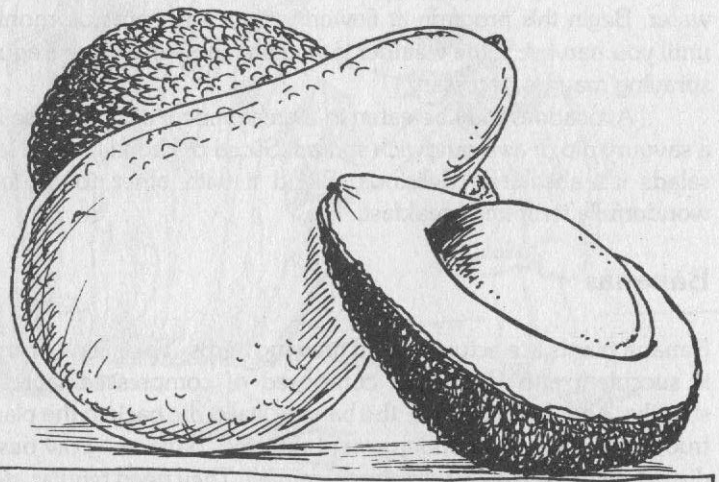
Hass avocado fruits mature in spring. They are excellent quality with creamy yellow flesh. The fruits are relatively small (only about 250 g) and have a thick pebbled skin which changes from green to dull purple at maturity. The tree is large and upright but not as cold hardy as Fuerte. It comes into cropping at an early age and crops regularly and heavily.

Sharwil

The pear-shaped fruit of the Sharwil avocado is green-skinned. The trees are upright, resembling those of Hass in shape and cold tolerance, but are less vigorous. Sharwil matures later than Fuerte.

Reed

The green-skinned fruit is large and has an excellent flavour. The tree is an upright grower with hanging branches which effectively protect the fruit from sunburn. The recommended tree spacing is about six metres by four metres. An advantage with Reed is that it begins cropping at an early age and will continue to produce good crops.



Planting a range of avocado varieties will provide you with an almost constant supply of avocadoes

Planting avocado trees

Young avocado trees can be planted out from February to August. Keep the plants well watered until they are established. Their soil should be well drained with plenty of well rotted compost, mixed in with an equal amount of topsoil. A thick mulch of spoiled hay or straw should be maintained beneath the tree to conserve soil moisture and keep weeds in check. Mulching is an effective control for *phytophthora cinnamomi* (a fungus disease of the root system).

You must also protect your young avocado trees against strong winds and intense dry heat. As the trees grow, you may give them additional food by applying small amounts of bone meal during spring and summer. Do not remove the lower branches because they protect the trunk from sunburn. No pruning is required except to keep the tree in shape: well balanced and symmetrical in growth. Don't cultivate near the roots because they dislike being disturbed.

Add generous amounts of compost twice each year. Lift the mulch and spread the compost around the tree out to the dripline. Allow a clear area of 15 cm around the trunk.

Anthracnose (a fungus disease) can be a problem with avocadoes. You can control it in the following manner. Clip the fruit from the tree, and handle it carefully to avoid damage. Store it in a cool, well ventilated area. Prune out any dead twigs and spray the tree with copper oxychloride (50 percent) at a rate of four g per litre of water. Begin this program at flowering time and continue monthly until you harvest. If the weather is wet and showery, more frequent spraying may be necessary.

Avocadoes may be eaten in a great variety of ways. Use it in a savoury dip or as a sandwich spread. Sliced or cubed in fresh leafy salads it's absolutely delicious. Blend it with other foods for a wonderfully tempting breakfast.

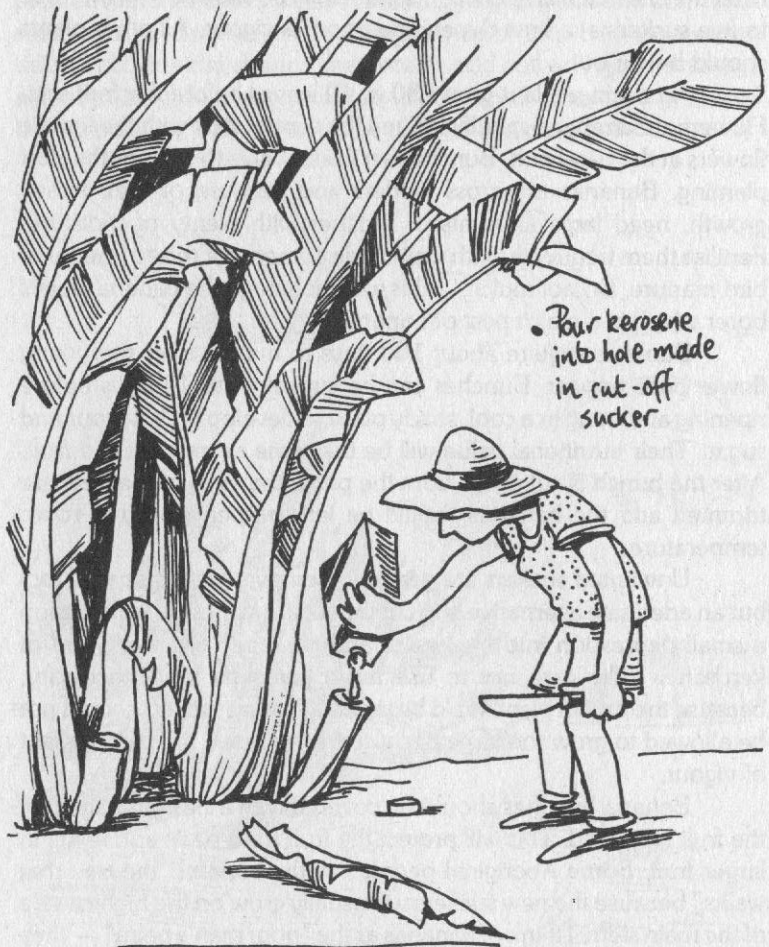
Bananas

Banana plants are actually rapid growing herbs. Their stalk or trunk is succulent and is actually composed of compressed layers or sheaths. After bearing once, the banana stalks die back to the plant's true stem which is an underground rhizome. Bananas grow best in districts with 125 to 250 cm annual rainfall. They need regular, deep watering in rich, deep soil with excellent drainage and a warm sunny position, sheltered from wind.

They are grown from 'bits' or 'suckers'. Suckers are the young

shoots growing alongside the old stem but only the most vigorous should be selected for planting material. 'Bits' are from the base of the parent stem which has been cut to ground level and split into pieces, each with one eye. Before planting them check with your local council about the variety and number permitted on your property. Planting material should be obtained from a registered source to ensure that you have disease-free plants.

The best time for planting is when the weather is warm and the young plants will have uninterrupted growth throughout the summer. Prepare a hole 60 cm by 70 cm and 45 cm deep for planting.



Liz with Banana Trees

Ladyfinger banana plants may be planted three metres apart, others should stand no closer than four metres. Plant the 'sucker' or 'bit' 30 cm deep and fill the hole with a mixture of topsoil and compost or rotted manure.

While the plant is young remove all but one sucker which should be allowed to bear its fruit and then be cut back before another sucker is permitted to grow. Older plants may be allowed to develop one new sucker every three months.

A plant will grow and bear well for four to six years, after which it should be dug out, the soil enriched and new suckers or bits planted. After the first fruit has ripened, the plant may be allowed to grow three to five suckers at a time depending upon its vigour. All other plants should be cut out.

An average plant grows 30 to 40 leaves before the fruit sets. Flowers are arranged spirally around the central stalk with the female flowers at the basal end. Bunches set from twelve to 18 months after planting. Bananas are gross feeders and because of their heavy growth, need large amounts of fertiliser with plenty of moisture. Fertilise them frequently with well-made compost or rotted poultry or bird manure. Do not mulch — this will encourage the banana weevil borer which is a major pest of bananas.

Bananas require about 100 days to mature after the young flower buds appear. Bunches can be cut seven to 14 days before ripening and hung in a cool, shady place to develop their flavour and sugar. Their nutritional value will be the same as tree ripened fruit. After the bunch is cut down from the plant, the ends of the stalk are trimmed and the bananas should be left to ripen slowly at room temperature.

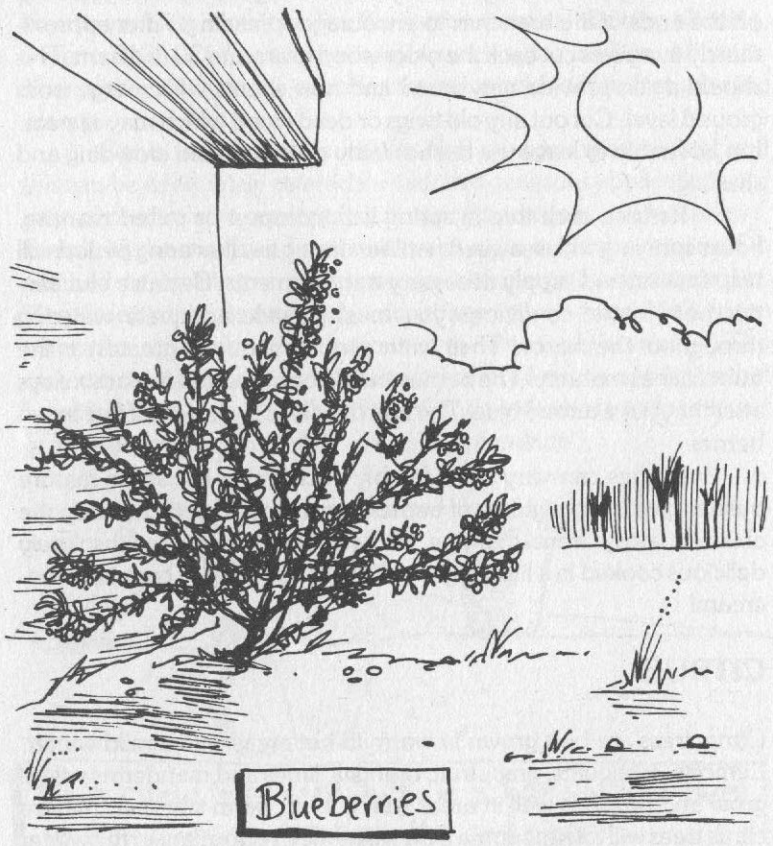
Unwanted suckers are generally removed with a special tool but an adequate alternative is to cut the sucker at ground level, scoop a small depression into the centre and pour in half a teaspoon of kerosene. Take care not to use more kerosene than necessary, because the parent plant could be injured. Young suckers should not be allowed to grow too large because they will rob the parent plant of vigour.

Banana bunches should be covered with a hessian bag once the fruit is formed. This will protect the fruit from pests and result in larger fruit. Some Aboriginal people call the banana "the tree that walks" because the new suckers will usually grow on the highest side of the main stem. I think of bananas as the "poor man's palm" — they are very decorative, and give a lush, tropical atmosphere to any garden.

Blueberries

The blueberry, with its pique and unique taste, is becoming increasingly popular as a fresh fruit and in pies or muffins. Blueberries originated as a wild plant so they are suited to organic growing. They are highly ornamental with ball-shaped flowers which develop into green berries which gradually turn blue. The leaves change into vibrant autumn shades before falling so the blueberry is a very attractive addition to the garden. It will grow up to two metres high.

Blueberries require moist, cool conditions and should be planted in a sheltered position receiving morning sun and afternoon shade. A row of native trees or shrubs could be grown on the western side to provide the shade. They prefer acid soil and good drainage although they do enjoy moist conditions. Soil should be prepared before planting with the addition of organic matter and humus.



Planting out blueberry bushes

Plant your blueberries during the winter months when the bushes are dormant. Space the bushes at 1.5 to 1.75 m intervals — the bush will grow into a cone shape. Allow five metres between rows. The bush does develop slowly so you need patience. Dig a hole large enough to receive the root ball and set the plants slightly more deeply than they stood in the nursery containers. Blueberries are not self pollinating so more than one variety should be planted. Each variety will ripen at different times, spreading the harvest time over several weeks.

When the bushes are well established mulch them generously with leaves, woodchips or sawdust to a depth of ten cm to provide protection and moisture for the surface roots, thus reducing temperature variations. A thick mulch will also suppress weeds.

Berries should appear in the second or third year and the bush matures in approximately seven years. During the first few years nip off the ends of the branches to encourage spreading. After approximately five years cut back the older wood to around 30 to 40 cm. This should again provide new wood and new shoots will emerge from ground level. Cut out any old twigs or dead wood which may appear. It is advisable to leave the bushes fairly open to avoid crowding and shading.

Fertilise each tree in spring with compost or rotted manure. Foliar spraying with seaweed fertiliser during the flowering period will help fruit set and supply necessary trace elements. Because blueberries need moist conditions you must provide adequate watering throughout the season. Their water requirements are greatest as the fruit reaches maturity. The berries should be harvested five or six days after they have turned blue. The fruit develops in clusters of five to ten berries.

Bushes can vary considerably in cropping but some mature bushes give up to eight kg of berries per season. If you can keep the children away from the ripe berries, blueberries are absolutely delicious cooked in a little sugar and water and poured over plain ice-cream!

CITRUS

Citrus trees are best grown in warm to hot areas with a mild winter. Lemons, cumquats, grapefruit, oranges, limes and manderins will all grow and produce well in areas with a long, warm summer. Mature citrus trees will tolerate some frost when they're dormant in the winter

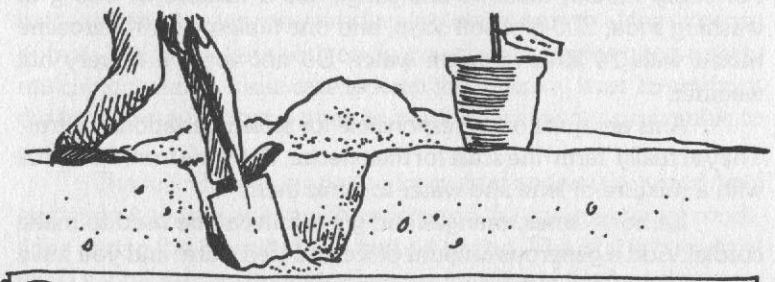
but even light frost in late winter or spring will kill young growth. Lemons and limes suffer more from frost than other citrus. Consult your local nursery staff for varieties suitable for your own area.

Choose a sunny planting position with protection from strong winds. Citrus trees exposed to wind will grow more slowly than sheltered trees. If you're planting a citrus orchard or more than one tree, spacing should be approximately five metres square. Citrus prefer a slightly acid soil and are not lime tolerant. Good drainage is essential and they prefer a sandy, sandy-loam soil.

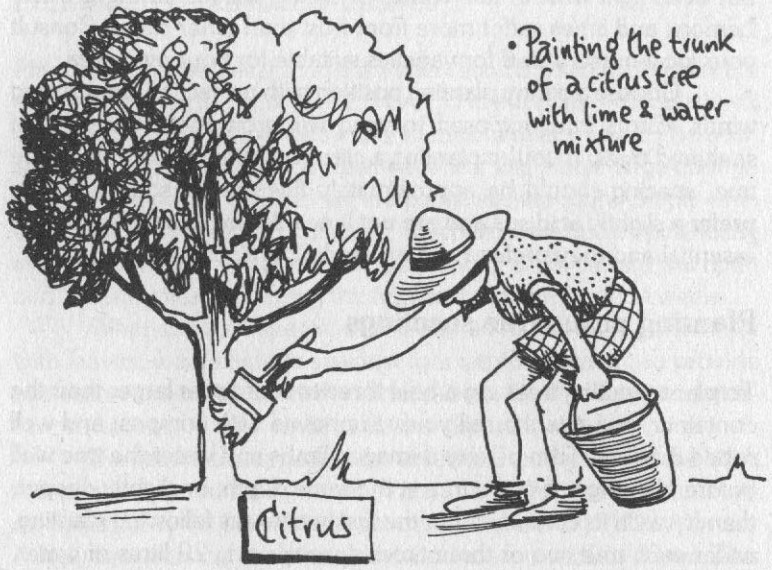
Planting citrus tree seedlings

To plant seedling trees dig a hole three to four times larger than the container, and mix the soil you've removed with compost and well rotted manure. Trim off any damaged limbs and water the tree well before planting it. Set the tree at the same depth, or slightly deeper, than it was in its container. For the first two weeks following planting, water each tree two or three times a week using 20 litres of water. Then water every week or so for the remainder of the first growing season.

Citrus trees have a relatively high nitrogen requirement and this can be adequately catered for with two generous applications per year of poultry manure. Apply it in spring and again in late summer. Simply lift the mulch and spread it evenly right out to the dripline. Do not hoe or dig into the soil as you could damage the surface roots. Very little pruning is required — for shape only — except in lemons where the centre should be kept open to allow sunlight to enter. The only other pruning needed is the removal of all old woody limbs that have lost their vigour, and cutting off the top limbs to induce lower growth in some of the taller varieties of mandarin.



Plant citrus tree seedlings in a hole which is three to four times larger than the container



You should prune immediately after you've picked citrus fruit and before flowers have begun to form. Remove any new shoots which appear below the graft. Also use sharp secateurs, to avoid bruising. Constant observation of citrus trees is essential for early detection of pest infestation or disease, so that you can treat it before serious damage occurs. Larger bugs, such as caterpillars, can simply be picked off. Red scale is one of the worst enemies of citrus and will increase rapidly if it's left untreated. It can be controlled with a spray of white oil and water, mixed in a one to 40 ratio. Whitefly can also be eradicated using white oil spray.

Soft scale is controllable with a solution of 450 g of washing soda, 150 ml of white oil and 14 litres of water, sprayed on a dull day. For sooty mould, mildews and fungi, use a mixture of 400 g of washing soda, 200 g of soft soap, and one tablespoon of kerosene mixed with 14 litres of warm water. Do not apply it in very hot weather.

Ants are quite often responsible for scale infestation of citrus. They actually 'farm' the scale for their nectar. Paint the trunks of citrus with a mixture of lime and water to deter them.

Lemons, limes, oranges and grapefruit can be used to make cordial. Add a generous amount of ice and iced water and you have the most cooling, thirst-quenching and enjoyable drink you could ever imagine. Sip it in the garden under the shade of a tree, or in the hammock on the verandah.

Custard apples

Custard apples are one of the easiest fruits to grow organically because pests and diseases are not major problems. Custard apples originated in northern South America, Mexico and the West Indies. They are strictly sub-tropical and tropical in growth and fruit maturity requirements. Young trees will be killed by temperatures of -3° C although older trees can stand mild frost when they are without leaves. It is very important to select the correct variety for each area.

Popular varieties of Custard Apple

Pink Mammoth produces huge fruit weighing up to 550 g, with an average of 24 seeds per 500 g of fruit.
African Pride is a custard apple with fruit which averages 300 g and 36 seeds per 500 g of fruit.
Island Gem has fruit which averages 250 g and 31 seeds per 500 g.

The custard apple is a semi-deciduous tree, growing to 4.5 metres high, with a spread of six metres. The trees should be spaced approximately nine metres apart when you're planting out a small or large orchard. As the trees develop they have a straggly habit and should be carefully pruned for shape during the early years of growth. When they're established the usual practice is to reduce the branches by one third of their size in late winter when the trees are in their dormant stage.

Good irrigation is essential during the flowering and fruit set period to prevent water stress. A humidity of 70 to 80 percent is also desirable at this time to ensure effective pollination. Mature trees and excessively vigorous trees also produce fewer fruiting laterals and reduced reproductive growth. Well made compost applied twice yearly will encourage a moderate level of tree vigour. Poultry manure, being rich in nitrogen, may produce excessive growth at the expense of fruit. Mulch the trees with blady grass hay or similar good quality mulching material. Take care to keep the mulch at least 15 cm from the trunk because young trees (in particular) are very susceptible to collar rot.

The main harvesting period for custard apples is between April and early August, varying with variety and the environmental conditions during the flowering and fruit set period. The fruit is harvested while it's still firm on the tree when the crevices in the fruit skin are a creamy colour.

The only serious pest which affects custard apples is citrus

mealy bug. This can be controlled by applications of hot soapy water and white oil. Natural predators of the mealy bug are ladybirds, lacewings, hoverflies, parasitic wasps and birds. Because young trees can be damaged by strong winds, establishing windbreaks before and during early tree development is essential to prevent structural damage. Yes, custard apples do actually taste like stewed apple and homemade custard mixed together. Chilled, they are wonderful for dessert or breakfast.

Lychees

"Beneath these green mountains, where spring rules the year,
The Arbutus and Loquat in season appear,
And feasting on Lychee - three hundred a day,
I should not mind staying eternally here."

Thus sang a Chinese poet 900 years ago, about that native to southern China — the luscious lychee. The lychee tree is a medium to large, handsome evergreen with a short, stocky trunk and a large head. It is a long-lived tree growing to 20 metres high with a girth of four metres. Lychees require periodic cold between -1 and 4° C in winter to cause the physiological changes the trees require for fruit bearing. Although the lychee is distinctly heat-loving, it does enjoy a relatively cool winter.

The two most commonly grown lychee varieties are Tai So and Bengal. Young lychee trees show an unfavourable reaction to intense light: they have a forest origin and will be easily damaged by strong winds. A protective tree guard with hessian attached is necessary for the first 12 months. They prefer lighter, well-drained soils, with a pH of 5.0 to 5.5. Lychees will not tolerate 'wet feet'. A north to north-east aspect is best, to protect the trees from cold winds which upset fruit set and can cause splitting. Protection from the north-west, hot dry winds is also necessary. The trees should be planted 12 by 12 metres apart and the soil prepared before planting.

Planting out lychee trees

You should prepare a large planting hole, at least ten times larger than the container, but do not dig down into the sub-soil. To the soil you've removed add 500 g of rock phosphate, 200 g of lime or dolomite, 15 kg of compost and five kg of fowl manure. Mix this well and plant the tree in the mixture. Do not plant it too deeply, to allow for adequate drainage. Mulch the tree thickly with hay or straw taking care to leave

15 cm clear around the trunk. Water in the trees thoroughly and keep them moist until the plants are well established.

After three to four years prune back the main terminal branches in spring, removing up to 15 cm of the tip to create a more compact tree and produce larger crops. For the first year, add 100 g of chicken manure each month to promote strong vegetative growth. After this time, fertilise each spring with ten kg of compost and three kg of fowl manure. Apply no fertiliser after the spring of the third year, if tree health and vigour are good. The lean and hungry lychee tree is one that crops!

Although adequate moisture is essential during spring and summer, water should be withheld in autumn and winter to discourage vegetative growth and promote flowering. The trees will begin to bear at four to five years. The lychee is a heavy bearer when conditions are favourable. Seven to eight year old trees should produce up to 45 kg of fruit, with ten to 12 year old trees carrying 60 to 70 kg. Older trees should produce more than 200 to 300 kg. The main disease of lychee is collar rot which can be controlled by allowing adequate air to circulate around the trunk at ground level.

Lychee erinose mite and soft scale are the main pests attacking lychee trees. During spring and summer months, foliar fertilise the trees with seaweed spray every four to six weeks to promote optimum health and vigour which will lessen the chances of insect attack. Lychee trees can live as long as 400 years. The flavour of this fruit is delicious and quite distinctive in its own right — many people liken it to that of a prime muscat grape.

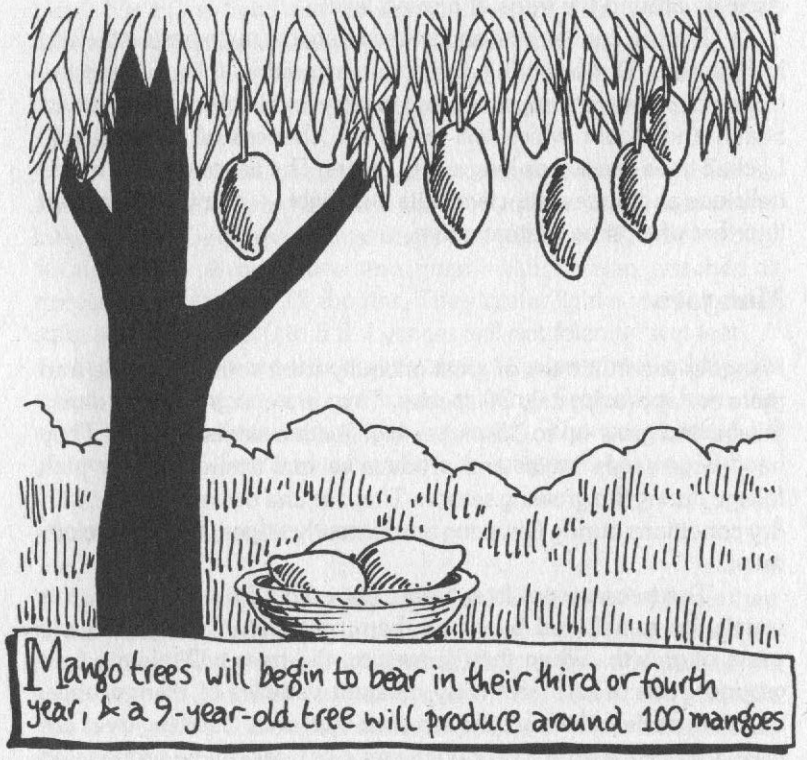
Mangoes

Mangoes are fruit trees of great antiquity from south-east Asia and there are approximately 30 species. They are evergreen with dense foliage and grow up to 15 metres high, with a similar spread. They have large single leaves and produce several flushes of new pink foliage during the growing season. They require a warm climate with dry conditions during flowering and the early stages of fruit development.

The trees are not frost hardy, but in light frost areas they can usually be established by giving them protection during the early years of growth. When they're mature, the trees will tolerate light ground frosts. There are many different varieties of mango trees. Select a species which is suited to your own area. Seedling trees are usually available from any good nursery, or trees can be propagated

from any good quality seed. Mangoes are poly-embryonic: several seedlings grow from one seed. Poly-embryonic seedlings can be described as having vegetative growth from the seed tissue itself, and not as a product of sexual reproduction. The seedlings will closely resemble the parent.

The seed is used fresh and is best if it's not dried out before planting. The husk should be gently opened eight to ten cm along the edge and either sown directly into its permanent position, or into nine or 18 litre pots for transplanting later on. A good well-rotted compost is an excellent planting medium. Place the seeds on edge just under the soil surface. Keep them moist until the first signs of growth appear. Seeds usually germinate in three to six weeks. Fresh seed can be planted any time during the summer. Always select the strongest seedling from each seed, discarding the weaker ones. Alternatively, seed can simply be added to the compost heap, where natural germination will take place. Seedlings can be carefully lifted out and transplanted into pots.



Planting out the mango seedlings

When you're planting them out, be sure the soil is rich in compost and manure. Dig a large hole to accommodate the new tree and mulch it well with hay or straw. Irrigate the new planting at least twice a week in dry areas. For practical purposes trees should be kept pruned back to three metres high, with a similar spread. A spacing of five metres between trees is quite adequate.

When the seedlings are one metre tall, pinch out the terminal bud. Two or three shoots will develop and these should be pruned when they're 50 to 70 cm long to induce further branching. As trees grow they should also be pruned upward, leaving a 30 cm clearance at ground level. This will prevent maturing fruit coming in contact with the ground and spoiling. Trees should also be thinned in the centre to improve ventilation, thus inhibiting fungus disease. Fertilise the young trees regularly with a mixture of chicken manure, wood ashes and phosphate rock to promote rapid growth. Mature trees should be fertilised each December and February.

Mango trees will begin to bear in their third or fourth year, producing 20 to 30 fruit. A nine year old tree will produce around 100 mangoes per year. The major disease of mango is the fungus disease anthracnose, which can seriously affect fruit set if conditions are wet at that time. Regular spraying with copper oxychloride will control this problem. Mango scale, which may appear on the fruit and stems, can be treated with white oil sprays or soapy water, especially when crawlers emerge in early summer. Predators of scale are ladybirds and lacewing.

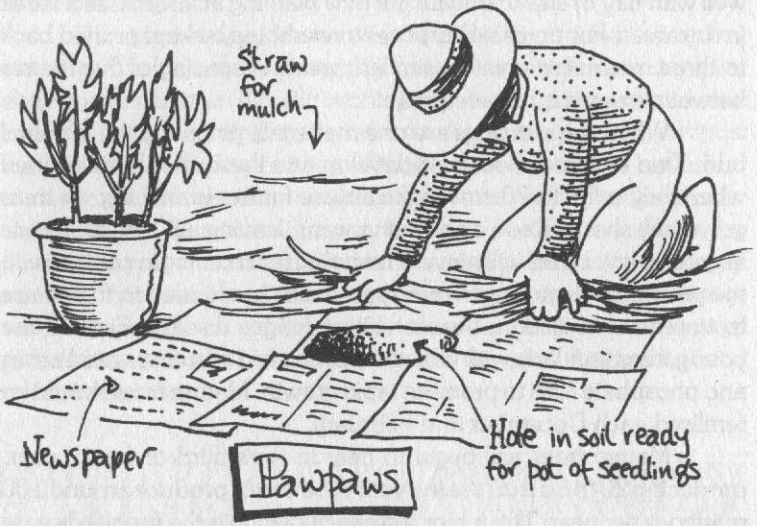
The exquisite taste of a ripe tropical mango is an experience to be remembered. Eat them over the kitchen sink — the flesh around the seed is the tastiest part, and the juice drips everywhere!

Pawpaws

Pawpaws are a delicious fruit to grow in the home garden and a seedling tree will begin bearing fruit only 12 months after planting. Trees can grow to a height of five to six metres but they begin fruiting when the tree is approximately 120 cm high. Pawpaw is only slightly frost tolerant and is defoliated in cold weather. It prefers high temperatures, plenty of water, and a sweet soil (high pH). Pawpaws also need protection from strong winds. Pawpaws can be male, female or hermaphrodite (both male and female).

Many home gardeners start trees from their own seed, often

with disappointing results. This is due to seed being taken from inferior fruit or under-productive trees. You should get your seedlings from a reputable seedling nursery, where seed is obtained from specially selected quality trees, bearing top grade fruit.



Planting out pawpaw seedlings

To prepare for planting out pawpaw seedlings, the area to be planted should be thoroughly dug over and chicken manure and dolomite added at least two months in advance. Cover the whole area with two layers of newspaper, then with 10 cm of mulch hay. Leave pot spaces about one and a half metres apart. This thick mulch will control weed and grass growth.

Seedlings are usually grown three to a container. All three are planted together, with the contents of each container placed about one and a half metres apart. As the trees grow, the males can be thinned out, because it is only necessary to have one male for every eight female plants. Hermaphrodite plants are generally discarded because they will bear inferior fruit.

Thin them out after the first flowering when it is possible to distinguish between the male and female plants. At this time apply approximately 10 g of boron and 30 g of sulphur to each tree. Place these minerals under the mulch. This combination will sweeten the fruit and should be applied at least twice yearly. Seaweed spray, used in a foliar application, should be carried out every two months to assist fruit set and supply all necessary trace elements.

Controlling pests on pawpaw trees

Most pests can be controlled by creating a micro-climate which will encourage many predators to breed and live in the pawpaw plantation. If the trees are planted as closely as is recommended, the leaves of the plants will form a shady canopy over the ground. Tiny tree frogs and a good population of spiders will soon develop in this cool, moist micro-climate. Spiders are well known as great predators and will attack many insect pests, including the fruit fly.

The most serious disease affecting pawpaws is die-back which is caused by fungus rot in the root system. Heavy mulching with a good quality mulch hay mixed with a little chicken manure will keep the trees extremely healthy, and die-back should not become a serious problem. Pick the fruit when it changes from light green to orange or orange-red in some varieties. When it's mixed with other fruit, pawpaw is absolutely luscious in fresh fruit salads. A dish of sliced pawpaw sprinkled with fresh lemon juice makes a superb breakfast.

OTHER FRUITS SUITED TO TROPICAL CLIMATES

Carambola or five-corner fruit

The carambola is an evergreen tree native to south-east Asia, with pink flowers and fruit which is a fleshy berry — acutely five angled and star-shaped in cross-section. It is yellow when ripe and contains ten to 12 seeds. Carambolas are a very decorative tree, growing five to 12 metres high. They require tropical or warm sub-tropical conditions to thrive. Young trees are extremely frost sensitive but although older trees can tolerate light frosts they can withstand low temperatures for only short periods.

This tree will thrive on almost any type of soil, provided it is reasonably well drained. It also prefers a moderately acid soil of pH 5.5 to 6.5. Flowering and cropping times vary with location. In some areas the tree can flower and fruit throughout the year. The trees are

long lived and consistent bearers: they can produce over 800 kg of fruit in one year. Seedling trees should be purchased from a reputable nursery and can be planted out at any time of the year.

Trees should be planted at approximately six metre spacings. Carambolas are slow growing and need only occasional pruning when they're mature. They can be severely damaged by flooding, and are not drought tolerant. These plants require plenty of water so irrigate them after planting and during dry periods.

The trees should be fertilised every three months until they're five years old. After this two applications of fertiliser per year are quite adequate. Apply chicken manure, phosphate rock and wood ash around the base of each tree and also apply a thick mulch. Pests and diseases are not a problem with carambolas, apart from occasional bird damage. Carambolas could be used as a very productive hedge or windbreak because they are resistant to wind damage and are highly decorative. The fruits can be eaten raw (they taste a little like an apple), juiced, or used in jams and jellies.

Tamarillo or tree tomato

Tree tomatoes are short lived, soft-wooded shrubs originating in Peru which are quite ornamental and would enhance any garden. They grow to a height of approximately four metres and can be propagated from seed, or by tip cuttings.

Tree tomatoes prefer a rich, well drained soil, and will start bearing in their second year. The fruits are egg-shaped and greenish purple, before ripening to a tomato red. They can be eaten raw or used in cooking or conserves. They need to be replaced after six years.

White sapote

The white sapote is distinctly sub-tropical in its climatic requirements, and originates in Central America where it has been found growing at above a 2500 m elevation. Sapotes will tolerate light frosts and can withstand drought, although adequate soil moisture must be maintained to get acceptable fruit size and yield. The trees do not like 'wet feet'. There are two distinct types: seasonal bearing and everbearing.

Fertilise them twice yearly with generous amounts of compost and a small amount of chicken manure. Mulch them well. Tip prune young trees to make the shoots branch and produce a good framework. Without pruning the growth will be excessively long and willowy and the mature trees will be prone to limb breakage.

Fruit fly is the main pest of sapote, and in some areas infestation with scale can be a problem. Pick the fruit at the mature-firm stage; it ripens in three to five days and is ready to eat when soft to touch. Sapotes are extremely sweet with a soft, fleshy consistency. They can be used to make a delicious flavouring for milkshakes. The pulp also freezes well and, when thawed, retains its original flavour. It's great for anyone who loves ice-cream!

NUT TREES

Nuts are not only delicious, but extremely nutritious and a great addition to a healthy diet. Two or three nut trees planted in the garden can be highly decorative and also very productive.

Macadamia nut

The macadamia is an evergreen tree which grows to nine metres, with a spread of six metres. It has spiny leaves, dense foliage and an upright habit. Nuts have a high oil content and the shell is particularly hard. The tree is native to the Australian rainforest of northern New South Wales and Queensland.

Macadamias need a rich, deep soil, a plentiful supply of water and a humid atmosphere. Seedling trees are available. They start bearing when they're seven years old but aren't in full production until they're 14 years old. The nuts fall from the tree when they're ripe. There are several varieties available — it's just a matter of personal choice.

Very little pruning is necessary. In early spring, spread a generous amount of well made compost together with a little chicken manure under the tree. Macadamias love being mulched. Pests are not a great problem with these lovely nut trees: just keep them healthy and happy and they will also be disease free. Raw nuts, lightly salted are great for the kids' lunches, not to mention a great snack after dinner.

Pecan

Pecan trees grow quite tall — up to 18 metres with a 12 metre spread. They are deciduous and prefer cool winter conditions. Pecans make a lovely shade tree in summer, and a small orchard of pecan nut trees would enhance any property. There are at least 160 varieties of pecan nuts grown, but only a limited number are available commercially. Check with your nursery for the variety best suited to your area.

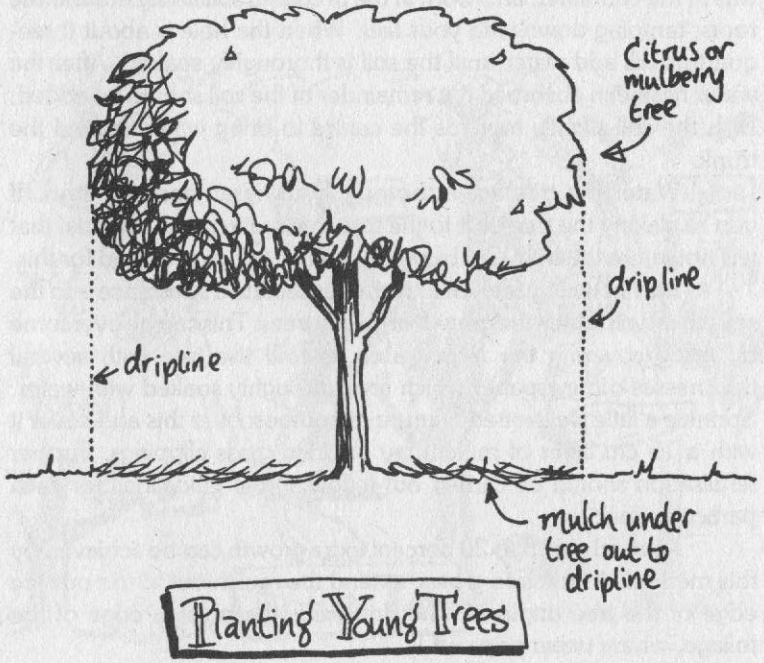
Pecan trees do best in a heavy soil. They don't even mind clay soils. Plant young trees during winter. They need regular watering and fertilisation to keep them in vigorous growth. Apply compost, chicken manure and mulch at three monthly intervals for the first three years. The male and female flowers are borne on the same tree and pollen is air-borne, therefore rain during the flowering season will interfere with pollination. Early pruning is for shape only — later on the tree will need little or no pruning.

Pecans are very similar to walnuts but creamier and smoother. The outside shell is easy to crack, and many a happy hour can be spent simply cracking and eating the delicious kernels.

CHAPTER 15 —

PLANTING YOUNG TREES

When you're planting out seedling trees — either fruit or native — you can achieve maximum growth and health by careful thought and preparation of the site. If you take extra time and care at this important point you'll have less work later on, plus more satisfying results. If you just quickly dig a hole and put in a tree you'll be disappointed later when it may 'refuse' to grow or becomes unhealthy.



Planting fruit trees

First, read through any information available regarding the particular requirements of the species you're planting. Take into consideration:
•soil pH (acid or alkaline)
•soil preferences: moist, semi-dry or even dry situations
•the amount of sun required, and
•resistance to wind.
These factors are most important to consider when selecting a suitable site for a fruit tree.

If possible, mow the area to a diameter of one metre. Dig a hole several times larger than the plant container, and mix the soil removed with a mixture of compost and well-rotted manure, adding lime or dolomite if necessary.

Trim off any damaged limbs and water the tree well before you plant it because this will ensure that it's easy to remove from the container, without damaging the delicate root system. If the roots have become root-bound (followed the shape of the container, and grown inwards in a circle) tease them out gently. If you fail to do this, the roots will sometimes fail to spread out into the surrounding soil.

Set the tree at the same depth, or slightly deeper than when it was in the container, and work in the prepared soil firmly around the roots, tamping down with your feet. When the hole is about three-quarters full add water until the soil is thoroughly soaked. After the water has been absorbed the remainder of the soil should be added. Dish the soil slightly towards the centre to bring water around the trunk.

Water the tree again thoroughly using at least ten litres. If you're staking the tree tie it to the tree trunk with some material that will not injure the tree. Old bicycle tyre inner-tubes are good for this.

It is not widely known that grasses secrete a substance into the soil which will inhibit the growth of young trees. This can be overcome by firstly covering the mown area around the tree with several thicknesses of newspaper which are thoroughly soaked with water. Sprinkle a little well-rotted manure or compost over this and cover it with a 15 cm layer of mulch hay or dried grass clippings. Further fertilisation should be carried out following the guidelines for each particular species.

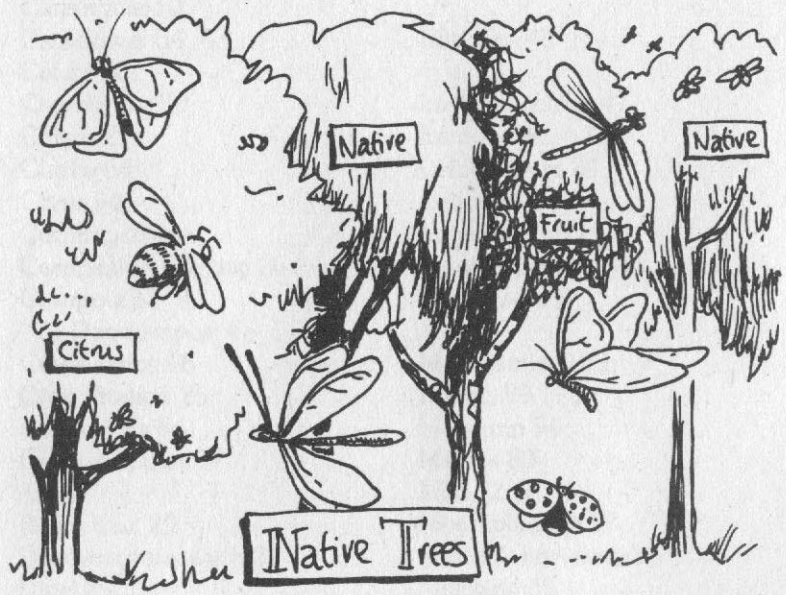
As much as 15 to 20 percent extra growth can be achieved by this method. As the tree grows, extend the mulch out to the outside edge of the tree dripline. (The dripline is the outside edge of the foliage, where water drips off.)

Poultry in the orchard

I have found that if free-range chooks are foraging in orchards or around young trees, they absolutely *love* the mulch placed around the base of the trees. They will effectively scratch away every bit of mulch and in some cases, they'll bare-root the tree. To combat this, you can put old chicken wire over the mulch — it works wonderfully. Two or three pieces of old timber or rough logs placed around the perimeter of the wire (or rocks) will keep the wire firm and the edges in place. Water will be able to penetrate quite easily so eager, busy chickens will no longer be a problem.

Planting native trees

Native trees are essential in an ecologically balanced garden and should also be planted correctly. They need a little less work because they require no added fertiliser or lime, being totally suited to our native soils. It is advisable, however, to dig a fair sized hole, at least three times larger than the container, and thoroughly break up the soil removed. This will enable the roots to penetrate the soil more quickly and faster growth will result. Water the tree well before removing it from the container.



The roots of native trees do not like to be disturbed, therefore careful handling is necessary when placing the tree into the prepared hole. If the tree needs a stake, place it into position before you plant the tree so as not to damage delicate roots. Mulch with newspaper, hay or dried grass clippings as with fruit trees, omitting the compost or manure. However, if the tree seems to be growing a little slowly you could scatter a small amount of compost over the mulch to promote breakdown and supply the tree with natural fertiliser. Trees planted this way will not only give satisfactory growth but are work free, because the mulch will maintain consistent soil moisture and heat levels, keeping down weeds and grasses for four to six months.

HAPPY GARDENING!

INDEX

PLANTING NOTES

Date	*Fruit or vegetable planted*	*Date Harvested*	*Comments*

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