

# **Growing Fruit & Nuts in the Top of the South**



*Created by*



*A network of agencies making it easy to create gardens, grow food, and compost in Nelson*

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# Why grow fruit & nuts at home?

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There are heaps of reasons! As well as getting real satisfaction from producing your own food:

- ✓ Your fruit will be fresh and delicious.
- ✓ You can grow fantastic varieties that you don't usually find in the shops.
- ✓ You'll save time and money on shopping for food, and you'll find it easier to eat a healthy diet.
- ✓ Your fruit will be free of chemicals.
- ✓ Your garden will look beautiful.
- ✓ Your kids will learn first-hand where their food comes from.
- ✓ Growing, watching and picking fruit is a fun family activity.

Of course, you'll want all your efforts to 'bear fruit' and be a great success!

This guide will:

- help you choose plants that suit your property
- show you how to plant and care for them
- suggest varieties that suit home gardens in the Top of the South
- suggest website links and books with more detailed information and advice.



## The Top of the South region



	Mild temperatures, high rainfall (2000–4000mm), especially at altitude.
	Sunny, sheltered, rain mostly in winter/spring (approx. 1000–1800mm). Warm summers, mild winters.
	Warm summers, mild winters, strong winds from the N.W. Rain approx. 1300–2000+mm.
	Cooler, rain approx. 1500–2000+mm, gales at times, snow in winter.
	Very warm summers with dry N.W. winds, moderate winters. Low rainfall (approx. 500–1200mm), mostly in winter.
	Very warm summers with dry N.W. winds, moderate winters. Low rainfall (approx. 500–1000mm), mostly in winter.
	Mountain areas, valleys and basins – wetter and colder.

# Part 1

## PLANNING

The climate in the Top of the South area suits a great range of fruits, although there are some differences across the region that affect what you can grow.

### *Rainfall*

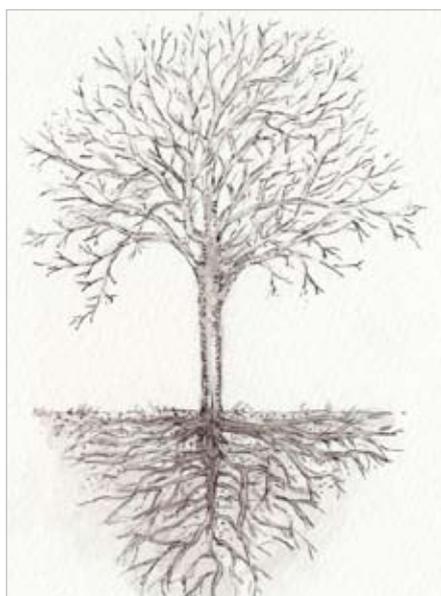
The most obvious one is rainfall – the map shows a big difference from west to east, with moist conditions that suit subtropical plants in Golden Bay, through to the dry areas near Blenheim that are famous for olives and grapes.

### *Wind*

There's also quite a difference in winds, especially in the east, which gets cold sou'-westers in winter, and hot nor'-westers in summer. If your property is exposed to strong winds, you'll need to create shelter.

### *Frost*

If you're near the sea it will be less frosty, so you might be able to grow some subtropical plants in sheltered spots. If you're a long way from the sea, you'll have to consider whether the fruits you want to grow can handle frost, especially in spring when they're flowering.



### **Leaf zone and root zone**

Note the drip line from the ends of the branches – this shows you how wide to spread fertiliser and mulch.

### **Get to know your site**

Most large fruiting plants need full sun. Smaller bushes and canes can handle some shade.

A typical town property will have several pockets (microclimates) that will particularly suit certain plants. Walk around your place at different times of the day, and in different seasons, and take notes about:

- the sunshine in various places – what time it arrives and leaves
- where north is
- places that get waterlogged (this can kill the plant)
- places that are sheltered from rain by a building e.g. under the house eaves
- where frost lies on winter mornings
- where the main winds come from in each season, and how strong they are
- any sheltered spots that could be used for tender plants
- how much space there is for plants to grow (width, height and root zone).

Think about other areas that you don't want to crowd or shade. Also think about whether your trees will create problems for your neighbours when they're fully grown (e.g. blocking the view, producing unwanted shade or annoying leaf litter).

It's important to know where underground pipes are (e.g. water, stormwater or sewage), as tree roots can cause expensive problems later on.

It can be hard to picture the full-grown size of the baby tree that you plant – it helps to put sticks in the ground to mark out its future spread. Remember that the root zone will spread about as wide as the branches (see the diagram).

It's worth taking the time to draw a plan of your property – it means you'll fill every suitable space as time and money allow.



## Factors to consider

### Factors that affect plants

#### Sun

Most fruit trees need at least six hours of direct sunlight per day. North-facing areas will usually deliver this. Early-morning sunshine is good for quickly drying out the leaves, which helps prevent some diseases.

Remember the sun is much lower in the winter, and it can be surprising how long the shadow from a building or tree gets at a time when you most want the sunlight (see the diagram below).

#### Wind

Strong wind can damage plant growth, stop insects from pollinating the flowers, and make the fruit fall before it's ripe. Edible plants grown close together as a hedge (e.g. feijoas, olives) make good windbreaks.

#### Water

Make sure you can get a hose to your plants. You'll need to water them regularly during the first year after planting; also if they're in containers. Once they're established, water them in early summer and occasionally during ripening, to make the fruit juicy and help the plants resist pests and diseases.

If you're in a dry area near Blenheim that has light, stony soil, water little and often – otherwise the water just drains away and is wasted. If water lies around the planting site for several days after rain, dig some drains to guide the water away so it doesn't kill the plant's roots.

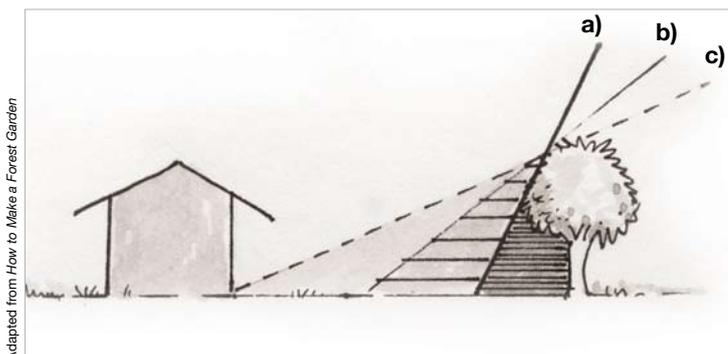
#### Type of soil

The quality of the soil is important, as fruiting plants stay in the same place for a long time. They grow best in free-draining, fertile soil. If your soil doesn't fit that description, you'll need to:

- choose the kinds of plants that suit your soil (see the section 'Part 3 – Essential Plant Info')
- add plenty of organic matter when you prepare the planting area.

A simple soil test is to dig up a handful of soil and pick out any sticks and stones. Dampen it, squeeze it, and see if you can mould it into a sausage shape.

- Clay soil sticks together and holds water, so it moulds well. In summer it can bake solid. It's usually full of nutrients, and just needs to have plenty of organic matter and a dose of gypsum worked into it.
- Sandy soil is light and gritty, and won't mould in your hand. It drains easily and lacks nutrients, so it needs heaps of organic matter worked into it to hold water and provide nutrients.
- Silty soil, which is ideal for growing fruit, is in between these. It sticks together when you mould it, but falls apart if you press the 'sausage' flat. It's free draining and high in nutrients. You'll find silty soil on old river flats e.g. Renwick.



#### Sun angles:

- a) Sun is high in summer, casting a short shadow.
- b) Autumn and spring positions.
- c) Sun is low in winter, casting a much longer shadow.

## Factors to consider

Having clay is not always a bad thing. Atawhai clay is rich in nutrients, once you've added gypsum and lime to make them available to plants.

The Wither Hills area has stony clay similar to Atawhai's. Unfortunately, Moutere clay contains less goodness, and nutrients need to be added.

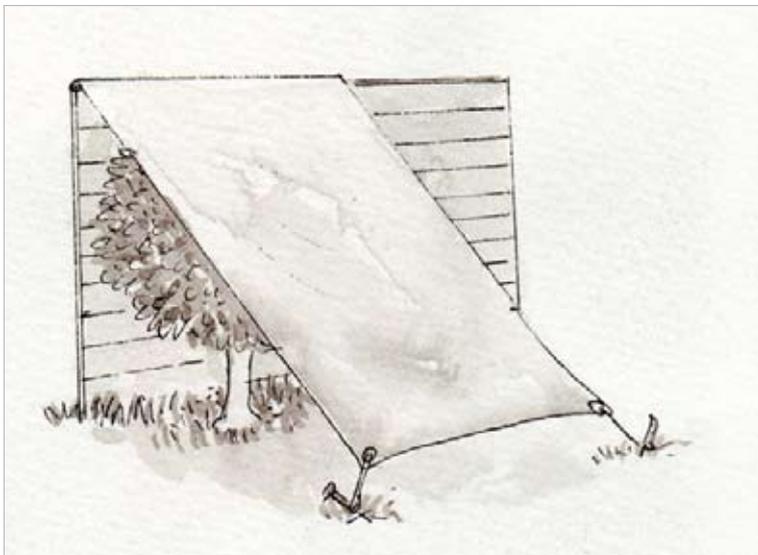
### *Frost*

If you have serious spring frosts, don't get plants that flower early, as frost can ruin the blossoms – and the whole season's crop. Grow tender plants next to a wall or fence so you can make a shelter to protect them on frosty nights (see the diagram below).

Cold air flows downwards and 'pools' in low places. Make sure the cover doesn't form a hollow over the top of the plant, as the frost could concentrate there and damage it, instead of sliding away from the plant.

### *Protection from birds*

For some fruits, the birds will take the lot just before they're ripe enough for you to pick. Group at-risk plants together and protect them with netting. Growing fruit trees on wires makes this easier.



**A Riwaka gardener**

One absolute necessity when planting berries is to protect them from birds. Cover them all with netting. Otherwise there's open slaughter and not a bite for the belly.

I've stapled bird-netting right down the side of the house then pegged it to the fence, forming a roof, and some more is draped over the ends.

In there, we have white, black, and redcurrants, a dwarf peach, boysenberries, a thornless blackberry, two cranberries and two gooseberries.

### *Need a pollinator?*

Some plants need a 'pollinator' nearby (i.e. another plant of the same type, flowering at the same time) to make sure the blossoms are cross-pollinated and form fruits.

A pollinator can be another tree on your own property or a neighbour's, or it can be a branch of another compatible variety grafted onto your tree.

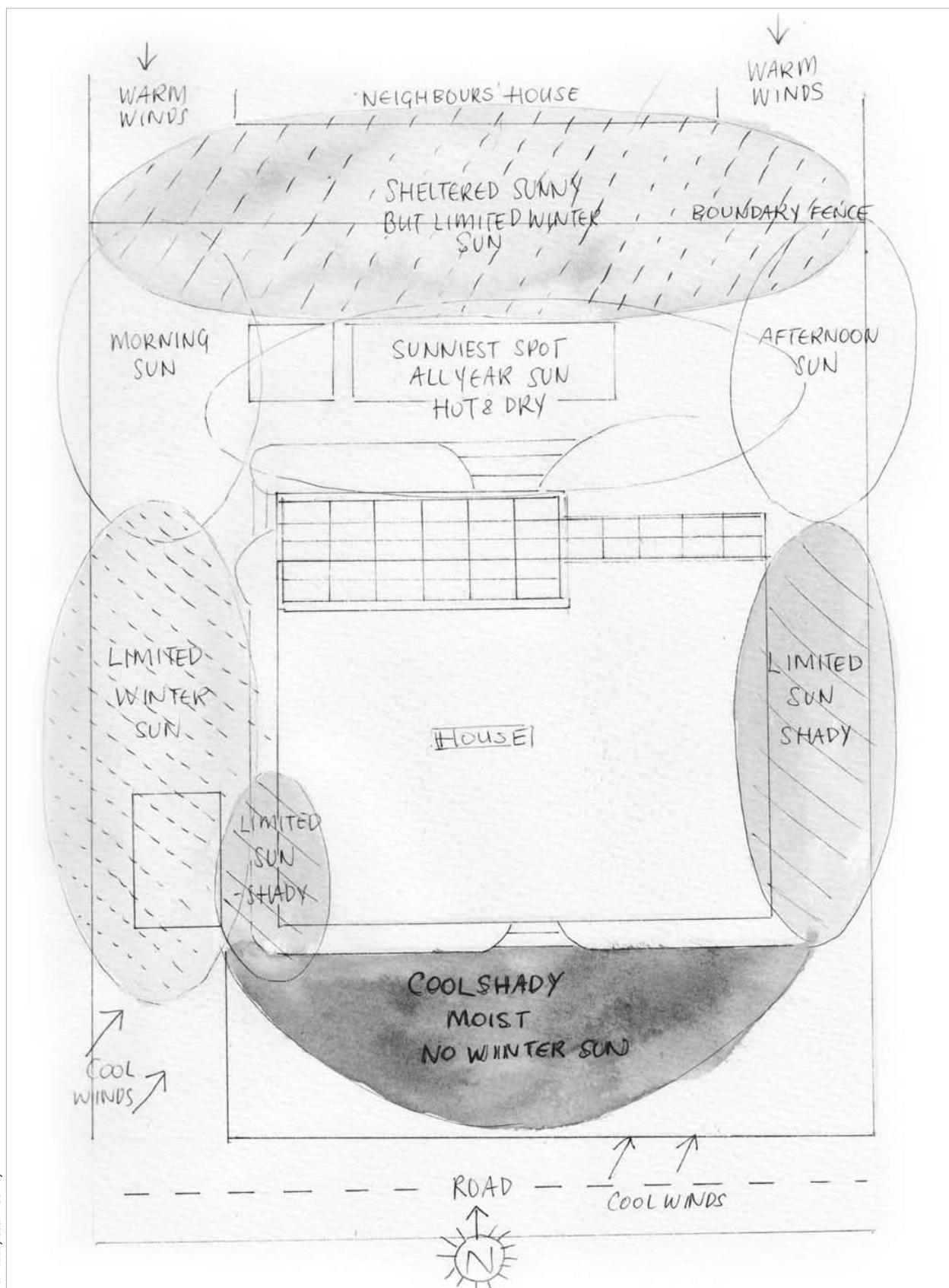
Check out whether the fruit trees you want to grow need a pollinator.

### **Frost protector:**

Cover tender plants for the night when heavy frosts threaten.



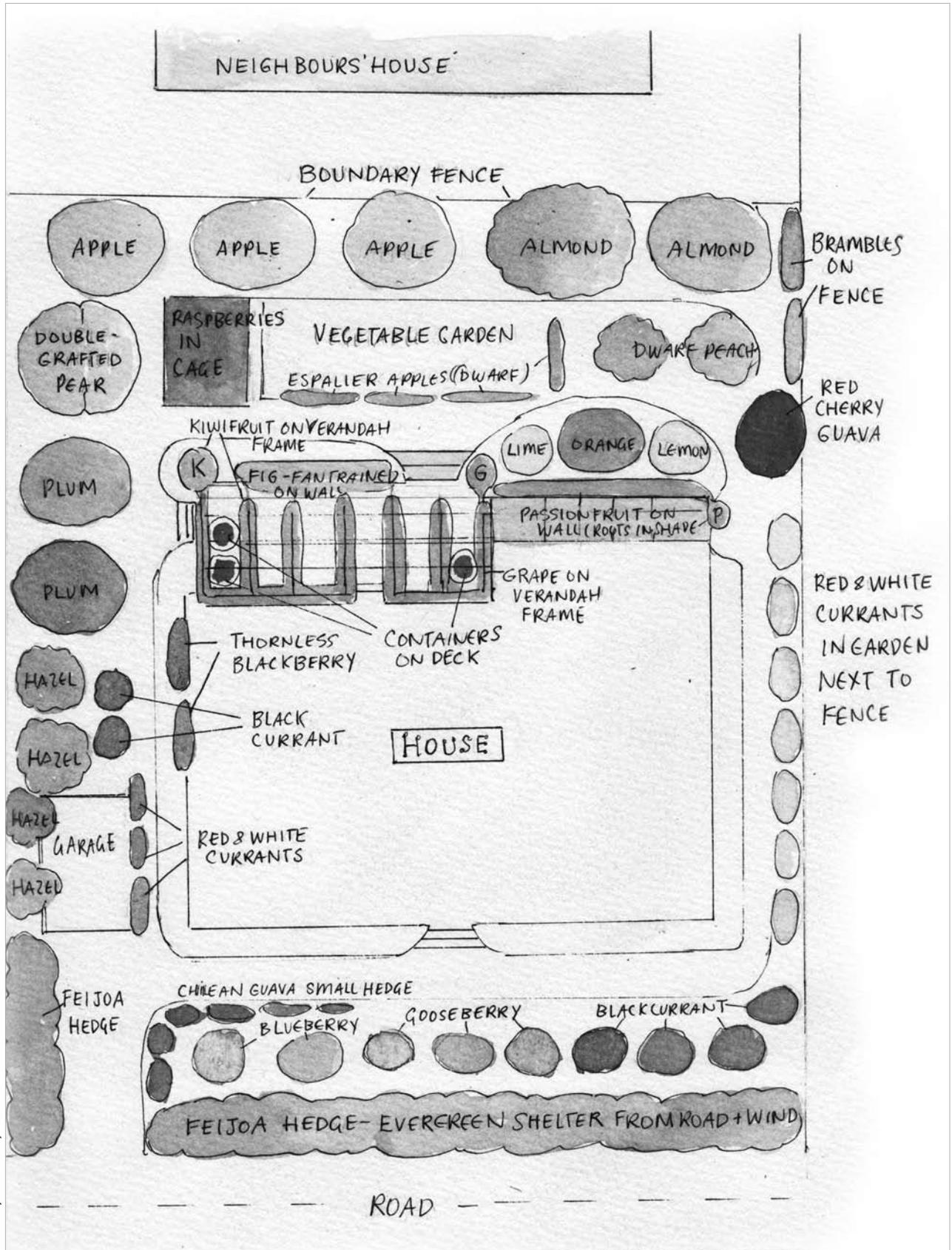
## Microclimates in a typical suburban property



Nick Kiddey/Judith Cowley



# What you could grow in those pockets



Nick Kiddey/Judith Cowley

## Using space well

### Make the most of your space

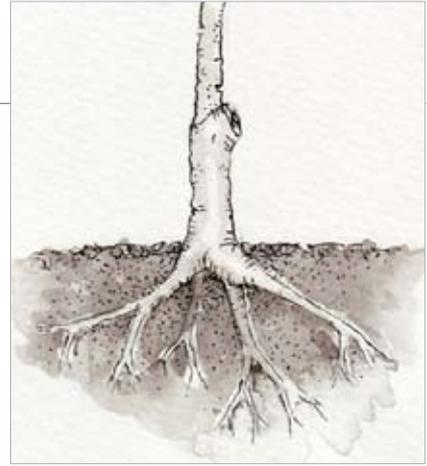
You might think you don't have enough suitable space to grow many fruit trees, but there are ways to get around that.

#### 1. *The right rootstock*

A tree you buy from a nursery usually consists of a 'graft' (a living piece of the variety you want) that has been fused to a 'rootstock' (a living stump). It is the rootstock that controls factors such as how big the tree gets and what soil conditions it can handle. When you buy your tree, tell the nursery the conditions the tree will grow in, so they can advise you on the right rootstock (there's more about rootstocks in the section 'Part 2 – Other Useful Info').

Trees grown on dwarf rootstock can be handy for fitting more types of fruit into a small property, as they only grow to two or three metres in height e.g. dwarf peaches, nectarines, apples, almonds and citrus. BUT:

- they are more delicate, and only do well if they're planted in fertile, well-drained soil
- they have brittle, shallow roots, so they need good shelter, irrigation and mulching, plus staking so they don't blow over.



Adapted from How to Make a Forest Garden

**Rootstock and graft union**

#### 2. *Vertical stacking*

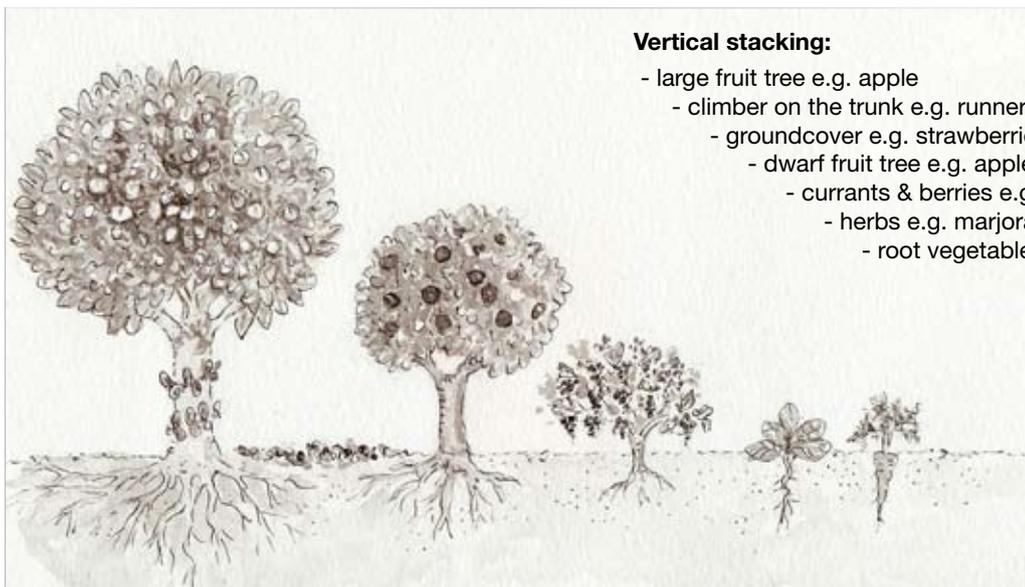
You can fit heaps more plants into a small property if you use 'vertical space' well.

For example, instead of having all your bigger trees in one area, your fruit bushes in another, and your herbs and groundcover fruits somewhere else, you can have a big tree with suitable shrubs planted around it, and herbs and groundcovers in between them all (see the illustration below). This is also known as 'forest gardening' – for more information see:

[www.edibleforestgardens.com/about\\_gardening](http://www.edibleforestgardens.com/about_gardening)

[www.agroforestry.co.uk/forngndg](http://www.agroforestry.co.uk/forngndg)

[www.spiralseed.co.uk](http://www.spiralseed.co.uk)



#### **Vertical stacking:**

- large fruit tree e.g. apple
- climber on the trunk e.g. runner bean
- groundcover e.g. strawberries, nasturtiums
- dwarf fruit tree e.g. apple, peach
- currants & berries e.g. blackcurrants
- herbs e.g. marjoram, comfrey
- root vegetables e.g. beetroot

Adapted from Graham Burnett [www.spiralseed.co.uk](http://www.spiralseed.co.uk)

## Using space well

### 3. Multiple grafts

To increase the number of varieties you can fit onto your section, you can buy trees with other related varieties grafted onto them – they're called 'family trees', or 'double grafts' or 'triples'.

Also, to make sure you have a pollinator for your blossoms, you can graft just one branch of the pollinator variety onto your tree.

If you want to add another variety to an established tree, the instructions on these websites are really clear:

[www.sces.org.nz/pmwiki.php/Content/Grafting](http://www.sces.org.nz/pmwiki.php/Content/Grafting)

[www.sces.org.nz/pmwiki.php/Content/TakingCuttingsFromOldVarieties](http://www.sces.org.nz/pmwiki.php/Content/TakingCuttingsFromOldVarieties)

### 4. Space-saving shapes

You can train trees against a fence or wall, or use them to divide the property into different areas. Berries and vines are also happy growing amongst the shrub border of the garden, or trained over arches and pergolas.

The simplest support structure is galvanised fencing wire attached along a wall, or between two strong posts or stakes.

See the section 'Part 2 – Training' for how to create the shapes below (Cordon, Espalier, Fan).

## An Atawhai gardener

We're growing all our fruit trees as espalier.

We've only got a small backyard, but by using espalier and double grafts, we can grow four varieties of apples, two pears, a greengage and a plum, and we still have room for a dwarf cherry and a mature blackboy peach.

We can easily drape birdnetting over the structures so the birds don't peck holes in the fruit when the weather's dry.

And because the lush tips get pruned off, we don't have problems with insects infesting the growing tips.

### 5. Containers

If your only growing space is on a balcony, you can grow fruiting plants in containers. Other advantages of using containers:

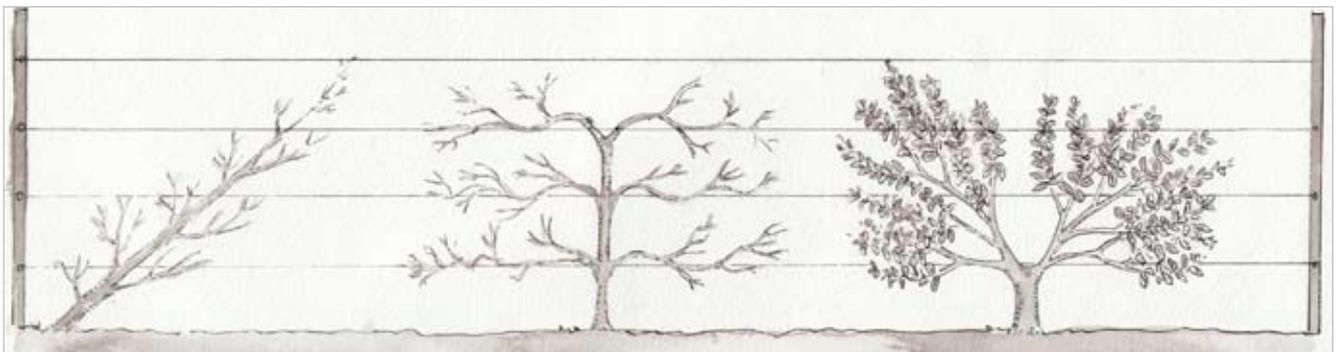
- In a cold area, you can grow citrus and other subtropicals in pots and move them under cover during winter.
- They're decorative e.g. for entrances, decks, paved areas.
- You can take them if you shift house!

BUT containers are less forgiving than growing plants in the ground, so it's easier to run into problems. For more information, see [www.edible.co.nz/growing.php#container](http://www.edible.co.nz/growing.php#container)

Cordon

Espalier

Fan



Adapted from *How to Make a Forest Garden*



## Getting started

### Easy plants to start with

Start with fruiting plants that aren't too fussy, e.g. feijoa, lemon, mandarin, orange, plum, persimmon, hazelnut, an apple that is resistant to black spot, and various berries.

Varieties of each fruit that perform well in organic home gardens in this region are listed in the section 'Part 3 – Essential Plant Info', and are also summarised in a chart in the section 'Part 4 – Other Useful Info' and on our website. The stonefruit varieties (except for plums) are not totally disease resistant – they often get curly leaf and brown rot in this region, even when they're called 'resistant'.

### Plan well ahead

If you select varieties that are less common, order them at the nursery in summer, so they arrive for planting in winter – nurseries often sell out before then.

Planting a fruit tree in winter, rather than any other time of year, helps it get well established because:

- the tree's energy is in its root zone then, rather than in leaf growth
- there's plenty of moisture in the ground, so the tree doesn't get stressed.

### Main points to remember for success

- Fruiting plants need sun.
- Protect them from strong winds.
- Dig drains if the soil gets waterlogged.
- Add organic matter to improve the soil.
- Water the plants regularly until they're established.
- Choose varieties and/or rootstocks that suit your soil type (e.g. clay, sandy, silty).
- Choose varieties that don't flower when you have frosts.
- Plant a pollinator if required.
- Protect near-ripe fruit from birds.



# Part 2

## PLANTING, TRAINING & PRUNING

### Planting a fruit tree

Plant fruit trees in winter, so the roots can get established before the leaves start to grow. For frost-tender plants (e.g. subtropicals and some citrus), wait until spring, when the worst frosts are over.

- Prepare the site first – clear all weeds and grass from an area about 1m square.
- Soak the tree (up to two hours maximum) in a bucket of water before removing the bag or pot.
- Prune off any damaged pieces of root. If the roots are circling around the root ball, slice them from top to bottom in several places with a sharp blade, so new roots will grow outwards instead of continuing in a circle.

#### 1. Prepare the planting hole

- Dig a large hole, about half a metre deep, piling the soil near the edge of the hole. Keep the topsoil separate from the subsoil so you can replace them in the same order.
- Mix some well-rotted organic matter (e.g. compost, old sawdust) into the pile of soil.
- Loosen the bottom and sides of the hole with a fork. Add gypsum if you're planting into clay.

#### 2. Place the plant on a mound

- Put a pile of the mixture in the middle of the hole and place the tree on top of it, carefully spreading the roots. On poorly drained soil, build up the planting mound to 0.5m above the normal soil level.
- Check that the tree is straight and will be buried to the same level as before.
- Make sure the grafting union is well above the soil level.
- For a free-standing tree, drive in stakes on two sides so you can support it for the first two years.

#### 3. Fill in the hole

- Carefully fill in the soil around the roots, filling any air pockets, firming the soil down, and watering a little as you go.
- On a dry slope, make sure the soil is level so that rainwater stays in the root zone.

#### 4. Firm the soil and stake the tree

- When the hole is full, press the soil down with your heel.
- Use flexible ties (e.g. old pantyhose, strips of bike inner tube) to tie the tree to the stakes. Check them regularly to make sure they're not restricting growth.

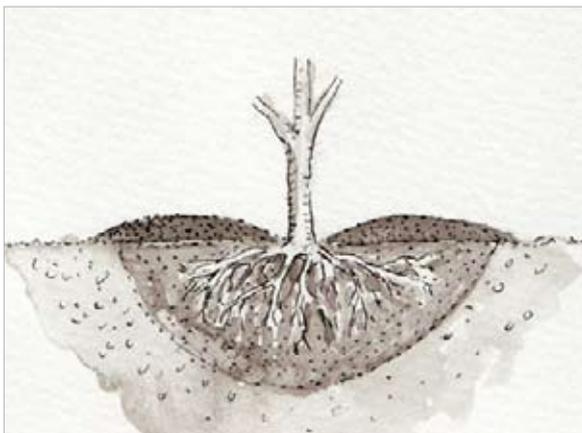
#### 5. Water and mulch

- Water the soil well.
- Spread rotted manure or compost over the soil and cover with mulch. Leave a clear space around the trunk so it doesn't rot.
- For the first year or two, water the tree regularly and deeply during dry periods, and keep the area weed free.

#### 6. Trim the branches

- Prune to shape the tree. If it has a lot of branches but a small root ball, prune off about a third of the branches to help the tree adjust while it forms new roots.

The mulched planting hole



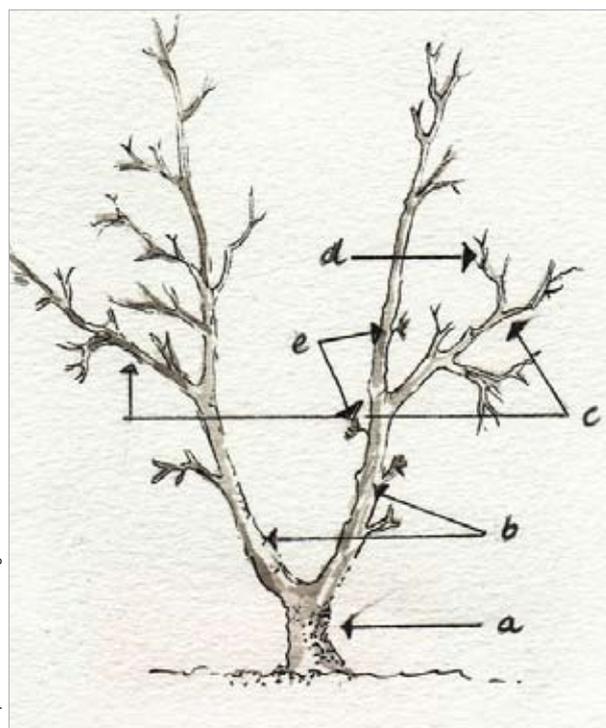
# Training & pruning

## Why train & prune fruit trees?

- You'll get more good-sized fruit.
- The tree is less likely to get diseases and broken branches.
- It will be easier to pick the fruit.
- You can train the tree to the size and shape that suits your property, and still get plenty of fruit.

## Terms for parts of a tree (see diagram)

- Trunk (central leader):** The new plant's central stem becomes the tree's trunk.
- Leaders:** Strong upright shoots that sprout from the central stem and are trained as the 'framework' of the tree.
- Fruiting arms:** Main branches that grow sideways from the leaders.
- Laterals (or 'shoots'):** Thinner, fruit-producing side shoots that grow from the fruiting arms or leaders.



Adapted from Fruit Gardening in NZ

## When to prune

- **Winter pruning** is best for shaping a young tree or reshaping an older tree. It encourages the growth of vigorous new leafy wood.

Do this before the sap begins to rise in spring.

- **Summer pruning** encourages the growth of less-vigorous fruiting wood, so it is the best time for trimming branches and renewing fruiting wood.

Do this when the new growth is several centimetres long, and again after the fruit is harvested.

- **Stonefruit trees should ONLY be pruned in summer, to reduce the risk of diseases.**

- Spurs:** Stubby clusters of fruit buds that develop on leaders and fruiting arms.



Fruiting spur

Adapted from Fruit Gardening in NZ

- **Buds:** The little lumps on a shoot are either leaf buds or fruiting buds (see below). It's easier to tell which is which in spring.



Leaf buds (pointed)  
Fruit buds (rounded)

## Training & pruning

### How & where to cut

The most important thing to know is what kind of wood each type of tree carries its fruit on, so you don't accidentally cut it off. This information is included in the section 'Part 3 – Essential Plant Info'.

#### *Trees that bear fruit on an earlier seasons' wood*

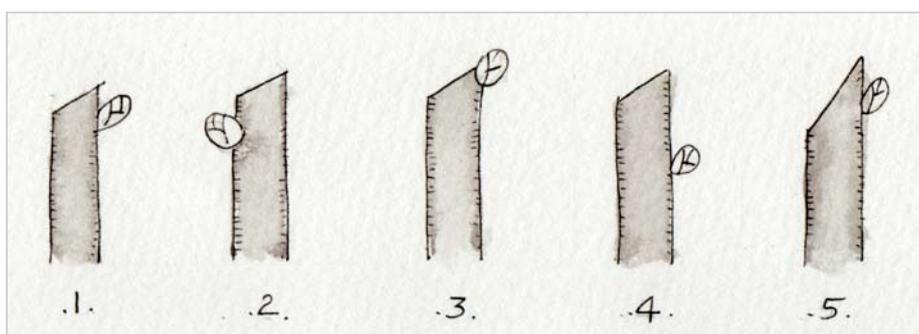
- You'll need to shorten some of the laterals (called *heading back*) to encourage the development of fruit buds.
- Make this kind of cut a little above a bud, sloping away from it at about 45 degrees (see below) so that rainwater runs down the other side instead of collecting on the bud.
- If you leave a longer stub, it can die back; if you cut too close to the bud, the wound might not heal (see below). Both of these can be an entry point for diseases.

#### *Trees that bear fruit on the new season's wood*

- Shortening the laterals would cut off the future fruit. Instead, you'll *thin out* some of them by cutting them right back to where they sprout from the branch or trunk.
- Cut exactly beside (but not into) the 'collar' – the rings where the shoot joins to the bigger branch. The bark grows fast in this area and will quickly heal over the cut.

### Orchard hygiene

- Make sure your secateurs and loppers are sharp, so you don't make jagged cuts or tears.
- Between trees, wipe the blades with methylated spirits or bleach (e.g. Janola wipes) to avoid carrying diseases between trees.
- Use a pruning saw for thicker branches. Start by 'undercutting' the underside of the branch, then cut through the rest from the top. This stops the bark tearing away as the branch falls, leaving a wound that diseases can get into. If the branch is heavy, cut it in several sections to ease some of the weight.
- For apples and stonefruit, seal the cuts with pruning paint so diseases can't enter the tree there. Some advisors believe it's better to let the tree heal itself – but growers in this region say the risk of disease is too high in the climatic conditions here.
- Remove all the prunings from your property, especially dead or diseased branches and 'mummified' (brown and shrivelled) fruit.



#### Pruning cuts:

1. Correct
2. Cut in the wrong direction (sloping down towards the bud)
3. Cut too close to the bud
4. Cut too far away from the bud
5. Cut too slanted

## Early training

### Choose the shape

The best shape for a fruit tree depends on:

- which season's wood it bears fruit on
- how vigorously it grows
- whether its branches are flexible or stiff
- whether you want a free-standing tree or you want to train it on wires.

It's best to decide on the shape for a new tree right from the start and train it to set up a clear framework. It will be easy to maintain after that. It's harder to correct the shape later on with pruning.

If your new tree has no side branches, cut the main stem back to a healthy-looking bud – side branches will develop below that cut during the next growing season. The height you should make this cut depends on which shape you've chosen (see the next four pages).

### Recommended shapes

#### Citrus

Bush

#### Stonefruit, fig, persimmon

Free-standing: Vase

On wires: Fan

#### Apple

Free-standing: Central leader, Vase

On wires: Espalier, Cordon

#### Pear

Free-standing: Modified central leader

On wires: Espalier, Cordon

When the new shoots grow in spring, choose the strongest ones that are in the position to create the shape you want. Cut off the other shoots for this season, then follow the steps required to create that shape. For all the shapes, remember that upright branches grow more vigorously, and flatter branches are more likely to develop fruiting wood.



Adapted from *Fruit Gardening in NZ*

### Vase

The best shape for stonefruits. Several fruiting arms form a 'bowl' that makes it easy to climb into the tree for picking and pruning – this also makes it a popular shape for home-grown apple and pear trees.

#### How to train

1. Head back the central stem at the level you want the 'bowl' to be.
2. In spring, choose four or five of the strongest shoots that are growing in the directions you want as the main 'leaders'. Shorten them to a healthy bud to force the growth of laterals below that point. Shorten or remove all other shoots for this season.

#### Maintain the shape

- From then on, remove any shoots that would clutter the centre of the bowl.

## Early training

### Central leader

The best shape for an apple tree – lets light into the tree to encourage the development of new fruit buds.

Pyramid-shaped, with one central trunk and tiers of fruiting arms starting at about 0.6m above ground level.

#### *How to train*

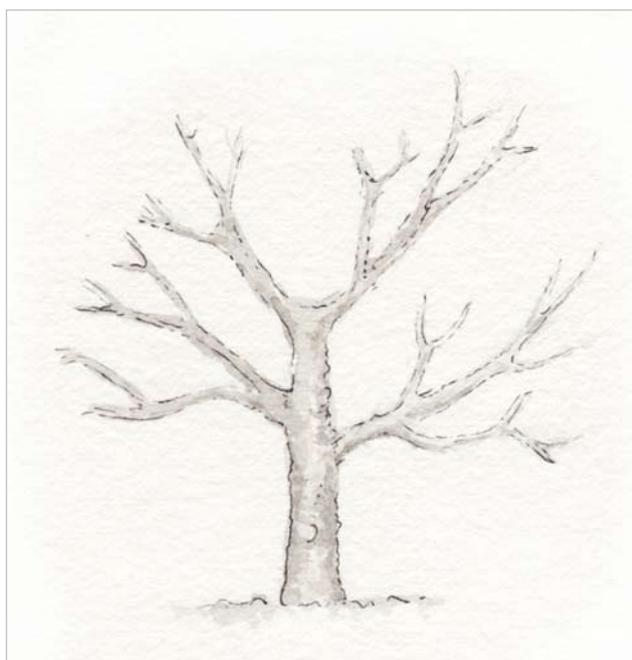
1. Choose four or five branches in an approximate layer at about 0.6m from the ground – they will be the fruiting arms. Make sure they don't all sprout at exactly the same level, as this weakens the tree.
2. Shorten the central stem to about 1m above this tier. New shoots will grow below this cut. Choose one of them to continue as the central stem, and keep four or five that are in the right places to be the next tier of fruiting arms. Cut off the unwanted shoots.
3. During summer, flatten the fruiting arms down a little, to encourage the development of fruit buds – tie the end of the branch to a stake, or just let the fruit weigh the branch down.



4. Repeat this until the tree has reached the height you want.

#### *Maintain the shape*

- Each year, cut the central leader back to a weak shoot to keep the tree at the height you want.



### Modified central leader

A good shape for controlling the height of vigorous trees such as pear and cherry.

#### *How to train*

1. Training starts as for the Central Leader tree, with one central trunk with tiers of fruiting arms.
2. When the top tier of fruiting arms is at about 1.8m from the ground, head back the central stem to a strong outward-growing branch.

#### *Maintain the shape*

- Rub off any shoots that grow from the top of the trunk, so the crown stays open.

## Early training

### Training trees on wires

Choose the shape that suits both the type of tree and your section. For all of them:

- Choose trees grown on dwarf rootstock where possible.
- Set up galvanised wires against a fence, wall, or between strong posts, with the bottom wire about 60cm from the ground.
- Use eyebolts to fix the wires onto walls or fences, to allow air circulation behind the plant.
- Insert pieces of cane between the branches and the wires, so that rubbing doesn't damage the bark.
- Set the plant in the ground about 30cm out from the wires.

### Espalier

#### Training

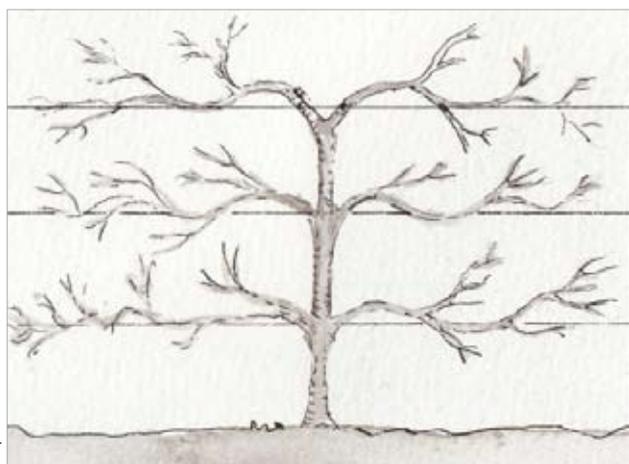
1. At planting, head back the leader to about 5cm above the level of the first wire – make sure there are at least three good buds below this cut.
2. The tree will grow new shoots below the cut. Choose the best three and pinch off the rest.
3. Select one shoot to continue as the centre stem, and two to gently tie down along the bottom wire as the horizontal arms. Let the tips of the arms point upwards.
4. When the centre stem has passed the next wire, cut it off just above the wire.
5. Repeat these steps until the tree is the height you want – up to six wires high, depending on the tree's rootstock. As they grow, keep tying down the fruiting arms until they've filled the wires.

### Why train dwarf fruit trees on wires

- You can fit vigorous trees into a small or medium-sized garden.
- The trees don't cast so much shade.
- They make great dividers within the property.
- You can grow tender trees, which wouldn't normally survive in your area, against a wall that radiates extra heat.
- Pruning, picking, netting against birds, and spotting pests and diseases are all much easier.
- Branches that have been damaged (e.g. by cicadas) or are heavy with fruit are supported and less likely to break.

#### Maintain the shape

- Rub off any vertical shoots that sprout from the top of the central leader.
- Each winter, head back new growth on the 'arms' by one third to a downward-facing bud. Prune the laterals back to 7cm. Pinch off any unwanted shoots.
- In summer, shorten the branch tips to the start of the new growth and remove a quarter of the old spurs.



Adapted from *How to Make a Forest Garden*

#### Espalier

Suits apple, pear, nashi, persimmon, grapes.

Dimensions of structure: up to 2.5m x 4.5m, with wires 30–60cm apart.

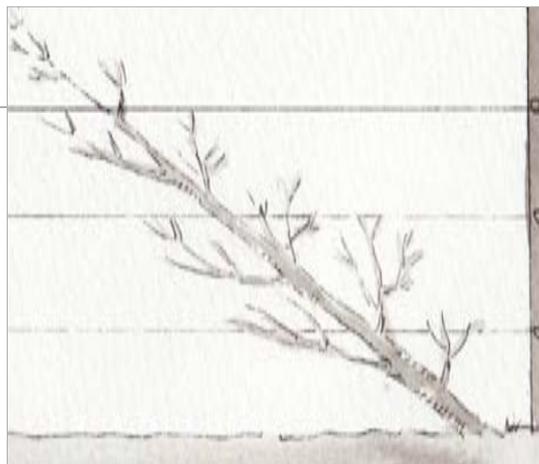
## Early training

### Cordon

Suits apple, pear, nashi, quince, gooseberries, red/whitecurrants.

Dimensions of structure: up to 1.8m x 75cm, with wires 60cm apart.

Fasten a piece of cane to the wires at a 45-degree angle.



Adapted from How to Make a Forest Garden

### Cordon

#### Training

1. At planting, head back the main stem by a third and fasten it to a piece of cane that you've placed at a 45-degree angle. Shorten side shoots to 7cm, to a downward-facing bud.
2. Remove all flowers during the first spring.
3. In summer, shorten all the side shoots coming from the main stem to 7cm. Shorten secondary shoots to 3 leaves.

4. Next winter, head back the new growth on the main leader by a third.
5. Repeat these steps until the tree reaches the required height.

#### Maintain the shape

- Shorten the new growth on the main shoots to 7cm, and on the secondary shoots to 3 leaves.

### Fan

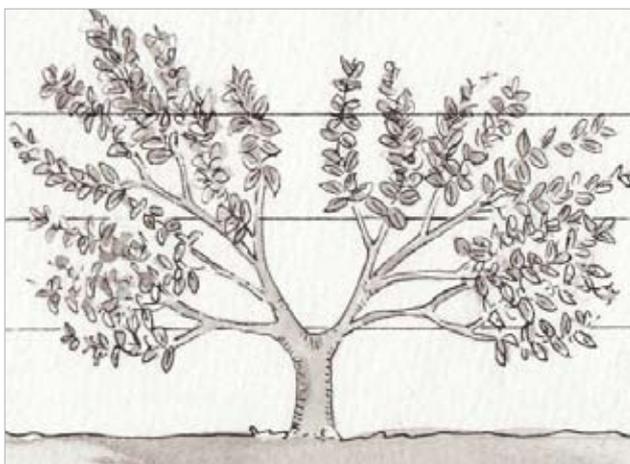
#### Training

1. In spring, head back the central leader to the level of the first wire. New shoots will grow from below that cut.
2. Select the best shoots for the fan 'ribs' – either radiating from one low central point, or from two evenly spaced laterals trained in each direction. Tie them loosely to pieces of cane that are tied between the wires.

3. The next season, shorten all the leaders to about 45cm of new growth, to force new shoots to sprout below that point.

#### Maintain the shape

- Each season, cut out any laterals that are growing in the wrong direction, and in midsummer, shorten to six leaves any shoots that are not part of the 'ribs'.
- Stonefruit, figs, persimmons and berries fruit on 1- or 2-year-old wood. Remove these shoots after they've fruited, to encourage the growth of new fruiting wood.



Adapted from How to Make a Forest Garden

### Fan

Suits almond, cherry, apricot, nectarine, peach, fig, quince, persimmon, berries, redcurrants, whitecurrants.

Dimensions of structure: up to 2.5m x 3.5m, with wires 15cm apart.

## Annual pruning

After the first few years of training, you'll need to establish a cycle of renewing the fruiting wood.

For this, you need to know where your tree carries its fruit (see the section 'Part 3 – Essential Plant Info' for each type of fruit).

You can tell new wood from old wood if you look closely at the new growth at the ends of branches in spring – it's a different colour from the wood further back down the branch, and there's often a clear line between the two.

### **Fruit on tips** – *e.g. stonefruit, figs, persimmons*

- Bear fruit on the tips of 1- or 2-year-old wood.
- Thin out new shoots so they're well spaced, and head back weak shoots by two-thirds.
- In early summer, completely remove any strong new growth that will crowd or shade the lower branches.
- After the shoots have fruited, cut them right out to encourage the growth of new replacement shoots.
- Prune stonefruit in summer, to reduce the risk of diseases.

### **Prune each year**

The aims of pruning are to:

- remove diseased, damaged and crossing branches
- control the tree's size and shape
- prevent shading and overcrowding inside the tree
- cut out some of the older 'worn out' fruiting wood to encourage the growth of new fruiting wood
- remove any suckers (shoots growing from the base)
- make spaces around the tree for placing a ladder if needed for picking and pruning.

Seal all cuts with pruning paint to reduce the risk of diseases.

### **Fruit on spurs** – *e.g. apples, pears*

- Bear fruit mainly on fruiting spurs that develop on 2-year-old wood and last for several years.
- Cut out a quarter of the old spurs each winter, and head back older laterals to a bud close to the tree's framework.
- Either shorten some of the newer laterals, or tie them down to encourage the formation of fruit buds.

### **Main points to remember for success**

- Prepare the planting hole beforehand, including plenty of organic matter.
- Plant the tree carefully and water, mulch and stake it if necessary.
- Find out where the tree carries its fruit, so you can choose the best shape and pruning methods to use.
- Train the tree when it's young.
- Once the tree is established, prune it each season to keep it healthy and productive.
- Pay attention to good orchard hygiene to reduce the risk of diseases.
- You don't have to get it exactly right!
- As long as you cut out any dead, diseased or damaged wood, and any branches that cross over one another, most trees will keep on producing fruit without too much fuss.
- If you accidentally cut off the wrong branch, or go away for a few years, you can still sort out the tree another season.
- It can take a while for a tree to recover from a major pruning. Just be patient ...

# Part 3

## Essential Plant Info

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### Key to chart symbols

<b>Form</b>			
	Groundcover	Bush	Tree
<b>Soil type</b>			
	Well drained	Medium	Heavy
<b>Sunlight</b>			
	Full sun	Partial shade	
<b>Moisture levels</b>			
	Tolerates dry	Average	Must be moist

# Almond (*Prunus dulcis*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil Type	Sun	Moisture	Shelter	Plant	Harvest
	D	Dw 4.5 x 4 F 6-10 x 6	4-5 5-7	Y				Y	Autumn to early spring	Late Feb/March

## Site

- Needs an open, sunny site, sheltered from spring frosts and wind at flowering. Likes hot summers. Tolerates drier conditions than other stone fruit.
- Needs dry weather at pollination time and during the growing season. Humidity causes diseases. Best suited to conditions in the east of the region.
- Does not tolerate poor drainage.

## Care

- Plant in late autumn or early spring.
- Be careful not to damage the taproot.
- Needs nitrogen – mulch with well-rotted manure.
- Dwarf is self-fertile. Others are cross-pollinated (by honey bees) – plant varieties that bloom at a similar time.



Fruiting spur

## Vase shape



## Modified central leader



## Training & pruning

- Train as a *vase* shape or *modified central leader* (see 'Part 2 – Training' for details). Also good as *espalier*.
- Once the shape is established, prune the tree in summer, in dry weather, and seal all cuts with pruning paint to minimise diseases.
- Bears fruit on 1-year-old shoots and on spurs on 2- or 3-year-old wood – cut back a quarter of the shoots that have already borne fruit to a new bud, to stimulate the growth of new fruiting wood.
- Cut out weak or criss-crossing branches, and dead or diseased wood.

## Companions

- Clover, thyme, garlic, chives, hyssop, tansy.

## Harvest

- Takes about 3 years to produce nuts.
- Nuts ripen late summer/early autumn.
- Harvest when the shells start to crack – clean off any dirt and pieces of hull, then air dry them and store in a cool, dry place.

## Health

- Eat fresh or use roasted – great added to vegetable or fish dishes, in sweets and desserts.
- High in healthy oils, protein, vitamins B and E, antioxidants, minerals.

## Recommended varieties

- CY750                      Fatnut/All-In-One  
403                              Fabin  
Monovale – excellent pollinator for all varieties, hard-shelled (hard to open), 'marzipan' taste

# Apple (*Malus spp.*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	Dw 2–3 x 4 F 5–6 x 5	3 10	Y				Y	Autumn to winter	Autumn

## Site

- Needs a sunny site, sheltered from strong winds – moderate summer, winter chill.
- Tolerates a range of soil types, and prefers slightly acidic conditions.
- Needs good air circulation to prevent diseases.
- Bears fruit on spurs and end buds (see diagrams). Fruit buds develop on 2-year-old wood, so keep new shoots for two seasons, then cut them back.
- Shorten or thin out about a quarter of the older fruiting wood each winter.
- Shorten the strong framework arms to an outward-facing leaf bud (see diagram).

## Care

- Plant in winter and mulch well.
- Tie to stakes for the first couple of years.
- Water regularly while it's fruiting.
- Cross-pollinated by bees and other insects – if there's no apple trees in your neighbourhood, plant two varieties or a multi-graft.
- Thin the fruit in early summer so it grows to a good size.

## Training & pruning

- Best as a *central leader*. Can be trained as *espalier* or *cordon* (details in 'Part 2 – Training').
- Once the tree is established, prune to remove crossing branches, dead or diseased wood, and to encourage new fruiting wood.

## Companions

- Replace grass with spring bulbs, chives, garlic, tansy, comfrey, alyssum, nasturtium.

## Harvest

- Fruits within 2–4 years.
- Pick fruit when they have developed full colour – lift them gently from the tree so you don't damage the fruiting spurs.

## Health

- Use fresh, cooked, bottled or frozen.
- Dry for use in cereals, trail mix, snacks.
- Best health benefits if you don't peel the skin. Good for vitamins A, B and C, minerals, fibre, antioxidants.

## Recommended varieties

Buy disease-resistant varieties.

*Early:* Akane, Discovery, Gravenstein

*Mid:* Captain Kidd, Dayton, Egremont Russet, Prima, Worcester Pearmain

*Late:* Belle de Boskoop, Jonagold, Liberty, Kidd's Orange Red, Merton Russet

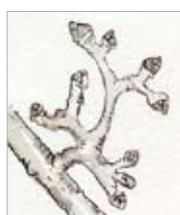
*Very late:* Bramley's Seedling, Sturmer Pippin, Cornish Aromatic

**Graft on a different variety:** [www.sces.org.nz/pmwiki.php/Content/Grafting](http://www.sces.org.nz/pmwiki.php/Content/Grafting)

## Central leader



## Fruiting spur



## Flower buds (rounded) leaf buds (pointed)



Adapted from Fruit Gardening in NZ

# Apricot (*Prunus armeniaca*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	4-6 x 4-8	7-8	N				N	Early winter	Early to late summer

## Site

- Needs full sun. Likes a cool winter, but not severe frosts or wet weather during spring. Humidity causes brown rot.
- Well-drained soil is essential. Plant on a mound if the soil can get waterlogged.

## Care

- Plant in early winter, being careful not to damage the roots. Don't try to shift it later.
- At planting, shorten some of the shoots to two or three buds.
- Water frequently while young, and a month before harvest.
- Mulch in early summer to keep weeds down and retain moisture.
- Self-fertile, but you'll get more fruit if it's cross-pollinated with another variety.

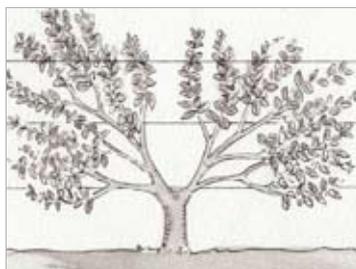
## Training & pruning

- Best shape is *vase* – keep the centre open. Also great trained as a *fan* against a wall or fence (see 'Part 2 – Training').



Fruiting spur

Fan shape



Vase shape



- Prune in dry weather in summer, after harvest.
- Shorten the limbs every year and regularly thin out the strong growth to keep the fruiting wood near the centre of the tree. Remove criss-crossing branches.
- Fruiting spurs form on the previous season's growth and last for 3 or 4 years. Establish a cycle of renewing the fruiting wood. Each summer:
  - remove worn-out laterals
  - space out new shoots
  - shorten weak shoots by two-thirds.
- Seal all cuts with pruning paint.

## Companions

- Nasturtium, garlic, chives, marigold, hyssop, forget-me-not.

## Harvest

- Bears fruit in 2-4 years.
- Check the fruit daily when ripening. Pick when fully ripe, very carefully so they don't bruise.
- Use fresh, add to desserts or yoghurt, cook for jam, or bottle or freeze.
- Dry for use in cereals, trail mix, snacks.

## Health

- Very high in vitamin A, good for vitamins B and C, potassium and antioxidants.

## Recommended varieties

- Katy Cot – self-fertile
- Royal Rosa – pollinates the others
- Sundrop + Trevatt – pollinate each other

# Blueberry (*Vaccinium* spp.)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D/E	3 x 2	1.5–2	Y				Y	Autumn to winter	Midsummer

## Site

- Prefers sun, with afternoon shade in summer. Needs winter chilling, and shelter from wind and spring frosts. Doesn't do well in the eastern parts of the region.
- Needs well-drained, acidic soil that can hold moisture during the summer – plant on a ridge if there's any chance of waterlogging. Does not like clay – add gypsum, organic matter and sand.
- Fruit forms on 1-year-old wood.
- Cut out dead or diseased wood, and weak or criss-crossing branches.
- Remove wood that is 4 years old, to encourage the growth of new shoots from the base of the plant.
- Once mature, prune again in summer, shortening any long shoots so new fruit buds grow near the centre of the plant.

## Care

- A very fussy plant.
- Plant in winter in a hole 30cm deep and wide, with leaf mould added to the soil; add flowers of sulphur to make the soil more acidic, or use a container (45cm diam.) of acidic potting soil.
- Very shallow rooting. Needs moisture at all times during the growing season, but doesn't tolerate waterlogging.
- Spread a 10cm deep mulch of sawdust, leaf mould or pine needles to keep the roots cool and moist, and to supply nutrients. Add 5cm more mulch every year, and some extra nitrogen in spring and midsummer.
- Pinch off the flowers in the first year so the plant can get established.
- Protect from birds.
- Pollinated by bumble bees. Will produce bigger fruit if cross-pollinated with another variety.

## Training & pruning

- Plant 1m apart to form a hedge, or include in mixed plantings.
- Prune in winter.

## Harvest

- Takes 2–4 years to bear fruit.
- Best flavour is a few days after the berries have turned blue. Pick by rolling them gently between the thumb and finger.
- Eat fresh, freeze (they naturally free-flow), add to smoothies, yoghurt, desserts and baking, bottle, or make jam or chutney.
- Dry them to use instead of raisins.

## Health

- High in vitamins A, B, C, E and minerals, very high in antioxidants, and have anti-inflammatory properties.

## Recommended varieties

*Rabbit eye:* Tifsblue, Powder Blue, Delite  
*Highbush:* Duke, Dixie, Bluecrop

## Plants for free

Multiply your plants by *layering*:

- In early autumn, choose a long, healthy young stem and peg it down in the soil.
- Keep it moist until it develops roots (up to 18 months), then cut the new plant free and keep it in a pot in a sheltered place until planting time.

# Boysenberry, Blackberry (*Rubus* spp.)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
Canes	D	2 x 2	2.5	Y/N				Y	Autumn	Summer to autumn

## CAUTION:

*Wild blackberries are a vigorous, painfully thorny weed. Don't get cuttings from the wild – buy cultivated Blackberry varieties.*

## Site

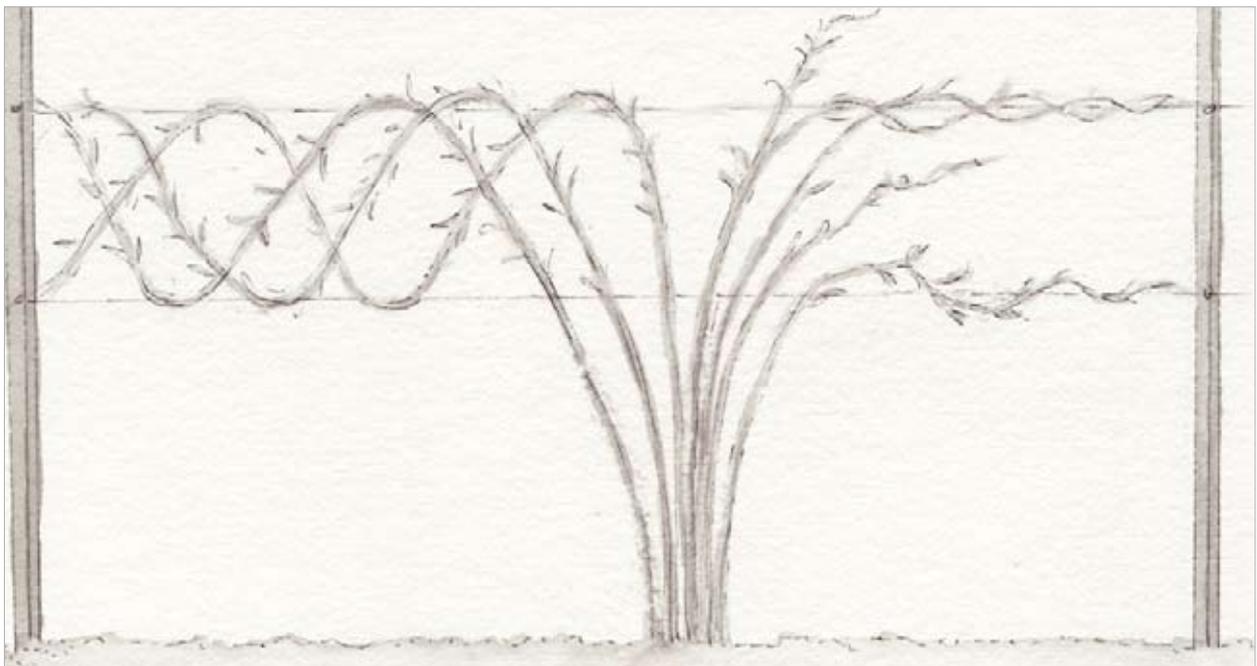
- Needs a sheltered position – full sun helps with flavour, but happy in part shade.
- Soil needs to retain moisture but NOT be heavy or waterlogged.

## Care

- Needs a support structure. Set up a strong trellis or set of 3 wires, at least 1.8m high, with the first wire 0.5m from the ground. (Don't plant against a fence – suckers will come up on the other side.)

- Plant in autumn, along with plenty of well-rotted manure and compost. Space the plants out well for good air circulation.
- At planting, shorten the canes to 15cm so the roots can get established.
- Water regularly during summer – dryness affects the current crop AND the next year's canes (an irrigation system is good for regular, light watering).
- Has shallow roots, so hand weed carefully and keep well mulched.
- Add a little fertiliser in August, and also in late summer before the new canes grow.
- Pollinated by bees and wind. Some need cross-pollination with another variety.

**Train the canes between two wires – you can weave, tie or twist them in place**





## Training & pruning

### *Erect-growing types*

- Tie the canes up against the support structure. Head back the new growth at 2m high and 1m wide, to encourage the development of fruiting laterals.
- A fan shape will let the sun reach all the fruit – choose the best four or six canes and cut each one at 15cm past the top wire, spacing them 10–15cm apart as fan 'ribs'. Thread them in and out between the wires and tie them in place.

### *Trailing types*

- Tie, twist or weave the canes onto horizontal wires (see diagram).
- First-year canes grow leaves early in the season, and then form flower buds in the late summer for the next season's fruiting. In the first summer, thread the canes in and out of the wires and tie them in place.
- In the second summer, train the new canes straight up through the centre and fasten them along the top wire. This will keep them separated from the fruit-bearing canes, and help keep the plant under control – especially important for Blackberries.
- Immediately after fruiting, cut the fruited canes down to ground level and weave the new canes in and out of the lower wires.
- Remove all prunings from your property to reduce the risk of diseases and pests.
- Make sure you don't let the plant's tips touch the ground, where they could sprout roots and become a thicket.

## Companions

- Marigolds, chives.

## Harvest

- The trailing types fruit between December and January. Blackberry fruits in late summer to autumn.
- Pick them when they are dark coloured and have softened. Handle them gently so they don't squash.
- Eat fresh, use in desserts, yoghurt, ice cream, drinks, or bottle, make jam.

## Health

- High levels of vitamins A, C and E, folic acid, antioxidants, minerals and fibre.

## Recommended varieties

*Boysenberry*: Tasman, McNicholl's Choice, Mapua

*Blackberry*: Black Satin, Navaho

## Plants for free

Multiply your plants by *tip layering*:

- In early autumn, choose a strong healthy cane on a disease-free plant and bring its tip down to soil level. Dig a hole in this spot, with the near side angled towards the parent plant.
- Bury the stem tip and peg it down with a piece of wire.
- When the tip shows new growth in spring, cut the new plant from the parent plant and tie the parent plant back upright.



Tip layering

# Cape gooseberry *(Physalis peruviana)*

Type	Deciduous/ Evergreen	HxW (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
Trailing or bush	E	1-2 x 2	1.5	N				Y	Spring	Autumn

## Site

- Copes with drought and a little shade.
- Needs shelter from heavy frosts.
- Prefers light well-drained soil, but copes with clay if it's well drained.

## Care

- Easy to grow, and is better not pampered with fertiliser or watering. Over-watering leads to fungal diseases.
- Its papery husks protect the fruit from most pests, and it seldom has any problems.
- Good in containers amongst other pots, and in the ornamental border.
- Plant 90cm apart in the ground, or in 30cm (diam.) pots.
- Self-fertile, easily pollinated by bees and other insects, as well as by wind.

## Training & pruning

- At planting, pinch out the new shoots to encourage the development of a more compact, bushy shape.
- Provide support (you could stake it like a tomato) or help it scramble up into other taller shrubs.
- No ongoing pruning needed – just cut back the stems after fruiting has finished.

## Harvest

- Produces bright yellow/orange fruit in autumn of the first year.
- Fruit is enclosed in papery husks – great fun for children to open and eat! But make sure they don't eat them when unripe, as they are poisonous then (like green tomatoes).
- Let the fruit ripen until it's a deep yellow/orange colour and the husk is a pale colour. They fall off at the slightest touch when they are ripe.
- Harvest in dry weather. Fruit will last for weeks if you leave it inside its husk.
- Eat fresh, dry into 'raisins', or cook for a dessert topping or jam (has a high pectin content), or for a sauce with meat.

## Health

- High in vitamins A, B and C, protein, phosphorous and iron.

## Plants for free

- The plant can survive the winter in milder areas, but it fruits best on new plants.
- Transplant self-sown seedlings to where you want them when they start popping up after spring, or grow plants from seed each year.



# Cherry (*Prunus avium*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	9+ x 6	6–10	Y				Y	Winter	Summer

## Site

- Needs a sunny, sheltered site, protected from spring frosts. Needs winter chilling, and a dry spring and summer. Suits conditions in the east of this region.
- Prefers deep, well-drained soil – does not tolerate waterlogging.

## Care

- Needs a lot of care.
- Plant in winter, well away from other large trees.
- Water regularly during the early stages and when the fruit is developing.
- Shallow-rooted, so weed carefully and mulch to retain moisture and suppress weeds. Keep underneath the tree clear of grass.
- Net against birds.
- Needs another variety for cross-pollination – try a double-graft.

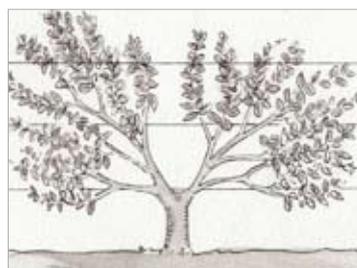
## Training & pruning

- If you have space for a large tree, training it as a *modified central leader* will control its size.

### Modified central leader



### Fan shape



Adapted from *How to Make a Forest Garden*

- A tree grown on dwarf rootstock can be trained as a *fan* (see details for both shapes in 'Part 2 – Training').
- Fruits on 1- and 2-year-old wood, and on spurs on older wood. Fruiting spurs last for 10–12 years, so they don't need to be renewed as often as in other stonefruits.
- Each year, cut dead, damaged and unproductive laterals back to a replacement shoot.
- Shorten new shoots to encourage the development of fruiting spurs.
- Remove vigorous upright growth.
- Prune in dry weather in summer, after harvest, to reduce the risk of diseases.

## Companions

- Chives, marigold, lettuce, nasturtium, red clover.

## Harvest

- Fruits in third year. Ripens from early to late summer, depending on the variety.
- Pick with stalks attached when fully ripe, or if the fruit starts to split.
- Eat as soon as possible or freeze them.

## Health

- High in vitamins A and C, antioxidants, iron, magnesium, potassium and fibre.
- Reported to reduce inflammation from rheumatoid arthritis and gout.

## Recommended varieties

*Early:* Burlat, Summit, Rosann, Tangshe  
*Early/Mid:* Rainier  
*Mid or late:* Dawson, Bing, Stella, Lapins

# Cherry guava (*Psidium cattleianum*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	E	2-3 x 3	2-4	N				N	Autumn or spring	Autumn

## Site

- Needs a warm site with full sun.
- Tolerates some frost once established.
- Tolerates salt and wind, good for coastal areas.
- Soil should be well drained but also retain moisture.

## Care

- Has shallow, spreading roots, so weed very carefully and mulch with well-rotted manure or compost to control weeds and help retain moisture.
- Take care not to damage the taproot when planting.
- Protect from frost when young.
- Water regularly while the fruit is developing.
- Pollinated by bees and other insects, and birds.
- Self-fertile, but you'll get more fruit if there's more than one tree.

## Training & pruning

- Ideal for growing in a container, or in the garden as a large, *vase*-shaped bush or as a small *central leader* tree.
- Prune in late autumn or early spring to shape the tree.
- Fruit forms on new growth, so don't prune after the new growth has started.

## Companions

- Citrus trees, marigolds

## Harvest

- Fruits within 2 or 3 years.
- Pick fruit in autumn when soft and fully coloured. Keep refrigerated.
- Eat fresh, or use in jellies, jams, sauces, baking and preserves.

## Health

- Good levels of vitamin C, fibre, iron, calcium and phosphorous.



# Chilean guava (NZ Cranberry – *Ugni molinae*/*Myrtus ugni*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil Type	Sun	Moisture	Shelter	Plant	Harvest
	E	1 x 1	1.5	N				Y	Autumn	Autumn

## Site

- Needs some sun, but tolerates a little shade – a good bush for placing around taller fruit trees.
- More cold tolerant than Cherry Guava.
- Not fussy about soil.

## Care

- Very easy to grow, no special care needed.
- Plant in autumn so it gets established before new growth starts in spring.
- Self-fertile.

## Training & pruning

- Very good for growing in containers – if you like topiary, you can grow it on a short stem and clip it as a ball.
- Also good grown as a low hedge – slow growing, so patience is needed.
- Grows as a tangle of small branches, with fruit throughout the bush.
- Thin out some branches occasionally to make picking the fruit easier, and remove old or broken twigs.

## Harvest

- Bears fruit in the first year – small, highly scented, wine-coloured berries that can be eaten directly from the bush (a favourite with children).
- Doesn't store well, so make juice from the excess, or cook for desserts and jellies.

## Plants for free

### From seed

- Soak seeds in water for 24 hours to soften the seed coat.
- Sow into warm seed-raising mix – only cover the seed very lightly.

### Hardwood cuttings

- In autumn, take a shoot with a 'heel' from this season's growth.
- Insert it into a pot of gritty compost and keep it moist in a sheltered, shady place during the winter.
- Plant out in spring when it shows new growth.



# Citrus (spp.)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	E	3-6 x 4	5-10	N				Y	Spring or autumn	Winter/ spring

## Site

- Most citrus trees are subtropical or tropical and some of them don't tolerate temperatures below freezing level.
- Prefer deep, slightly acidic soil, but will grow on most soils – use trifoliata rootstock on heavy clay.
- Need excellent drainage, but also have very shallow feeder roots, so the soil needs to retain moisture.
- *Grapefruit* needs warmth to develop good flavour, and moisture to be juicy.
- *Lemon* is fairly frost hardy, likes a warm summer, mild winter, full sun, and shelter from wind.
- *Lemonade* is not at all fussy.
- *Lime* needs similar conditions to lemon, but is very frost sensitive when young – needs protection for the first few years in colder areas.
- *Mandarin* needs more heat than other citrus. Protect young trees from heavy frost.
- *Orange* trees need protection from frost when young. Don't water as much in autumn, as the new growth can be damaged in winter. Too much water makes the oranges less sweet.
- Water daily during the first summer, and keep them moist during dry periods and when the fruit is developing.
- Keep underneath the tree clear of plants to allow free air movement, to reduce the risk of diseases.
- Have very shallow feeder roots and dislike competition from other plants – keep them mulched with a thick layer of acidic mulch e.g. well-rotted compost, manure, pine needles, rinsed seaweed.
- Are 'gross feeders', so they need regular fertilising, especially with nitrogen (e.g. poultry manure, blood and bone, fishmeal) in autumn and spring when they put on a lot of growth (limes prefer less nitrogen). Yellowy leaves, blotches, stunted growth and early leaf fall are signs that the tree is undernourished.
- Self-fertile, pollinated by bees and other insects.

## Training & pruning

- In late winter of the first year, shorten the main branches by one-third, to encourage growth in a *rounded* shape.
- Remove all the flower buds in the first year to let the roots get established.
- Thin the fruit to ensure it gets to a good size and is sweet and juicy.
- After fruiting has finished, remove any dead, diseased or criss-crossing branches.
- Lemons and some of the bushy mandarins need to have the older branches thinned out occasionally to allow sunlight and air circulation.

## Care

- Attractive evergreen trees, easy to train, but need quite a bit of care to get juicy, tasty fruit.
- Great grown in containers – in colder places, move them inside for the winter.
- Plant in spring after the big frosts have finished, adding some well-rotted manure to the planting hole.



- Prune to keep the tree at the height you want.
- Whenever you pick the fruit, shorten any spindly old branches (see diagram) to a strong lateral, to encourage the development of fresh fruiting wood.
- Remove any growth from the rootstock.

### Companions

- Guavas, Mediterranean herbs e.g. lavender, catnip, rosemary – plant at the edges of the tree's dripline, not directly under the tree.

### Harvest

- Bear fruit within 2–3 years.
- Cut off the fruit with secateurs so you don't damage the fruiting laterals.
- Eat fresh or add to desserts, baking, chutneys and preserves.
- *Grapefruit* ripens late autumn to early spring. Leave on the tree to ripen.
- *Lemon* fruits all year. Fruit ripens about 6–8 months after flowering, and will ripen indoors if picked unripe. Keeps well.
- *Lemonade* is delicious to eat straight from the tree.

- *Limes* ripen in either midsummer or midwinter. Can be left on the tree for some time. Pick when the skin is lemon-green and feels a little soft.
- *Mandarins* need to be picked when they're ripe – they dry out if they're left on the tree.
- *Orange* fruits when 7–8 years old. Fruit ripens over many weeks and can be left on the tree for up to 6 months, picking them fresh as you want them.

### Health

- High levels of vitamins A and C, antioxidants, and other beneficial compounds.

### Recommended varieties

*Grapefruit*: Golden Special (Sept–Dec)

*Lemon*: Meyer (year-round), Genoa (Sept), Yen Ben (July/Aug)

*Lemonade*: (Sept)

*Orange*: Washington Navel (Aug), Ruby Blood (Oct), Harward Late (Nov)

*Mandarin*: Clementine (July), Encore (Sept), Miho for containers (very early winter)

*Tangelo*: Seminole (Sept)

*Lime*: Bearss (June–Aug), Tahitian (Sept)



**Citrus laterals**

Top – healthy

Bottom – old and spindly, needs to be shortened

# Currants (Black, White, Red – *Ribes* spp.)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	1.5 x 1.5	1.5	N				Y	Autumn	Midsummer

## Site

- Like a cold winter with some frosts – but need protection from late spring frosts and wind.
- Need shade from hot afternoon sun – do well on the south side of fruit trees or buildings.
- Need soil that will hold moisture (not sandy), containing lots of organic matter. Tolerate heavier and wetter soils than most fruits, but not waterlogging.
- Mostly self-fertile, but Blackcurrants set more fruit if they're cross-pollinated by other varieties.

## Training & pruning

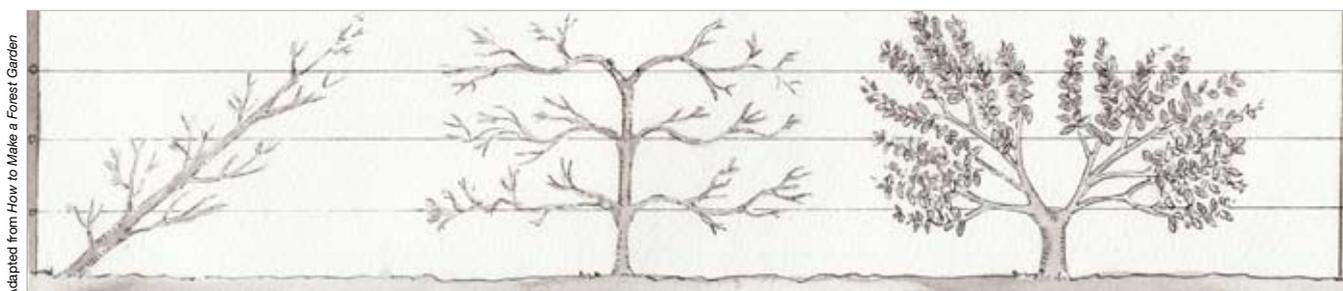
### *Blackcurrants*

Train as a *vase*-shaped bush (plants 1.5m apart), or as a hedge (plants 1m apart):

## Care

- Fairly easy to grow.
- Plant in autumn.
- Plant deeply, as the new growth shoots up from below the ground.
- At planting, cut the shoots back to 30cm so the roots can get established.
- The roots are very fine and close to the surface. Handweed carefully.
- Water regularly during the growing season, and keep the roots cool and moist with a thick mulch.
- Add potash (wood ash) during winter.
- Cover with bird netting when the fruits begin to ripen.
- Pollinated by bees and flies.
- At planting, remove any branches that are shorter than 15cm and any suckers.
- Choose eight to ten branches as the main framework, and shorten them by half to an upward-pointing bud. Allow enough space between the branches for airflow and sunlight.
- Once established, prune in winter, NOT after new growth has started in spring.
- Bears fruit on the previous season's shoots – cut old (dark-coloured) or weak wood back to ground level to stimulate the growth of new shoots.
- Keep eight to ten of the new shoots to be next year's fruiting branches, and cut the rest to ground level.
- If necessary, renew the bush every third year by cutting all the shoots to ground level.

## Cordon, espalier and fan shapes





### **White/Redcurrants**

Plant 2m apart to train as *vase*-shaped bushes, *espalier* or *fan* (see diagram), or 45cm apart to train as a *cordon* – wires about 60cm apart.

- At planting, shorten the main leader to half its length and lightly tie it to a piece of cane that will support it up to the first wire.
- Remove any branches that are shorter than 10cm, and any suckers.
- Trim all the laterals back to a bud at about 2.5cm.
- Once established, prune in summer.
- Fruit forms on older wood, so shorten the main stems to force the growth of lateral branches. These will last for about 3 years, so keep a balance of younger and older canes each year e.g.:

**Year 1:** Cut to ground level all except two or three stems.

**Years 2 & 3:** Cut back all except two or three stems of that year's growth.

**Year 4 onwards:** Cut out the oldest stems to make way for new growth, and shorten any extra-long stems.

### **Harvest**

- Takes 2–3 years to bear fruit.
- Ripens in midsummer over several weeks. If protected from birds, will last for several weeks on the bush.
- Pick (when dry) in whole clusters.
- Eat fresh, or bottle, freeze, cook for dessert, or make into jam.
- Redcurrants are quite tart, most often used for juice, jellies and purees.

### **Health**

- Rich in vitamin C.

### **Recommended varieties**

**Blackcurrant:** Magnus, Tai Tahi, Ben Mapua

**Redcurrant:** Myra McKee, Gloriade de Versailles

**Whitecurrant:** White

### **Plants for free**

Easy to propagate with cuttings, taken in autumn after the leaves have fallen.

- Cut healthy stems from the current season's growth.
- Get them into pots of sandy soil as soon as possible after cutting, and keep them moist in the shade for 1 year, planting out the following autumn.



### **Blackcurrants**

- Take cuttings 20–30cm long. Leave all the buds on the stem, but remove all the leaves.
- Pot up with two buds showing.

### **White/Redcurrants**

- Cuttings 30–38cm long. Remove all but the top four or five buds, and all the leaves.
- Pot up with the buds showing.



# Feijoa (*Feijoa sellowiana*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	E	2-5 x 2-5	4	Y				N	Winter	Autumn

## Site

- Needs a fairly sunny site with a long, warm summer.
- Tolerates some frost, but not while the fruit is ripening in autumn.
- Tolerates moderate winds.
- Happy in most soils but does not like to be waterlogged.

## Care

- Very easy to grow.
- Plant in early winter.
- Water well during the early stages and when fruit is developing.
- Has shallow feeder roots – needs a deep mulch to retain moisture, control weeds and supply nutrients.
- Some varieties are self-fertile, but all produce more fruit if cross-pollinated with another variety.
- Pollinated by birds (especially blackbirds) and bees. Keep the centre of the tree clear so birds can get to the flowers.

## Training & pruning

- Grow as a stand-alone *bush*, or as an attractive hedge or windbreak.
- Grow in a container in very cold areas.
- A single-stemmed plant is the easiest to manage. At planting, shorten the main stem to knee height. Four or five branches will develop from the top of the stem – nip them back to two or three buds, to keep a compact shape. Keep the trunk bare below the first branches.
- In January, pinch out the tips of the new growth if it is getting very long.

- Bears fruit mainly on the outside of the tree on the tips of the previous season's growth, and on short side shoots.
- Once the tree is established, remove a few of the larger branches each year in winter, to encourage the growth of new shoots.
- Pep up a tired tree with a heavy pruning in late winter.

## Companions

- Keep underneath the tree well mulched and clear of plants.

## Harvest

- Fruits within 2 or 3 years.
- Feijoas ripen in autumn. When they're ready, they fall to the ground at the slightest touch – don't pick them unripe, as the flavour is not as good. Collect them daily and store in the fridge, otherwise the flesh turns brown and soft.
- Eat fresh, added to fruit salads (sprinkle with lemon juice so they don't go brown), make juice, or cook for desserts, bottling, chutney, jam, relish, sauces. Scooped out flesh can be stored in the freezer.

## Health

- High in vitamins C and B6, iodine, minerals, folic acid, pectin, antioxidants.

## Recommended varieties

*Early:* Apollo, Gemini, Unique

*Mid:* Kakapo

*Mid-late:* Wiki Tu

*Late:* Triumph

# Fig (*Ficus carica*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	3–6 x 5	4–6	N				N	Autumn to early spring	Autumn

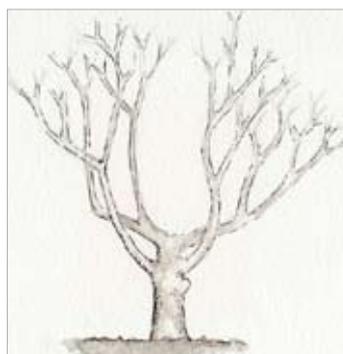
## Site

- Needs maximum sun, a sheltered and frost-free site, with a long, hot, dry summer for the fruit to fully mature.
- Likes soil that retains moisture but is well drained.
- In colder areas, plant against a sunny wall that reflects warmth.
- Has wide-spreading, invasive roots – don't plant it close to the house or plumbing. Put rubble in the bottom of the planting hole to restrict the roots, or you could grow it in a container.

## Care

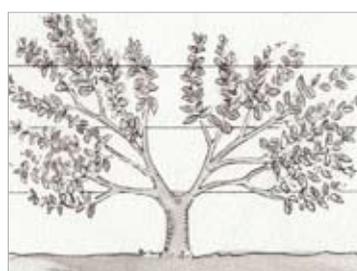
- Easy to grow, but must be protected from birds when fruit is ripening.
- Plant between autumn and early spring.
- *Container-grown trees* – water regularly, and re-pot in winter every 3 years. Shade the sides of the container in summer to keep the roots cool.
- *Trees in the ground* – water well while young and when fruit is developing.
- Weed carefully to avoid damaging the surface roots.
- Self-fertile.

### Vase shape



Adapted from *Fruit Gardening in NZ*

### Fan shape



Adapted from *How to Make a Forest Garden*

## Training & pruning

- Train as a sprawling *vase* shape with several strong fruiting arms, or as a *fan* against a sunny wall (see 'Part 2 – Training & Pruning' for details).
- Fruits mainly on the tips of the previous season's growth. Don't shorten them, or they won't fruit the next season.
- If pruning is needed, cut out half of the previous season's growth.
- Keep the tree open to allow maximum sunshine and light. Don't prune hard – it stimulates too much leafy growth.
- In early summer, pinch back young side shoots to five leaves.

## Harvest

- Bears fruit within a year or two.
- Harvest the fully coloured fruit in late summer as it begins to split. Pick fruit gently so it doesn't bruise.
- Eat fresh, freeze whole, or dry in gentle sun for 4 or 5 days.
- Use for pies, desserts, baking, jam, preserves, syrup, and in savoury dishes.
- Remove any fruit that didn't ripen this season BUT leave the small fruits close to the end of the shoots – these are next year's harvest.

## Health

- Good levels of B vitamins, iron, magnesium, manganese and fibre.

## Recommended varieties

*Early:* Brown Turkey

*Mid:* Brunswick, San Pedro No 2

*Late:* Lesa, Preston Prolific, French Sugar

# Gooseberry *(Ribes grossularia)*

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	1-1.5 x 1-2	1.5	N				Y	Mid- to late autumn	Late summer

## Site

- Needs a cold winter to form plenty of fruit, and prefers cooler summers – but tolerates warmth if it's not humid. Very frost hardy.
- Best in a position with part sun, shade in the afternoons, and sheltered from strong winds, which can break the branches.
- Likes slightly acidic, medium-heavy soil, not prone to drying out.
- Set them well away from pathways, because of their prickles.

## Care

- Easy to grow.
- Plant in autumn or late winter, allowing 1.5m in all directions so there is good air circulation.
- Has shallow roots – weed carefully, and mulch in early spring with well-rotted manure or compost.
- Cover with bird netting when the fruit begins to ripen.
- Self-fertile.

## Training & pruning

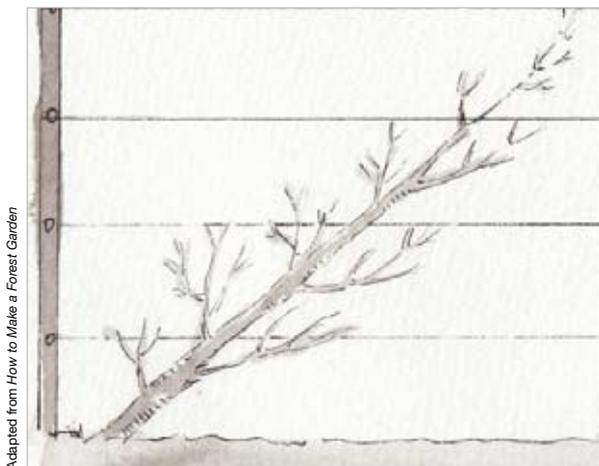
- Train as an open *bush*, or a *cordon*, which makes picking the fruit much easier.
- For both shapes, plant deeply, as the new shoots spring from below ground level.

### *Cordon*

- Space the wires about 60cm apart, with the first wire 60cm from the ground.
- Space plants 45cm apart, supported with a piece of cane tied to the first wire.
- At planting, cut branches that are shorter than 10cm back to ground level.
- Shorten the main leader to half its length and tie it to the piece of cane.
- Shorten all the side shoots (laterals) back to a bud at about 2.5cm.
- Once established, prune in late winter by shortening the leaders to 15cm, and all laterals to 2.5cm.

### *Open-centred bush*

- At planting, cut branches that are shorter than 15cm back to ground level.
- Choose eight to ten branches to keep as the main framework and shorten them to half their length, to an upward-pointing bud. Allow enough space between the branches for airflow and sunlight.
- Once established, bears fruit on older wood – each year shorten the main stems by one-third to force the growth of fruiting laterals. These will last for about 3 years – prune each year to keep a balance of young and older stems e.g.:  
**Year 1:** Cut to ground level all except two or three stems.  
**Years 2 & 3:** Cut back all except two or three stems of that year's growth.



Cordon

Adapted from How to Make a Forest Garden



**Year 4 onwards:** Cut out the oldest stems to make way for new growth, and shorten any extra-long stems.

- Make sure you keep the centre of the bush open – otherwise you won't be able to reach the fruit because of the prickles!

### Companions

- Strawberries.

### Harvest

- Bears fruit within 2–3 years.
- Pick in late summer when the fruit is fully coloured, slightly soft, and is easy to pull off the stalk (or when it drops to the ground).
- Eat fresh, cooked in pies, tarts, sauces, jams, desserts, or added to sweet-and-sour sauce. Freezes well.

### Health

- Good levels of vitamins A, B6, C, and potassium, copper and manganese.

### Recommended varieties

- Invicta
- Pax

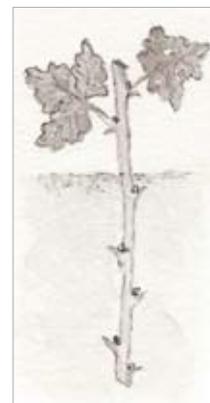


Tip layering

## Plants for free

### Hardwood cuttings

- In early autumn, take a cutting about 30cm long from the current season's growth. Remove all the leaves except for the top two, and insert the cutting to half its length into pots of well-drained soil. Keep it in partial shade for the summer.
- Next autumn, dig up the plant and replant it where you want it, with more of the stem exposed, so your gooseberry has a 'standard' – this lifts the bush higher and makes it easier to pick the fruit.



### Layering

- Some varieties have drooping branches that are easy to layer.
- In late summer or early autumn, choose a strong healthy cane and bring its tip down to soil level. Dig a hole in this spot, with the near side angled towards the parent plant.
- If the soil is heavy, work in some grit or river sand to improve the drainage.
- Bury the stem tip into the soil and peg it down with a piece of wire.
- Keep it moist until the tip shows new growth in the following spring. Then cut the new plant from the parent plant.
- Be sure to remember to shift it, or you could create a thorny thicket.

# Grape (*Vitis* spp.)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
Vine	D	1-3 x 2-5	1.5-3	N				Y	Winter	Autumn

## Site

- Must be in full sun. Needs a hot summer, and also winter chill.
- Shelter from wind and heavy spring frosts.
- Needs good air circulation to avoid diseases.
- Needs good drainage for its deep roots – prefers fertile, dry, stony soils.
- Good grown over a pergola, verandah or trellis to provide summer shade, or on wires (2m high, wires 30cm apart).

## Care

- Self-fertile.
- Plant in winter.
- Mulch in spring to control weeds and retain moisture.
- Feed with a liquid organic fertiliser high in potash while fruit is ripening.
- Protect from birds when the fruit is nearly ripe – use nets, or tie a paper bag over each bunch.

## Training & pruning

- Training and pruning are essential for getting a good crop.
- Place a strong stake in the position you want for the main trunk, reaching either to the top of the wires or the top of the pergola/patio.
- At planting, select the strongest shoot as the main stem, shorten it back to 60cm, and tie it to the stake. Remove all other shoots.
- In spring, select the strongest of the new shoots to be the permanent trunk and tie it to the stake loosely. Remove all the other shoots.

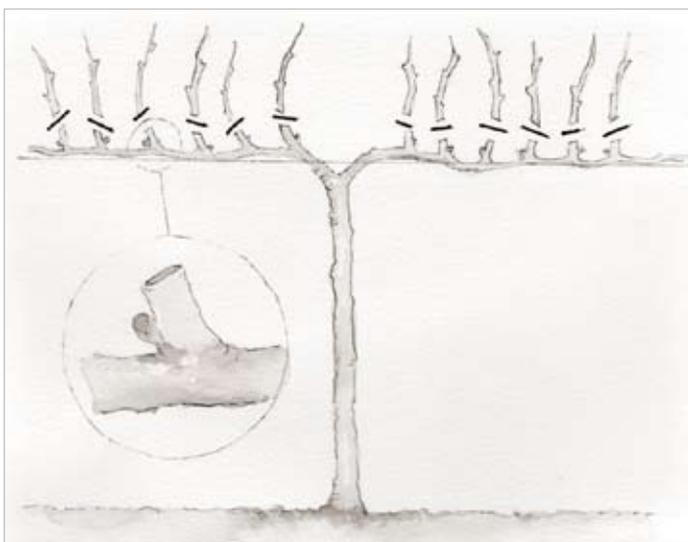
### Growing on wires

#### Spring/summer training:

- When this main stem has grown past the top of the wire, cut it back to the level of the wire.
- When the top two buds sprout a new shoot each, train them as 'arms', one to the right and one to the left along the wire, and tie them loosely. Remove all fruit until the vine is established.

#### Winter training:

- Cut off all side shoots (laterals) growing from these main 'arms', leaving just a stub (see the diagram).



Training a grape vine on wires – in winter, cut all the laterals back to a stub



### *Growing over a pergola or patio*

#### **Spring/summer training:**

- When the main stem reaches the top of the support stake, bend it over the top of the first beam and tie it down. Pinch off any side shoots, so all the plant's energy goes into lengthening the main stem until it has covered the structure.

#### **Winter training:**

- Cut off any side shoots (laterals) that have developed, leaving just a stub.

#### **Next spring:**

- When the new shoots reach about 15cm, thin them to 30cm apart and as they get longer, loosely tie them down onto wires, to the right and to the left of the main stem.

#### **Once established on the structure**

- Fruit forms on lateral growth off 1-year-old stems.
- Prune each winter, well before the sap rises in spring. Space out the laterals to 20cm apart and stub each lateral back to two buds (see the diagram below).
- Remove all weak, diseased, damaged or worn-out growth.
- After the new growth has sprouted in spring, choose one fruiting lateral per spur, and rub off the rest.
- To have good-quality fruit each year, it's important to control the amount of fruit.

Once the bunches have formed, allow two or three bunches per lateral, and cut off the end of each lateral two leaves beyond the last bunch. Shorten any sub-laterals to one leaf, or rub them off.

- Trim the laterals again during summer to let in enough sun to ripen the grapes.

#### **Companions**

- Tansy, mustard, sage, hyssop.

#### **Harvest**

- Fruits within 2–4 years.
- Pick in dry weather when fully ripe, cutting the bunch with scissors and keeping a small length of stem.
- Eat fresh, make into juice, or freeze for desserts.

#### **Health**

- High levels of antioxidants and vitamins C and K. Also good levels of vitamins A, B1, B2 and potassium.

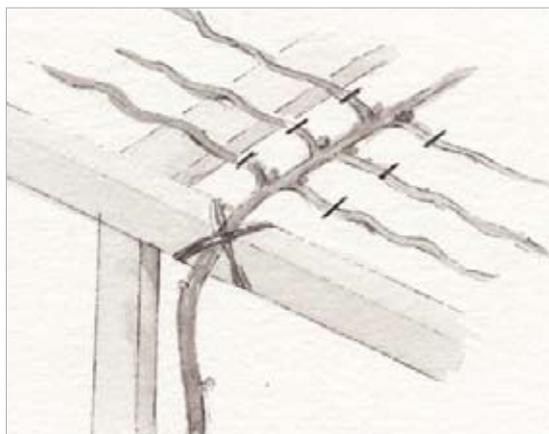
#### **Recommended varieties**

*Early:* Himrod (seedless green), Buffalo (red), Shuyler (black)

*Mid:* Iona (pink), Steuben & Albany Surprise (red)

*Late:* Niagara (green)

**Training over a pergola or patio – in winter, stub each lateral back to two buds**



#### **Plants for free**

##### *Hardwood cuttings*

- In winter, cut sections of stem that are as thick as a pencil and include three buds.
- Insert them into a pot of sandy potting compost, leaving the top bud uncovered.
- Leaves and roots will form during the summer. Plant into pots and keep in a sheltered place until it's time to plant them out.



# Hazelnut *(Corylus avellana)*

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	4 x 3	3-6	Y				Yes	Autumn	Autumn

## Site

- Needs a warm summer and cold winter, with frosts in spring. Prefers drier areas.
- Tolerates a little shade, but needs sunlight on the stems to form flowers.
- Avoid windy sites and very hot summers.
- Grows well in most soils except sand – must be well drained.

## Care

- Plant in autumn or early winter.
- Has shallow roots – mulch well.
- Pollinated by wind.
- Carries both male and female flowers on the same tree, but needs other varieties to cross-pollinate them – plant a group of varieties that will pollinate each other.

## Training & pruning

- Essential for good nut production.
- A *vase* shape makes it easier to collect the nuts and lets the sun reach the stems to stimulate flowering. Remove low-growing shoots and all suckers from the base of the tree four or five times throughout the season.
- A multi-stemmed *bush* reduces the harvest because some nuts get lost amongst the stems, and some fruiting wood gets cut off.

- Prune in late winter after the dangling male catkins have shed their pollen – but don't cut off wood carrying the small female flowers.
- Shorten the main leaders by about half, to an outward-facing bud.
- In late summer, break any longer side shoots in half and leave them hanging on the tree, so light and air can reach the inner branches. Cut them back further in the winter.
- If the tree becomes tired, prune it hard in winter to stimulate new fruiting wood.

## Companions

- Flowering bulbs.

## Harvest

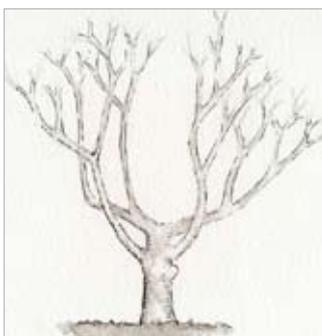
- Takes 4–5 years to bear fruit.
- Collect the nuts from the ground in autumn. Dry them well to prevent the development of a fungus.
- Nuts in the shell last about 5 months in a cool, dry place. After shelling, they last up to a year in the fridge or 2 years in the freezer.
- Remove any nuts left on the branches, as they can stop the next season's female flowers from forming.
- Great eaten fresh, added to cereal or bread, roasted, or made into a spread.

## Health

- High in vitamins E, B1, B6 and folate, 'good' fats, protein and minerals.

## Recommended varieties

Whiteheart	Alexandra
Barcelona	Merv De Bolwillier
Ennis	Tonda de Giffoni



Vase shape

# Kiwifruit, Kiwiberry (*Actinidia deliciosa/arguta*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
Vine	D	3–4 x 6–8	4.5	Y				Y	Early spring	Early winter

## Site

- Likes a hot, sunny site, with a long, warm summer.
- Needs winter chilling for good fruit. Tolerates light frosts (but not in early spring or autumn). *Kiwiberry* is more cold hardy, but needs about 150 frost-free days and shelter from winds.
- Both need well-drained, deep, light soil – they do not tolerate wet soils.
- Needs shelter from wind.
- *Kiwifruit* is a vigorous trailing plant that will grow to 8m wide unless it's well controlled. Grow it on a sturdy pergola or T-shaped support structure, about 1.8m high, 4–5m long, with braced T-bars 1.5m wide. Space three wires evenly across the top of the T for tying down the branches. New season's shoots can grow 5m in a season, so think carefully about where you locate it! You'll need to tie the new growth down and prune it, so make sure you can reach above the top of the wires.
- A very hungry plant, so add plenty of organic matter (especially nitrogen at the beginning of the growing season) across the whole root zone area – but keep it clear of the stem.
- Must have a male vine that flowers at the same time as the female vine. Grow them together, or buy a double-graft with both male and female plants – label which plant is which, and make sure you don't prune all the male flowers off. Restrict the size of the male plant.
- Pollinated by bees, but the flowers aren't very attractive to them so it helps to hand-pollinate by rubbing a freshly opened male flower across a female flower. One male flower can pollinate five or six female flowers.

## Training & pruning

## Care

- Plant in early spring and shorten the central stem back to 30cm, and remove all other growth below the graft. As the main shoot lengthens, tie it securely to a support stake that is attached to the top central wire. This will form the single trunk.
- Has some very deep roots (up to 15m deep), and also spreading shallow roots that must not dry out – water regularly and keep weed free. A heavy mulch in spring (include comfrey leaves to provide potassium) will help to control weeds and retain moisture.
- Once the main stem reaches the top wire, choose two strong shoots to train in opposite directions along the centre top of the structure, making a T shape. All the future fruiting canes will grow from these permanent main 'arms' or leaders. If there are no suitable shoots available, cut the main stem just below the wire to force the growth of new shoots. As these leaders get longer, loosely twist them around the central wire and tie them lightly in several places.
- During the first summer, choose healthy shoots growing at right angles from the permanent 'arms', spaced about 25–35cm apart, to be next year's fruiting wood, and carefully tie them down to the wires. Remove any extra canes.



- From then on, it will bear fruit on the current season's growth coming off 1-year-old wood. Pruning is essential to allow enough air, light and sun for good fruit production.
- In spring, after the male plant has finished flowering, cut it right back so it doesn't compete with the fruiting plant.
- During summer, choose healthy fruiting shoots (those with fat buds close together) that are either growing from the main leaders or off 1-year-old laterals. Tie them down to be next year's fruiting wood (see *a* in the diagram). Cut off any extra or over-vigorous canes.
- Shorten the ends of fruiting laterals to reduce the amount of leafy growth (see *b* in the diagram). Prune several times during summer to make sure the growth doesn't get tangled or too dense.
- In late summer, remove some of the leaves to let more sun onto the plant, to encourage fruit buds for the following year.
- Each July, remove the canes that carried fruit last season (see *c* in the diagram), and keep the new replacement canes that grew during the season (see *a* in diagram). Shorten the ends dangling over the wires to about knee height.
- Remove any suckers, and any wood that is more than 3 years old.

### Companions

- Underplanting with comfrey helps the soil stay moist and provides the potassium the plant needs.

### Harvest

- Bears fruit 3–4 years after planting. Leave the fruit on the vine until they start to soften.
- Harvest by snapping them from the branch with some of the stem attached.
- Carefully pack them into a box. They'll keep ripening over the next 3 months – pick them over regularly to take out the ripe fruit. If you want some to ripen more quickly, put them in a bag with an apple for a few days.
- Eat fresh, or add to fresh-fruit desserts, savoury dishes, make into juice or jam.
- Contains enzymes that can tenderise meat.

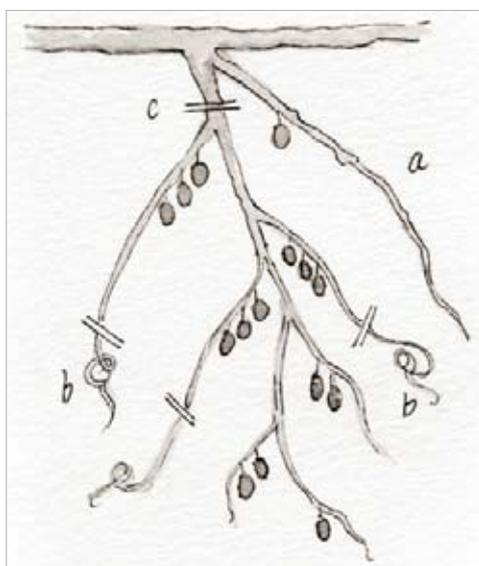
### Health

- Very high in vitamin C.
- Also high in vitamins A and E, digestive enzymes, antioxidants, fibre and potassium.

### Recommended varieties

*Kiwifruit*: Hayward

*Kiwiberries*: Takaka green



#### Pruning kiwifruit:

- a) During summer, select strong new shoots to be next year's fruiting wood and tie them down to the wires.
- b) Shorten the ends of fruiting laterals to reduce the amount of leafy growth.
- c) In winter, remove the cane that has already carried fruit, and keep the replacement lateral (a).

# Olive (*Olea europaea*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	E	4-8 x 3-6	5-7	Y				N	Autumn	Autumn

## Site

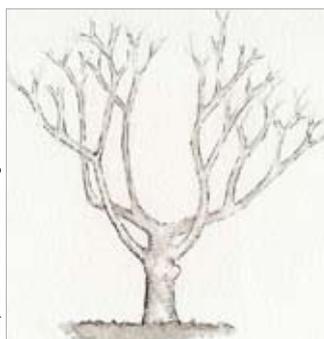
- Prefers full sun, a hot, dry summer and winter chilling.
- Tolerates frost in winter but not in spring.
- Copes with coastal conditions – young trees need staking against strong winds.
- Soil should be well drained, alkaline, and have lowish fertility.

## Care

- Easy to grow, long lived, height easily controlled with pruning.
- Plant during autumn or spring, taking care not to damage the long taproot.
- Space plants 5–7m each way. One or two trees are enough for pickling; more if you're growing them for oil.
- Has shallow roots as well as deep taproots – mulch well.
- Water while the tree is young and during dry weather to improve the fruit yield.
- Cross-pollination (by wind and bees) is needed for good fruit.

## Training & pruning

- Grows fast at first, then slows down – makes an attractive specimen tree or hedge.
- Best trained in a *vase* shape.



Vase shape

- At planting, shorten the central stem to force the growth of side shoots below that point.
- Next spring, keep about five of the strongest long new shoots as the main framework. Remove the tips of those shoots.
- Once the tree is established, each year remove the tips of the leaders and any very long shoots, to keep the shape open.
- Remove dead or criss-crossing branches, suckers and very low branches.
- Fruits on the previous season's wood, so don't cut off the new growth.
- Thin the fruit by hand soon after it has formed – this helps the tree bear even crops each year.
- Heavy pruning will pep up a tired tree.

## Companions

- Mediterranean herbs eg oregano, thyme.

## Harvest

- Bears fruit within 3–4 years.
- Leave olives for oil on the tree until they're fully ripe. Pick olives for pickling while they're still firm.

## Health

- Very high in monounsaturated fat, antioxidants and vitamin E. Good for digestion.

## Recommended varieties

- *Oil*: Chemlali, Koroneiki, Moraiolo, Picual, Sourani
- *Oil & Pickling*: Barnea, Manzanilla, Frantoio, Leccino, Nocellara, Pendolino.

# Passionfruit *(Passiflora edulis)*

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
Vine	E	2 x 6	3-5	N				Y	Spring/ summer	Midsummer to winter

**CAUTION:** Be sure to grow black passionfruit, not banana passionfruit, which is a noxious weed.

## Site

- A subtropical vine, fussy about site. Can't tolerate wind, frost, or wet feet. Frost can split the stem and kill the plant.
- Needs warm, moist conditions. Likes shade from hot afternoon sun.
- Prefers slightly acidic, sandy, moist soil that is rich in organic matter – good drainage is essential.
- Grow in a large pot if necessary, in a warm sheltered spot.
- Grow on a fence or trellis, with support wires 23cm apart – great for disguising an ugly wall.
- Fertilise it at planting time, and every 4–6 weeks in the first growing season. Once the vine is bearing fruit, don't add nitrogen during the growing season – this leads to a lot of leafy growth rather than fruit, and makes the vine more vulnerable to diseases.
- Self-fertile. Bees love the flowers. To get more fruit, hand-pollinate with a soft brush in the late morning (the time when the female part is receptive to pollen).

## Care

- Short-lived – only lasts 5–7 years.
- Prepare a 1-metre deep planting hole, with plenty of well-rotted manure. If the soil is heavy, plant it on a mound.
- Plant out between mid-October and January, and shorten back the main stem to let the roots get established.
- If grown in a container, repot every year in early spring.
- Has shallow, spreading roots – needs a thick layer of mulch to keep the roots moist and control weeds, but keep a clear space around the stem or it will rot.
- Because the vine is so leafy it needs a lot of water – every day in hot weather. If the roots get dry, the leaves and fruit will fall off. However, don't overwater, as this leads to root rot!
- Needs a strong supporting structure – train against a wall or across a pergola.
- Can be left untrained, but training and tying up will prevent the development of a disease-prone tangle.
- At planting, place two light stakes on either side of the plant in a fan shape, and tie them to the wires. Choose the four strongest shoots that grow in spring, and gently tie them to the stakes. Remove all other shoots.
- As these leaders grow, tie them to the stakes until they reach the wires, then train one each way along the lower wire, and the other two along the top wire (see diagram). Regularly remove all other shoots so that all the plant's energy goes into establishing these leaders.
- Bears fruit on the new season's growth.
- Once established, prune every year in spring after the plant has started to grow. Sacrifice the last fruit, or you'll end up cutting off the new season's growth.



- Shorten all the laterals to 15–20cm below each wire (see diagram), cutting to a young side shoot, rather than to a bud.
- Cut out any dead, diseased and weak growth. Remove all the prunings from your property.
- If the vine gets straggly, prune it back to ground level and start again.

### Companions

- Plant marigolds nearby.

### Harvest

- May produce fruit in the first year.
- Fruit ripens from midsummer and throughout the winter – the skin turns dark purple and the fruit falls off.
- Harvest daily in the morning, so the fruit doesn't get scorched by the sun. Gently shake the vine to make ripe fruit fall.
- Eat fresh or add to fruit salad, ice cream, yoghurt, cakes, juice. Can be frozen for up to a year.

### Health

- A good source of vitamins A, B and C, minerals, fibre.
- The fruit and herbal tea made from the leaves have a calming influence.

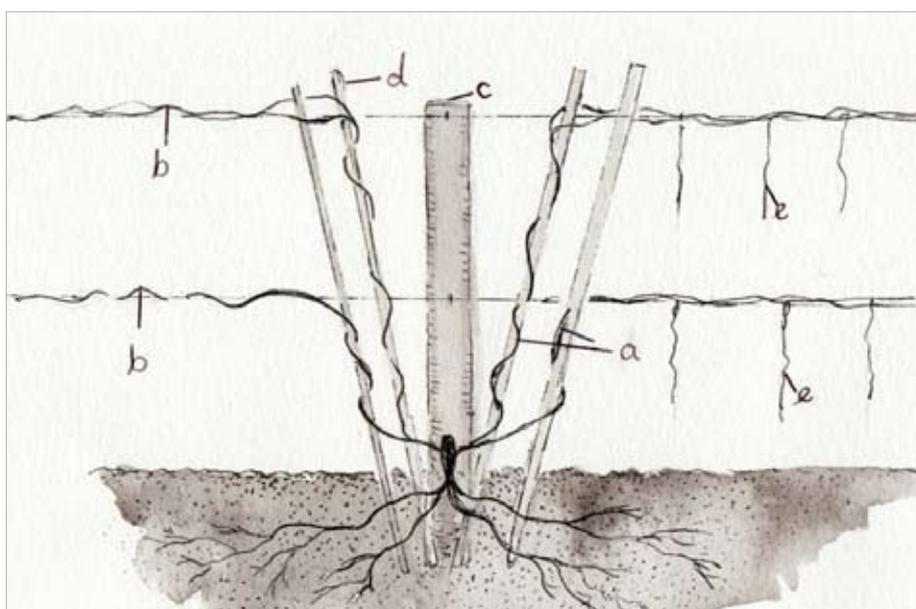
### Plants for free

#### Seed

- Pick out the seeds from the flesh, wash them, and sow them immediately 1cm deep in well-drained compost.

#### Cuttings

- In late spring, take 20cm cuttings with a 'heel' from new shoots.
- Put them in a pot of sandy compost and place the pot in a clear plastic bag, with sticks to keep the plastic bag from touching the cuttings.
- Keep them warm and moist.
- Pot out each seedling into its own pot when it has taken root.



### Passionfruit training:

- a) Main leaders
- b) Secondary leaders
- c) Post
- d) Stakes
- e) Laterals

Adapted from Aglink Information Pack – Subtropicals

# Peach, Nectarine *(Prunus persica)*

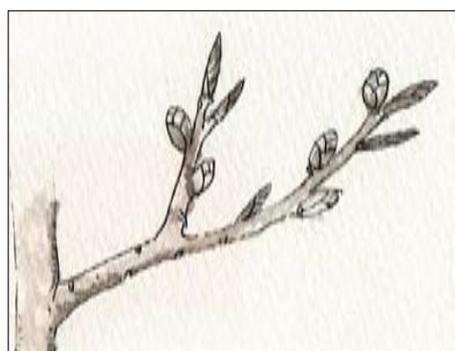
Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	3-6 x 4	4-6	N				Y	Midwinter	Summer

## Site

- Very fussy. Needs a warm site with good sunshine. Prefers a hot, dry summer, cool winter and dry weather in spring – but not late spring frosts.
- Needs good air circulation, but not strong winds. Prone to diseases in humid conditions.
- Prefers deep, sandy loam with good drainage – very sensitive to waterlogging. Plant on a mound if necessary.

## Care

- Short-lived.
- Hard to grow in this region without regular copper sprays.
- Plant in midwinter so the tree can get established before new growth starts in early spring.
- Has shallow roots that should not dry out. In spring, spread a mulch of well-rotted manure and compost over the whole root zone.
- Most varieties are self-fertile. Pollinated by bees and other insects.



**Flower buds** (rounded)  
**leaf buds** (pointed)

## Training & pruning

- Best trained in a *vase* shape that lets sunlight into the tree (fruiting buds die if they are shaded), or as a *fan* against a fence or a wall (wires 15cm apart). See the section 'Part 2 – Training' for details.
- Prune in summer to minimise the chance of diseases – after harvest is best, and always in dry weather.
- Seal all cuts with pruning paint, to protect against silverleaf disease.

### Once the tree is established

- They're naturally large, vigorous trees, so don't let a lot of heavy wood develop, pushing the fruiting zone further and further out – shorten the limbs every year, and regularly thin strong growth to keep the fruiting wood near the centre of the tree.
- Bears fruit on the previous season's growth, as well as on short spurs from 2-year-old (or older) wood. Make sure you don't cut off the flower buds for the next season's crop (see the diagram below).
- To get a succession of new fruiting wood:
  - cut out 2-year-old laterals
  - thin to space out new laterals
  - shorten weak laterals by two-thirds.
- In early summer and again after harvest, remove any over-vigorous laterals – the laterals you keep should be fairly flat, a lot thinner than the leaders, and flexible enough to flatten out when loaded with fruit next season.
- If strong laterals develop higher up the tree, summer-prune them back to a weaker side shoot so they don't shade out the lower branches.



### Companions

- Tansy, garlic, chives, and on dry sites, creeping rosemary, oregano, thyme, borage.

### Harvest

- Fruits within 2 or 3 years.
- Fruit ripens in mid- or late summer. Pick when ripe for best flavour, just as they start to soften. Handle them gently to prevent bruising.
- Eat fresh, add to fruit salads, yoghurt, ice cream, cook for desserts, bottling, chutney, or dry for use as a snack.

### Health

- High in vitamins A and C, and also good levels of vitamins B3 (niacin), E and K.
- Good source of fibre and minerals, especially potassium.

### Recommended varieties

Even varieties labelled 'disease-resistant' get curly leaf and brown rot in the Top of the South region. The following varieties have been found to be the best performers:

*Peach*: Blackboy, Golden Queen, Late White, Red Haven

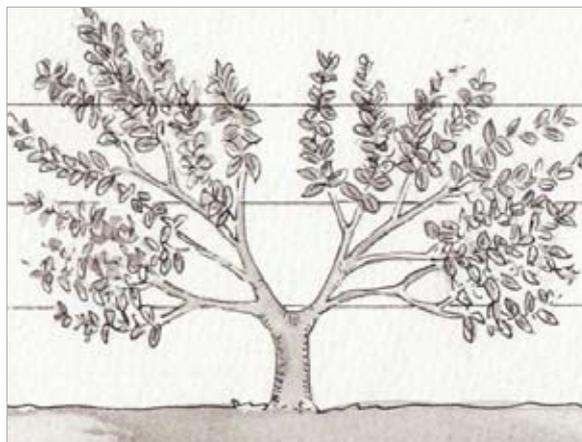
*Nectarine*: Theo Ching, Goldmine, Black Pearl

### Vase shape



Adapted from *Fruit Gardening in NZ*

### Fan shape



Adapted from *How to Make a Forest Garden*

# Pear, Nashi, Quince *(Pyrus spp.)*

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	5–15 x 4–6	4–10	Y				Y	Winter	Autumn

## Site

- Prefers a warm summer, cool winter, shelter from wind, and a cool, damp, shady site.
- Likes deep, well-drained clay soil. Copes with wet conditions, but doesn't produce as much fruit if waterlogged.

## Care

- Easy-to-grow, long-lived trees.
- Quince is self-fertile.
- Pollinated by bees.
- You'll get more fruit if there's another suitable variety nearby for cross-pollination, or if you grow a double-grafted tree. Most pears and nashi cross-pollinate each other.
- Plant in winter.
- Mulch with well-rotted manure and rinsed seaweed, leaving a clear space around the trunk.

## Training & pruning

- Vigorous trees that need to be controlled if grown in an urban backyard.
- Training options:
  - freestanding tall pears – *modified central leader*
  - nashi, quince, dwarf pear – *espalier, cordon*
  - quince – *fan or bush*
- See the section 'Part 2 – Training' for details on early training for each of these shapes.

### Once the tree is established

*Pears* carry the best fruit on 2–4-year-old spurs on the main branches.

- Fruiting laterals form on branches that grow flat, rather than upright – each spring, cut off any strong, upright laterals and keep the flatter-angled growth.
- Tie down vigorous growth to encourage the development of fruit buds.
- To get a succession of new fruiting wood:
  - remove the tips of the fruiting arms
  - shorten 2-year-old laterals to three or four fruit buds
  - remove older spurs.
- In summer, remove any diseased or damaged wood – cut this well below the infected area and remove it from your property. Sterilise your pruners with meths or bleach wipes.

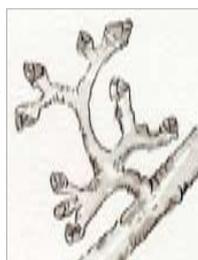
*Quince* bears fruit on the tips of the previous season's growth and on spurs on older wood.

- Prune in winter to remove dead or diseased wood, old laterals and overcrowded growth. Don't shorten the laterals, as they carry the next season's fruit buds.

## Modified central leader



## Fruiting spur



Adapted from *Fruit Gardening in NZ*



### Companions

- Spring bulbs, tansy, alyssum, nasturtium, borage, comfrey, chives, garlic.

### Harvest

- Dwarf trees bear fruit within 3–5 years; tall varieties take 5–9 years.
- Fruit ripens in autumn.
- Pick *pears* carefully just before they're fully ripe and let them finish ripening indoors. Eat fresh, or cook for freezing, bottling, desserts, jams, chutneys, savoury dishes. Dry them for use in cereal or trail mix.
- Leave *nashi* on the tree until fully ripe and eat them fresh, when crisp and juicy. Store in fridge for up to 3 months.
- Pick *quince* in midautumn before frosts. Store in a cool, dark place for 4–8 weeks, until the skin turns green. Use in marmalades, jellies, candies and pastes.

### Health

- Have good levels of fibre and vitamins C and K (but most of the vitamin C is lost if the fruit is cooked).

### Recommended varieties

#### *Pear*

*Early:* Williams Bon Chrétien

*Mid:* Princess, Beurre Hardy, Conference

*Late:* Beurre Bosc, Doyenne du Comice

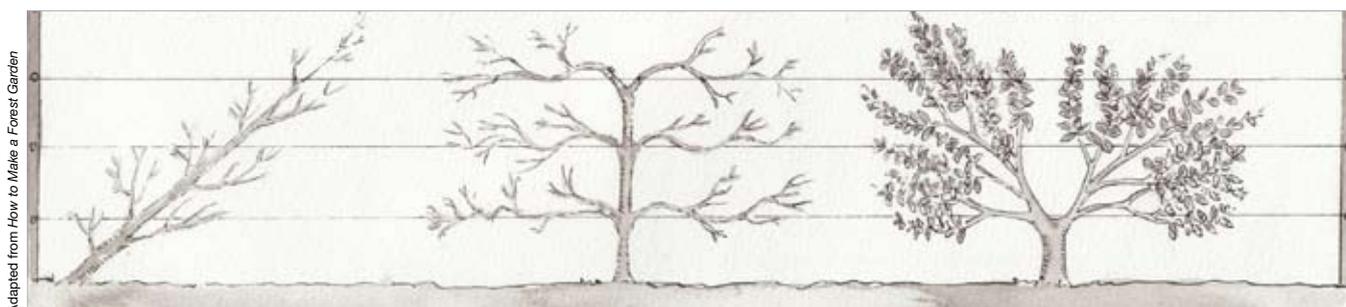
*Very late:* Winter Cole, Winter Nelis

#### *Quince*

*Early:* Van Deman

*Mid:* Vranja

### Cordon, espalier and fan shapes



Adapted from *How to Make a Forest Garden*

# Persimmon *(Diospyros kaki – non-astringent)*

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	3-6 x 4-6	5-6	N				Y	Winter	Autumn/ early winter

## Site

- Needs a sunny, sheltered and frost-free position, with a hot summer.
- Prefers deep, fertile, fairly heavy soil – but must be free-draining. Will tolerate flooding for a short time, but can develop root rot if wet for longer.
- A handsome tree with great autumn colours – looks good as a specimen tree, in the shrub border or beside a driveway.

## Care

- A long-lived tree. Remove suckers or it will turn into a thicket over time.
- Prepare a deep hole and plant in winter, taking care not to damage the taproot.
- Stake the tree against wind.
- Water well while young, especially in spring and early summer, and during dry periods when the fruit is developing.
- Mulch in spring.
- **Don't use non-organic fertiliser – it can kill the tree.**
- Self-fertile, pollinated by bees and other insects.

## Training & pruning

- Good grown in a container and also trained as a fan, hedge or espalier.
- Freestanding trees are best trained as a *vase* shape or *modified central leader*.
- See the section 'Part 2 – Training' for details on training these shapes.
- Fruits on 1-year-old wood. Prune to keep the tree open and shorten the fruiting arms so they don't break under the weight of fruit. Thin out the fruit to one every 10cm.
- Heavy pruning will pep up a 'tired' tree.

## Harvest

- Bears fruit within 2–5 years.
- Fruit ripens in autumn.
- Eat fresh while crisp, or wait until the full flavour develops when the flesh is soft. Can be frozen, peeled and dried, stewed, or used in salads, ice cream, cakes, desserts, sauces.

## Health

- High in vitamins A and C, manganese and fibre.

## Recommended variety

- Fuyu



Vase shape



Modified central leader

# Plum, Greengage (*Prunus* spp.)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	D	3-6 x 4-6	3-5	Y				Y	Late autumn	Mid/late summer

## Site

- Prefers a warm, dry summer, cool winter, and tolerate frost (except in spring).
- Tolerates partial shade, and both wet and dry conditions.
- Copes with a wide range of soils, including clay.

## Care

- Plant in late autumn so the tree is well established by spring.
- Has shallow roots – mulch thickly to keep the root zone moist and weed free.
- Water regularly while young and when fruit is developing.
- Net against birds when fruit is ripening (or share with the birds).
- Self-fertile, but you'll get more fruit if cross-pollinated with another variety.

## Training & pruning

- Easy to grow, more disease resistant than other stonefruits.
- Best trained in a *vase* shape or *fan* on wires spaced 15cm apart.
- Training and pruning tips are the same as for Peaches and Nectarines.

## Companions

- Spring bulbs, tansy, garlic, comfrey, marigold, multiplying onion.

## Harvest

- Bears fruit within 2–4 years, ripening from midsummer to early autumn.
- Pick when ripe for eating fresh or for making juice. Can also use for jelly, desserts, sauce or bottling.
- *Prune plums* fruit later, and can be eaten fresh, dried or bottled.

## Health

- Very high in vitamin C and fibre, and a good source of vitamins A and K.

## Recommended varieties

### Plum

*Early:* Duff's Early Jewel, Wilson's Early

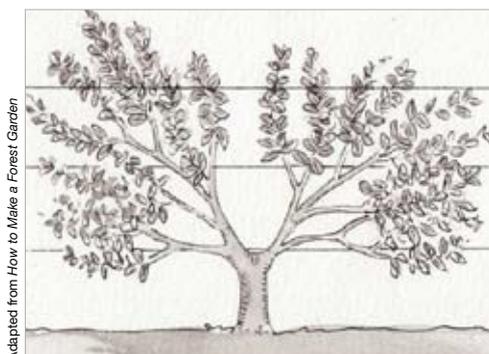
*Mid:* Fortune, Purple King, Greengage

*Late:* Omega

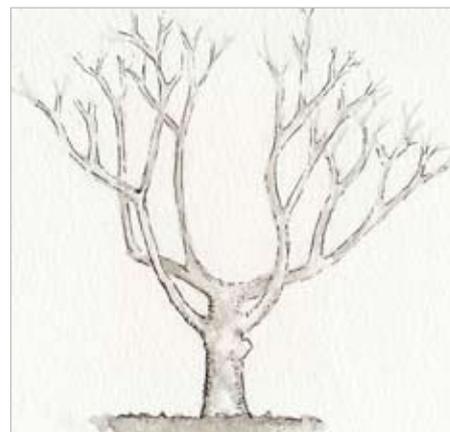
### Prune plum

*Mid:* Cacac Fruitful

*Late:* Stanley



Fan shape



Vase shape

Adapted from How to Make a Forest Garden

Adapted from Fruit Gardening in NZ

# Raspberry *(Rubus idaeus)*

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
Cane icon	D	2 x 1.5	0.45	N				Y	Autumn/ winter	Summer/ autumn

## Site

- Prefers a sunny site with some shade from hot afternoon sun – tolerates partial shade.
- Hardy to frosts and needs winter chill.
- Needs shelter from strong winds.
- Does not tolerate wet feet – needs well-drained soil that also retains water.
- Spreads by suckers – plant in a place where this won't matter, or dig the suckers up each year and relocate them.
- Grow against a support structure e.g. between posts or against a fence with two or three strands of wire, up to 1.7m high.
- Cut off any surplus new canes at ground level, to prevent overcrowding.
- Cut off the tops of any canes that grow taller than 2m.
- After fruiting in autumn, keep the canes that carried fruit this season until they fruit again next spring, then cut them off at ground level in autumn.
- Keep a balance of new and second-year canes each year.
- Remove all prunings from your property, and clean your tools between plants, to reduce the risk of diseases.

## Care

- Plant canes preferably in late autumn/early winter, or early spring if necessary.
- Plant into a trench filled with compost and soil, about 45cm apart (overcrowding leads to diseases).
- Cut the stems back to a bud at about 25cm.
- Roots are very close to the surface – in spring, spread a thick mulch of well-rotted manure (or acidic compost and pine needles) to keep the roots moist and suppress weeds.
- Keep the soil moist (but not waterlogged) when the fruit is developing.
- Self-fertile – pollinated mainly by bees and other insects.
- Need to be protected from birds with netting.

## Training & pruning

- Each spring, train six new canes per plant up between two wires (upright or fan pattern), with the canes spaced 15cm apart.

## Companions

- Mulch the canes and grow parsley and tansy nearby.

## Harvest

- Bears fruit within 2 or 3 years.
- Pick when fully ripe for using fresh with yoghurt, or in desserts, fruit salad.
- For jam or freezing, pick when they're still firm.

## Health

- Good for vitamin C, anti-cancer properties, fibre, minerals.

## Plants for free

### Suckers

- In autumn, carefully cut the suckers away from the parent root, plant them in a new row, and shorten them to 30cm.

# Strawberry (*Fragaria x ananassa*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	F	0.20 x 0.30	0.35	N				Y	Autumn	Summer to autumn

## Site

- Needs an open, sunny site with no frosts at flowering or fruiting times, and shelter from wind.
- Soil should be slightly acidic, well drained but able to retain moisture.

## Care

- Easy to grow if cared for.
- Plants need to be replaced after 3 years – put new plants in a different place to avoid a buildup of diseases (allow 4 years before replanting a site).
- To allow frequent picking, plant on garden edges or in containers near the house.
- Best planted in early autumn so they can get established during the winter.
- Plant 45cm apart on a slight mound, with the plant's crown slightly raised.
- Roots are very shallow – water regularly in dry weather, but make sure the soil isn't waterlogged and the berries aren't damp.
- Mulch the ground with straw or pine needles to retain moisture and keep the fruit off the ground – but watch out for slugs hiding in the mulch.
- Protect from birds.
- Cut off any 'runners' that develop during the first year.
- At the end of each season, remove the mulch and all dead leaves, and carefully fork up any compacted soil between the plants.
- Self-fertile, pollinated mainly by bees.

## Companions

- Parsley, marigold, lettuce, borage, chives, lavender, onions, sage.

## Harvest

- Pick fruit as it ripens.
- Eat fresh with cereal or yoghurt, or in fruit salad. Cook and bottle or freeze, or make into jam.

## Health

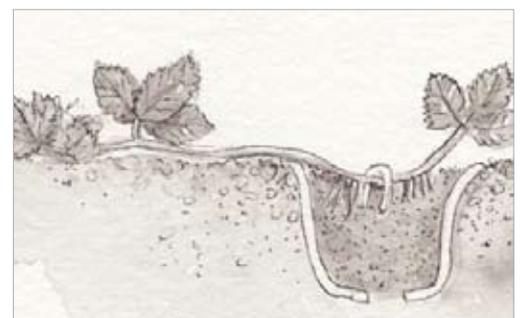
- Very high in vitamin C when eaten fresh, good for manganese, potassium, iron, Vitamins A, B6 and K, calcium, fibre, antioxidants and anti-cancer agents.

## Plants for free

Each year, catch a few runners from disease-free plants to replace old plants:

- Bury pots of compost in the ground near the mother-plant and peg runners down into them to grow roots.
- Once the roots have formed, cut the runners free and shift the pots to a sheltered spot until you're ready to plant them out.

**Strawberry runner pegged down into a pot in the ground**



# Tamarillo

(Tree Tomato – *Cyphomandra betacea*)

Type	Deciduous/ Evergreen	Height x Width (metres)	Spacing (metres)	Pollinator	Soil type	Sun	Moisture	Shelter	Plant	Harvest
	E	2–3.5 x 3	3	N				Y	Oct–Nov	Autumn– winter

## Site

- Needs a warm summer, mild winter and sheltered site.
- Very frost tender, with large, thin leaves and brittle branches that break easily. Evergreen unless frost removes the leaves in winter.
- Prefers deep, rich, well-drained soil that retains moisture during summer.
- Does not tolerate waterlogging – grow on a slope if this might be a problem.
- Fruits on new growth. Needs pruning to keep the fruiting wood near the tree's strong framework – each year, cut laterals that have fruited back to the tree's basic framework, and remove dead or diseased wood, and any suckers.
- Prune from after the last of the big frosts until as late as October. The timing of pruning determines the timing of the next season's fruit.

## Care

- A short-lived tree (5–12 years).
- Plant in October or November. Stake the tree against winds and protect from frosts in the first winter.
- Has very shallow roots – water regularly during dry periods. Doesn't tolerate competition from weeds – mulch thickly to control weeds and keep the roots cool and moist (but keep the area next to the trunk clear so it doesn't rot).
- Established trees can survive brief frosts – the leaves might fall off, but new leaves will grow again.
- A fast-growing tree. Fertilise four times per year, when the soil is wet – in early spring, after pruning, in November, and in February.
- Self-fertile. Pollinated by insects and wind.

## Training & pruning

- At planting, shorten the main stem to 1m to encourage low branching.
- When side shoots (laterals) grow, pinch them back when they're 50cm long, to create a strong framework.

## Harvest

- Bears fruit within 18 months – fruit takes 8 months from pollination to ripening.
- Ripens from April to November.
- Pick when the fruit is slightly soft and pulls off the tree easily.
- Eat fresh, add to fruit salad, or use in sauces, chutneys, savoury dishes, jams, juice and jellies. Preserve in jars, or puree the flesh and freeze (it turns brown, but is still good to eat). To remove the skins easily, cover the fruit in a bowl with boiling water for a few minutes then peel.

## Health

- High levels of vitamins A, B6, C (when eaten fresh) and E, iron and potassium, fibre.

## Plants for free

- Take 30cm cuttings from 1- or 2-year-old wood on disease-free plants.
- Cut the stem square, just below a leaf node, and remove the leaves.
- Insert the cuttings into firm soil until they've taken root, then plant in late spring.

# Part 4

## OTHER USEFUL INFO ...

### Plants for free

Some fruits are easy to propagate, and this can save you a lot of money. *Make sure you propagate from a healthy plant!*

### Grafting and budding

These are the methods for propagating most fruit trees, but they are fairly tricky. Find a local workshop to get some experience with them, or check out the instructions on these websites:

[www.sces.org.nz/pmwiki.php/Content/Grafting](http://www.sces.org.nz/pmwiki.php/Content/Grafting)

[www.sces.org.nz/pmwiki.php/Content/TakingCuttingsFromOldVarieties](http://www.sces.org.nz/pmwiki.php/Content/TakingCuttingsFromOldVarieties)

### Growing from seed

This is not a good method for most fruits, as the 'offspring' often aren't as good as the 'parent'.

Also, they can take several years to bear fruit, and for all that time you won't know whether the fruit is any good! Cape Goosberry and Passionfruit are the exceptions.

### Easy and reliable methods

Instructions for the easiest propagation methods are in the section 'Part 3 – Essential Plant Info', under the heading of the fruits for which they are suitable.

Examples:

- *Runners* – strawberry
- *Layering* – blackberry, boysenberry, blueberry
- *Suckers* – raspberry.

## Propagating by hardwood cuttings

	Blackcurrant	Blueberry	Fig	Gooseberry	Grape	White/Redcurrant
<b>Best time</b>	Autumn	Midwinter	Autumn or winter	Autumn	Midautumn	Autumn
<b>Cutting length</b>	20–30cm	10–15cm	20–30cm (1–2cm thick)	30–38cm	Stem section with 3 buds	30–38cm
<b>Preparing the cutting</b>	Leave all buds on the stem, but remove all leaves	Use the bottom 2/3 of strong shoots of the previous season's growth	Choose stems with some 2-year-old wood at the base	Leave all buds on the stem, and the top 2 leaves	Choose stems that are just thicker than a pencil	Remove all but the top 4 or 5 buds, and all leaves
<b>Planting</b>	Insert upright in a trench or pot, leaving 2 buds showing	Insert upright in a pot, leaving 1–2 buds showing	Insert upright in a pot, leaving a few buds showing	Insert upright in a pot, to half its length	Insert upright in a pot, leaving the top bud showing	Insert upright in a pot, to half its length
<b>What to expect</b>	Should have roots and 3 or 4 good stems after 1 year	Should be ready to plant out after 1 year	Can take more than a year to develop a good root system	Should be ready to plant out after 1 year	Pot up after leaves and roots form in summer, plant out next winter	Should be ready to plant out after 1 year

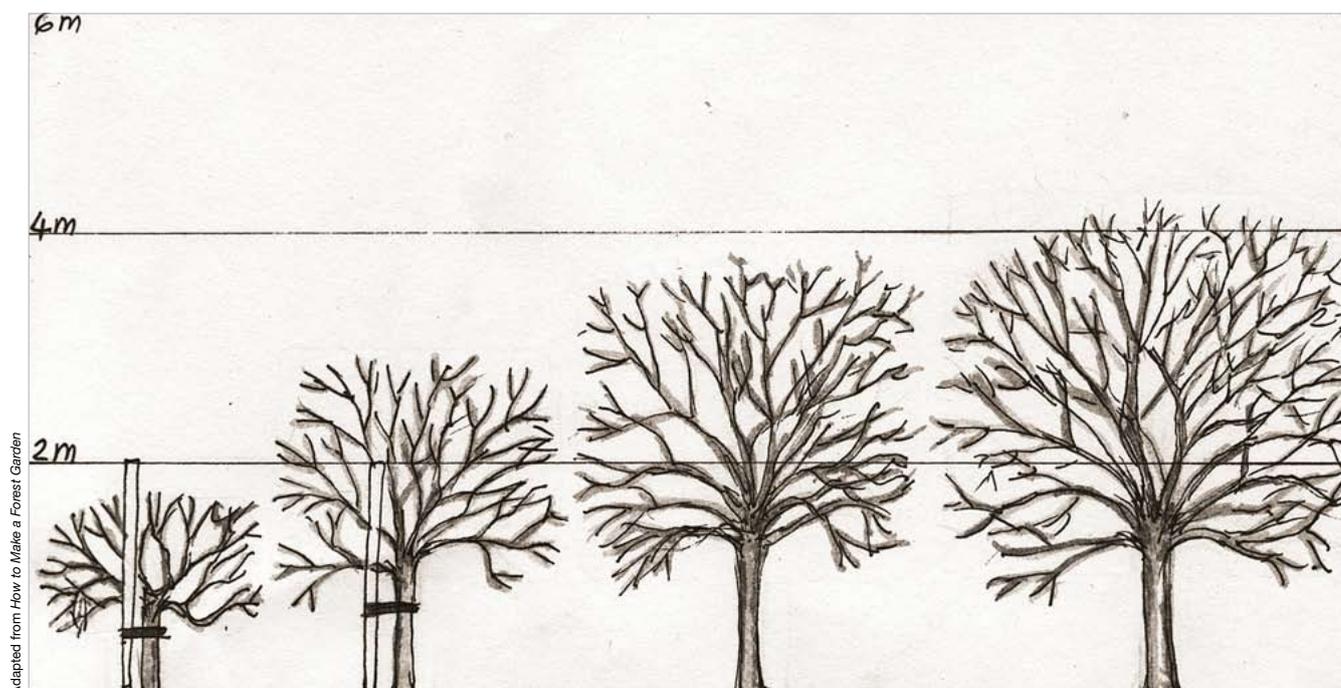


# Choose the right rootstock

It is the rootstock of a fruit tree that determines how big the tree gets and what soil conditions it can handle. This especially applies to apples.

Useful information about types of apple rootstock is listed below, and the best rootstocks for other types of fruit are on the next page.

## Rootstocks for apple trees



Adapted from How to Make a Forest Garden

### *M27 Super dwarf    M9 Dwarf*

- Suits well-drained, fertile soils – NOT heavy clay soils
- Fruits well in 2nd year
- Shallow roots – needs a sheltered spot, permanent stakes, and plenty of mulch
- Espalier is best – train along a fence or wires
- Lives about 30 years

### *M26 Dwarf*

- Best in fertile, free-draining soil – cannot cope with waterlogging
- Can be grown without staking in sheltered areas

### *MM106 Semi-dwarf*

- Good on most soils, except poorly drained sites
- Has a strong frame and roots, does not need staking – good in exposed areas
- Semi-vigorous – can be kept smaller with pruning
- Fruits in the 3rd or 4th year and can be a heavy cropper
- More resistant to woolly aphid



## Rootstocks

### Rootstocks for other trees

#### *Pear*

On heavy, fertile soils, grow pears on quince rootstock (grows to about 3m tall).

#### *Apricot, plum, peach, nectarine*

On heavy soils, use trees grown on plum rootstock (grows to 4–6m). On dry soils, use peach rootstock (grows to 5–8m). To save space, you can prune them to size as a standard tree, or as a *fan* against a wall.

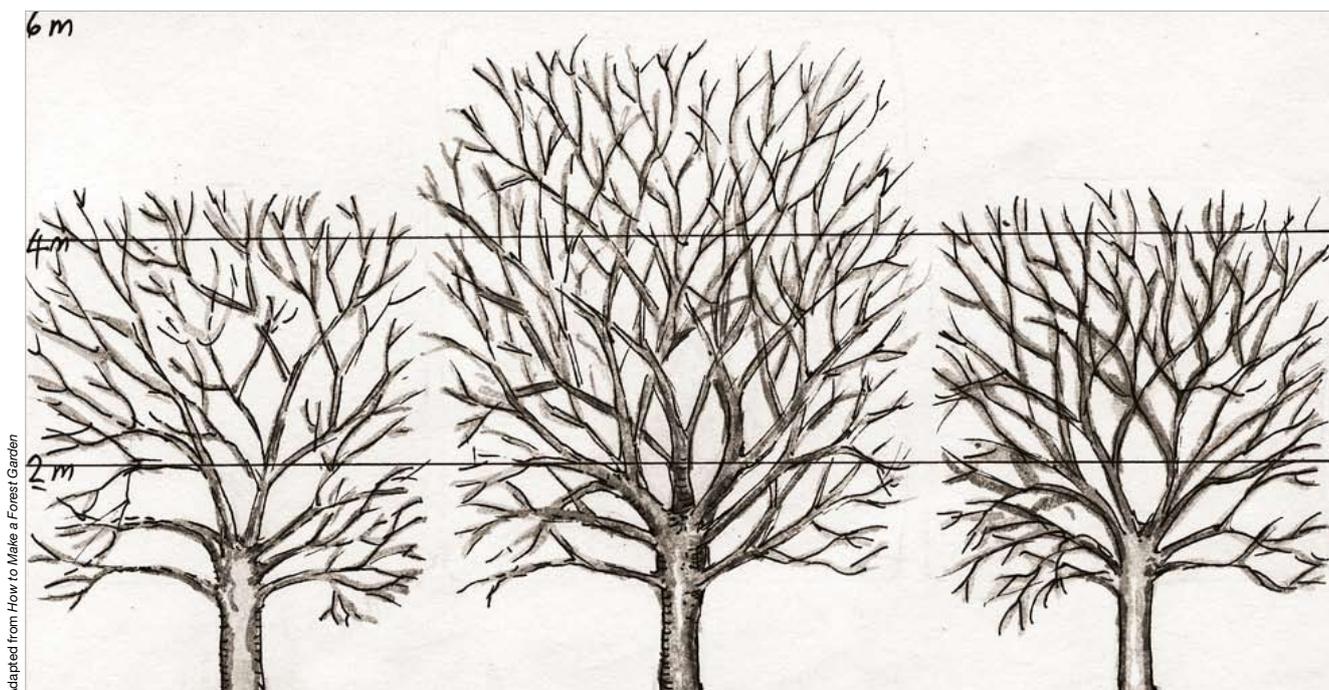
#### *Cherry*

Choose trees grown on Tangshe rootstock (grows to 4m). Prune to an appropriate size for your section, as a standard tree or as a *fan*.

#### *Citrus*

Use trees grown on Flying Dragon (grows to 2.5m), or if you're on heavy clay soil, Trifoliata (grows to 2.3m).

(Apple rootstocks cont.)



Adapted from How to Make a Forest Garden

#### *M116 Semi dwarf*

- Better suited to difficult soils (heavy or clay) than other rootstocks
- Vigorous, looks chunkier than the M106, and has a more upright framework and branches
- Needs regular pruning, or growing as espalier, to control size
- Has good anchorage
- Fruits strongly in the 5th year
- More resistant to woolly aphid and collar rot

#### *M793 Tall*

#### *Northern Spy*

- An especially good rootstock for heavy clay soils
- Suits conditions in Golden Bay
- Grows into a large strong tree – needs regular pruning, or growing as espalier, to keep it smaller
- Shows resistance to woolly aphid

# Pests & diseases

Before you turn to toxic chemicals, make sure you follow these steps to reducing the likelihood of getting pests and diseases in your fruit trees:

1. Choose the right kind of fruit, and the right specific variety, to suit the conditions at your place. For the varieties that suit home gardens, see the 'Tried & True' chart overleaf.
2. Allow enough space between trees for good airflow, and also prune to keep the inside of the tree open.
3. Summer prune to remove the lush growing tips, so the plants are less attractive to sucking insects.
4. Keep your plants appropriately fertilised and watered, so they don't become vulnerable to pests and diseases.
5. Attract a range of helpful insects into your garden to control the pests for you:
  - plant 'good companions' for your trees (see the 'Companions' page)

## Tonics for your trees

Regular doses of tonic food (e.g. compost, comfrey leaves, seaweed) help plants resist diseases and survive the effects of insect attacks.

You can either put the tonics on the soil as a mulch, or make a 'tea' out of them:

- Put one of the above tonics in a bucket of water, cover it with a lid, and leave it for a few weeks. (It will smell terrible!)
- Put a cup or two of the liquid in a bucket or watering can and dilute it with water to the colour of weak tea.
- Pour this over the leaves, or strain the bits out and spray the tree.

- keep some rocks, logs and long grass on the property for helpful animals to hide in (or under) and live and breed safely.

## Helpful insects

Ants	eat	fruit flies, codling moth and some caterpillars	
Birds	eat	heaps of insect pests	BUT also your fruit
Centipedes	eat	caterpillars and slugs	
Hedgehogs	eat	millipedes, snails and slugs	BUT also ground-nesting bird's eggs, skinks, geckos
Hoverfly larvae	eat	aphids, scale insects, mites, young caterpillars and the larvae of pear/cherry slugs	
Lacewing larvae	eat	HEAPS of aphids, scale, mealy bugs, mites and whitefly	
Ladybirds	eat	scale, aphids, whitefly and mealy bugs	
Praying mantises	eat	caterpillars, bugs, beetles, aphids	BUT also beneficial insects
Spiders	eat	flies, mosquitoes, codling moth, caterpillars, butterflies	AND anything else that strays into their web!
Parasitic wasps	invade	caterpillars and their larvae eat the caterpillars from the inside	



### Hygienic habits

Good garden hygiene is ESSENTIAL.

- Clean up all fallen fruit, 'mummies' and prunings, as pests and diseases can live on them until next season. Remove them from your property.
- When you're pruning, wipe your tools with methylated spirits or bleach between trees, to avoid spreading diseases.

### Lotions & potions

If you think you've discovered a problem in your fruit trees, first of all find out exactly what's going on:

- Is it *really* a pest attack or outbreak of disease? If it's a nutrient deficiency or a problem with the soil, then spraying for diseases won't get rid of the problem!
- Take some samples (in a plastic bag) to your local nursery to get advice, or compare the sample with pictures in library books (e.g. *Managing Pests and Diseases* – Rob Lucas) or on websites (e.g. [www.hortnet.co.nz/publications/hortfacts/hfinal.htm](http://www.hortnet.co.nz/publications/hortfacts/hfinal.htm)).

Not all pests require action from you e.g.

- Pear leaf slug dries up on a hot day.
- Beneficial insects multiply when there's a lot of their favourite pest food around, and sometimes they can restore the balance without your 'help'.

Some growers do a copper spray at leaf fall and again at bud burst to control diseases.

- Always read spray labels carefully and apply as recommended.
- Wear protective gear.
- Make sure you know what else is living in the target zone – even a 'natural' spray can wipe out both the pest you're targeting, and also every other friendly insect in the area.
- Spray in the morning before many insects are out and about, and when there is no wind so the spray doesn't drift.

### *Don't give up!*

If your trees develop a pest or disease problem, don't give up on your efforts to provide the best conditions possible.

### *Controls you can make*

Problem	Solution
Sucking insects (e.g. aphids)	Blend together 2–3 garlic cloves, 6–12 chilli peppers, 1tbsp cooking oil, 7 cups of water, and a few squirts of detergent. Spray it directly on the pest.
Fungal diseases	Mix 1tbsp baking soda with 4.5l of water, and spray it on the affected areas.
Powdery mildew	Mix equal parts of milk and water, and spray it on affected areas.
Codling moth (apples)	Wrap corrugated cardboard around the base of the tree when it's fruiting so the moths hibernate in it. Take it off in early winter and burn it.

For more spray recipes see [www.urbanorganics.org.nz/node/35](http://www.urbanorganics.org.nz/node/35)

### *'Natural controls' you can buy*

Problem	Solution
Slugs, snails, caterpillars	Diatomaceous earth – a natural rock-based powder
Sucking insects (e.g. aphids)	Neem oil or sprays based on fatty acids – useful if numbers seem to be building up.
Codling moth	Pheromone-based traps that you hang in trees at a certain time of year – they don't control the moth, but they help you know if you have a lot and need to take some action
Fungal diseases	Copper or sulphur-based sprays – read the labels, use only as recommended, and wear protective gear.



## Companion plants

Some plants are known to benefit each other when they grow together. Also, some plants are known to be bad companions, so try to avoid having them near your fruit trees – e.g. grass.

Planting 'good companions' under your fruit trees will mean less work for you, as your trees will be healthier.

### How good companions help

1. They provide food for:
  - bees to pollinate the blossoms
  - predatory insects to eat the pests
  - birds to pollinate the blossoms and eat pests.

Examples:

- yarrow (*Achillea millefolium*)
- sweet cicely (*Myrrhis odorata*)
- sage (*Salvia*)
- lemon balm (*Melissa officinalis*)
- borage (*Borago officinalis*).

2. They collect nutrients for other plants in two ways:

- Their deep roots bring up minerals and nutrients to their leaves, which end up rotting on the soil's surface and then the tree's roots can absorb them.

Examples:

- comfrey (*Symphytum officinale*)
- chicory (*Cichorium intybus*)
- dandelion (*Taraxacum officinale*)

- They absorb nitrogen from the atmosphere and when they die, other plants can use it.

Examples:

- red clover (*Trifolium pratense*)
- lucerne/alfalfa (*Medicago sativa*)
- peas and beans.

3. Groundcovers protect the soil and plant roots from the sun and heavy rain.

Examples:

- oregano (*Origanum vulgare*)
- nasturtiums (*Tropaeolum majus*)
- roman chamomile (*Anthemis nobilis*)
- strawberries (*Fragaria*).

### The top 10 companions

Think about:

- what herbs you like using
- what flowers you like
- what other plants like the same conditions as your tree.

Then choose some of these examples:

- Bergamot (*Monarda didyma*) for bees
- Bulbs (eg snowdrops, daffodils, jonquils, garlic, chives) to help with soil nutrients
- Calendula/marigold (*Calendula officinalis*) for insects, and as a herb
- Fennel (*Foeniculum*) for insects, and as a herb
- Lavender (*Lavandula*) for insects – good in drier soils
- Lovage (*Levisticum officinale*) for insects, and as a herb
- Rosemary (*Rosmarinus officinalis*) for bees, and as a herb – good in drier soils
- Sorrel (*Rumex acetosa*) as a groundcover, vegetable
- Tansy (*Tanacetum vulgare*) for insects
- Violet (creeping – (*Viola odorata*) for bees, and as a groundcover

Ideas for specific companions for each type of fruit are given in the section 'Part 3 – Essential Plant Info'. For more information about Companion Planting, look at:

[www.urbanorganics.org.nz/node/36](http://www.urbanorganics.org.nz/node/36)



## Tried & true varieties for home gardens

The varieties listed below have been recommended for home gardens by growers in this region. There's also a list of more apple varieties, including heritage types, on our website.

These lists are a selection only – there are other varieties that also do well. Talk to other organic growers in your area to find out about their successes, or contact the local branch of the NZ Tree Crops Association.

<b>Almond</b>	CY750, 403, Fabi, Monovale	<b>Kiwifruit</b>	Hayward
<b>Apple</b>	<i>Early:</i> Akane, Gravenstein Stripey <i>Mid:</i> Priscilla, Prima, Sir Prize <i>Late:</i> Liberty, Sturmer, Jonagold	<b>Lemon</b>	Meyer, Genoa, Yen Ben
<b>Apricot</b>	<i>Early:</i> Katy Cot, Sundrop <i>Mid/late:</i> Trevatt, Fitzroy	<b>Lime</b>	Bearss, Tahitian
<b>Blackberry</b>	Black Satin, Navaho	<b>Mandarin</b>	Clementine, Encore, Miho for containers
<b>Blueberry</b>	<i>Rabbit eye:</i> Tifsblue, Powder Blue <i>Highbush:</i> Duke, Dixie, Bluecrop	<b>Nectarine</b>	<i>Early:</i> Snowqueen <i>Late:</i> Fantasia, Red Gold, Sunglo
<b>Boysenberry</b>	Tasman, McNicholls Choice, Mapua	<b>Orange</b>	Washington Navel, Ruby Blood, Harward Late
<b>Cherry</b>	<i>Early:</i> Burlat, Summit, Rosann <i>Mid:</i> Dawson, Bing, Compact Stella <i>Mid-late:</i> Lapins	<b>Peach</b>	<i>Mid:</i> Redhaven, Black Boy <i>Late:</i> April White, Golden Queen
<b>Currants</b>	<i>Black:</i> Magnus, Tai Tah <i>Red:</i> Myra McKee, Gloriade de Versaille	<b>Pear</b>	<i>Early:</i> Williams Bon Chrétien <i>Mid:</i> Princess, Beurre Hardy, Conference <i>Late:</i> Beurre Bosc, Doyenne du Comice <i>Very late:</i> Winter Cole, Winter Nelis
<b>Feijoa</b>	<i>Early:</i> Apollo, Gemini, Unique <i>Mid:</i> Kakapo, Wiki Tu <i>Late:</i> Triumph	<b>Plum</b>	<i>Early:</i> Duff's Early Jewel, Wilson's Early <i>Mid:</i> Fortune, Purple King, Greengage <i>Late:</i> Omega
<b>Fig</b>	<i>Early:</i> Brown Turkey <i>Mid:</i> Brunswick, San Pedro No 2 <i>Late:</i> Lesa, Preston Prolific, French Sugar	<b>Prune Plum</b>	<i>Mid:</i> Cacak Fruitful <i>Late:</i> Italian, Stanley
<b>Grape</b>	<i>Early:</i> Himrod, Buffalo, Shuyler <i>Mid:</i> Iona, Albany Surprise <i>Late:</i> Niagara	<b>Quince</b>	<i>Early:</i> Van Deman <i>Mid:</i> Vranja
<b>Gooseberry</b>	Invicta, Pax	<b>Raspberry</b>	<i>Early:</i> Waiiau <i>Late:</i> Autumn Bliss, Manna Yellow
<b>Hazelnut</b>	Whiteheart, Alexandra, Barcelona, Ennis	<b>Sour Cherry</b>	<i>Mid:</i> North Star, Fanal, Kelleris <i>Mid/late:</i> Montmorency, Richmorency
<b>Kiwiberry</b>	Takaka Green	<b>Tangelo</b>	Seminole



## Terms used in this booklet

- Bud** – a little lump on a shoot that will grow either a leaf or a flower
- Central leader** – a tree trained with one main stem or trunk
- Cordon** – a fruit tree grown as a main stem with spurs but no side branches
- Deciduous** – leaves fall off the tree in winter
- Espalier** – a fruit tree trained to grow with horizontal branches flat against a wall or fence, or on wires
- Evergreen** – has leaves all year round
- Fan** – the shape of one method of growing fruit trees on wires against a wall or fence
- Forest gardening** – using all the space around and under trees, including vertical space, to grow more plants
- Frost tender** – a plant that gets damaged by frost
- Fruiting arm** – a main branch that grows sideways from the leader
- Graft** – fusing a piece of living tissue from the shoot of one plant onto the root system and stem of another plant
- Grafting union** – the place where the new tissue was fused to the rootstock tissue
- Hardwood cutting** – a piece of a plant that is cut at the end of the growing season, when the new growth has matured
- Head back** – cut a shoot back to a suitable bud
- Lateral** – a thin, fruit-producing side shoot
- Leaders** – strong upright stems that sprout from the central stem and form the main framework of the tree – there might be one central leader or several leaders
- Microclimate** – the climate conditions in a smaller area that are noticeably different from the rest of the area
- Mulch** – a layer of organic matter (e.g. straw, compost, shredded material) spread over the soil to retain moisture and suppress weeds
- Mummified fruit** – the shrivelled, brown fruit left on the tree after the harvest is finished
- Pollinate** – pollen is transferred from one flower to another, which fertilises the flower so it can turn into a fruit
- Prune** – deliberately cut the plant in certain places to control its size and shape, and to encourage the development of more fruiting wood
- Rootstock** – the living roots and stem of a plant that has tissue from a different plant grafted onto it to grow into the upper form of the plant
- Self-fertile** – the flowers are fertilised by the pollen from the same plant, which means they don't need a different variety to pollinate them and form fruit
- Spurs** – short, stubby clusters of fruit buds growing on leaders and fruiting arms
- Sucker** – shoot growing from the base of the tree
- Thinning cut** – cut a shoot right back to where it sprouts from the branch or trunk, in order to thin out some of the growth
- Vase** – a tree trained with several upright leaders creating a 'bowl' shape in the centre



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[www.treecrops.org.nz/](http://www.treecrops.org.nz/)  
[www.garden-nz.co.nz/growers-nurseries/2.html](http://www.garden-nz.co.nz/growers-nurseries/2.html)

### *Climate*

[www.niwa.co.nz/our-science/climate](http://www.niwa.co.nz/our-science/climate)

### *Planning*

[www.edible.co.nz/calendar.php](http://www.edible.co.nz/calendar.php)  
[www.edibleforestgardens.com/about\\_gardening](http://www.edibleforestgardens.com/about_gardening)  
[www.permaculture.co.uk](http://www.permaculture.co.uk)  
[www.agroforestry.co.uk/forgndg](http://www.agroforestry.co.uk/forgndg)

### *Site considerations*

[www.sces.org.nz/pmwiki.php/Content/ChoosingFruitTrees](http://www.sces.org.nz/pmwiki.php/Content/ChoosingFruitTrees)  
[www.edible.co.nz/growing.php](http://www.edible.co.nz/growing.php)

### *Growing in containers*

[www.edible.co.nz/growing.php#container](http://www.edible.co.nz/growing.php#container)

### *Planting*

[www.sces.org.nz/pmwiki.php/Content/PlantingAndCaringForFruitTrees](http://www.sces.org.nz/pmwiki.php/Content/PlantingAndCaringForFruitTrees)  
[www.urbanorganics.org.nz/node/18](http://www.urbanorganics.org.nz/node/18)

### *Training & Pruning*

[www.newplymouthnz.com/VisitingNewPlymouth/Attractions/ParksAndReserves/GardeningTips/PruningFruitTrees.htm](http://www.newplymouthnz.com/VisitingNewPlymouth/Attractions/ParksAndReserves/GardeningTips/PruningFruitTrees.htm)  
[www.sces.org.nz/pmwiki.php/Content/Pruning](http://www.sces.org.nz/pmwiki.php/Content/Pruning)

### *Pests and diseases*

[www.urbanorganics.org.nz/node/35](http://www.urbanorganics.org.nz/node/35)  
[www.landcareresearch.co.nz/research/biosystematics/invertebrates/invertid/index.asp](http://www.landcareresearch.co.nz/research/biosystematics/invertebrates/invertid/index.asp)  
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[www.urbanorganics.org.nz/node/35](http://www.urbanorganics.org.nz/node/35)

### *Companion planting*

[www.urbanorganics.org.nz/node/36](http://www.urbanorganics.org.nz/node/36)

### *Propagation*

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This Guide is available on:  
[www.nec.org.nz/growing-fruit-and-nuts/](http://www.nec.org.nz/growing-fruit-and-nuts/)

For more information on growing food at home and in Open Orchards go to:  
[www.healthyas.org.nz/fresh-foods/grow-your-own/](http://www.healthyas.org.nz/fresh-foods/grow-your-own/)

**ISBN 978-0-473-17487-3**

ISBN 978-0-473-17487-3 (paperback)

ISBN 978-0-473-17488-0 (PDF)

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Grow It! would like to acknowledge the support of the following people:

- For turning the concept into a reality – Cheryll McMorran, Nick Kiddey, Pauline Hervey and Kirsten Revell (Revell Design)
- For her quirky illustrations – Judith Cowley
- For review and advice – Bruce McConnell, and Karen & Darrell Johnston (River Terrace Nurseries)
- For advice and information – Jennie & Bob Crum (Kiwi Crums), Adrienne Henry, Richard Hunter, Robina McCurdy, Bidy Myer, Tim Newsham

We gratefully acknowledge permission to adapt information and illustrations from:

- Ralph & John Ballinger – *Fruit Gardening in New Zealand*
- Graham Burnett – [www.spiralseed.co.uk](http://www.spiralseed.co.uk)
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