



Grow Great Fruit

ESSENTIALS COURSE



[WEEK 5 – MID SUMMER]



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HOW MUCH WATER DO MY FRUIT TREES NEED?

AT A GLANCE...

Too little water, and your trees won't thrive, and might drop their fruit. Too much, and it's easy to flush the nutrients away from the root zone.

Deciding when to water can be as simple as checking the soil beneath the tree to see if it feels moist, or going the slightly more scientific route of using our Water Ready Reckoner, or using soil moisture monitoring.

While they have leaves on them, fruit trees need water available to their roots at all times if you want them to grow well, and produce fantastic fruit!

Basically, you need to give your trees enough water to replace the amount they use (for photosynthesis) and lose (through evapotranspiration from their leaves, and evaporation from the soil). The aim when watering is to keep the trees above wilting point, and the soil below being waterlogged. How much water is needed to do this depends on a number of factors, which we've summarised for you below...

Other things can also affect how much water the tree needs, like what rootstock it's on (some are more drought tolerant than others); how stressed the tree is from disease, pest attack, or environmental conditions; and how large the leaves are (because trees with larger leaves photosynthesise more, and need more water).

High levels of organic matter will help irrigation water and rainfall soak into the soil better (as opposed to running off), and help the soil store any water it receives, thereby reducing the amount of water you need to give the trees. Having good cover crops growing under your fruit trees will also help water soak into the soil, and will reduce evaporation.

Mulch will slow evaporation of water from the soil, but be sure to use a mulch that will let water get into the soil—thick straw mulch, for example, can take a long time to get fully soaked itself, before any water reaches the soil. The best strategy is to water under the mulch.

HOW MUCH WATER?

There's no fixed rule about how much water a fruit tree needs – unfortunately! Luckily, we bring you both a simple method and two scientific methods of making this difficult decision. Whichever method you end up using, the principles are the same:

1. The more organic matter your soil contains, the more effectively it will store water for use by your trees.
2. It's best to water slowly, say over 4–6 hours, rather than all at once (drippers are ideal for this) to give the water a chance to soak in and not run off.
3. Small trees have small root systems and need more frequent watering.
4. After watering, the ground should be damp but not waterlogged, and should drain quite quickly.
5. Rainfall reduces the amount

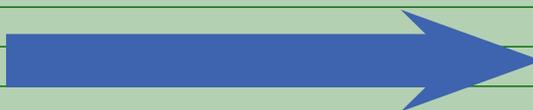
of water you need to give your trees. To help you work out how much less water you need to give your trees: 1 mm of rain = 1 litre of water per square metre of ground area.

THE SIMPLE METHOD

Dig a hole a few cm deep near the trunk of the tree with a shovel; the soil should feel cool and moist, but not wet. If it looks and feels hot or dry, and is very hard to dig into, it's too dry! Other things you can look out for include

FACTORS THAT AFFECT THE AMOUNT OF WATER YOUR TREE NEEDS

Temperature	Low	High
Humidity	High	Low
Wind	No wind	Extremely windy
Sunshine	Cloud cover	No clouds
Rainfall	Rain	Time since last rain
Age of tree	Newly planted	Mature
Crop load	No crop/post harvest	Heavy crop
Ground cover	Full ground cover	Bare soil
Size of fruit	Small (eg cherry)	Large (eg apple)



- whether the tree is wilting—it may wilt on a hot afternoon, but if it's not fully recovered by morning, it needs water (desperately!);
- how many weeds or groundcover plants under the tree are looking—if they're looking dry, or are dead, the tree is not getting enough water.

How easy is that?

SCIENTIFIC METHOD #1: WATER READY RECKONER

The following formula may look complicated, but in fact it is an easy way to figure out how many litres per week each of your fruit trees needs to replace the amount lost. Even though it looks quite precise, it is still an approximation, and will be affected by all the factors mentioned above, so you'll still need to adjust it depending on your local conditions.

However, what makes this formula easy to use is that (in Australia) the evapotranspiration rate is already worked out for us by those clever bods at the Bureau of Meteorology, and up-to-date information is available as long as you have access to a computer.

So, the formula is: tree canopy size x evapotranspiration rate x multiplier = water requirement. These terms are defined as follows:

TREE CANOPY SIZE: This is the size of the top (canopy) of your tree. To work it out, imagine the sun is directly over the top of your tree. You need to work out the size of the shadow the tree casts on the ground—the easiest way is to estimate the diameter of the shadow, and multiply it by itself. For example if the shadow of your tree's canopy is 1.2m across, the tree canopy size is 1.44 square metres.

EVAPOTRANSPIRATION RATE: We're lucky in Australia that the brilliant Bureau of Meteorology works this out for us, making the rest of our calculation really simple. Here's the link to the BOM page you need (called Recent Evapotranspiration): <http://www.bom.gov.au/watl/eto/>. Click on the tab for your state, and find the location closest to you. Not all weather stations are listed; for example, the closest to our farm is Bendigo Airport. On 7 February, the evapotranspiration at Bendigo Airport was 9.2, which means, on average, 9.2 litres of water evaporated from each square metre of ground on that day. Obviously this is a generalisation, but it is a good reflection of the weather conditions in your district.

MULTIPLIER: Two of the main things that affect how much water your tree needs are the amount of fruit it's carrying (crop load) and the development stage. We've bundled these things together to come up with a multiplier effect (see table).

The key times to make sure your tree has enough water are (i) at flowering, when cell division is occurring within the fruit, and insufficient water will limit the amount

of cells that form in the developing fruit, restricting the size of the fruit for the rest of the season; and (ii) in the 6 weeks before harvest. Between those two times, the fruit is developing quite slowly and can manage with less water, though the tree is growing rapidly in that period, and insufficient water may restrict tree growth. After harvest the tree's water needs reduce again, and they don't need any water at all while they are dormant.

WORKING OUT THE MULTIPLIER

Development stage	Crop load	Multiplier
Blossom through to fruit set	Heavy crop	0.6
	Medium crop	0.4
	Light crop	0.2
Fruit set through to 6 weeks before harvest	Heavy crop	0.6
	Medium crop	0.6
	Light crop	0.6
Last 6 weeks before harvest	Heavy crop	1.2
	Medium crop	1.1
	Light crop	1.0
After harvest	All trees	0.4

EXAMPLE

A tree with a canopy size of 1.44 square metres, with a medium crop, 2 weeks before harvest (multiplier of 1.1, as per table above), in Harcourt on 7 February (a 40°C stinker!) (evapotranspiration rate of 9.2) needed 14.6 litres! On a cooler day (28°C) a couple of weeks earlier it would only have required 7.8 litres!



SCIENTIFIC METHOD #2: SOIL MOISTURE MONITORING

Commercial orchards usually rely on soil moisture monitoring equipment, and it's possible for you to do this in your home garden as well, though you probably wouldn't bother spending thousands of dollars on a state-of-the-art computerised system!

The simplest and cheapest soil moisture monitoring equipment is the simple gypsum blocks that have been around for ages, and the more modern tensiometers that are cheap, easy to install and easy to read—we'll go into more detail on both systems in a future Program

HOW OFTEN SHOULD I WATER?

Ideally, your tree would get its daily water allowance every day, but watering that often is not practical for most of us. How often you water will depend on your watering system, and your soil type. In the example above, where your tree needs 8 litres per day, that equals 56 litres per week—if you're watering by bucket, it's clearly going to make more sense to give

your tree 3 buckets every 3 days, rather than 7 buckets in one day! If you have a drip system that delivers 4 litres per hour, it makes more sense to turn the system on for 5 hours every 3 days, rather than 14 hours at once!

Your soil type will also affect how often you need to water. Sandy soils hold less water and drain much faster than those with high percentages of clay, so you'll need to water them more frequently—if you give your tree its weekly allowance in 1 day, the water will just rapidly drain away from the tree's root zone, taking a whole lot of nutrients with it!

Whatever soil type you have, adding copious amounts of organic matter will help it to retain more water, and to drain better!

ANYTHING ELSE I NEED TO KNOW?

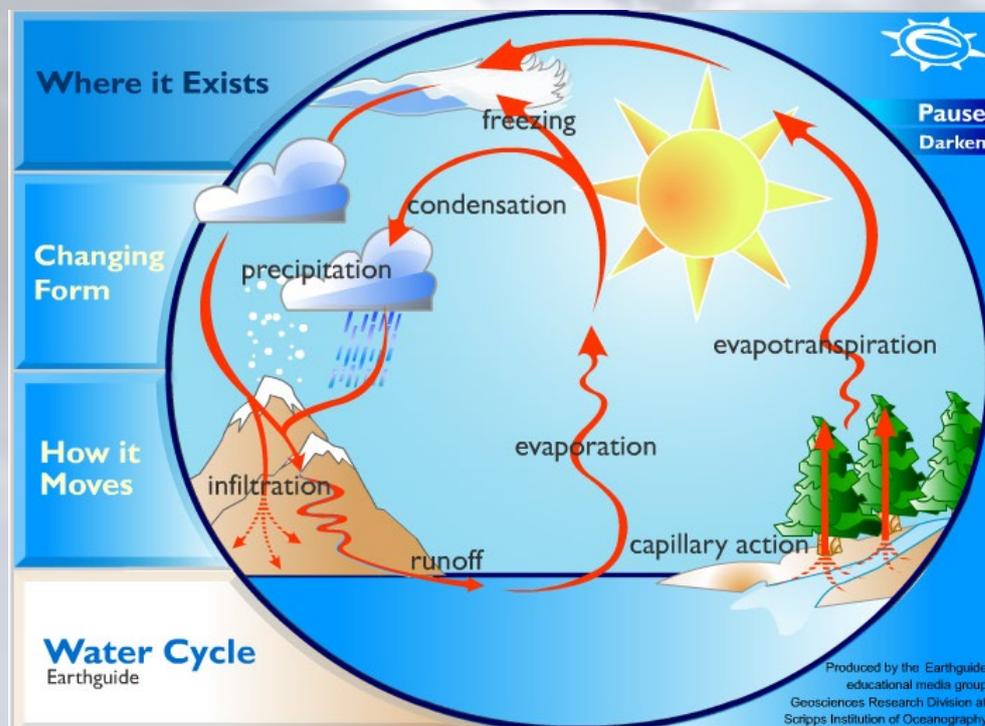
If you live in a particularly hot or dry climate, or if water is scarce, there are several things you can do to encourage your trees to be less reliant on irrigation:

- Anything that helps prevent evaporation from the soil, or evapotranspiration from the tree's leaves, eg mulch, groundcover

plants growing under the tree, weed mat, protection from wind or sun.

- Deep ripping the soil before you plant your trees.
- Constantly increasing the amount of organic matter in the soil by adding compost, mulch, mowing the grass under your trees or planting green manure crops.
- Fruit trees thrive on 'grey' water—water that has already been used once, like washing up or bath water.
- On particularly hot days, trees may look a bit wilted in the late afternoon if they become water stressed, even if there is enough water in the soil. The stomata (pores) in the leaves close down once the temperature of the roots hits about 34°C to stop the tree losing any more water via evapotranspiration through its leaves, and the tree and fruit temporarily stop growing. As long as there's enough water in the soil this is not a problem, and the tree will recover overnight. If your tree is still looking wilted in the morning, you know you've got a problem and you'd better water pronto!

THE WATER CYCLE



Thanks to the Geosciences Research Division at Scripps Institution of Oceanography for permission to use this diagram. They also have an interactive version at earthguide.ucsd.edu/earthguide/diagrams/watercycle/

The Water Cycle describes how water moves between the sea, atmosphere, plants and soil.

When the soil is full of water—like after heavy rain—it's called "waterlogged" or saturated. This is not so good; it flushes nutrients below the root zone, and can kill soil microbes (which are really important to keep soil healthy). So, we don't want to over-water.

A couple of days after mega-rain, lots of the water has drained away, and the soil is at "field capacity". This is the right amount of full, and what we're aiming to achieve with irrigation.

For a few days (how many depends on all the factors listed above) the tree's roots can easily pull water from the soil—"readily available water", but once that's gone, the tree reaches "wilting point". At this point trees look visibly wilted, and if it doesn't get water soon, is at danger of dying because it can't get any more out of the soil.

SHOULD MY YOUNG TREE HAVE FRUIT?...

Growing fruit trees is always a balance between growing wood—which forms the structure of the tree, and on which fruit will be carried—and growing the fruit itself, which is the point of having a fruit tree in the first place, isn't it?

In mature trees, this balance is established by pruning the right amount, at the right time, and making sure your tree has everything it needs to keep growing, year after year, while also producing a crop of fruit.

However, for young trees it's a different story. The first 2–3 years are the crucial time to establish the framework of the tree for the rest of its life.

Establishing a tree is all about selecting the limbs that will make up the permanent structure. In a vase-shaped tree, this means selecting 6–10 limbs, evenly spaced around the tree, as if they are the walls of a 'vase' around an open centre.

To do this, the tree needs to grow well and produce lots of shoots, to give you plenty of options to choose from. Letting the tree bear fruit will divert much of the tree's energy into fruit production at the expense of shoot production, and it may end up actually taking longer to establish the tree.

To establish your fruit tree as quickly as possible, prune it back hard in the first year, leaving at least 3 or

4 strong healthy buds on each branch. This is called a 'heading cut', because it removes the apical or end bud from the branch.



Heading cuts encourage the buds directly under the cut to grow into new shoots, so hopefully in the second year, it will look something like this:

This tree could be said to have achieved its permanent structure, with 6 limbs evenly spaced around an open centre, making a classic 'vase' shaped tree. We would still let it grow for one more year, and get a bit bigger and more established before we let it have fruit.

However, very often a tree in the second year will only have 3 or 4 limbs in the right position, and you will need to make heading cuts again fairly low in the tree to encourage it to put out more shoots, in the right position. Remember, wherever you make the cut is where you are encouraging the tree to create a new branch (so don't do them too high in the tree!).

This is a peach tree in its 3rd growing year (right) showing the sort of structure and healthy growth we like to see. This tree is now ready to have its first crop of fruit next season, and hopefully, every season after that for the rest of its life!

A tree like this will probably easily bear between three and four kilos of fruit next season, and we would expect that amount to at least double every year until it reaches full size, at about 8 to 10 years old.

AT A GLANCE...

We're often proudly told by new fruit tree owners that their one- or two-year old tree has fruit on it. While we appreciate how exciting it is to get a return from a new fruit tree, you could be sacrificing the future shape and structure of your tree by letting it bear fruit too early.

If your young tree has been allowed to bear fruit, and now you're wondering whether that was wise, let your next move be guided by how well the tree is growing. If it's



If the tree is not showing at least 20cm growth with lots of new shoots, or if it's a late ripening variety, then it's probably best to pull the fruit off now.



PICKING, CARE, AND STORAGE OF PEACHES AND NECTARINES...

HOW DO YOU KNOW WHEN YOUR PEACHES AND NECTARINES ARE RIPE?

COLOUR AND APPEARANCE: Many varieties get their mature skin colour well before they are ripe, so colour can be misleading. The best guide is actually the background colour, which is the colour of the skin beneath the top colour. It can usually be seen on the shady side of the fruit, around the stem end, or between patches of the main skin colour. On all peaches and nectarines this background colour starts green, and as the fruit ripens, it develops into a white colour (for white flesh fruit) or a yellow colour (for yellow flesh fruit).

Less able to be taught, but something that comes with experience, is being able to see the almost unnoticeable faint glow emitted by ripe fruit. Once you get your eye in, you'll start to notice that they just look ripe!

FRUIT DROPPING: On the farm, we often wait until a couple of pieces of fruit have fallen on the ground (because they're ripe, not because of birds or wind), to be sure the fruit is mature and in the ripening phase.

A lot of people think that the fruit will drop easily into your hand when it's ripe, and while this is true for some varieties, it can also be misleading—for example, some varieties of nectarine will fall in a strong wind even if they are not ripe, others will hang on the tree until they are overripe, and some varieties just don't come off easily, even when they're ripe! Fruit coming off easily in your hand is one of the least useful things to help make the decision about when to pick.

FEEL: If they are ripe peaches and nectarines will start to have some 'give' to them when you gently squeeze them. It's frighteningly easy to bruise them by doing this though, particularly if they are completely ripe, so approach this one with caution.

TASTE: One of the most important indicators of ripeness is taste, and

this also helps you learn how to match the way the fruit looks, to how ripe it actually is. For some strange reason, fruit often tastes sweeter when tasted straight off the tree, compared to how it tastes later out of the fruit bowl if it's been picked green. This subjective mistake seems to be influenced by how excited you are to be picking fruit from your own tree, whether it's the first of its type for the season, and how many birds are threatening your crop!

SIZE: Many varieties will increase in size in the last week to 10 days of ripening by between 30% and 100%—truly! When you start picking your tree, you'll notice that the darkest, ripest fruit is also the largest. If you can resist picking the smaller, greener fruit, you'll be so pleased to find when you revisit the tree in a few days or a week that the fruit you left behind will now also be large and ripe (if the birds haven't beaten you to them!). This does not always hold completely true; sometimes small fruit ripens without getting any larger, and this is influenced by various factors that were in play when the fruit set.

RIPENESS TESTS: If you want to get technical, there are a couple of tests you can do—an iodine test to check how much starch has converted to sugar (commonly used for apples), and a Brix meter can be used to test the amount of soluble sugar in the juice of the fruit—but this is too much detail for most home gardeners! (Both are covered in detail in coming weeks for those that are interested.)

If you've waited to pick until some pieces of fruit are definitely ripe, you can be pretty confident that if you accidentally pick some that are not quite ready, they will ripen well off

Colour and ripeness are not the same thing...

AT A GLANCE...

It's a waste to pick peaches and nectarines before they are ready, because flavour and size both improve dramatically in the last week of ripening. Once picked, storing your fruit correctly will let you enjoy it, in good condition, for much longer.

the tree. The trick is not to wait too long, and find half the crop on the ground (been there, done that!).

PICKING WITH THE END USE IN MIND:

Also consider the end use for the fruit. If you're planning to make jam, you'll want ripe fruit with plenty of flavour, but also it will set better if you include some greener fruit (which has more pectin).

If you're planning to bottle whole fruit, it's better for it to be on the firm side so it will keep its shape in the bottle, but if you want to stew the fruit for freezing or bottling, then soft, ripe fruit will suit the purpose better. Going camping with no refrigeration? Need your fruit a bit greener. Serving it for dessert tonight? Very ripe. Want fruit for school lunches? Then you need it ripe enough to eat today, but firm enough that it doesn't end up mushy in the lunchbox. Get the picture?

The key is to get to know your varieties—some ripen from the top of the tree, some from the bottom, some from the middle! Check them out on the [GGF Fruit Tree Database](#) (if your varieties are not there let us know and we'll add them!). And remember, keep notes in your picking diary and you'll soon become familiar with each variety in your garden, and pick perfect fruit every year.

However, it's just as important, with some varieties, not to pick too late, as the fruit may lose flavour or texture if it gets overripe!



PICKING DO'S AND DON'TS

DO'S:

Before you start picking from the tree, pick up any windfalls. Any fruit that is good enough to salvage can be put in a picking container, any rubbish fruit in a bucket or box for disposal later. It's best to do this before you start so you don't stand on and squash the fallen fruit, which makes the job of picking it up later much messier and less pleasant!

Have an ample supply of picking containers ready. If you're picking when the fruit is ripe, peaches and nectarines will easily bruise, and should be placed only one layer deep in the picking container. We use cardboard trays, lined with plastic inserts with moulded cups, to keep the pieces of fruit from touching one another, and from rolling around, but large cardboard boxes would do just as well. If the peaches and nectarines are slightly underripe, or a more robust variety (like clingstone peaches), it's ok to stack them two deep in the picking container.

Place the fruit carefully into the picking container with the stem end down; never drop fruit into your container.

Pick fruit by cupping it in the palm of the hand, and using the flats of your fingers rather than fingertips.

Gently pull, with a slight twisting motion.

Sort the fruit as you pick by removing any fruit with brown rot, severe earwig infestation, bird poo, or any other issue that would contaminate the healthy fruit you are picking. It's easiest to keep a bucket with you for any of this 3rd-grade fruit, which you can sort through later to salvage anything worth cooking.

Pick in the coolest part of the day.

Remove fruit to the coolest place available as soon as you've picked it. The faster you get the fruit down to a cool temperature, the longer it will last off the tree—within reason, of course! The optimum temperature for storing fruit is 2°C, but if this isn't possible, just choose the coolest place you have available. Allow air circulation around the fruit to help it cool down quickly.

DON'TS

Don't place fruit upside down (ie, on its round side) in the picking container, or it will become bruised.

Don't let fruit sit in the sun once it's picked; it will quickly warm up, and start to deteriorate much faster.

Don't pull off any leaves as you pick the fruit. Peaches and nectarines are often growing at the junction between 2-year-old wood and the new wood that has grown this year; the current season's growth is very precious because that's where next year's fruit will grow. Protect the new growth by holding the shoot with one hand while gently pulling off the fruit with the other hand.

HOT TIP:

Don't pick the whole tree at once! Pick only the ripest fruit, and check back every few days (more often in hot weather). Some varieties can be picked over two or three weeks! If for some reason you need to harvest the entire tree at once (to beat the birds, for example, or you're going on holidays), try to choose the time when most of the fruit is ripe. You'll lose a few as windfalls, but with any luck, most of the unripe fruit will ripen just fine off the tree.

Don't twist the fruit too much as you pull it off; it's very easy to create a picking injury on the stem end of a ripe peach this way, and once it has a hole in it, the fruit will deteriorate much faster.

Don't dig your fingertips into the fruit as you pick it or you'll end up with lots of bruised fruit.

Don't let fruit roll around in the picking container or it will bruise.

Don't drop fruit into the picking container - place it in gently. We always remind our pickers that you should never be able to *hear* your fruit.



Always cup your hand around ripe fruit when picking, and hold growing tip so it doesn't break and...



...never use just your fingertips as it will bruise the fruit, and this damage may not show up until some time after picking.

GETTING RID OF PROBLEM WEEDS-IF YOU MUST!

BENEFITS OF WEEDS

Plants are such an important part of the ecosystem that a weed of some description will nearly always pop up to fill any bare ground, even in the most unfriendly conditions.

Soil is at its healthiest when it has healthy plants growing in it, as the roots provide valuable habitat for all the marvellous microbes that make nutrients available for your plants, for free! Plants also provide air spaces, organic matter and shade to keep the temperature perfect for all the underground critters!

Lots of garden weeds are herbs, which were the first pharmaceuticals, and form the basis of many modern medicines. Many more are edible, or have other uses, which is why we introduce you to different weeds regularly.

WHEN YOU NEED TO GET RID OF WEEDS

However, there are clearly some times when you need to kill weeds:

Some weeds are **DECLARED NOXIOUS WEEDS**, and are controlled by law. Legislation will vary from state to state, and country to country, and you need to familiarise yourself with

any weeds you are obliged to control in your area (more info is available from your local Landcare group, or from [Weeds Australia](#)). In Victoria, where we live, there are several categories, all requiring different levels of action by landholders:

STATE-PROHIBITED WEEDS are weeds that either do not yet occur in Victoria but pose a significant threat if they invade or, if present, pose a serious threat. Responsibility for control of these weeds rests with the relevant government department. Plants in this category include:

- Alligator weed
- Black knapweed
- Camelthorn
- Ivy leaf sida
- Lagarosiphon
- Mesquite
- Nodding thistle
- Parthenium weed
- Perennial ragweed
- Poverty weed
- Tangled hypericum
- Water hyacinth

REGIONALLY PROHIBITED WEEDS are not widely distributed in the region, but are capable of spreading further. It's reasonable to expect they

AT A GLANCE...

We're strong advocates of learning to love and appreciate plants that are often defined as weeds, and we spend much of the Grow Great Fruit Program extolling their multiple virtues.

However, we do acknowledge that sometimes you need to kill or prevent weeds, but that's still no excuse for putting poisons in your soil! This week we give you strategies for those times when the balance comes down in favour of weed control.

can be eradicated from the region. In Victoria, responsibility for control of these weeds rests with private and public land managers on their land, VicRoads on declared roads, and the appropriate government department on other roadsides (check regulations for your state). Plants in this category include:

Serrated tussock

REGIONALLY CONTROLLED WEEDS exist in the region and are usually widespread. Continued control measures are required to prevent further spread to clean land. Responsibility for control of these weeds rests with private and public land managers on their land and adjoining roadsides, except where VicRoads has responsibility for declared roads (check regulations for your state). Plants in this category include:

- Blackberry
- Boxthorn
- Cape tulip
- Gorse
- Hardheads
- Horehound
- Paterson's curse
- Prairie ground-cherry (Cape gooseberry)
- Silver-leaf nightshade
- Spiny burr grass
- Spiny rush
- St John's wort
- Wheel cactus
- Wild garlic

You may also need to kill weeds if the cost of the competition for water and nutrients outweighs the benefits, and removing them will increase the chances of survival for fruit trees (e.g. young trees) or other food plants.



Serrated tussock is a regionally prohibited weed that can seriously degrade land and spreads easily

Horehound does have its uses but can be a nuisance in and around fruit trees



GETTING RID OF WEEDS WITHOUT USING CHEMICALS

METHOD	NOTES	PROS	CONS
<p>ANIMALS</p> 	<ul style="list-style-type: none"> Many different animals, alone or in combination, can be used to control weeds in an orchard or garden, including sheep, pigs, goats, chickens and other poultry. See November MGP for more details. 	<ul style="list-style-type: none"> Low energy use Turn weeds into other products (e.g. manure, meat, wool, eggs) Good for soil health and carbon sequestration into soil if animals are rotationally grazed 	<ul style="list-style-type: none"> Replace weed issues with animal management issues
<p>WEED MAT/NEWSPAPER/MULCH</p>  	<ul style="list-style-type: none"> We would only recommend using biodegradable weed mats certified for use in organic gardens, eg Weed Gannel or EcoCover. Plastic weed mats are toxic to the soil. Thick layers of newspaper/cardboard Mulches can be used to smother weeds, either by themselves or on top of newspapers or cardboard. Brown mulches (dead leaves, bark chips, straw) are best to use under fruit trees because they encourage fungal growth as they decay, but other mulches such as stones can also be used. 	<ul style="list-style-type: none"> Suppress weeds quite effectively Newspaper and cardboard are free and effective, will rot down to help build soil Mulches are generally free or inexpensive 	<ul style="list-style-type: none"> Weed Gannel and EcoCover are expensive Despite being biodegradable, they are persistent, and may take a long time to break down in soil and prevent the establishment of understorey plants If the weed mat becomes covered with soil or compost, weeds will grow above it, and will gradually infest the weedmat with their roots Quite a lot of work to apply Mulch can prevent rainfall getting to the soil Persistent weeds like couch grass will eventually get through
<p>“OFF THE SHELF” ORGANIC WEED KILLERS</p> 	<ul style="list-style-type: none"> Off-the-shelf products include Weed Blitz Organic Herbicide, a pine oil herbicide, and Bioweed, both certified organic sprays. 	<ul style="list-style-type: none"> Not harmful to soil microbes or worms Works best on soft, non-woody plants, seedlings, annuals, grasses, herbaceous plants and seeds Nonsystemic, ie, not absorbed into plants 	<ul style="list-style-type: none"> Expensive Don't work on woody or deep rooted weeds like gorse, onion weed or thistle May need regular repetition
<p>STEAM OR BOILING WATER</p> 	<ul style="list-style-type: none"> Need to buy, borrow or hire a steam machine. These machines are hired for steam cleaning, eg. carpets, or for steaming wallpaper off walls. Alternatively pour boiling water straight onto the weeds. 	<ul style="list-style-type: none"> Boiling water is readily available and costs only the energy required 	<ul style="list-style-type: none"> May be expensive to buy machine or get a contractor to do the job, difficult to borrow one. Boiling water is quite time intensive and physical Adverse effect on soil microbes directly hit by steam or cooked by boiling water Won't work on all weeds Needs regular repetition
<p>VINEGAR</p> 	<ul style="list-style-type: none"> Use undiluted household white vinegar, with 5% acetic acid, spray it neat directly onto the weeds on a warm, dry day. You can add a squirt of liquid soap to help the vinegar stick to the plants you're trying to kill. Using stronger vinegar (15-20% acetic acid) can lower soil pH dramatically and stop anything growing in the soil 	<ul style="list-style-type: none"> Cheap, readily available Easy to use Best used only on paths, not in garden beds or under fruit trees 	<ul style="list-style-type: none"> An indiscriminate killer, so take care not to spray plants you want to keep! Works best on annuals, perennials need repeated spraying Can lower the pH of the soil Not effective on large, invasive weeds

GETTING RID OF WEEDS WITHOUT USING CHEMICALS

METHOD	NOTES	PROS	CONS
<p>PULLING OUT BY HAND</p> 	<ul style="list-style-type: none"> • Best to wear gloves for prickly weeds 	<ul style="list-style-type: none"> • Kills weeds 	<ul style="list-style-type: none"> • Time consuming • Physically difficult • Disruptive and damaging to soil microbes, particularly fungi • Removes organic matter from soil • Creates conditions that are harmful to soil microbes • Bare soil will rapidly be recolonised with new weeds if not replaced with other plants
<p>MOWING & BRUSHCUTTERING</p> 	<ul style="list-style-type: none"> • Need to own (or be able to borrow) a brushcutter or mower, and keep it running 	<ul style="list-style-type: none"> • Good for soil by putting lots of organic matter in, both the cut tops of the weeds, and roots that are shed underground • Good for carbon sequestration into soil 	<ul style="list-style-type: none"> • Uses fossil fuels • Takes time • Needs redoing regularly • It's a tedious job!
<p>GROOMER (A FLAIL MOWER ON A TRACTOR-MOUNTED BOOM)</p> 	<p>Used to clear really thick infestations of invasive weeds such as gorse and blackberry</p>	<ul style="list-style-type: none"> • Completely removes infestation down to ground level • Allows opportunity to manage regrowth for future control by slashing or using animals • Adds lots of organic matter to surface of soil 	<ul style="list-style-type: none"> • Weeds not killed, so will need to deal with regrowth • Expensive to hire a groomer or contractor (though services may be available through local Landcare groups)
<p>BURNING OR USING A FLAME TORCH</p> 	<ul style="list-style-type: none"> • Used for large infestations, eg, gorse and blackberry 	<ul style="list-style-type: none"> • Easy • Cheap • Doesn't require equipment • Allows management of hard to reach areas • Provides large setback to weed population, but not eradication 	<ul style="list-style-type: none"> • Tend to get massive regrowth because seed bank in the soil that is regenerated • May not completely remove the infestation • Major risk of fire escaping and doing damage

Why haven't we included chemical weedkillers in our list of weed removing strategies? Many of the chemicals registered for use in Australia—including herbicides—have been linked to disease in people, or harm to the environment.

Glyphosate specifically has been linked to Hairy Cell Leukemia, non-Hodgkins lymphoma, Parkinsons disease, a range of cell mutations, miscarriages and premature births. It's now known to be extremely persistent in the soil and to able to be absorbed by plants months after its application. It's extremely toxic to soil microbes, arthropods and earthworms, and increases the susceptibility of plants to diseases. It is also now banned in a number of countries.

We also would never support Monsanto—financially or otherwise—the makers of the world's most-used weed killer, or any other chemical company.



blackberry and gorse are two very common and invasive weeds that you may need to control



WHO OWNS FRUIT VARIETIES, AND ARE WE ALLOWED TO PROPAGATE THEM?...

As new fruit varieties are developed, they are usually patented under plant breeder's rights (PBR, also called plant variety rights). Like any patent, this is to protect the breeder and let them make a return on their investment of the research and development involved in developing a new variety. PBR grants a patent, but doesn't dictate how a variety can be sold.

Once PBR is granted, the owner of a new variety can then either sell it themselves, or licence a nursery to sell it, either wholesale or retail. Each tree sale generates a royalty which is paid to the breeder.

The breeder can also place licence restrictions on trees sold to orchardists (like us), that might stipulate things like

- a minimum quantity of a single variety must be bought (which may be as low as 10 trees, but could be up to 200 tree for some varieties),
- the buyer must sign a non-propagation agreement and/or a grower's agreement,
- a royalty on the sale of the fruit must be paid back to the breeder or licensee,
- stipulations about where and how the fruit must be packed, labelled and sold; and
- the licensee may be allowed onto your property with 24 hours notice to inspect your plantings.

In a famous case in Victoria in 2003, a grower was forced to destroy his orchard of patented trees after failing to sell the fruit in the way he was supposed to, or to pay appropriate royalties on the fruit.

You can see why most small growers like us stick to heritage or heirloom varieties, which are not patented or licenced. Fruit tree patents only last for 20 years, so if we're patient, all varieties will eventually become available to us, but we're happy to stick with the wonderful old heritage varieties anyway.

HOW DOES PBR AFFECT HOME GROWERS?

New, patented varieties often become available for home growers to buy in nurseries. Some examples you might

have heard of include Ballerina apples, Trixie peaches and nectarines, and Zee Sweet peaches and nectarines, all of which include a whole range of varieties. Every time you buy one of these trees, part of the cost of the tree is a royalty, which the nursery passes on to the plant breeder.

“

Fruit tree patents only last for 20 years, so if we're patient, all varieties will eventually become available to us!

”

Considering one of the things we teach in the GGF program is how to grow your own trees, and there is an increasing amount of swapping of plant material going on between members (which we heartily endorse and encourage!), we thought we'd better just clear up the legality of the situation.

The good news for backyard growers is that as long as you're propagating the trees privately and for noncommercial purposes, you're exempted from the PBR Act!

This means you're welcome, and indeed encouraged, to keep swapping varieties between yourselves, and practice your grafting and propagation skills in your gardens!



Plants protected by plant breeder's rights should carry the PBR logo

AT A GLANCE...

Ever wondered why we grow so many heritage varieties at Mt Alexander Fruit Gardens? One reason is that we want to help preserve them, and the best way to do that is to grow them, but the other reason is that many modern varieties are not easily available to small growers like us because they are patented.

If you have fruit trees in your garden, one of the jobs you really should pay attention to in January is to remove any suckers that have grown from the rootstock. They can grow really big, really quickly, and suck all the energy away from your tree. Left alone, they can actually get bigger and stronger than your fruit tree, and the original fruit tree may die, leaving a vigorous, but useless sucker in its place. If this happens, all is not lost of course, because you can graft (or bud) the sucker to recreate the tree you originally had, but you will have lost precious time.



NUTRITION THROUGH THE YEAR....

AT A GLANCE...
This week we give an overview of how your fruit trees get their nutrition throughout the year, so you'll understand when to feed them, what to feed them, and why.

Understanding the growth cycles of our tree helps understand its nutritional needs. There are certain times of the year when it's vital that trees have access to adequate nutrition. In a nutshell, the two main times are mid-late Spring, when the trees are growing madly and have used anything that has been stored—either in the tree or the soil—over winter; and in autumn when the tree is forming buds for next year's crop, and laying in stores for winter and early spring.

If you've been with us a while, you'll be familiar by now with us stressing—a lot!—the importance of soil microbes. If our soil microbes are low or lacking, there's no way that 'nutrient cycling' (the process whereby microbes turn nutrients into forms that are available to the plants) can happen properly, and this means our trees will be at risk of starving.

Given the importance of microbes, we also stress the importance of constantly building soil microbe levels, both by adding microbes to the soil (compost, worm castings) and also feeding the microbes that are there (organic matter, kelp, fish) so they can get on with doing their thing.

Let's take a look at what is happening with our trees over the course of the year.

SUMMER

In summer trees are—or should be—still actively growing, and soil microbes are active in the warm conditions. Moisture is the most

critical thing at this stage as things tend to dry out rapidly, and we want to keep the trees growing for as long a possible. If the soil is allowed to dry out—even for a short time—growth will stop and it's hard to kick start it again as summer progresses. It's a good idea to keep the soil covered—always—either with a 'green mulch' (grasses, weeds, herbs, companion plants) or mulch material such as dead leaves, pea straw, or lucerne. Compost is even better, but it can be hard to make or obtain large enough quantities to effectively mulch with it; aged horse or cow manure also makes a good mulch.

It's also important to keep our microbes fed. Applications of diluted liquid fish and seaweed to the soil are the mainstays of microbe food. These are best applied during watering, and should be added during the last half-hour of a watering cycle. This way there is no risk that the foods will get washed through the soil, beyond the root zone of the tree.

Compost tea is another useful addition to the soil now as the microbe populations that you're adding have a good chance to get into



in autumn trees store the energy from the leaves, and develop buds for next year's crop...

the soil and established before the soil cools down in autumn. In fact, any time other than winter is a good time to apply compost tea, as there will always be active microbes in it, and you can add microbe food at the same time.

Any of these things (compost tea, liquid fish, seaweed) can also be sprayed onto the leaves, rather than the soil - that's called a foliar spray. It's feeding the trees rather than the soil, and is a great instant pick-me-up as the trees are able to absorb things more rapidly through leaves rather than via the soil. They also help to encourage microbial colonies on the leaves themselves, and this makes it harder for diseases to attack. Foliar sprays are best done early or late in the day, when it's not too hot.

AUTUMN

In autumn trees are gradually closing down, storing energy for the burst of activity that starts in spring. It's also when they store energy in fruiting buds for next season's crop, so it's most important they have a ready supply of nutrient at this time. Again, microbial food applications to the soil are the first step.

As the soil starts to cool down, microbial activity also slows down, and so any liquid applications to the soil should be done before things get too cold.

Young trees need plenty of water, and mulch adds organic matter and keeps competing weeds at bay...



If you're preparing some ground for new plantings, now is a good time to plant a green manure crop (eg white clover, prostrate lucerne, alfalfa) which can either be turned in before planting, or used as the basis for your permanent ground cover.

WINTER

In winter things pretty much stop. Trees are dormant and microbes are largely inactive. This gives us a chance to do things such as spread compost around trees, and perhaps apply a handful of rock dust (crushed basalt, often sold as 'crusher dust') around each tree to help top up important trace elements.

If you are planting new trees, you can incorporate these into the top 150 mm of soil in each tree hole, or across the entire area if your planting is more ambitious. It's also a good idea to inoculate the fruit tree roots with microbes and microbial food before planting, to give them a head start. Have a bucket or drum of compost tea with some extra liquid fish and seaweed added handy, and dip each tree in it for a good 5 minutes before planting. Even dipping them in dilute fish and seaweed without the compost tea will help.

SPRING

Ok, things are going to start happening as the soil warms up, and hopefully you—and your trees—are ready. Before things really start to move, it's not a bad idea to apply a handful of complete organic fertiliser around each tree just for a little treat, especially if the tree looked like it was struggling a bit last season.

Wood ash is another good source of micro-nutrients (those only found in minute quantities in the soil) and spreading a shovelful around each tree is useful. Don't overdo ash as it is very alkaline and too much can throw things out of whack.

Trees start growing in spring by making use of the energy they have stored in autumn. This first flush of growth usually starts well, but if your tree is hungry it will start showing symptoms quite quickly. Because the tree is growing quickly during this stage, it really is the time to be feeding it and the soil—compost tea, liquid fish, liquid seaweed, compost, worm castings, well-rotted manure, foliar sprays—and try to do something at least every couple of weeks during spring and early summer.

It's easy to get caught out in spring by letting trees get dry. If the soil has not been recharged by good rain over winter, it is surprising how quickly it dries out, and when the weather is still cool/cold it may not feel like things are dry—check! (We got caught out badly some years ago

and the trees never really made up for the hard time they had in early spring. It was during the drought and we had few options, but it still caught us by surprise as it didn't feel that dry.)

LEAF TESTING

Leaf testing is a handy way to get a mid-season snapshot of where your trees are at, but, given the cost, is probably only worth doing if you have a serious or ongoing problem that you can't get to the bottom of. Unlike soil testing, it only tells us what the tree has access to, and what shortages or excesses it is experiencing. What it doesn't tell us is how much of these things exist in the soil—just because there is a potassium deficiency showing up in the leaves doesn't necessarily mean there is not enough potassium in the soil; it may be that the soil is too acid or is compacted or poorly drained, or has too much magnesium; all of these things can affect potassium availability. So a leaf test will tell us if there is anything major that our trees are struggling with, and if done in mid-summer, we have a chance to try to amend things before the end of the season.

To take a leaf sample, we need about 50 leaves all from a single variety, so either from one tree or from as many of that variety as you have. Leaves should be taken from mid-way along a piece of this season's growth, so don't take really young leaves, or the oldest leaves on the tree. If you are specifically trying to diagnose a problem area or tree, use affected leaves for your sample.

Wear rubber gloves when picking the leaves so there can be no contamination from something on your skin, and take the samples early in the day (before about 10 am). Place the leaves in a clean brown paper bag, and put them in the fridge until you're ready to send them off to the lab (ASAP).

The lab result will give you measurements for all the major and micro nutrients, and will compare these with what is considered desirable for this particular crop.



Spring growth comes from energy stored in autumn

SPOTLIGHT ON BIRDS

ABOUT: Pest species will depend on where you live, but some of the worst offenders include cockatoos, parrots, wattle birds, and crows.

PREVENTION AND TREATMENT: There are two main strategies for protecting your fruit trees from birds:

- Deterrents
- Exclusion

Deterrents can include anything that scares the birds away or makes them think it's a bad idea to eat your fruit:

- Loud noises, e.g., scare guns
- Physical presence, either being around your fruit trees regularly, or putting up a scarecrow
- Real or fake predators, e.g., hanging hawks in the tree, pretend cats or snakes in or near the tree
- Shiny or scary things in or nearby the tree: hanging CDs, red paper to make the tree appear to be on fire
- Distress call audio systems designed to scare birds away e.g. 'Birdgard'
- 'Waving man' air-filled balloons, especially when combined with noise.

These deterrents may work on some species of birds, but usually not for long. Some of the best ones may even work for an entire fruit season, but often only one. If you're planning to use deterrents to guard your crop, the best strategy is to combine as many different ones as possible, and change them often. Birds will quickly get used to a particular situation, and it is not uncommon to find them sitting on a scarecrow or Birdgard unit after a short period, when they figure out there is no threat.

Netting used by commercial orchards is hexagonal shaped, with holes of varying size, usually 13-15 mm. It's not a good idea to use shade cloth as this reduces the sunlight hitting the tree; netting should also allow good air flow and insect movement. Net can usually be purchased at garden supply or hardware stores.

Nets slightly increase the humidity, leading to greater risk of fungal disease.

Snakes can get also caught if the net walls go right to the ground.



NETTING TYPE	DESCRIPTION	PROS	CONS
<p>DRAPE NETTING</p> 	<p>Net is draped over each tree (or several together if they are close enough) in spring or early summer when the fruit is small, and then fixed to the ground around the</p>	<ul style="list-style-type: none"> • Easy • Can be very effective • Effective against small birds if net is secured to the ground all the way around • Cheap 	<ul style="list-style-type: none"> • May require 2 or more people to put nets over trees, and possibly some special equipment, depending on size of trees • The weight of the net is on the tree, and this can result in bent or broken branches, particularly at the growing tips on the end of the branches • Difficult to get access to tree for mowing, picking, and maintenance • Removing nets after harvest can damage the tree • Birds and other pests can still reach fruit that is close to the net • Slight risk of birds getting tangled in nets as they try to reach fruit, or if they get under the net and then can't escape • Snakes can get caught in net

<p>SIMPLE HOOP ENCLOSURE</p>	<p>A simple structure is erected, for example with star pickets and poly-pipe (see picture), around individual trees, or groups of trees, which can be removed each season or left for a few years.</p>	<ul style="list-style-type: none"> • Cheap • Keeps the net away from the trees • Can do more than one tree easily 	<ul style="list-style-type: none"> • Difficult to get access to trees for mowing, picking, and maintenance 
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<p>PERMANENT EXCLUSION</p>	<p>A permanent structure of poles and cables is built around the garden or orchard, and covered with either net or chicken wire</p>	<ul style="list-style-type: none"> • Provides a permanent solution to many problem pests, eg. birds, fruit bats, possums, kangaroos • Provides safe enclosure for other animals, eg. chooks, other poultry, guinea pigs • Easy access for picking, weed control, and maintenance 	<ul style="list-style-type: none"> • Structure needs to be strong enough to cope with local weather conditions all year, eg. strong winds, snow, hail • If netting is used, regular maintenance is required to fix holes that develop in the net • If wire is used, the poles and support need to be heavy duty (and therefore more expensive) to support the heavy wire • Relatively expensive
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PEST AND DISEASE CONTROL: WHY ORGANIC?

Do you eat organic food? Sometimes, most of the time, or all the time? More and more people every year are deciding to eat organics, with the global organic industry experiencing sustained strong growth every year driven by consumer demand.

CAN ORGANIC FARMING FEED THE WORLD?

It's often mistakenly assumed that organic farming is not productive enough to really help feed the world.

You might be surprised to know then, that many studies (including comparative studies over more than 20 years by the Rodale Institute in America) have shown that organic farming systems produce a yield between 80% and 110% of chemical systems. They also use (on average) 50% less fertiliser, 97% less pesticide, and up to 53% less energy. Organic farms are also more resilient, and survive conditions like droughts and hurricanes much better than chemical farms.

WHY DO SO MANY FARMS USE CHEMICALS, AND WHAT DO THEY USE THEM FOR?

Controlling pests and diseases with chemicals needs less labour input,

gives the farmer a greater sense of control, and is all a lot of farmers know! As farmers ourselves, we understand how distressing it is to see your precious crop attacked by pests or diseases, and many's the time we've wished we had a magic wand to fix the problem!

In Australia, 77 pesticides are registered for use against codling moth, there are 261 registered fungicides, and 546 registered chemicals for killing aphids. Some of the commonly used pesticides are organophosphates including Malathion, Diazinon and Chlorpyrifos, as well as carbamates and synthetic pyrethroids. There are also 3,076 registered herbicides.

A review of current scientific literature by Andre Leu from the

“*chemicals are not the magic wand farmers wish they were! They're expensive, they damage human health and the environment, and they cause more problems in the long term than they solve in the short term...*”

”

AT A GLANCE...

Most of the chemicals in non-organic agriculture are used for controlling pests and diseases, and despite the organic sector holding more than 12 million hectares of land in Australia, chemical farming still accounts for more than 99% of the food we eat – which means unless you follow a strict organic diet, you're eating chemicals on a daily basis. But at what cost?

This week we look at some of the substances that are commonly used in chemical farming, and how they might affect you and the environment.

Organic Federation of Australia found that many of these chemicals have been linked to

- disruptions in the hormone, nervous and immune systems;
- cancers including pancreatic, colon, lymphoma, leukemia, breast, uterine and prostate; and
- auto-immune diseases such as asthma, arthritis and chronic fatigue syndrome.

We include a reference to the article at the end if you're interested to find out more, but here's just a couple of examples that Andre quotes:

1. Atrazine is one of the world's most commonly used herbicides.



farm chemicals are everywhere, but that doesn't mean they're safe...

Two peer reviewed studies showed that levels 1,000 lower than currently permitted in our food and in the environment cause severe reproductive deformities in frogs.

2. The Report by the US President's Cancer Panel in 2010 stated that environmental toxins, especially chemicals, are the main causes of cancer, and raises particular concerns over the exposure levels for children.
3. Four studies published in the peer reviewed journal Environmental Health Perspectives in 2010 and 2011 showed that prenatal exposure to organophosphate insecticides adversely affects the neurological development of children and reduces their IQ.
4. A study by the University of Washington found that children who eat organic foods have lower levels of pesticides in their bodies, and that feeding children organic food can reduce their exposure to pesticides to a negligible risk.
5. The French Agency for Food Safety found in 2010 that organic foods have higher levels of minerals and 1/3 more antioxidants on average.

We learned the hard way (before converting to organic production), that chemicals are not the magic wand farmers wish they were! They're expensive, they damage human health and the environment, and they cause more problems in the long term than they solve in the short term by destroying natural fertility, killing predators, and upsetting the natural balance of a biodiverse garden.

KEYS TO ORGANIC PEST



AND DISEASE CONTROL

We also learned the hard way that weaning yourself from chemicals can take time, persistence, and a lot of hard work, but through experience, we've worked out the keys to organic pest and disease control.

1. **Soil:** having healthy soil, with lots of microorganisms, lots of nutrients, and lots of organic matter means your fruit trees will get all the nutrients they need, at the right time. This means the tree's sap (and the fruit) will contain complete proteins, instead of incomplete amino acids, which makes them very indigestible to insects.
2. **Prevention is easier than cure:** understanding the life cycle of pests and diseases helps you figure out how and when to disrupt it, to prevent it becoming a pest in the first place.
3. **Most pests have predators:** the first few pests to show up in spring are often essential in attracting the right predators to your garden
4. **Encourage variety in your garden to provide habitat for beneficial insects:** the more diverse your garden is, ie the more different types of fruit trees, other plants, animals, insects, weeds, microbes, birds, water sources and microclimates you have, the more balanced your system will become, and the less pests and diseases you'll need to deal with.
5. **Hygiene is important:** cleaning up fallen fruit, diseased wood, etc. is one of the basic ways to interrupt the life cycle of many pests and diseases.
6. **Maintain your trees well with nutrition, pruning and water:** making sure your fruit trees aren't stressed gives them the best chance of staying healthy.
7. **Monitor your trees regularly:** keeping on eye on things, at least once a week, avoids problems sneaking up on you. It's easier to nip a problem in the bud than deal with the damage afterwards.
8. **Plan your fruit tree garden:** having the right number of fruit trees really helps you look after them properly.

healthy soil is the key to healthy trees, and healthy trees are much less likely to be attacked and therefore need treatment



Though it's an organic spray and is often marketed as "eco friendly" or similar, pyrethrum should be used with extreme caution, as it is a broad spectrum insecticide, which means it will kill ALL insects, not just the ones you are trying to target. You must be particularly careful not to accidentally kill bees.



CREATING MICRO CLIMATES TO IMPROVE YOUR FRUIT GROWING

Deciduous fruit trees will grow in a wide range of climates, as long as their basic needs are met; these may be slightly different for each variety.

- **Chill factor:** many varieties need a certain number of hours at a minimum temperature over winter in order to break dormancy and set fruit in spring. More low-chill fruit varieties are becoming available all the time, making it possible for people in subtropical and tropical climates to grow their own deciduous fruit
- **High enough summer temperatures:** each variety needs a certain number of hours at a high enough temperature for the fruit to reach maturity on the tree.
- **Enough water:** either from rainfall or irrigation.
- **Decent soil:** no matter what type of soil you start with, it can be improved, as long as there are no toxicity issues.
- **Protection from the elements:** too much wind or rain, extreme temperatures, frost, hail, drought, or other weather events can prevent your tree from bearing fruit

Every fruit tree in your garden should yield a decent crop of fruit, most years. If that's not happening, observation is the key to figuring out why not, and working out how to solve the problem.

Summer is a good time to pay attention to feedback from your fruit trees and garden (e.g., notice where the sunshine and shade fall, how the wind affects your trees, pests and diseases, and rainfall and drainage). Spring and summer



are the crucial times your trees need to perform if you're going to get a return on your hard work during the year, ie, a crop of fruit!

This week we focus on identifying and creating micro climates to address some of the issues you may have noticed that are preventing your fruit trees performing well, create opportunities to grow fruit that wouldn't normally easily grow in your climate, and extend your growing season.

HOW TO IDENTIFY MICRO CLIMATES IN YOUR GARDEN

The main factors that create different micro climates in your garden are:

Structures: Your house, your neighbour's house, fences, animal shelters and sheds all help create different climates around them. Here in the southern hemisphere, the north side of a house, fence or shed will store and reflect heat, creating a much warmer (and probably dryer) micro climate than the south side of the structure. Espaliering a tree against a north-facing wall may provide enough extra heat to provide frost protection for a sensitive apricot tree, for example.

Aspect: Whether the land faces north or south will dramatically affect how much sun your trees get. A Gala apple tree on a north-facing slope might ripen up to a week or 10 days before a Gala apple tree on a south-facing slope on the same property, for example.

Water bodies: Dams, ponds and (full) tanks all help to create a more stable temperature in their immediate vicinity,

The thermal mass of (full)water tanks moderates low temperatures and can provide protection for frost-tender plants

AT A GLANCE...

Establishing healthy fruit trees, and learning how to grow fruit successfully, doesn't happen overnight. Because we're dealing with slow-growing, perennial plants, it can take years to get your fruit trees to be really productive, particularly if they're challenged by the environmental conditions in your garden, such as excessive wind, frost, or poor soil.

Creating micro climates can definitely help compensate for these problems, and even though it may also take some years to get them established, micro climates can really help to create a beautiful and productive garden in the long term.



Brick and stone walls (north facing in southern hemisphere) provide frost protection

because water heats and cools slower than air. This can help to mitigate extremes of temperature, and may provide some protection against frost and excessive heat. The north side of your water tank could be the most frost-free site in your garden!

Vegetation: Existing trees, particularly large trees, can provide wind breaks and frost shelter for fruit trees. If you don't have existing trees you can use to shelter new fruit trees, planting windbreak trees is a long-term but very effective solution.

If wind is not a particular problem, it might make more sense to plant trees on the prevailing wind side of larger trees, so they are exposed to the wind and dry faster after wet weather, reducing the risk of fungal disease.

Slope and drainage: Steep slopes will tend to drain faster than flat areas, which may be advantageous or disadvantageous, depending on the grade of the slope, and the soil type. Trees that particularly need good drainage (e.g., cherries, apricots, peaches, and nectarines) may perform better on a slope, whereas if you are in a very dry climate, trees might grow better at the bottom of the slope where the water tends to collect. The point is, differences in topography create different growing conditions that you can take advantage of.



Dwarf fruit trees in pots can be moved around to take advantage of micro climates

HOW TO USE AND CREATE MICRO CLIMATES IN YOUR GARDEN

- If you have more than one tree of the same variety, plant them in different places on your property. We have many of the same varieties growing in 2 or 3 different places on the farm, and they regularly ripen more than a week apart
- Create windbreaks by planting trees on the prevailing wind side of your fruit trees. Windbreaks work best when they are not solid, but let some of the wind through, for example casuarina trees make a better windbreak than trees with very dense foliage, or solid barriers such as brick walls, which create turbulence on the other side. The best

shape for a windbreak is a boomerang shape, to help channel the wind around the area you are trying to protect. If you have enough space, plant two or three rows of trees and shrubs to make a better shelter belt.

- Temporary windbreaks can be built with:
 - o star pickets and hessian
 - o a staggered wall of hay bales with gaps to allow some wind through
 - o poles with a wire trellis between them, and grow a quick-growing vine on the trellis
- Use any large mass (house, water tank, fence) to provide protection from frost
- Extra frost protection can come from locating a tree close to a paved area or driveway that will radiate heat
- Build a frame around your young fruit trees that can be easily covered with a cloth to protect the tree from frost or excessive heat, at least while the tree is young
- Dwarf trees can be planted in pots or wicking beds. This allows you to put the trees in a sheltered part of the garden where they wouldn't otherwise grow well, for example near a large established tree, on a verandah, or extremely close to a building where you might otherwise not want to plant a tree
- Sun trap: use existing walls or build stone or mudbrick walls to enclose a fruit tree within a sun trap.
- A fruit tree planted in a vegie garden will probably perform quite differently, and ripen at a different time, to the same variety planted in the middle of the lawn, because of the extra fertility, water, improved soil and extra attention it's likely to receive in the vegie garden.

It's not always essential to understand what's influencing your fruit trees; the most important thing is to stick to the basic principles of continuously improving the soil, and managing risk with diversity. By having the same variety—e.g., two Golden Delicious apples, or even the same fruit type (e.g., two different apple varieties)—growing in different microclimates in your garden, you're increasing your chances of getting a crop of fruit.

WHERE DOES THE PREVAILING WIND COMES FROM AT YOUR PLACE?

Observation is the best way to get to know your local conditions, but in Australia, the Bureau of Meteorology website (www.bom.gov.au) also provides wind maps for all its weather stations around the country. The maps show the wind speed and direction at different times of day.

*To access the data from the BOM home page, click on **Climate>Weather & climate data**. Under **Daily weather observations** select **Weather & climate** and under **Type of data** choose **Monthly Statistics**. Enter your location, then click **Get Data**. A chart of all the weather statistics for your closest weather station will appear. Scroll down to **9 am conditions** in the chart, click on the **PDF icon** in the **Annual** column and you'll see a diagram showing the average wind speed and direction at your closest weather station, at 9 am. Return to the chart and scroll down to **3 pm conditions**, click on the **PDF icon** in the **Annual** column, and you'll see the wind diagram for 3 pm. You can also check the wind speed and direction for each month of the year.*

ABOUT US

We—Katie and Hugh Finlay—run Grow Great Fruit from our farm in central Victoria, Australia. Teaching organic fruit growing was a natural progression from growing fruit commercially for years, and being asked thousands of fruit tree questions as we were selling fruit at markets.

We've always used organic, biological and regenerative farming methods, relying on building healthy soil to grow healthy trees and fruit—so that's what we teach. The trees get their nutrients from a diversity of microbes in the soil and plant tissues and from their relationships with other plants, rather than from artificial fertilisers.

We've been orchardists since 1998, both coming to it from non-farming careers, though Katie grew up on the orchard and Hugh worked on farms in Western Australia and the Middle East before roaming the globe for many years as a travel writer for Lonely Planet.

Training in organic farming, permaculture, soil biology, compost and holistic farming (as well as years of practical, hands-on experience) has all been important in developing our growing practices, the sustainable development of the farm, the establishment of the Harcourt Organic Farming Co-op, and the ethics of what we bring to you in Grow Great Fruit.

Diverse plantings rather than monoculture, spreading risk with biodiversity, and learning how to grow your own food successfully all contribute to food security—and we're on a mission to help build a secure food future for all!



DISCLAIMER: We make every effort to ensure the information given in this program is accurate. However, as conditions and methods vary, we cannot guarantee the results, and take no responsibility for any damage or injury that may occur, no matter how caused. But relax—you'll probably grow twice as much fruit as we predict...without incident!

Staying in touch

Part of what we love about the Grow Great Fruit Program is that we're building a community of like-minded fruit growers—something we wish we'd had when we were learning how to grow fruit.

There's lots of ways to join in, ask questions, share information, swap stories, make connections, and get to know us, and other GGF members.

On the socials...

See daily photos and updates from the farm, post comments, and share your own news on our social platforms:

Visit our [Facebook](#) page.



Instagram: [GrowGreatFruit](#)



For our exclusive community...

Grow Great Fruit Forum: Post your photos and questions online to get answers and feedback about fruit growing issues. Also a great place to brag about your success! Click [here](#).

Monthly Q&A Sessions: Join the community for a face-to-face friendly group chat once a month. Bring your questions and send photos in beforehand for us to share with the group. Register from the Members Home Page [here](#).

Blog. Our blog is another way we share what's happening on the farm, and go into more detail about various aspects of organic fruit-growing. Click [here](#) to view the blog.

All the material in the Grow Great Fruit program is the property of Hugh and Katie Finlay. It is provided to you as a member of the Grow Great Fruit program, and is not to be shared or distributed in any form without written permission.

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