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Tree Fruit

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The aim of this article is not only to develop an understanding of the importance of temperature management, but also to ensure that orchardist can grow a quality product that is big, dark, sweet and firm, and will have a reasonable shelf life.

High quality cherries also must have a low incidence of defects such as pebbling (rough pebbled texture of the skin), pitting, stem browning, shrivel, decay and softening.

People love to eat fresh cherries but few realise how difficult it is to keep cherries fresh.

The reason for this is that the cherry is a non-climacteric fruit. Non-climacteric means that what you harvest is what you get. Internal quality does not improve after harvest.

Cherries are also highly perishable because of their high respiration rate. When cherries are picked from the tree they are removed from their life support system and senescence begins. They also lose water easily during picking, packing, storage and transit because the cuticle (a waxy layer coating the outer wall of epidermal cells) is poorly developed.

Maintaining cherry quality after harvest (part 8)

Bas van den Ende and Ken Gaudion

Maintaining cherry quality after harvest

Continued from last issue

Sorting, packing and transporting cherries

At the packinghouse, cherries are susceptible to bruising and pitting, though not all the blame can be placed on the packing facility.

Pitting occurs from impact on dimple surfaces, while bruises result from impact on flat surfaces.

Fruit temperature also plays a role in bruising. Impact bruising will occur at colder temperatures. Colder cherries are also more susceptible to pitting.

Compression damage is observed at warmer temperatures. But you can only run warmer fruit if the cherries can be cooled down before being put in the box. Once cherries are in the box, it is difficult to cool them down.

Research conducted in Canada showed that cherries get firmer when held in cold storage for a week or two, particularly with the Summerland varieties. The reason for the increase in firmness is not understood.

Storability & flavour

One of the important influences in the storability of cherries is acidity.

When cherries ripen during storage and transport, the amount of titratable acids decreases faster than the loss of soluble solids (sugars). The cherries may still look good, but the acid-to-sugar ratio becomes skewed because the fruit loses more acids than sugars, which changes and causes loss of flavour.

Cherry flavour is defined by sugar content (sweetness), acidity (tartness) and aroma. While the balance of sugars and acids is often as important as the actual amounts of either component of taste, sweetness is of primary importance for flavour.

Cooling

Cherry handling and packing equipment have improved greatly.

Improvements have also been made to reduce fruit damage from leaf-eliminating equipment and cluster cutters.

The aim of sorting and packing cherries is to remove unmarketable fruit, size the fruit and cool it without causing damage.

During transit and marketing, cherry temperature should be as close to 0C as possible, to reduce respiration to a low enough level to maintain cherry and stem colour and minimize water loss.

At this temperature, flesh firmness, acidity and sugars will be retained.

If no additional cooling can take place once the cherries have been boxed, it must be placed into the box at this temperature.

Once warm cherries have been placed in a cardboard box with a poly-bag liner and palletized, it takes a very long time to reduce the temperature of the cherries if the pallets are just set in a cold room for cooling.

However, there are methods and procedures that increase cooling rates significantly, so that acceptable transit temperatures can be obtained overnight.

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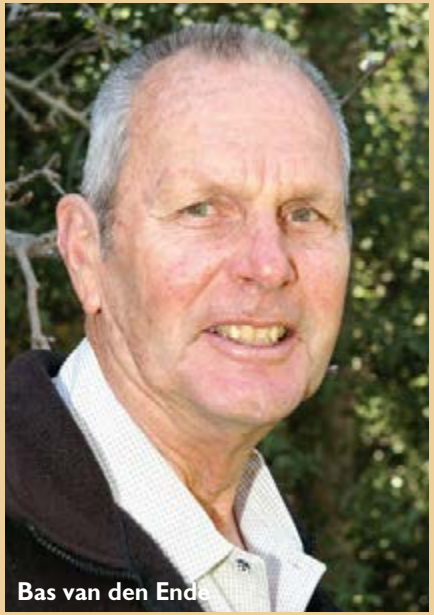

Bas van den Ende

Consultant
fruit production
(retired)

The largest and best quality apples and pears grow on two-year-old wood and young spurs.

To develop two-year-old wood, prune trees according to the 1-2-3 rule of renewal pruning. This rule ensures that the fruiting wood remains young and productive. Your trees are as young as the fruiting wood.

The 1-2-3 rule of renewal pruning is simple and less expensive than spur pruning, and it ensures that your trees do not develop old, tired spurs that produce fruit of poor quality and size.

This rule also avoids biennial bearing, provided there has been adequate cross-pollination.

The 1-2-3 rule is very effective if you keep your trees calm. Calm trees have dominant leaders that are not forked and have stubs and small secondary branches that carry the one, two, and three-year-old wood.

Two-year-old wood of apple and pear trees is most productive.

Using a pear tree as an example, here is how you use the 1-2-3 rule.

1 The 1 of the 1-2-3 rule refers to the one-year-old laterals, also called pencils.

These laterals are 300 to 400 mm long and a little thinner than a pencil.

The buds at the tips are often fruit buds (Figure 1). Never shorten these laterals. If you have too many, space them out and keep the ones that are horizontal and almost as thick as a pencil.

Remove the strong upright shoots and long laterals without fruit buds at the tips. These are nonproductive growth shoots. However, some pear varieties, such as Forelle and Beurre Bosc, often do not produce one-year-old laterals with fruit buds at the tips. If left untipped, these laterals will bud up in the second year.

Bas van den Ende

Keep apple/pear fruiting wood young & productive with the 1-2-3 rule of pruning

Keep apple/ pear fruiting wood young & productive with the 1-2-3 rule of pruning

Figure 1.
This 1-year-old lateral is the foundation of your fruiting wood.
Do not shorten it.
Keep your trees healthy and moderately vigorous so that you will always have plenty of laterals to choose from.

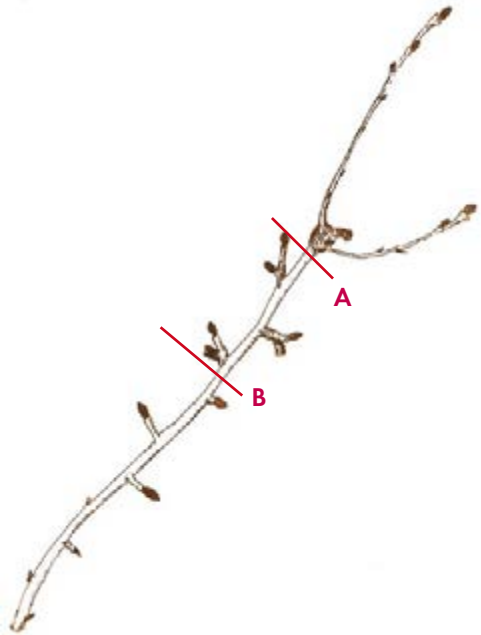

Figure 2.
Two-year-old wood with several pears set at the tip end.
Cut the wood at the ring (A) or deeper (B), depending on the length and thickness of the wood, the number of fruit buds present and the vigour of the tree.
Either cut will enhance fruit set and fruit size.

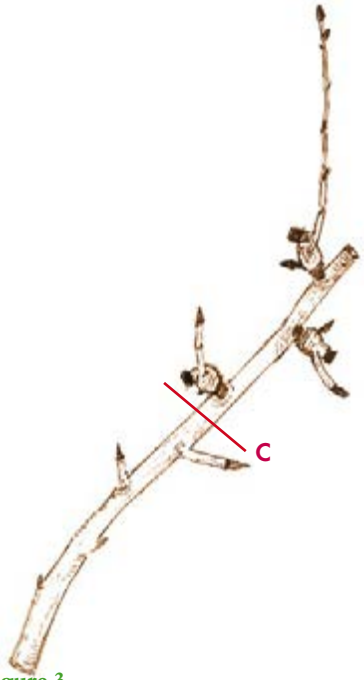

Figure 3.
This 3-year-old wood was cropped when two years old. It was cut back deeper than the ring.
The three buds below the cut have set fruit, as shown by the swellings (bourses) and bourse shoots. The buds on these bourses are of little value because they are not fruit buds.
Cut this piece back to C to generate new laterals.

Figure 4.
The 3-year-old piece of wood has produced two new laterals.
You could keep one or both laterals.
The cycle of wood renewal can start again.

Also remove the very thin laterals, because these will not produce the quality and sizes of fruit that the market wants.

About one-third of the renewal wood should be one year old.

If the laterals are much longer than 300 to 400 mm, your trees are excessively vigorous, and you must address this problem first. Here are some suggestions:

- Do not apply, or cut back on nitrogen fertiliser. Definitely no nitrogen fertiliser in spring.
- Prune more in summer, less in winter. Make thinning cuts instead of heading cuts. Let sunlight into your trees.
- Apply regulated deficit irrigation (RDI) if you can.
- Boost cross-pollination and fruit set by re-grafting whole trees, branch-grafting or inter-planting Chinese or Asian pear polliniser trees, i.e. Ya Li for Forelle, Hosui and Nijiseiki for d'Anjou and Packham, Nijiseiki for Bosc and Bartlett.
- Introduce five beehives per hectare at 5 percent full bloom. Hives must have young brood collecting mainly pollen. Place hives on fruit bins with hive openings to east-north (east-south for Northern Hemisphere).
- Mow weeds in the orchard to prevent them from flowering.

(On young, nonbearing Williams (Bartlett) and Forelle trees on Open Tatura with 2000 trees per hectare, we have used Ethrel (ethephon) sprays in mid and late summer to terminate extension growth of laterals.

This method of vigour control often resulted in laterals setting terminal fruit buds. Ethrel was sprayed [without a wetting agent] at the rate of 300 to 700 mL/ha three to five times. The differences in rates depended on the temperature in the orchard after spraying.

A low rate was used when it was hot, and a high rate when it was cool. The active constituent of Ethrel was 480 g/L of ethephon.)

2 The 2 in 1-2-3 refers to fruiting wood that is now two years old.

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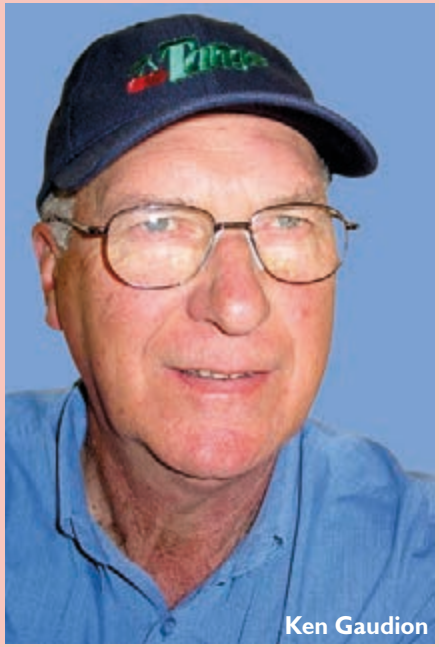

Ken Gaudion

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e-mail k.gaudion@bigpond.com

All about CHERRIES

Little cherry disease—big problem for growers in North West USA

Below is an article from Northwest Cherry Growers, Yakima, WA about a virus of another kind—one that potentially can have a huge impact on cherry production.

"Growing sweet cherries was already one of the riskiest ventures a farmer could undertake.

Mother Nature is unforgiving, and production of large, quality fruit requires an incredible amount of time, labour and orchard management.

And then came a group of viruses collectively known as *Little Cherry Disease*. We know now that the three viruses have been around for years in different regions under different names.

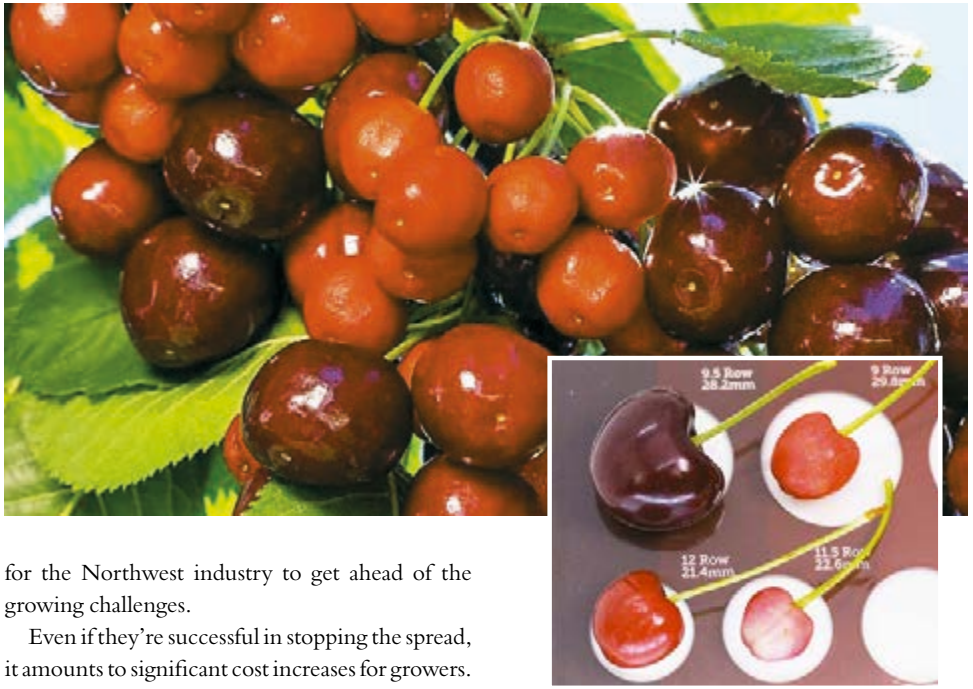
They destroyed the thriving British Columbia industry in the 1930s, literally decimating the industry in 30 years and forcing every packing line to close.

The same group of plant pathogenic phytoplasma caused a significant reduction in the California cherry industry in the 1980s and 1990s.

Unfortunately, scientists have shown that while these viruses all cause the same result—small and under-developed fruit—there are several different vectors that cause their spread. And each vector may have a number of different native hosts as well, which makes controlling them in a natural environment all the more difficult.

As with immunizations in people, total group participation is key to developing a resistance.

A multi-state task force has been convened to develop a series of controlling procedures in order for the Northwest industry to get ahead of the growing challenges.



Even if they're successful in stopping the spread, it amounts to significant cost increases for growers.

While the growing season for sweet cherries is relatively narrow, the period of possible infection is fairly wide, resulting in a consistent spray regimen stretching into late autumn, or several months past when growers would be able to reduce their labour force and input costs into their orchards.

This surge in growing costs adds to an already challenging increase in labour and input costs, and spells disaster for many small growers.

Fortunately there is hope on the horizon. The Northwest industry has taken the lessons of the past and are actively searching their orchards during the narrow window for symptoms—essentially the few weeks when cherries should get bigger but don't—and are removing trees, blocks of trees and entire orchards.

We are hopeful that these efforts will slow the spread of the disease while a task force of industry veteran scientists work on a cure.

In the meantime, the most precious and riskiest of all orchard crops will continue to be just that."

During the Millennium drought, options for minimising irrigation applications to pear orchards were investigated by Agriculture Victoria.

Ian Goodwin, Lexie McClymont

Water vs pear crop (part 4)

This article was first published in *Australian Fruit Grower*. Reproduced here with permission and thanks. Visit APAL.

Parking trees and post-harvest irrigation cut-off were evaluated in terms of potential water savings and the impacts on current and future production and are discussed here.

Regulated deficit irrigation (RDI) has been established as an effective technique to control vigour and maintain yield, with the added benefit of lower water use, and is also discussed.

Continued from last issue

Parking trees

The aim of parking trees is to sacrifice the crop and apply the minimum amount of irrigation so that trees survive and return to full production the following year.

Trees are managed to minimise the transpiring leaf area and avoid excessive water stress so that developing fruit buds are not desiccated.

The following are recommendations to park trees and minimise irrigation:

- Withhold irrigation until the root-zone (defined as containing 80 per cent of the roots) dries out to a minimum soil water tension of at least 400 kPa.
  This occurs at the start of November in the Goulburn Valley after average winter and spring rainfall.
- Use deficit irrigation by applying 30 per cent of orchard water use capability. This is conservative and based on RDI studies conducted at Tatura.
  Apply frequent irrigation with less water. In other words, cut irrigation run time back to 30 per cent of full irrigation but maintain irrigation interval similar to full irrigation.
- Remove fruit from the tree.
  De-fruiting reduces competition from dry weight accumulation by the fruit and thus increases the amount of carbon available for the developing fruit buds for next season's crop. Fruit also consume water for growth and lose water through their skin although the amount is small compared to foliage transpiration.
- Remove water shoots.
  Shoot growth will be strong at the start of the season if there is adequate soil moisture from winter and spring rainfall.

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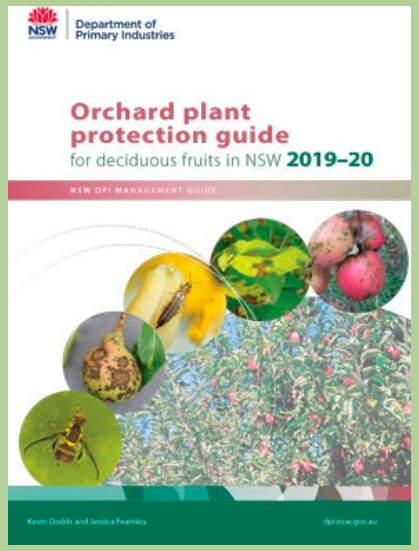

Managing disease, pests & disorders

This information is from the *Orchard plant protection guide for deciduous fruits in NSW 2019–20*, published by the NSW Department of Primary Industries.

It is reproduced here with permission and thanks. The guide is available here

NOTE: *Any chemical recommendations are based on chemicals and products registered for use in New South Wales, Australia. Readers from other jurisdictions should check product registration status and label recommendations for their country, state or territory.*

San José scale

San José scale feeding on fruit causes slight depressions with a red–purple halo.

San José scale is an extremely important pest of pome and stone fruit. It is a sucking insect that injects a toxin into the plant as it feeds, causing localised discolouration.

San José scale is a difficult pest to control within orchards due to its life cycle.

The first indication of San José scale might be when infested fruit is found at harvest or packing.

Careful examination of trees during dormancy to look for the insect and watching for the trees that retain leaves during winter are good monitoring tools.

Using pheromone traps after the pink stage of flower development will give an indication of the population size of males. Crawlers can be monitored 4–6 weeks after bloom using double-sided tape with a thin layer of petroleum jelly around infested tree limbs.

Pest identification

San José scale adult females are yellow with rounded dark grey scales. Females are wingless and legless, measuring 2.5 mm in diameter.

Males have a dark band across their back, long antennae, legs and wings. Crawlers are approximately 0.25 mm long and bright yellow.

Damage

San José scale sucks the sap and juice out of the tree and fruit while also injecting a toxin. This causes loss of tree vigour, stunted growth and limb death.

On fruit, San José scale feeding will cause slight depressions with a red–purple halo.

If the populations are low, damage will be concentrated to the bottom of the fruit.

Management

San José scale overwinter as immature scales. In spring, the winged males emerge and mate with the wingless females.

Approximately one month after the first male flight, the first crawlers can be seen. Understanding this life cycle helps target control and management.

Dormant season treatments are the most effective.

Cultural and physical

The most effective cultural control is to prune out infested branches.

This will reduce scale numbers and opens up the tree canopy, which allows effective penetration if spray treatments are used.

Control ant populations as they spread the scale crawlers and protect them from natural enemies.

Always provide optimal growing conditions, including appropriate nutrition and water to reduce the number of susceptible plants at lower pest populations.

Always ensure that the growing area and surrounds are weed-free to minimise competition for resources.

Biological

There are a number of natural enemies that can be used to control San José scale.

The most common predatory insects and naturally occurring parasitoid wasps include *Cryptolaemus* (*Cryptolaemus montrouzieri*), green lacewings (*Mallada signata*) and *Chilocorus* beetles (*Chilocorus circumdatus*).

A range of fungi and bacteria is available that can infect and kill scale insects, however, these are less likely to reduce populations unless they become very abundant.

It should be noted that almost all pesticides will negatively affect beneficial insect populations when trying to control San José scale.

CaTs liquid fertiliser for crops and soils

CaTs® is a clear liquid fertiliser containing calcium and sulfur that reduces the harmful effects of salt such as sodium in the soil, and it can work as a soil amendment.

Multipurpose

CaTs contains key nutrients and acts as soil amendment, it:

- Boosts crop quality—consistency, crop colour and shelf life
- Delivers 100% readily available calcium and sulfur
- Is a liquid fertiliser without nitrogen or chloride
- Enhances root growth.

Soil balance

- CaTs balances the soil, allowing better water infiltration.
- It stabilizes and solubilizes soil nutrients (calcium, potassium, magnesium, iron and manganese).

Crop quality

- CaTs improves fruit firmness
- Improves cell structure
- Increases disease resistance
- Increases shelf life.

CaTs contains active thiosulfate that can:

- Increase chlorophyll content
- Assist the synthesis and function of enzymes and vitamins within the plant
- Lowers salting out temperature.

Nutrient uptake

- CaTs is a readily available source of calcium and sulfur
- Liberates soil nutrients.

Contact Dr Petar Bursac
Tessenderlo Kerley International
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petar.bursac@tessenderlo.com
www.cropvitality.com

Waterbird Mini Sprinkler: under tree & overhead irrigation

The iconic Toro Waterbird Pressure Compensated (PC) and Classic mini sprinklers are designed, engineered and manufactured in Australia since 1978.

The range of custom made agricultural mini-sprinklers is the result of continuous consultation between engineers, growers and dealers to minimise water consumption whilst increasing yield.

With a unique patented pressure compensating diaphragm assembly the Waterbird PC mini sprinkler offers greater stream control, better uniformity and an increased radius on both flat and undulating terrain.

They have a larger droplet size that reduces susceptibility to wind.

The low angle of throw maximises under foliage penetration.

Other characteristics include an anti-insect and dust proof spinner that retracts to protect nozzles when not in operation.

Aerofoil shaped frames improve distribution and a snap fit bearing enables easy dismantling and assembly.

www.toroirrigationsolutions.com.au/waterbird-pc-sprinkler

New VA Series anvil secateurs from ARS Japan

The new professional quality anvil secateurs from ARS Japan are now available in Australia.

Ideal for pruning grapevines and other hardwood branches they feature a curved blade and anvil which helps to hold the branch in place during the cut.

In use, the comfortable grip and razor sharp blade offers a smooth light cutting action even on larger diameter branches and stems.

Contoured cast alloy handles with soft PVC grips offer a comfortable and light action suitable for all day use.

The blade is made from high carbon Japanese steel and features a non-stick coating.

These secateurs have a high quality, solid feel as one expects from ARS and spare blades are stocked locally by the distributor.

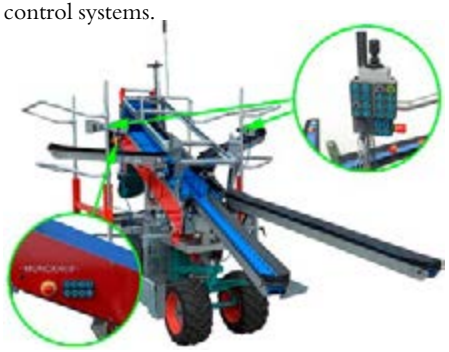
The ARS VA Series secateurs are available in small (18cm) and medium (20.5cm) sizes through the Australian distributors Woodchuck Pty Ltd.

Freecall: 1800 655 542
www.woodchuck.com.au

New, clever Pluk-O-Trak control system

Munckhof fruit tech innovators aims to help its customers more effectively and faster in the future, by offering innovative and reliable spraying and harvesting techniques for businesses that grow fruit, nuts and olives.

The company recently signed a new partnership contract with RIWO, a well-known and experienced supplier of (mobile) machine control systems.



The collaboration between the two companies has already led to a completely redesigned control system for the Pluk-O-Trak.

Thanks to RIWO, the Pluk-O-Trak now features a clever, variably adjustable straight-line control that keeps the machine centred even if the trees are not upright, or the machine has to operate on sloping ground.

This feature is extremely useful when pruning from one side.

Machine operation has been further simplified by adding robust push-buttons and a joystick.

Munckhof expects to benefit from the ongoing rapid developments in automation, robotisation, navigation and camera technology.

www.munckhof.org

Understand fruit trees: an orchard manual that enriches grower knowledge

Unfortunately the answers to many questions about why and how fruit trees grow and produce fruit are found in scientific journals. These are not written for orchardists.

Grower magazines, seminars, conferences and field days are supposed to translate much of the results from the scientific work.

Extension officers, representatives of chemical companies and consultants all play their parts in bridging the gulf between the researcher and the ultimate user, you, the fruit grower. But are we doing this well enough?

Fundamentals needed for progress

Producing fruit successfully in today's competitive world–market, requires that you constantly aim to maximise crop value by optimising yield, maximising fruit quality, and improving production efficiency.

To achieve these goals you must integrate new production technologies with your fundamental knowledge of tree performance.

Fundamental knowledge of tree performance often means going back to the basics of how fruit trees grow and produce fruit.

Grower understanding is key

It takes an entire chain of events to grow the fruit and then guide it from the tree to the packing house and the supermarket shelf. But it all begins with the fruit grower.

> *Understand Fruit Trees* links sunlight, root growth, soil and water so you can see the big picture. This will equip you with enough basic knowledge to make sound decisions.

You must make the early decisions on how you plan to obtain the best yields of the highest quality fruit, while keeping cost of production to a minimum.

The pressure for tomorrow is to be more productive than today. To survive in the 21st century, fruit growers must produce more and better fruit, for less.

'Knowledge' needed to maximise productivity

We are at a time when all aspects of fruit production have become management and information intensive. You have to have the knowledge about fruit production—and know how to use it.

Knowledge is fundamental for problem solving and maximizing resources in the orchard.

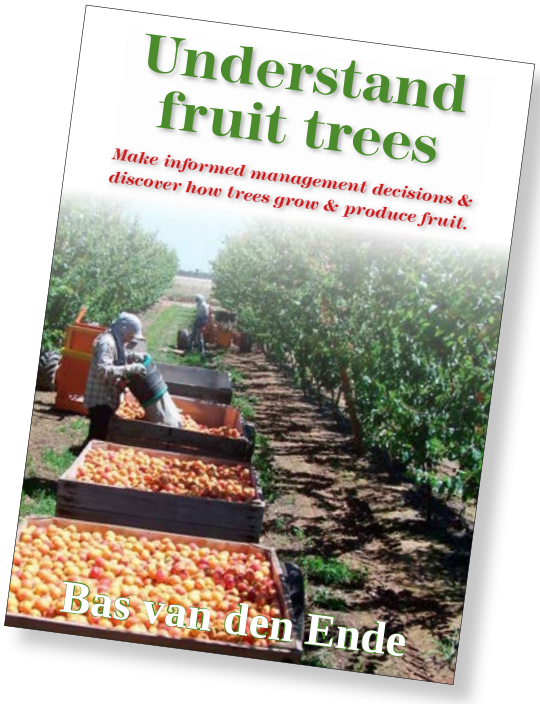
Manual aims to enrich grower knowledge

Our latest orchard manual, *Understand Fruit Trees* is written to enrich your knowledge—it provides the basic information needed to help you manage cultural practices in a timely manner, and to make more informed decisions.

It is an adjunct to the other orchard manuals written by the same author.

Understand Fruit Trees links sunlight, root growth, soil and water so you can see the big picture. This will equip you with enough basic knowledge to make sound decisions.

For more information or to buy this manual, visit treefruit.com.au or orchardmanuals.com.au



***Understand Fruit Trees* is written by Bas van den Ende.**

Bas's involvement and interest in the fruit industry spans 60 years, during which he has written or co-authored more than 300 scientific papers, Agnotes, chapters in horticultural books, articles in national and international horticultural journals and magazines, and orchard manuals.

Products & Services

Orchard Manuals

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