Growing for Your Market

Maximising Orchard Performance Next Year and Beyond

This year’s crop is well on the way through harvest with early and mid season varieties largely off the tree and into storage. Later varieties such as Fuji, Pink Lady™, Granny Smith and Sundowner are still to be picked in most districts.

It is now time to turn our attention to planning and setting up the orchard for the future. One of the keys to growing your market is continuity of supply and if you are successfully growing the market, expanding production to keep pace with the growth of the market is essential.

The post harvest period is a critical time on the orchard for setting up next year’s crop, as well as preparing for longer term developments necessary to maintain the orchard business as a viable sustainable enterprise.

Appraise Orchard Performance

A good starting point for the future is to appraise this season’s performance. For many pome fruit producing districts the 2010/11 season has been very different to recent years due to the high rainfall over the growing season and the affects this will have had on tree and crop behaviour.

Growing season effects are likely to have been:

- Excessive tree vigour
- Elevated wet weather disease incidence
- Soil drainage problems
- Vigorous weed growth
- Soil nutrient depletion

A proactive approach to these issues now will benefit next year’s orchard performance.

Excessive Tree Vigour

It will have been a great year to get new plantings established, but mature cropping blocks can make excessive shoot growth when there is plenty of soil moisture around to the detriment of fruit quality and future crops.

Mature cropping trees only need to have annual shoot extension growth of 20 to 30cm. Strong growth, in excess of around 50cm annual extension growth, particularly if there are large numbers of these vigorous annual shoots, makes it very difficult to manage the fruiting canopy in regard to maintaining adequate light in the fruit bearing zones, which need at least 50% of ambient light to produce quality fruit.

Experience we have had with high tree vigour is that the effects often carry over into the following growing season, due to the development of a larger root system which in turn drives vigour the following season. The library section on the Future Orchards 2012 website has several items on vigour management. One worth looking up, “Vigour Management” by John Wilton and Ross Wilson in September 2009.
In mature fruiting trees, excess vigour is often associated with particular branches that have become unbalanced due to having been shortened back. This destroys their vegetative cropping balance so they burst into growth rather than fruit. Our observations and study of branch behaviour, both here and in South America suggest that once branch diameter measured 5 to 10cm out from the trunk or main branch exceeds 3cm per metre of branch length the branch is becoming excessively vigorous and needs to be completely removed.

With early and mid season fruiting varieties, taking out these excessively strong branches immediately after harvest helps to reduce tree vigour and opens up better light penetration into the weaker more fruitful branches that remain, to improve their bud quality for next season.

**Elevated Wet Weather Disease Incidence**

Wet growing seasons present a challenge when it comes to scab (venturia spp) control. Even though there may not have been much noticeable scab infection in the fruit, this does not necessarily mean the orchard does not have high potential disease carry over.

Many of our modern kick back fungicides do not completely kill the leaf infection, they just suppress its ability to produce spores, then later, either post harvest if conditions are conducive to infection, or over winter these lesions become active again to produce ascospores and start next year’s infection.

Leaf fall urea sprays at 5kg/100l to hasten leaf decay are good insurance. Incidentally urea at this concentration also has a direct effect on the ability of the fungus to sporulate.

Phytophthora root rots are the other wet weather disease likely to cause problems, following a wet growing season. Vulnerable rootstocks particularly MM106, which is widely planted in Australia are very susceptible to infection. More tolerant rootstocks, even M26 and M9 can succumb to the disease if conditions for it are very favourable. While MM106 usually dies in one season, more tolerant rootstocks often take several years to die.

Post harvest sprays of Phosphorous acid are good insurance against Phytophthora root rots. Provided the root rot is caught in its early stages of development, there is a good chance of a successful cure with Phosphorous acid sprays.
Soil Drainage

With the exception of pears, fruit trees do not like their roots being waterlogged. A wet growing season will show up any drainage problems, so check out the orchard carefully for signs of poor drainage. Post harvest is the best time to do drainage work.

![Figure 2: Soil water logging in the spring killed these trees.](image)

Where impervious pans exist in the soil profile, deep ripping when the soil is at its driest gives a better result than at other times due to the soil shattering more readily when dry.

A word of caution however, sometimes the soil pan is holding the water table down and in these situations deep ripping may make the situation worse, unless the poor drainage problem beneath the pan has been addressed.

Vigorous Weed Growth

Where weed growth has become a problem, application of herbicides post harvest may be beneficial, particularly where difficult to control weed species are becoming established.

Soil Nutrients

Wet growing seasons, particularly in orchards planted on relatively free draining soils, usually lead to lower nutrient availability due to leaching of soluble nutrients such as nitrates.

Where there has been strong vegetative growth nutrient dilution occurs, so tissue nutrient levels can be lower than in a normal growing season. There is good data, particularly for nitrogen, to show that buds with high nutrient reserves are more likely to set fruit than deficient buds.

Where crops were heavier than normal pre-leaf fall foliar nutrient sprays to build up bud reserves will help set next season’s crop.
Modest soil nutrient application prior to dormancy setting in is also advisable. The Future Orchards 2010 website has an excellent paper, “Orchard Nutrition, June 2009” by Kevin Manning, that discusses orchard nutrition.

**New Plantings**

Ongoing orchard businesses need to have a good long term orchard renewal programme together with a strategic plan of when re-development will be done.

Trees need to be ordered several years in advance to insure that high quality planting materiel is available when it is required. Producing a new tree from scratch takes about 2-3 years.

In the spring of Year 1, the rootstock cutting is established, budded to the chosen variety the following autumn, grown on in the nursery in the following year and is ready to be transplanted into the new orchard block sometime during the second winter.

New pipfruit trees tend to perform much better on land which has been in crops other then pipfruit, or land which has been out of pipfruit for a few years. This is due to specific replant diseases (SRD) which built up while the land was in the previous pipfruit orchard.

Finding new land to plant is not an option for most pipfruit growers so it is necessary to replant their old orchard land. With thorough preparation it is possible to successfully establish new pipfruit orchards on replant sites.
Preparation needs to begin as soon as the crop is off the existing orchard, by pulling the trees. If the trees are pulled well before leaf fall transpiration from their attached leaves dries out the wood, enabling a cleaner burn later on.

The site then needs to be cultivated and raked with a tyned cultivator to drag up as many of the old roots as possible, so these can be removed.

Ideally, a minimum 12 month fallow between pulling out the old orchard and planting the new orchard is desirable, but not always possible.

Established infrastructure such as irrigation or hail net structures often impose limitations on orchard design in regard to between row spacings for new plantings and if accommodated can lock the new planting into an obsolete orchard design. Careful analysis of the pros and cons of removing this infrastructure needs to be carried out to establish whether or not it is best to retain the established infrastructure and its limitations for the new planting.

The Future Orchards 2012 website has a number of very good papers describing intensive orchard systems.

**SRD**

Specific replant diseases which occur when apples follow apples, or pears follow pears on the same ground have a major impact on new orchard performance.

Dr Gordon Brown in a study of ten sites planted in apples in Tasmania found an average reduction of 58.5% in tree growth due to SARD with a range from 30 to 73%. In another study, cumulative yield over the first seven years from planting ranged from just over 210 tonne/ha for the untreated to almost 310 tonne/ha in the best fumigation treatment. Details of this work can be found in “Soil Treatments against Replant Pests and Diseases” by Dr Gordon Brown posted on the Future Orchards 2012 website in 2008.

Soil fumigation treatments are best carried out in the post-harvest period, once soil moisture is satisfactory, while soil temperatures remain satisfactory for good fumigant action.