

## Focus Orchard Update No. 4: reviewing successes and failures

By Ross Wilson, AgFirst

We're now into our second year working with the Future Orchards® panel of Focus Orchardists and things are really starting to happen. Some great results have come out of the trials, block monitoring and the close interaction between the grower, local Front Line Advisor (FLA) and the respective AgFirst consultant.

Over the past 18 months we have endeavoured to keep the wider industry aware of all the initiatives for the betterment of the entire industry. These articles are just one component of the entire technology transfer program, but an important one as they are able to be read by all stakeholders at their leisure.

In this article I'll share a cross section of the successes and some failures across Australia in the program.

### Business Planning

Business Planning was introduced by Future Orchards during the June 2012 orchard walks. We have practiced what we preached and undertaken a Business Planning session with all 16 Focus Orchards in winter 2012 and updated them again during winter 2013. Each session took approximately three to four hours. It was then the role of AgFirst to compile the plan into an easily read document. One of the real successes amongst the growers that I work with has been the growing recognition of how valuable a documented plan is – particularly when all stakeholders involved in the business are involved.

In the good old days of fruit growing the businesses were often quite small and run by either husband and wife, or father and son. These small businesses often didn't need to document the plan as the plan was communicated verbally very well across that small management team. However, the modern fruit business is often a much more complex business with many more stakeholders involved in its operation and ultimate success. Getting all stakeholders around the same table for three to four hours – I believe – is the best time you will spend in a year. In winter 2012 we often had only one stakeholder at the table which meant the other players did not feel real ownership of the plan. In winter 2013 in many cases all stakeholders were present and the plan is now a mutually agreed pathway forward. Everyone knows where the business is heading and the objectives set and agreed to make it happen. Motivation levels climb a couple of notches and in most cases the business moves forward in a positive direction – a very satisfying progression.

For all other growers wanting to carry out their own business plan, there are numerous resources on the Future Orchards website in the library section.

### Irrigation Best Practice

Irrigation Best Practice is a huge topic in Australia and one that we need to get right. Water is generally in short supply and is therefore a limited resource. Tree performance can be significantly impaired if trees are either overwatered or underwatered. Trials run on the West Australian Focus Orchards and fruit size monitoring on some Victorian orchards demonstrated that there is still much that can be done for us all, to better maximise irrigation knowledge and effectiveness. It is our impression that soil moisture monitoring is relatively advanced, but knowledge of water budgeting techniques to back up the soil monitoring are poorly understood. Commonly the soil moisture monitoring tools are only monitoring a very small portion of the orchard floor and – while valuable – need a water budget working in tandem as a cross check.

Last year we calculated that the Three Bridges Focus Orchard applied 1.7 megalitres per hectare (ML/ha) of irrigation water to their Gala over the season – whereas the water budget indicated the trees would have been optimised at 2.2 ML/ha. A West Australian trial comparing two grower irrigation regimes

demonstrated that the difference in application from one grower to another on trees of similar canopy size was 0.9 to 6.0 ML/ha – a massive difference in understanding of what is required. To help growers better understand good water management we invited Dr Ian Goodwin from the Department of Environment and Primary Industries (DEPI) Victoria to address the Southern Loop growers in November 2013. By the time this article has been published many of you will have heard Ian's presentation. For those that missed it, please take a moment to jump onto the Future Orchards website library and not only download Ian's notes but also the many other irrigation resources that have been built up over the project duration. You will find them in the archive library under 'Water and Nutrition'. We are confident that increased knowledge in this field will go a long way towards improving your orchard results.

### Raising the Bar

One of the most satisfying accomplishments Australian focus growers have made over recent years is the demonstration that – with the right inputs – world's best practice can be achieved in Australian microclimates. Australia's unique microclimates have high sunshine hours, high summer temperatures and often inadequate water – not to mention destructive native pests. These all add up to make Australia a very challenging environment to achieve high class 1 productivity. Even with these limitations many of the Focus Orchards have lifted their productivity to a point where they are now averaging 50 to 60 tonnes per hectare (ha) gross yield across their entire business. One business we work closely with has averaged 77 tonnes per ha (this includes young plantings) – that is truly world class.



Figure 1 Paul James amongst Oakleigh Rosy Glow Blk 17: 94 t/ha 2013 and targeting 100 t /ha in 2014.

Our observations on how this has been achieved can be summarised as follows:

- Realisation that world class yield is indeed possible in Australia
- Calm, good-sized canopies capable of intercepting good light levels
- Climate modification and pest minimisation which usually involves net
- Increased inputs to match the increased crop needs (water, nutrition etc)
- Attention to detail and things being done on time

While it seems easy to list the five bullet points, the skill required and the execution is where it really happens. A key goal of Future Orchards is to lift the Class 1 productivity of Australian orchards. It is great to see individual businesses achieve that goal and also satisfying to watch the average productivity of each variety improve through the monitoring on OrchardNet®.

In Figure 2 we show how the average productivity has moved for the variety Pink Lady™ across all blocks that are within the OrchardNet database.

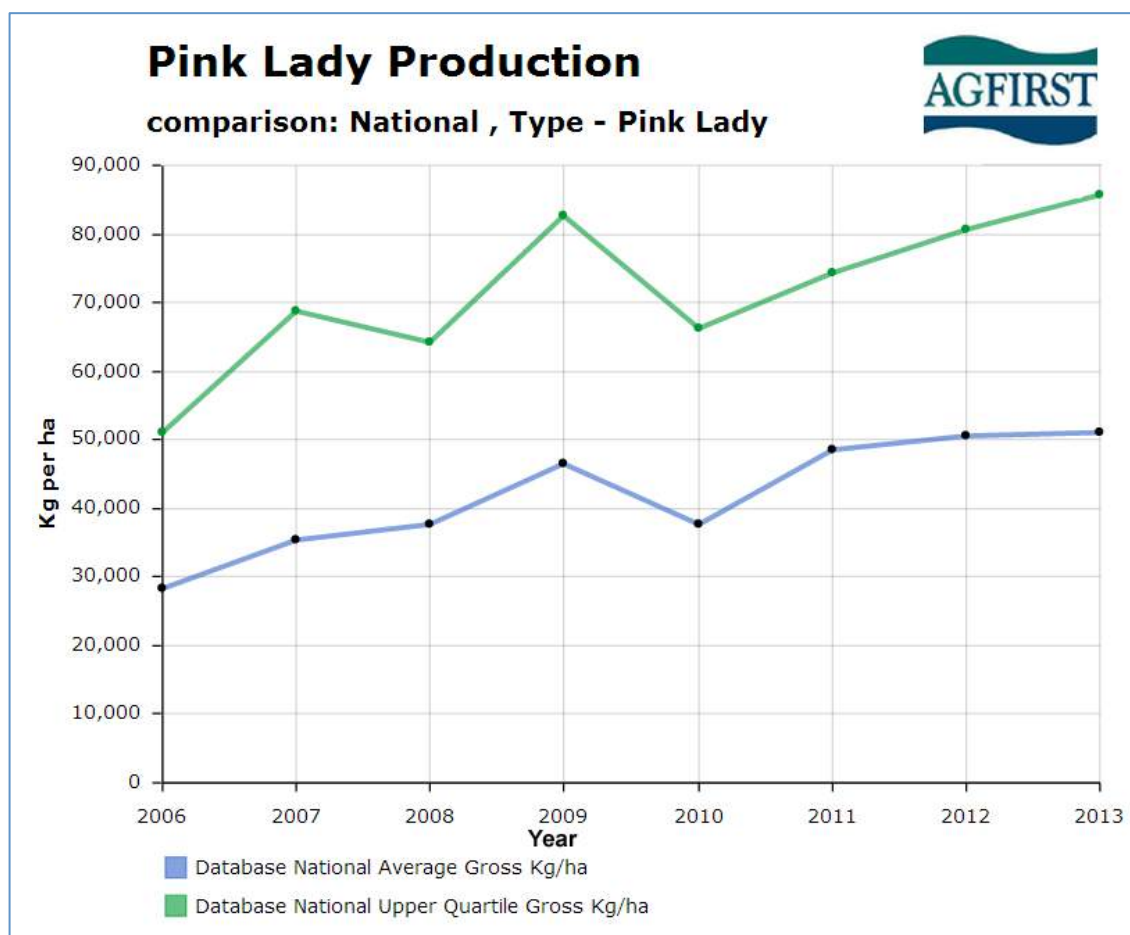


Figure 2: OrchardNet Pink Lady gross production 2006-2013.

### Biennial Bearing

This is not a problem unique to Australia, however, Australia suffers the disorder more violently – probably due to the hot summer temperatures leading to tree shutdown and lower carbohydrate supply to developing fruit buds. Many focus growers have really struggled to produce consistent crops of biennial varieties such as Fuji, Braeburn, Red Delicious and even Granny Smith. Several Focus Orchards around the country have either laid down block trials or at least endeavoured to introduce best practice in an effort to rectify the problem.

Rob Green with the help of local FLA Paul James ran a trial in the Adelaide Hills looking at the impact of root pruning and Summer Naphthaleneacetic acid (NAA). Both treatments worked extremely well in Rob's situation to the point where the treated block of Fuji backed up a 50 tonne per ha crop with a 53 tonne per ha crop. The untreated block dropped from 50 tonne per ha down to 36 tonne per ha. We calculate the improvement was worth an additional \$16,000 per ha profit.



The keys to solving the biennial bearing problem are:

- Climate management, particularly frost damage
- Good cross pollination
- Calm canopy with bud to fruit ratios over 2.0
- Great chemical thinning using Ethrel and Benzyladenine (BA) as core products (Figure 3)
- Early hand thinning to reduce the impact of current season's crop on next year's fruit buds
- Setting sustainable fruit numbers per tree
- Use of strategic growth regulators, cincturing, root pruning, etc, help break a biennial pattern

We think biennial bearing is so important that AgFirst have recently prepared notes and a presentation on the subject which was given during the recent November 2013 orchard walks. If you missed it and all the valuable horticultural techniques involved to even out a biennial crop jump onto the library and seek out the relevant papers and presentations. The presentation given by Professor Steve McCartney March 2012 is also a very worthwhile read.



Figure 3 Great chemical thinning result with spurs back to 1s and 2s and the middle spur thinned completely.

### Monitoring Fruit Growth Rates

You will be aware that Future Orchards have promoted the technique of monitoring fruit growth rates throughout the season. OrchardNet has a fruit growth monitoring tool that enables any grower who is interested to carry the monitoring out themselves. I'm not sure if it is a direct relationship but my observation is that very successful growers monitor fruit size and growth rates quite extensively. They watch for dips in growth rate as that tells them that something is not right. They then try and ascertain the problem and rectify it. It could be water, nutrition, disease or – more often than not – over cropping.

I was at a seminar recently and listened to one of the world’s leading pomefruit scientists, Professor Luca Grappidelli from the Bologna University in Italy. The Professor was so impressed with what monitoring fruit growth could do – he wanted to be quoted: “Fruit growth is the best parameter to measure as it can give us a summary of fruit conditions – if growth is satisfactory , we can assume that our management is OK.”

Entering your data into OrchardNet not only allows you to monitor your own growth rate, it also allows you to benchmark your growth rate with blocks of the same variety in your own region and nationally. We want to encourage as many growers as possible to use the service as it can not only provide a great degree of crop information it also doesn't cost anything as it is part of the Future Orchards program.

Again, to learn how to become involved, jump onto the website. There is a multitude of resources to help you get started – including two videos showing in-field monitoring and how to enter the data onto OrchardNet. If you’re new to OrchardNet contact your local Front Line Advisor and they'll help you set up the blocks you want to monitor.

The graph below is of the fruit growth rate of one of Three Bridges Gala blocks in 2013 compared to the Australian Gala average. You will note a significant drop off in growth around 70 days after full bloom (DAFB) and then fruit growth rate really dropped consistently from 100 DAFB. We think the latter growth rate was irrigation related.

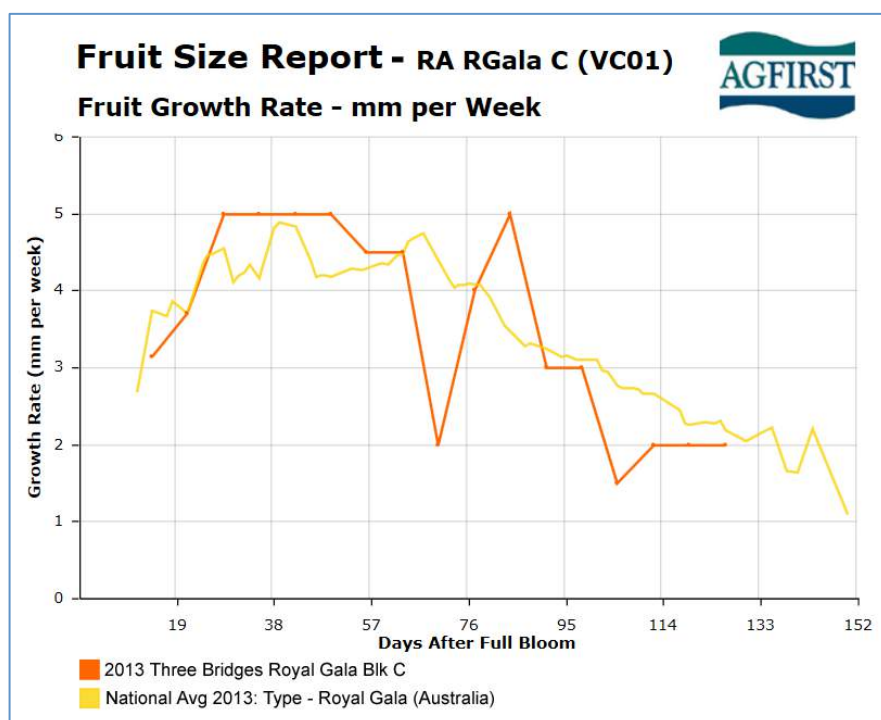


Figure 4: Three Bridges Gala block C 2013 Growth Rate