Future Orchards Article for the Australian Fruitgrower
May 2013

Focus Orchard: Update No 3

By Ross Wilson

As we write this article, the harvest is in full swing. The big variety in Australia, Pink Lady, has commenced, but there are also many other varieties on the go such as Fuji, Granny Smith, Kanzi and Jazz, just to name a few.

As with all fruitgrowing seasons, the 2012/13 season has had its fair share of challenges. This year the Future Orchards team has been working closely alongside the 16 Focus Orchards around the country. By doing this it has enabled us to get a much better handle on the regionally specific issues that are occurring. This article is a chance for us to update you on some of the issues that have arisen as the season has unfolded.

Battunga Orchard, managed by Mark Trzaskoma (Fig 1), in Southern Victoria has had some real successes this year. Some of the significant inputs that the Future Orchards team has worked on have included:

Figure 1: Mark Trzaskoma of Battunga Orchard

Chemical Thinning Strategy on Gala

The Gala crops at Battunga historically had been cropping at an Australian average level, with the Buckeye Gala in 2012 achieving about 36 tonnes/ha across all blocks. Mark had one objective to improve his Gala yields and was looking for ways to make reasonably substantial improvements over a period of time.

There was a belief that the standard chemical thinning programme, which basically relied on multiple Carbaryl mix applications post-bloom, was not capturing the best crop potential as the thinning was occurring far too late to grow big crops of large fruit. Not only were the multiple Carbaryls impacting on the crop outcome, they were also having a negative effect on the biological population of *Aphelinus mali*, which was resulting in high levels of Woolly Apple Aphid and substantial bud damage.

To overcome this limitation, Mark decided to use a much more aggressive bloom thinning programme, which included Ethrel and ANA and combinations of these two chemicals. The aim was to get the crop load down much earlier in the season than had been achieved before with post-bloom thinners. Overall, this strategy has been extremely successful, with the Gala yields being up in 2013. In the case of Buckeye, from 36 tonnes per ha to 45 tonnes per ha on average (see Fig 2). Not only were the yields up, but the fruit size was also very acceptable at about a 165 gram average and the Class 1 recoveries are expected to be over 90%. The levels of Woolly Apple Aphid in the tree are significantly reduced, and the bud strength looks good going into the 2013/14 season. Overall, Mark is very happy with this new strategy and will be looking to make it part of his ongoing programme in the future.

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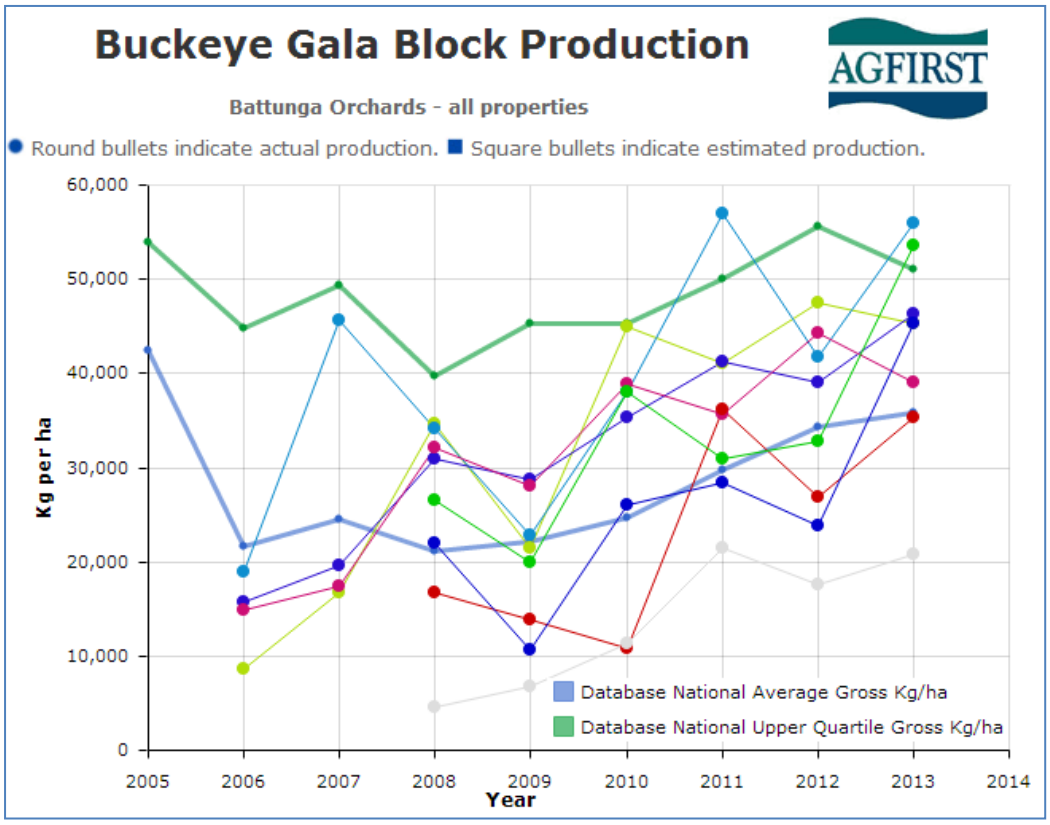

Figure 2 Battunga Buckeye Gross Production

Multiple picking versus strip picking

One of the consistent pieces of feedback that AgFirst encounter in our travels around Australia is the real reluctance to do multiple picks on coloured varieties. It is often described as a failure if this needs to happen. This is completely foreign to our experience where multiple picks are absolutely essential to ensure that the crop is maximized from the grower's perspective in terms of size, colour and maturity, but also, and just as importantly, a much more consistent product is delivered to the consumer.

Battunga Orchards have planted high coloured Gala sports, Buckeye and Brookfield, and these varieties typically are more able to be picked in fewer picks, however, the 2013 harvest season experienced very warm day-time temperatures and fruit colour development was poor. Repeated hot daytime temperatures in excess of 30°C and warm night time temperatures made colour development poor.

Mark and his team discussed the benefits of selective picking and went into the 2013 harvest much more accepting of the benefits of a multiple pick strategy. Interestingly, most Gala blocks, although they were of the high-coloured sports, were actually picked four times.

Mark reports that the evenness of the line in the bin was excellent, with the marketers very confident that they can achieve much better outcomes for the product than if it had been picked in fewer picks.

The multiple pick strategy has given the marketer a better product, the consumer a better product, and no doubt has contributed substantially to the increases in class 1 yield that Mark has been able to achieve off each block of trees.

Canopy Development

A major limiting factor that is encountered by most orchardists is the inability to establish a new canopy quickly. We all know that to achieve good crop loads we need a canopy that can intercept 65-70% of direct light to sustainably produce good class 1 crop loads. Clearly the sooner we can get our canopies to this point the better.

In the case of Battunga, Mark has a Brookfield block planted in 2006 which, due to poor canopy development early on, has only been cropping at about 15 tonne/ha. The decision was made that in 2013 something drastic needed to happen to break out of this poor performing habit. The crop load would be sacrificed and the main focus of the block this year would be to increase the size of the canopy. A multi-pronged approach was implemented, including a hard prune, light crop load, good fertilizer and water applications.

In addition to this overall strategy for the block, Virginie Gregory from Fruit Growers Victoria, the frontline advisor at Battunga has set down an applied trial looking at cropload, fertilizer, and GA3 treatments with the aim to increase leader development.

Although the results are still provisional (Fig 3), it would appear the lighter crop loads and the high fertilizer regimes are the treatments that have both induced greater leader extension. It is difficult to explain why the GA3 hasn't given an extra boost, and will be looking for Virginie to delve into the data to see if she can explain the results at the upcoming June fieldwalks.

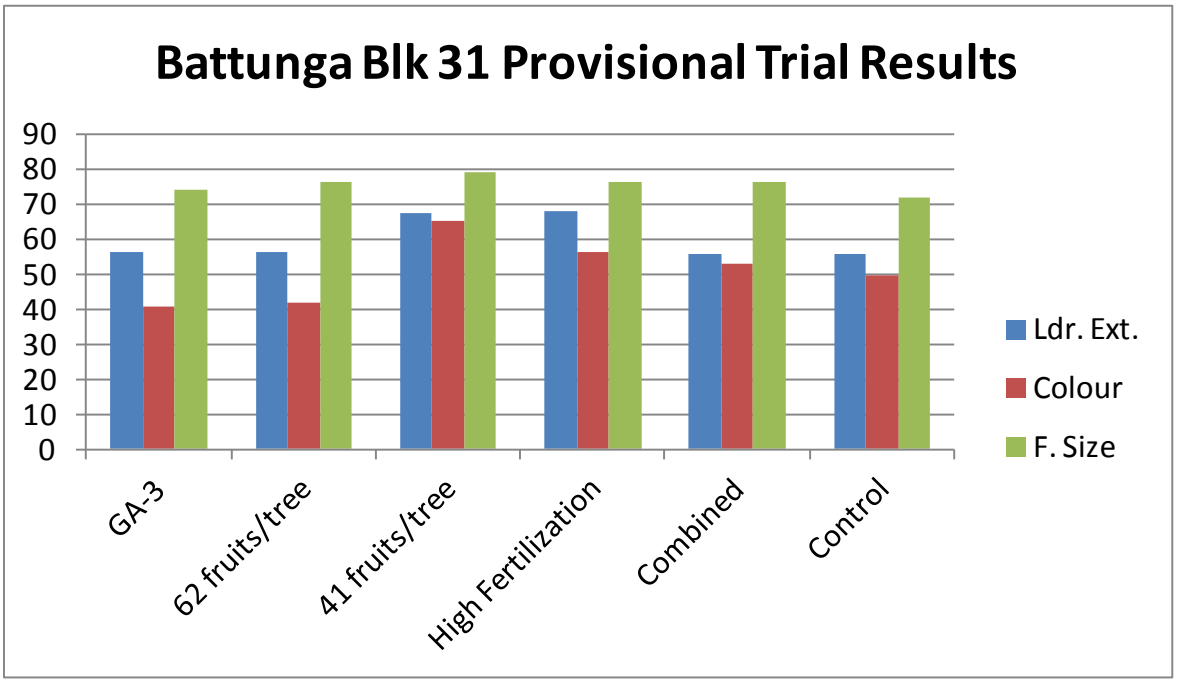

Figure 3 Block 31 Provisional Trial Results

There are several applied trails occurring around the country all aiming to come up with ways of improving canopy development. The trial at Sanders property at Three Bridges is comparing 2 soil sterilants (Basamid and Chloropicrin) and various root promotant products on a new planting of Rosy Glow. As at 26th March 2013 the stand out treatment was the Choropicrin plus Radifarm™ plus Plantmate™. While the poorest treatment only had 15cm of growth, the best treatment had 40cm of

growth and Virginie reports that the growing tips were still active. It will be interesting to see the final result.

Peter Sanders is still disappointed in even the top performing treatment but places much of that due to the late November planting date.

A standout new planting in NZ (Fig 4) has been viewed by a number of visiting Australian growers. This block will achieve over 1.0m leader extension in the first years of planting. This outstanding achievement shows what can be done when the very best horticultural practices all come together and it's something we all should be aiming to replicate.

Figure 4: Waima Fruit Co Ltd, Hawke's Bay, NZ - first year on replant land.

Post-harvest tree management

One of the interesting outcomes that occurred on the Sanders property this spring was the poor fruit fall bud break on a few of their Gala and Pink Lady blocks. When we investigated why this had occurred, the most obvious reasons were a combination of heavy crop loads the year before, and a lack of good leaf condition going into the autumn. Peter Sanders made the connection that many of the poor flowering blocks in the spring of 2012 were the ones that had bad mite damage and poor leaf condition in the autumn of 2012.

As we are aware, the potential of next year's crop is largely dependent on the reserves that are laid down in the buds and wood in the previous season. When the reserves are poor, bud strength is poor, fruitful

buds numbers low, and what flower buds are there, can be very small and prone to poor set and poor fruit size.

Coming into this autumn, we have recommended to all our focus orchards to pay particular attention to tree health post-harvest. Tree health post-harvest can be negatively influenced by pest or disease outbreaks, dry conditions, and poor nutrition. Some growth regulator treatments also can have an impact, eg, a heavy root prune or a heavy cincture can result in premature leaf defoliation.

Most focus orchards have taken leaf tests to identify and correct any nutritional deficiencies immediately post-harvest. Some are spraying mites post-harvest to retain leaves as long as possible. Where dam water reserves allow, trees are given sufficient irrigation water to keep them ticking over.

The important message here is to not breathe a sigh of relief as soon as the last apple is picked and forget about that block until winter. Keep in mind that the tree functions between harvest and leaf fall have a significant influence on next year's crop and try to maximise the reserves that the tree is laying down.

Irrigation

Irrigation water and supplying enough to maximize the crop is always a huge issue in Australian growing conditions. One of our Focus Orchards who was monitoring fruit size regularly was disappointed with the growth rates on Gala fruit from mid-January through to harvest. The fruit target outcome was 160 g average, whereas the actual outcome was closer to 145 g average.

Irrigation had been monitored using the gopher soil moisture monitoring device. The irrigation was a drip system and the gopher was measuring the soil moisture in the tree row immediately under the drip system. Although soil moisture devices such as this have a very important role to play, it is often very difficult to get a soil moisture monitoring device to tell you the whole story, particularly on drip systems that are only irrigating a very small portion of the soil.

We always advocate that alongside your soil moisture monitoring device you should be running a simple water budget. A simple water budget records the evapotranspiration and rainfall and then uses a crop factor (crop coefficient) to determine what irrigation inputs are necessary. The ET and rainfall values are easily accessed for most growing regions on the BOM website.

There have been many publications that have come out of Australian research on irrigation use by apple trees. One of those documents is stored within the Focus Orchard library, called "Guidelines to Irrigation Management for Apple and Pear".

When we did a simple water budget, it was obvious that the irrigation regime was only applying 36% of total ET. Publications based on research have indicated that the average crop factor for apples is around 70 % of ET although this can vary by property depending on subterranean water availability. Quite clearly at only 36%, the irrigation regime and water storage capacity were unable to meet the full requirement to maximize the crop, and may be a significant reason why the fruit size came in well under target.

Use of OrchardNet

The various Focus Orchards around the country have taken on OrchardNet within their business to varying degrees.

Some of the businesses have really harnessed its power and good examples of its use include:

- Fruit size monitoring of most blocks on the orchard.
- Entering crop details as they come to hand to measure progress against the plan and also to set targets for future years.
- Good recording of full bloom and harvest dates, which give a good guideline for future years on likely harvest dates and chemical final spray dates and withholding periods.
- The ability to track yield against budget and update the financial performance of each block of trees.
- The ability to benchmark your performance against all other blocks in the database

Orchardnet use is open to all Australian fruitgrowers, don't hesitate to contact your Front Line Advisor for assistance.

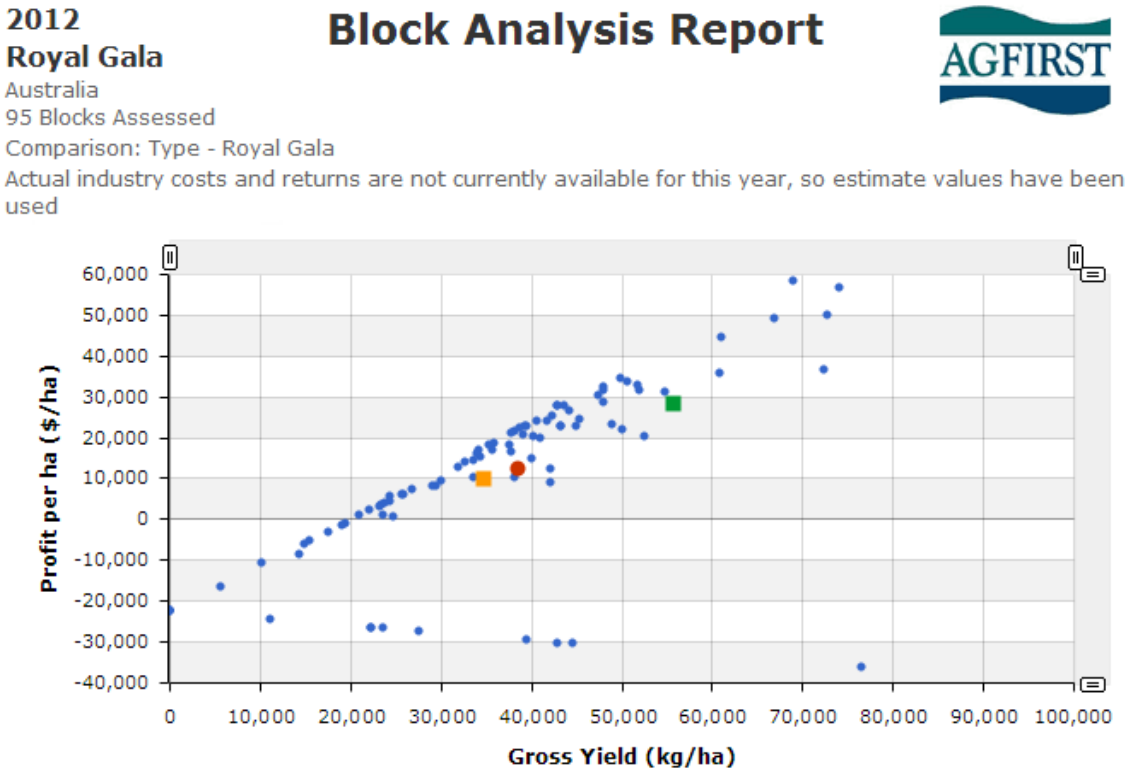

Figure 5: OrchardNet's block analysis shows the grower's own performance (red) against other individual blocks, the average performance (orange), and the average of the upper quartile (green). The analysis uses industry average costs and returns, to give an "apples to apples" comparison of how well the crop is grown, excluding the influence of marketing decisions, etc.