

## Future Orchards 2012- Orchard Walk 4 Batlow

This walk was held at the orchards of the Batlow Fruit Co-operative Limited on Batlow Road.

Facilitator: Julie Dart

Ag First Consultant: Ross Wilson

Local Speaker: Ron Gordon

The day started with a series of presentations by Ross Wilson from AgFirst NZ, followed by an orchard tour led by local consultant Ron Gordon.

### Ross Wilson's presentations:

#### Maturity and harvest. What's the goal?

Commonly used maturity indices

<b>Cripp's Pink</b> SPI 1-3 Brix greater than 12.5 Pressure greater than 8kg	<b>Fuji</b> SPI 3-5 Brix greater than 12.5
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Different regions have realised that maturity indices can be different. For example in NZ where the focus is on foreground colour, Cripp's pink is harvested in Hawke's Bay at SPI 2, but in Nelson the ideal is SPI 1. In Batlow we use the SmartFresh™ harvest maturity indices for long term storage.

In Australia and NZ we use a 6 point Starch Pattern Index (SPI) scale, but in Europe they use a 10 point scale for greater accuracy in pinpointing harvest maturity,

(RG) *Does using Smart Fresh require a change in target for SPI?*

(Ross) *No, you still need to pick according to the target SPI, pressure and sugars for long term storage.*

#### Colour as a driver for decisions:

Colour shouldn't be the sole criteria used to judge maturity. Growers have been guilty of waiting for colour in Cripp's Pink, only for the fruit to be past ideal maturity at harvest. (This is a major contributing factor in Cripp's Pink Internal Browning disorder and deterioration of eating quality).

However, there are plenty of tools that can be used to make colour match up with internal maturity. Some of these are:

- Plant high colour strains
- Pruning and training
- Vigour control
- Crop load management
- Summer pruning
- Retain (can strip colour a bit, but if you can use it to shift harvest into a cooler time of year it can help enhance pink/red colour development)
- Use reflective ground covers eg: Extenday™ (can make a large difference if put out in the orchard 3-4 weeks before harvest, provided that the temperatures are suitable for colouring.)
- Leaf plucking?

For Cripp's Pink to achieve optimum colour, the tree needs to capture 50% of direct light throughout the entire canopy.

#### Keys to Quality for Cripp's Pink

- Know where maturity is up to
- Multiple colour picks (may need to be 4-5 days apart). Two picks is the optimum in Batlow.
- Be aware of areas of different maturity in the tree and in the block
- Harvest quickly (aim to be finished within 10 days in Batlow). Maximum 14-18 days in NZ, with 3-4 picks.
- Be careful of bruising

- Maximise the storage potential- Pick it right, store it right
- Choose a storage and marketing regime that suits the fruit

(RG) In Batlow CP flowers first low in the tree. This fruit also then matures first, but is slow to colour. We need to pick by maturity rather than on colour for best eating quality. The second pick usually comes soon after. In this district we really need to be using tools such as Extenday™ to colour up the fruit low in the tree to match fruit maturity.

## Presentation 2:

From previous talks, we have discussed the need for rapid yield accumulation in young plantings to make money.

Ross then showed a graph of some of the Tree Row Volumes for Australian monitoring blocks in the project. The overall trend shows that on average Australian orchards are taking up to sixteen years to grow a canopy volume of 11,000m<sup>3</sup>.

Under Australian conditions, we need to intercept 60% of light to get good quality yields.

To achieve target growth and yields, a new planting needs to develop a canopy row volume of 10,000m<sup>3</sup> by year five! (*Looks like we have some learning to do!*)

### Young tree growth:

- Autumn, look at what the trees have done for the season
- Soil preparation can have a big influence on how trees grow (Ross showed photo's comparing two lots of trees on the one block. The better trees have had much better soil preparation, and are doing a lot better than the other trees which came from the same batch and were planted at the same time.)
- It is possible to monitor tree growth to make sure they continue moving (use tape markers to track growth fortnightly on about 10 trees in the block).

It costs around \$60,000 per hectare to plant a new high density orchard.

Cumulative Yield Targets:

Year after planting	Yield accumulation target (T/Ha)
2 <sup>nd</sup>	10
3 <sup>rd</sup>	33
4 <sup>th</sup>	45
5 <sup>th</sup>	60

If these yield targets are reached, this is equate to a 40% return on investment. If the rate of yield accumulation slows down then this really impacts on profitability, driving it down to 10% or even less. So it's important to keep the yields increasing quickly.

Keys to success are:

- 1) get good nursery trees
- 2) fill the canopy space quickly

Eg: NZ orchard. 2<sup>nd</sup> leaf Jazz achieved a 36T/Ha yield- It is possible.

In Italy, a 3<sup>rd</sup> leaf Golden Delicious block 60T/ha.  
Also a 90T crop (NZ 5<sup>th</sup> leaf)

(DA) *On the 90T crop, what was the size like?*  
(Ross) *It was good.*

Each region really needs to work out what the optimum yield targets are for variety and region. In South Australia they think that 35T/ha is their optimum, but is it? Is 90T/ha is reasonable in NZ if everything is done right?

(JO) It depends on the density, I think 50-60T/ha would be our optimum on the new systems.

(Ross) Maybe in a district where you are focussed on eating quality, the target should be a bit lower than for other areas? Is this reasonable?

(RG) Yes

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### Presentation 3

Ross then talked about the web site and the Future Orchards 2012 database with all the tree data. There's over 100 blocks in the project and some really good information is being collected.

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### ORCHARD WALK – Led by Ron Gordon from Batlow Fruit Co-operative

#### Monitor Block: a Young Cripp's Pink (Rosy Glow™) and Sundowner™ block on M26.

This block was planted at 3.5m x 1m. It was planted in November 2006 using cold- stored rod trees.



- The site is on replant ground.
- When the pre-plant soil tests were done, there was no Phosphorus at all! The pH was good because the previous owner routinely used spent cool-store lime on the blocks
- High aluminium levels (and low pH) can be a problem in the Batlow area. Both these issues need to be addressed prior to planting.
- Trees were planted in November 2006 out of the cool store (trees have been in the ground for about 5

months.

- Water was the main limiting factor this season which has impacted on the young tree growth. Most of the trees are around 1.5m tall.
- Trees haven't grown much but have really started to feather up, they arrived as rods.
- Weed competition has really taken off in the last month when it finally started to rain.
- They have tried clothes pegs on the branches to flatten the angles.
- Next year they plan to really force the growth (providing we get normal winter rainfall to fill the dams). Will fertigate fortnightly with Cal Nitrate
- Ron would have preferred the trees on M9, but maybe this would have been too dwarfing for the Sundowners on replant ground

(RW) In my experience M9 seems to do much better on replant ground than M26

(RG) Here M26 is also more susceptible to drought stress. Ottawa 3 is worse than both M9 and M26 for drought stress

(Ross) M9 is much better than M26 for replant sites in NZ

(RG) Getting back to the block... We don't want to have any permanent branches in this block, only light wood. We hope to have the hail net up soon (with the trellis wires). We are aiming at growing the trees to 3.5m tall.

(Ross) I see that the extension growth is short, but the leaves grown in the recent flush (after rain) are really healthy and large. These trees should really jump next season and put on at least 40-50cm of extension growth. There is some good branching starting

(RG) I think that cool-storing the trees really helped the feathers to break, even though trees were under stress.

(RW) They look like good nursery trees now! It's a shame they didn't come like that. Some of the trees I got this season were pretty poor. Rod trees arrived with only 2 or 4 pieces of root on them.

(Ross) That will be a big limiting factor

(RW) I agree that we really need to improve soil preparation. A wet winter can really hinder it though.

(Ross) Totally agree, in Europe they are right into mounding up the soil, they use heaps of organic matter then mound it up. This greatly improves aeration under soggy conditions. We need to get the fertility and aeration right.

(RW) We also need to focus on getting the soil structure right

(RG) I would cool-store trees again if I was planting a block and the soil conditions were not right for planting at the time. Here we hand planted the trees, after we put the netting posts in to try and minimise shock to the trees. We also didn't want scion rooting so some trees had to be re-positioned. BUT it cost too much. The next time we will be using steel trellis posts. We'll use a tree planter then put the posts in.

(Ross) (Talking about a block in Orange) Scion rooting can have a big influence on TRV. For example there's a block with M9 with the shanks 20cm out of the ground. The growth's really weak and the TRV is small. Next door is some more M9 with a huge canopy, because its scion rooted. You can have both extremes in the one block. Both scion rooting and not having the shank length right are both problems in Australia that need to be overcome to achieve uniform blocks. Shank length should be approx 10cm unless the grower has good information on their block to modify it.

(RG) (Talking about trellis systems) Intermediate trellis posts are often too far apart in Batlow – we have put ours in at 12m spacings here.

(Ross)(Talking about the canopy development of this block)- this block started off with a TRV of about 500m<sup>3</sup>. (Today it has increased up to 645m<sup>3</sup>).

(RG) We had hoped to really get them growing this year, but unfortunately we couldn't make it happen because of the lack of water.

### Sundowner Block (95)

This block was Jonagold on M9 re-worked to Sundowner. It is 4.5m x 1.3m spacing



- This block has about a 40T/ha crop on it. This could have been 52T/ha if the rows were put in at 3.5m

(Ross) Why wouldn't you bring the row spacing down to 3m in Batlow?

(RW) It would be OK here (where it's flat land) but for Batlow 3m rows are too tight for steep country on slippery clay soils in winter. 3.5m rows are safer when you have side slip with machinery

(RG) 2 years ago this block had lots of restricted growth from choke points in the tree. We had to prune the tops out with the chokes to get the trees to grow again. (They look pretty good now).

(Ross) You don't always need to pull out older blocks if they can be managed better. We need to ensure an orchardist is maximising their current plantings as much as getting the new plantings right.

(RG) We're aiming to grow these trees to 3.5-3.8m

(Unknown) Are you going to put in taller trellis posts?

(RG) Yes, we'll do that when we net it.

It was hard to get this block to grow. Here the fruit size is too large. Maybe M26 would help reduce size? (Ross later suggested that maybe the crop load targets have been too low if fruit size is an issue and there is no problem with biennial bearing).

On an M26 section (a couple of rows over) the crop is really good

(RG) We had very limited water this season, and we've been using pulse irrigation with monitoring by Neutron probe. We have shifted from long irrigations to irrigating five times a day for short periods (about 20 minutes to start with). If the trees need more water we run the irrigation a bit longer.

Irrigation scheduling has also been tightened by monitoring fruit volume increases; this has caused us to really drop the refill point on our scheduling curves. So far we have only used 1 megalitre/ha to grow this crop (and it only started raining in the last month).

(Ross) That's pretty amazing when you consider that a lot of growers would have used about six ML/ha to get a similar crop.

### Blocks at another co-op site across the road

Jonnies on M26, planted Nov 2006 (better quality trees, also cool-stored). Block planted 3.5 x 1m



- The trees on this block are already tall (2m+) and have some good branches

(RG) I am expecting to get 18T/ha next year (2<sup>nd</sup> leaf)

(Ross) You will still need to achieve TRV quickly, train branches before thinking of pruning them out. Also need to be careful with the 3:1 rule.

(RG) I think we are safe with 2:1 as a rule.

So many growers prune out lots of useful fruiting wood because it doesn't meet the rule. This will slow down your ability to fill the canopy quickly. Using a 2:1 rule is probably better. You can train branches down and it will really slow down vegetative growth.

Train the branches down once they have reached their desired length if you are not confident that fruit weight will do it for you.

(RG) I am planning to put 3 pieces of fruit per branch next year; this will bring the branches down naturally,

The discussion moves to nursery trees...

(Ross) Tree quality is also an issue in NZ

(RW) Even although it is much harder it is possible to get good yields with whips. The trial sites in Tasmania and South Australia have demonstrated that with densities of 3,000 trees/ha.

(Ross) I have also seen a block in Qld that is on MM106, at 2,000 trees/ha. It's in its 8<sup>th</sup> leaf but although it's on a vigorous rootstock it's well balanced because the grower has been really fastidious about branch angles and keeping the branches light and calm.

### FUJI – Nagafu 2 on virus tested Northern Spy at 5m x 2m

- (RG) these trees had two Regalis® sprays this season.
- This block has a history of being very biennial before we took it on. It needed lots of heavy pruning in the tops where the growth was out of control.
- This year there is lots of large fruit, Ron thinks it should be a 50T/ha crop, it will be harvested tomorrow. Expecting two picks.
- Fruit is sitting on 17°Brix. (JT says he has tested other Fuji in the district with 21°brix).
- No summer pruning needed this year

(Ross) For biennial varieties, aim for a more moderate crop, say about 50T/ha. On this block it is about 50kg per tree or 250 pieces of fruit per tree. You need to have 50% of fruit bud resting in a biennial variety which equates to 500-600 fruit buds in this block to get a return crop.

(RG) This block is under cropped (fruit large) so we should get a good return crop next year



### **Fuji on M9 (photo on left)**

(RG) This block had 2 sprays of Regalis®, but it was too much. The trees really stopped growing and there isn't enough leaf. The leaf to fruit ratio is too low. We really need to be careful with this product in a dry year, especially on M9

(Ross) I have also managed to shut down a MM106 block at home after 3 sprays. It shut down the leaf area too much. Each block will be different, and in time we'll get to know how many sprays and what rates to apply in each particular situation.

### **Cripp's Pink on M9- 4.5 x 1.2m**

(RG) The crop is a bit bunchy. It was late thinned. We applied Retain® last week, but the netting will also delay maturity by 4 to 5 days. (Expect to harvest Cripp's Pink in 3 weeks).

The block has uneven production because a lot of the trees here have scion rooted (the difference in growth is huge, with the scion rooted trees really vigorous and unproductive).

We are going to try girdling on the scion rooted trees using cable ties next year. Put them on in winter, and then take them off after harvest so the trees don't die. We also want to use Regalis® on this block next year. This block has had a 70T crop before, but the block is really uneven.

### **Braeburn on heat treated Northern Spy**

- 3 sprays of Regalis® - It has worked really well.
- The block has had it's first pick
- 50T/ha estimated crop yield
- Practicing long pruning, the branches were really loaded up with fruit before the first pick.
- Before Regalis® the trees were too vigorous to set a crop

(Ross) Regalis® will be a useful tool for managing existing blocks. It can really turn profitability around. We really need to have more branches below horizontal in close plantings to get good quality fruit. Being able to see trees 3 rows in is good. It means that there is lots of light getting into the canopy. Having the sawtooth pattern in the tops is also good here. Growers need to resist the temptation of growing a solid wall of tree in the close planted systems; you need gaps for light.

(RG) We took the branches down with the fruit weight. Next year we will only put the 3<sup>rd</sup> Regalis® on the tops of the trees.

(Ross) Talking about colour vs. maturity... Here we can see that although the fruit is reaching maturity, the colour isn't block red all over (It's pale on one side), but this fruit will be excellent to eat. The colour will intensify a bit in the cool-room too.

(RG) Yes last year we waited too long for colour, and the texture was really poor after storage. From now on we will be picking on maturity, not what the foreground colour looks like.