

MARCH 2012 FUTURE ORCHARDS WALK

Growing High Quality Fruit at Internationally Competitive Prices – Creating Value from Harvest to Sale

Prepared by John Wilton, Ross Wilson and Craig Hornblow

When we posed the title statement “Growing High Quality Fruit at Internationally Competitive Prices” to Chris Peters of the Auvil Fruit Co and asked him for his feedback, his response was:

The grower must answer the following questions and in so doing must be ruthlessly honest with him/herself. It is only the honest answers that will give guidance on the pathway steps to improvement.

1. Can you call your fruit, glamour fruit? Does it have the right colour, size, outstanding condition and consistency?
2. What is your cost of production (COP)? Will you achieve your target? Remember Future Orchards set an industry target of \$1.10 per gross kg or \$1.60 per class 1 kg delivered to market.
3. Will your marketing regime deliver a sustainable margin over COP?

With the crop ready to harvest, it is an ideal time to answer these questions.

- 1) Does your crop quality and appearance have glamour appeal?

The features of a glamour crop are:

- Outstanding colour for the variety.
- Optimum size range for the market.
- Low levels of cosmetic and spoilt defects.
- Correct and uniform maturity.
- Once harvested, a consistent line in the bin.

If you can honestly say that you have produced glamour fruit, fantastic, but make sure you document the management inputs that delivered that result so that you can repeat them in the future. If your answer is negative, then identify why it is not glamour fruit, and document the management solutions that will be required to turn it around in the future. In the field walk we will ask this question of every block we visit and go through this procedure of honest evaluation.

- 2) What is your cost of production?

We will also demonstrate a technique to easily calculate each block’s Cost of Production using the Demo Grower on OrchardNet¹.

¹ Go to <http://www.hortwatch.com/orchardnet/>. User Name: AUGrower, Password: Cobber

3) Will your marketing regime deliver a sustainable margin over COP?

Although most marketing regimes for 2012 will already be in place, each year we must review our marketing options to ensure that the returns being achieved deliver a sustainable margin above COP and are achieving a return at a competitive level for the market destination.

Chris recommends that “we take no prisoners” with no 3. If the marketing option is not delivering above COP then we not only need to look to improve COP, but we must review whether a change in marketing option is justified. That may be market timing, destination or the marketing company.

Creating Value from Harvest to Sale

The second component of our presentation is “Creating Value from Harvest to Sale”.

As upwards of 70 to 75% of on-orchard costs are fixed rather than variable, and the post-harvest costs increase exponentially as marketable product in the bin declines, production cost per unit of marketable fruit can only be minimised by maximising the amount of high value fruit harvested. This means careful attention to detail at harvest is critical.

As a general rule, the grower is a price taker, while the service industries he supplies his crop to, such as packer, coolstore and marketer, work on a cost plus margin basis. Often they are volume based businesses, so it is in their interest to pack, store and market the crop irrespective of whether or not market returns fully cover the grower’s production costs.

Many orchard businesses are vertically integrated, so pack, store and often market their own crop, which enable downstream profit centres to subsidise orchard production costs. In the short term, this enables the business to survive on lower returns for a poor season or two, as they can marginally cost the post harvest operations, however, in the long term the orchard needs to be profitable in its own right to enable the re-investment necessary to maintain a viable production base.

The survival of all links in the chain between tree and market depends on a market return that exceeds costs by a sustainable margin.

The key drivers that we can influence from immediately pre-harvest are:

- Maximising fruit value from the crop.
- Minimising handling costs from tree to market.

This process starts at the tree with picking.

The quality and consistency of fruit in the bin drives post-harvest costs. It costs as much to harvest, pack, store, apply post-harvest treatments (such as SmartFreshSM) to a reject fruit as it does a marketable fruit.

Step No 1

Grow good volumes of high quality fruit using all horticultural skills from pruning to pre-harvest. This has already occurred and has been covered in earlier presentations, webinars and magazine articles.



Step No 2

Keep low quality and blemished reject fruit out of the Class 1 bin. We must endeavour to avoid WASTE as much as possible. Waste, ie, fruit that does not contribute positively, should not go into the Class 1 bin. The cost of non-compliant fruit in the bin is huge. During the presentation we will use OrchardNet and a spreadsheet harvest calculator to quantify the real cost.

Step No 3

- Harvest at optimum maturity for the proposed market. Check maturity progression with regular maturity testing.



Source : Sumitomo WebSite²

Variety	Optimum SPI
Gala and Sports	1.5-3.5
Granny Smith	2.0-3.5
Jazz	2.0-4.0
Red Delicious	1.5-3.5
Cripps Pink and strains	1.0-3.0
Fuji	2.0-4.5

Optimal SPI (6 point scale) at Harvest for long term storage

² <http://www.sumitomo-chem.com.au/sites/default/files/pdf/bulletin/retain-techb.pdf>

Step No 4

- Understand preferred size profiles for the market and maximise the proportion of fruit in this size range being picked.
- Fruit continues to size through harvest, so select picking by fruit size will enable lower value, smaller fruit to grow into larger, higher value fruit if harvested later.

Step No 5

- Manage Potential Storage Issues.
- Immediately prior to harvest, evaluate fruit quality, packout potential and post-harvest risk factors on a block by block basis. Review historical post-harvest storage behaviour.
- Be very aware of the risk factors of every variety and every block. Previous history is a great guide but crops and climates will vary from season to season that can create different challenges.
- Eg, Pit and Blotch in Braeburn and Jazz, Scald in Granny Smith, Internal Browning in Cripps Pink (see case study below).

Step No 6

- Once you understand the attributes of high quality fruit, make sure it happens with clear instructions and adequate training of the harvesting team backed up by careful harvest supervision.

Step No 7

- Programme storage and marketing strategies to maximise the crop value.

Consistency of Quality

What are we trying to achieve?

An internationally competitive apple business historically has been about variety, production levels, costs, and labour, etc. The future competitive business will be about fruit quality, targeted production, and mostly consumer experience. Consumers now have more choice than ever before. We need to give them a reason to choose an apple. The Brand we are selling has to be about quality and a great consumer experience.

When we talk of quality we mean the consumer's experience, from the visual appearance to picking the fruit up, to the texture and flavour of the mouthful they take. Quality could be simply measured as exceeding the consumer's expectations.

We only receive consistent revenues if we have achieved repeat sales from a satisfied consumer base (those that eat the apple). Yes, we have to get past the gate keeper (retailer) but ultimately the consumer decides our fate. A great looking apple that has poor taste will not get the repeat sale and your market will be shrinking.

We are competing for the consumer's choice of so many great products, other fantastic fruits and a range of awesome snack foods.



Giving any consumer one poor apple in ten will have them leave the product category for a number of weeks before trying for a new, better experience again. Firstly and easily we need to eliminate the lower quality apples. With most aspects of performance, to improve significantly we just have to eliminate the lower quartile and focus on lifting the average.

Combine like lines together to maintain consistency and gradual changes in quality. Consumers don't like variation in the fruit bowl.

- Exceed your consumers' expectations – do not disappoint.
- Eliminate the lower quartile – reduce the variation and the average will go up.
- Be consistent in the delivery.

How can we achieve it?

Where does this quality variation come from?

- Immature fruit– starchy woody texture
- Over mature fruit– mealy low crunch fruit with little flavour
- Low brix – over cropped trees , low light

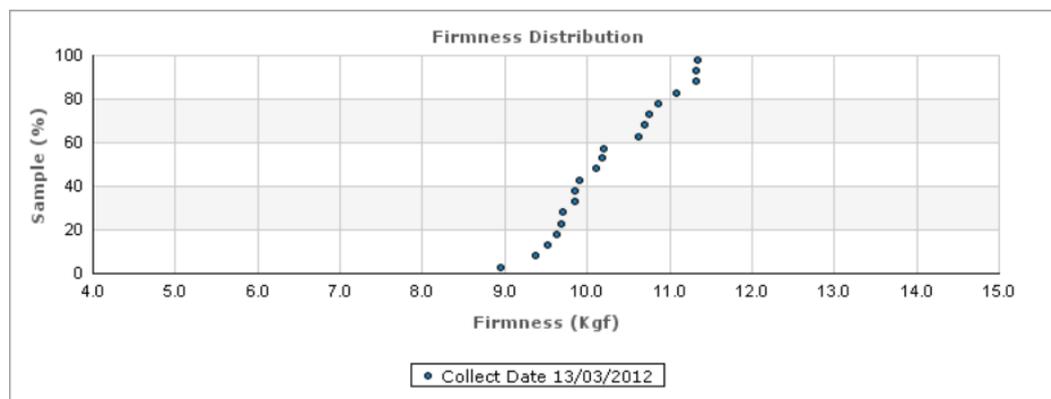
We can only manage what we can monitor.

Variation in starch pattern index (right and below) shows the variation in maturity that can be achieved within the tree. We know that different maturities have differing storage potentials and tastes profile, so this line of fruit has it all.



PRESSURE INDIVIDUAL SAMPLE DETAILS

Pressure Avg. (Kgf)	10.2
Pressure Std.Dev (%)	0.71



Externally we could leave it to the post-harvest operators using expensive gear and wait for the bin charges, or we can focus in the paddock as much as we can, to reduce the variation and the downstream costs that go with it.

Managing external variation such as foreground colour, background colour, fruit size and cosmetic quality are the minimum expectation. Internal variation is where the fun begins. We have to understand where variation is in the paddock and within the tree and pick into the bin the most consistent product possible.

There is some great new technology (NIR) to help us identify and monitor variation which we will discuss today, but for most of us we have to do the basics. Monitor by SPI test, penetrometer background colour. Identify variation and then:

- Select pick
 - as maturity progresses.
 - light/ heavy trees, these will mature at different times
 - Soil type variations.....
 - Tree position- tops are always behind bottoms in maturity

Manage the inventory - Identify blocks, variation occurs we are just trying to reduce it,
- work with the supply chain to make the most of what you supply.

Case Study ~ Managing the Potential of Flesh Browning in Cripps Pink

As an example to managing potential storage disorders, Cripps Pink is prone to several flesh browning disorders during storage, which develop progressively as the storage period is extended:

There are three types of Browning in Pinks

Diffuse flesh browning – found in locations with cool growing season accumulation < 1,100 GDD base 10°C. This is chilling injury and can be managed by storing at 3°C rather than cooler. The potential for more rapid maturation at this higher temperature can be offset by the use of Smartfresh. Fruit from orchard sites accumulating less than 950 GDD should be marketed within five months of harvest regardless of storage temperature. Block history can be a good guide to risk and growing season heat unit accumulation can be a tool for forecasting risk.

Radial flesh browning – this is a form of senescent breakdown, usually found in fruit from warmer locations that accumulate GDDs in the range of 1,100 to 1,700. Above 1,700 GDD there is little risk of this disorder, but in a cool growing season locations that usually have little risk may have increased risk. Risk is higher in fruit from light crop trees or where fruit calcium levels are low.

CO² Injury - CO₂ Injury can also cause internal browning. All Cripps Pink apples are susceptible and stores need to maintain concentration levels below 1% CO₂ to minimise injury. In CA stores this can be controlled, in normal air stores this can be achieved by venting with fresh air if required, which is 0.04% CO₂

Risk of both diffuse and radial browning increases with advancing harvest maturity. Optimum harvest maturity for long-term storage is SPI 3.5 on the 10 point CTIFL scale³ (1.5 on the six point

³ http://physiquemangin.pagesperso-orange.fr/2nde/TP/chTP1pomme%20code_amidon.pdf



scale). Fruit picked at SPI significantly above 3.5 (ie > 6.0) should be marketed within five months of harvest. Note the upper limit will be region specific.

For further information, refer to “Managing the Risk of Flesh Browning Disorders of Cripps Pink Apples - a summary of Australian research investigating the causes and management of the problem”, Applied Horticultural Research, www.ahr.com.au. The summary recommendations from this report are shown in the Table below.

Table 1 Recommendations for the optimal growth, harvest and storage of ‘Cripps Pink’ apples for prevention of the diffuse flesh browning (DFB), radial flesh browning (RFB) and carbon dioxide induced browning disorders. The severity of browning increases in cooler seasons for both diffuse and radial flesh browning.

	Diffuse Flesh Browning (DFB)	Radial Flesh Browning (RFB)
Injury classification	Chilling injury	Senescent breakdown
Climatic range	<1100 GDD	>1100 GDD ²
Maturity	SPI ³ 3.5	SPI 3.5
Storage temperature	3°C ⁴	1°C ^w or stepwise cooling ^v
Storage atmosphere	<1% CO ₂	<1% CO ₂
Orchard management	Ensure calcium levels adequate	Best commercial practice _u
Storage management	<950 GDD avoid long storage & export ^t	Best commercial practice _u
Packing-shed management	Best commercial practice _u	DPA reduces CO ₂ and senescent related flesh browning ^s
Packing-shed sorting	Reject all swollen misshapen fruit ^r	Reject worst misshapen fruit ^r

With 2012 being a much cooler season than recent history, growers need to assess the potential of each browning type and take the appropriate management options from harvest through storage.

Where pre-harvest block assessment indicates significant defect problems, such as hail, russet or poor colour that would make recovery of the high value fruit of marginal viability, consideration should be given to directing the whole or partial crop to processing.

Blocks with a history of marginal colour development will benefit from skim picking the better colour fruit early in the harvest window for long term storage, then leaving poor colour fruit for later picks, destined for immediate sale or process.

Only fruit harvested at optimum maturity for long-term storage should be held beyond four to five months.