

Future Orchard 2012 – Huon, Tasmania

Orchard Walk February 2007

Facilitator – Jesse Reader, Serve-Ag P/L

Attendees:

Steve Spark, Simon Middleton, Anna Steinhauer, Gordon Brown, Doug Wilson, S.Reardon, Raymond, Scott Price, Nigel Bartells, Paul Francis, Jesse Reader, James Clements, Howard Hansen.

The 3rd orchard walk for the Tasmanian future orchards group was held at Hansen Orchards Pty Ltd, Grove, Tasmania. We were kindly hosted by Howard Hansen and family and were provided with a fantastic new board room for our meeting.

Attendance was down but actually proved to be a good sized group with plenty of interaction. The usual format was carried out with introduction of the guest speakers, presentations, questions, evaluation forms followed by the orchard walk. We re-convened after the orchard walk for lunch and got stuck into the MB meeting, which had reasonable attendance.

Dr. Simon Middleton, Principal Horticulturist, DPI&F, Queensland.

“Maximising the light interception and productivity of Australian apple orchards”

As Simon’s notes were handed out on the day I will not repeat everything but simply state the take home points and provide some additional comment.

1.1 The impact of light interception and distribution are the keys to high yields and good fruit quality.

- Maximise light interception (aim for 60% midseason light interception)
- Maintain good light distribution

Low productivity is a result of the following;

- Insufficient canopy volume
- Excess tree vigour = internal shading

Easiest way to achieve these objectives is to use trees on dwarfing root stocks planted at high densities (greater than 1900 trees/ha). Modern intensive planting systems must be designed to intercept high levels of sunlight early in the lifetime of the orchard, to help produce the yield and fruit quality needed to offset orchard establishment costs as quickly as possible.

1.2 Tree Row Volume (TRV)

Tree Row Volume was discussed briefly as another important factor in maximising light interception and productivity. With all of us now being familiar with TRV, it made for timely discussion.

Tree Row Volume (TRV) is a measure of the maximum potential light interception of an orchard and is calculated as a volume of canopy (m³ per hectare) from measurements of tree height, canopy spread and row spacing.

Many Australian orchards have severely insufficient TRV due to low tree densities, poor tree health, insufficient leaf area index all of which are often a result of cropping too early. Ideally,

the tree row volume will be filled by a high proportion of evenly spaced branches supporting fruiting spurs that are exposed to adequate sunlight, balanced with new extension shoots primarily 30cm or less in length.

Estimates of Tree Row Volumes required for maximum yields are:

- Intensive orchards > 1900 trees/ha 10 000 to 12000 m³/ha
- Semi- intensive orchards 1000 to 1900 trees/ha 12 000 to 15000 m³/ha
- Extensive orchards < 1000 trees/ha 18 000 to 20 000+ m³/ha

(as provided in the notes for the second Future Orchards 2012 Orchard Walks in Nov 2006).

1.3 Leaf Area Index

Leaf Area Index is another key performance indicator and good guide to how well a tree is filling its allotted space. It is measured as m² leaf/ m² of orchard floor surface area. Leaf area index will help determine the tree's potential to intercept light.

- A higher density orchard will need less LAI to achieve the optimum result.
- Light interception is measured with a Septometer

Leaf area (m² per tree) required to achieve a particular LAI

	1250 trees/ha	2000 trees/ha	2500 trees/ha
	(4m x 2m)	(4m x 1.25m)	(4m x 1m)
LAI = 1.0	8 m ² leaf	5 m ² leaf	4 m ² leaf
LAI = 2.0	16 m ² leaf	10 m ² leaf	8 m ² leaf
LAI = 3.0	24 m ² leaf	15 m ² leaf	12 m ² leaf

1.4 Light interception and productivity of Australian apple orchards

The most productive systems are characterised by the following features;

- · Diurnal midseason light interception of 55-62%
- · LAI of 2.0 to 3.0
- · North/south row orientation
- · Tree densities of 1500 – 2900 trees/ha (most were 2000 – 2900 trees/ha).

Several important trends should also be noted:

- · Yields increased as light interception increased from 55 to 62%
- · Marketable yields increased as LAI reduced from 3.0 to 2.0
- · Marketable yields improved as tree height reduced from 1.2 times to 1.0 times row
- · Space (4.5 to 3.5 metres in a 3.5m row space).

1.5 Effect of tree height

Increasing tree height has less effect on light interception than planting density and LAI. Light interception is increased with taller trees and narrower alleyways, but a point will be reached where yield and apple quality decline as a result of internal shading and poor light distribution. Unintercepted light that completely misses trees is a 'wasted' resource.

It is generally accepted that to maximize marketable yield, tree height needs to be between 0.8 and 1.0 times the between row space.

Alleyways are an essential yet inefficient feature of orchards, representing areas of land that are non-productive. Despite this, the contribution of alleyways in providing 'gaps' for light penetration in the orchard is important and shouldn't be under-estimated.

1.6 Tree Density

In the early years of an orchard planting, the higher the tree density, the higher the light interception. Hence the potential for higher yields and earlier return on investment.

The higher the tree density the;

- Lower canopy volume and LAI / ha
 - Less pressure per tree to perform
- Aim to achieve 50-60% sunlight within 4yrs of planting.

Aim to grow a calm tree.

Move towards densities of 2000-3000 trees/ha.

'V' trellis permits higher densities.

1.7 Rootstocks

The implementation of dwarfing rootstocks is vital for success of a high density planting.

- If you increase rootstock vigour you decrease yields.
- Hard to switch vigourous stocks into fruiting mode.

Advantages of dwarfing stocks;

- Calm stocks
- Good light interception
- Precocity
- High early yields
- High volume of well illuminated canopy

1.8 Orchard Vision

Begin with the end in mind, what's your goal? Trees should be discrete units with a well defined leader. Know the optimum TRV and LAI for your desired result.

We also spent quite a bit of time discussing harvest management and related issues. Below are some key not to be overlooked.

- Use appropriate forms of advertising to obtain staff – Internet, Backpackers etc.
 - Retention of staff, what works for you? Contract rates, fixed rates.
 - Accommodation/Transport
 - Supervision critical.
 - Training critical.
 - Q.A. every bin!
 - Provide incentives.
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- - Have enough 'horsepower' to keep up with harvest.
 - - Focus on value when things get tough.
 - - Track maturity development and know your market.
 - - Have a harvest schedule.
 - - Manage irrigation carefully up to harvest.

Conclusion

“Aim to make every apple contribute to profit. Your time and money are valuable. Sunlight is free; therefore aim for 60% light interception ASAP. Strive for adequate TRV and a LAI of 2.0.”

Steve Spark – Agfirst Consultant, Nelson, New Zealand

‘Gala Production’

- Nelson aims for 115 count Gala
- Hawkes Bay aims for 110 count Gala
- NZ will be producing around 1million cartons this year.

Harvest Management of Gala

- Quality is determined in the orchard and by the way it’s harvested
- Cool storage will preserve fruit attributes not fix them!
- Care and attention are to be paid at harvest.

Factors to consider

- Destination – Quick sale or long storage?
- Choose blocks carefully, watch maturity.
- Starch, Pressure, Brix.
- Early picks – Size and blush colour
- Later picks – Background colour
- Upper tree fruit tends to lag behind lower tree fruit – Check starch with Iodine
- Gala tends to ripen rapidly, check maturity regularly
- Aim to get them off on in three picks

Fruit Pressure

- During harvest, pressure declines 7-12% in a week.
- Losses of up to 25% in two weeks

Colour

- Extenday - Reflective matting

Influences on Maturity

- Crop load
- Tree Health
- Tree Nutrition
- Pest/Diseases
- Climatic conditions
- Orchard location
- Hail netting / bird netting
- Irrigation – limit prior to picking – decrease bruising.
- Retain – Useful tool (only using on high colour varieties in NZ)
- Rootstocks – M9 will even up maturity
- Tree Architecture