More is not better!!

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Adjusting our rules – visual cues

Over the past few years we have presented and discussed a range of topics with lots of theory, some practical demonstrations and always good discussion. I want to look at a few points from a different perspective. As well as giving some background, I want to show some quick visual cues that will help describe good or bad canopy structure. I find that at all levels in our business we need to use the same language (how we describe the technical things in our business) and with it we also need practical visual cues to describe some of our concepts to all our staff members.

As we have discussed young tree growth we have talked about filling the allotted space and branch bending rules etc. As trees age we need to adjust our thinking and the rules for staff.

<table>
<thead>
<tr>
<th>Old rule</th>
<th>New simple rule</th>
<th>comments</th>
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</thead>
<tbody>
<tr>
<td>Fill the allotted space, 3-5 row rule</td>
<td>50% shade (when shadows longest)</td>
<td>We need to see through a canopy easily mid-season 10 rows is too far, 3-5 rows is ideal. The amount and consistency of shade between rows</td>
</tr>
<tr>
<td>Branch bending 45-60 degrees</td>
<td>Aim at the tractor wheel or ½ way between trees</td>
<td>Aiming at a point on the ground means branches will get steeper higher in the tree.</td>
</tr>
<tr>
<td>200 tonnes in 5 years</td>
<td>Targeted (marketable) fruit!</td>
<td>The target is for marketable fruit, the fruit that pays the bills. Define this for your situation - it may be different for different growers.</td>
</tr>
<tr>
<td>Water: Measure and apply when needed</td>
<td>Start early, apply often, all season</td>
<td>With young trees in most situations growers are starting too late. Irrigate straight after planting to settle soil around roots, apply often while roots are shallow.</td>
</tr>
<tr>
<td>Weeds: Keep sward clean</td>
<td>The same in young, less important in old trees</td>
<td>Maybe less weed is ok for vigour control</td>
</tr>
</tbody>
</table>
I want now to focus on ‘filling the allotted space’ and why this rule changes as the tree ages.

One principle that always stays constant is that we are harvesting light, converting sunlight to carbohydrate and adding a little moisture (85%).

\[
\text{Light interception} = \text{yield} \cdot \text{fill the allotted space} \\
= \text{Fruit Quality, Brix, colour, firmness}.... \\
= \text{ Marketable yield}
\]

Therefore harvesting light in the best way possible has implication for:
- the consumer,
- storage potential
- maturity at harvest.

Filling the allotted space is an important target for young trees, but too much light is not good.

Growers are greedy by definition. We all want more: more fruit, more colour, more Brix, more land, more spray will fix it. But it does not always pay off.

Studying high performing (yield and quality= targeted fruit) orchards it is very surprising how small a tree we need to perform at the highest level. These orchards have lots of “windows” allowing light to fall right around the tree.

The orchard shown here has a 4 year averages of 78 tonnes/ha. Notice the gaps between the trees. This is an excellent example of the 3-5 row rule. As I walk the orchard I can easily see 3 rows across the block.
The following two photos show a block where you cannot see one row across the rows. Although the yield is good (at about 70 tonnes gross) the packed yield is only about 40-45 due to poor foreground colour, maturity is delayed and storage potential has been poor.
The next characteristic of these top blocks is the amount of shade reaching the ground. These photos show a block at about 65 tonnes with only 50% shade down the row. Compared to this block with about 80% shade, only doing 60 tonnes of low colour fruit. Note not enough windows high in the canopy.
Here are two photos different rows in the same block of pink lady and you can easily see the variation in vigour and pruning styles by the variation in shade along the row. Use these sort of examples in your own orchards to explain good and bad tree structure and pruning techniques.
Here's a poor performing Jazz block with the canopy too dense - zero rows across the block and 85-90% shade.
Fruit colour and light

Fruit colour development is triggered and influenced by a range of factors,

Maturity, temperature, nutrition, yield, light etc....

The biggest impact is sunlight. As you can see clearly from the two following photos, if any part of that fruit does not receive light, colour does not develop well. Therefore getting excellent light around the whole tree is critical for all fruit to colour. This reinforces the 3-5 row and 50% shade rule.
We tend to pick fruit by foreground colour, delaying poorly coloured fruit to later in the harvest window to pick. The expectation is that this later colouring fruit is later maturing, but it is not. The implications of this can clearly be seen in the following photos where fruit colour and maturity in the same block can be seen to be poorly linked. If we are to maximise storagability and consumer acceptance we need to pick fruit at its optimal maturity and if colour is also important then tree management is a key to improving both.

3-5 row and 50% shade rule.

I picked fruit of high and low colour at random from a block of Royal gala. The same royal gala fruit in each photo with high colour at the top and low colour at the bottom of each photo. The average and range of maturity as indicated by an iodine test (SPI) is the same for low and high colour fruit.
The following sample is of a new variety Sonja. Fruit of acceptable colour which we would include in the first pick from the outside of the canopy (top of each tray) is compared with fruit low in the canopy which we would leave behind in the first pick. The maturity is similar and may even be higher in the low coloured fruit.

**Conclusions**
As trees get older we need open canopies for high yields and optimal quality

- *Mid season 3-5 row rule*
- *Maximum 50% consistent shade*

Fruit colour is not a good indicator of fruit maturity. Focus on better canopy management to be able to pick fruit at the optimal stage for storage and consumer acceptance.