

## Focus Orchard Trial: Do summer applications of NAA and root ripping assist in reducing biennial bearing in Fuji trees?

Prepared by: Paul James, Lenswood Rural

### Objective

To determine if summer applications of NAA and root ripping assist in reducing biennial bearing in Fuji trees by enhancing return bloom levels.

### Outline

As part of the November 2011 Future Orchards field day growers were introduced to the use of Summer applications of NAA to enhance return bloom in Fuji. This followed up on previous discussions about the use of root- ripping to reduce vigour and also assist in reducing biennial bearing in this variety.

In a block of Fuji (Naga Fu 2) on MM.106 rootstock planted in 1995 with a pronounced biennial bearing pattern the grower applied both root ripping and summer applications of NAA to the trees to enhance return bloom and attempt to reduce the biennial bearing pattern in the block. A part of the block was left untreated.

A trial was set up in the block to compare the performance of the treated and untreated sections. In each section 10 trees were randomly selected. On each of these trees three limbs were selected to provide a combined total of 100 winter buds / tree.

These buds were assessed at different times throughout the year to compare performance. Aspects that were evaluated included

- The number of flower buds at flowering
- The number of flowers
- The number of fruit set (pre thinning)
- The number of fruit left post thinning
- Comparative yields

- Return bloom 2013 (yet to be undertaken)



**Photo – representative trial tree with marked (3) limbs totalling 100 winter buds**

## Results Summary

Due to a number of factors, including the very significant differences in results obtained at flowering, fruit quality evaluations were not undertaken at harvest. Comparative information will be obtained from packout results when the fruit is packed.

Return bloom assessments will be undertaken on the same trees during flowering 2014.

The initial results have been outstanding as shown in the following results tables

### Results / tree (10 individual tree replications)

	Winter buds	Flower clusters	Total flowers	Post thinning Fruit numbers	Flowers / final fruit no's
<b>Untreated</b>	<b>100</b>	<b>28.3</b>	<b>146</b>	<b>24.1</b>	<b>6</b>
<b>Treated</b>	<b>100</b>	<b>59.2</b>	<b>301</b>	<b>37.7</b>	<b>8</b>

### Commercial Yields from the control and treated blocks – April 2013

	Final yields t/ha
<b>Untreated</b>	<b>36.9</b>
<b>Treated</b>	<b>53.8</b>

Please note that the treated block carried a crop of in excess of 50 t/ha in the previous crop cycle (2012) – the 2013 crop result was not influenced by the trees being considered “off crop” in the previous season.

### Comments and observations on the trial trees at flowering:

- Full bloom 8/10/12
- untreated rows highly variable flowering, distinct on/off trees
- treated rows – very even flowering all trees – no obvious off crop trees



Treated trees – pre bloom



Untreated trees at full Bloom



Treated trees at Full Bloom

### Post thinning Comments and observations

- Treated trees = 8 flowers / final fruit, Untreated = 6 flowers/final fruit
- Treated trees - 56% more fruit at the end of hand thinning
- More even crop distribution in treated rows

## Fruit characteristics vs yield

No formal fruit assessments were undertaken at harvest. The fruit size was monitored throughout the season on a weekly basis with the fruit having an average fruit size of 78.6 mm – well with in the commercial target range of 75 – 80 mm.

**Small or large fruit size was not a factor in the yield differences attained in the trial.**

## Implications

The results obtained in this trial are extremely successful; very few simple trial treatments result in a 146% difference in commercial performance as achieved in this trial. However this result needs to be considered in relation to the full management strategies used on this property.

The grower has a deliberate strategy of trying to shut down the vegetative growth in his Fuji trees as quickly as he can post flowering. This is aimed at minimising plant energy spent producing excessive vegetative growth and maximising the resources available for fruit and bud development. Consequently he is using a number of different techniques throughout the season that cumulatively impact on the trees to achieve his ambition of calm, well-structured trees that crop regularly with large, good quality crops.

The treatments used in this trial were two more treatments that were added to his already significant list of management “tools”. The net result was that they all cumulatively led to this very impressive result. In achieving the trial results the trees were well structured, relatively calm trees with very good nutrition and several vigour management strategies used, including the use of Regalis.

Unfortunately further work needs to be undertaken to see which of the 2 treatments used (Summer NAA applications and Root pruning may have had the biggest individual impact. **However together they have had a very significant impact that demonstrates that a strategic approach to tree management is needed to enhance return crops rather than a “silver bullet” approach.**

The grower has again used these treatments in his treated block this season. This will enable the trial to be continued to see the impacts of the treatments on subsequent season’s performance.

