Apricot ‘Golden May’ Tatura Trellis out yield’s vase in establishment years

AGRICULTURE VICTORIA

Orchard Updates 2020

Agriculture Victoria research indicates the need to consider canopy design and crop load to achieve large sweet fruit, maximum pack-out of domestic & export quality fruit and minimal vegetative (pruning) growth in ‘Golden May’ apricot.

A field experiment was established to investigate yield, fruit quality and tree growth response to canopy design and crop load on ‘Golden May’ apricot at Tatura, Victoria.

Trees were planted in winter 2014, trained as Tatura Trellis and vase at 4.5 m row & 1.0 m tree spacing. The research used a sensor equipped fruit grader with stringent fruit quality metrics to determine the number of ‘premium’ grade fruit. Premium grade fruit was defined as fruit size ≥ 36 g, maturity < 1.2 I_{AD} and sweetness ≥ 12 °Brix of individual fruit (~ 17,000 fruit per season). This article summaries production results for 4 seasons from 2016/17 to 2019/20.

KEY POINTS

- Fruit size and sweetness was improved by reducing crop load in Tatura Trellis and vase trained trees.
- Tatura Trellis resulted in more uniform fruit weight outcomes than vase trained trees.
- Tatura Trellis trained trees were larger. They had a bigger canopy and greater light interception. This gave them the ability to carry a greater fruit number, hence greater yields than the vase trees.
- The vase trained trees were smaller and produced lower yields in establishment years.
- Trunk diameter was not impacted by crop load management on either Tatura Trellis or vase trees.
- In canopies that have poor light distribution in the lower parts of the tree, we suggest maximizing fruit numbers in higher part of the canopy and reducing the number at the base of the tree to improve the uniformity in fruit quality and size.

Varying crop load impacts yield and fruit quality

- High crop loads failed to achieve ‘premium’ grade production outcomes primarily due to a combination of poor fruit size and low sweetness irrespective of tree training system. For Tatura Trellis and vase trained trees, high crop load reduced fruit weight, lowered sweetness and delayed fruit maturation. Low crop load produced large sweet fruit, but penalised yield and grew more vegetative growth that required more pruning, irrespective of training system.
- Less seasonal variability in fruit quality was found in the Tatura Trellis trained trees. In season 3, no fruit in the vase trained trees met the premium grade due to low fruit sweetness compared to ≥ 80% of fruit meeting 'premium' grade in the Tatura Trellis trained trees.
- The vase architecture (a free-standing training system) produced smaller trees and lower yields in establishment years. Figure 1 highlights that Tatura Trellis produced higher cumulative yield (seasons 1 – 4) for each crop load treatment (Low, Medium and High) than vase trained tree.

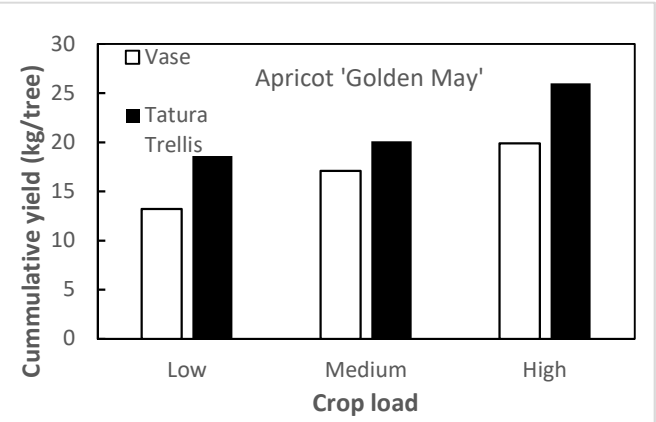

Figure 1 Cumulative yield (seasons 1 – 4) under crop load treatments in vase and Tatura Trellis trained trees

- Crop load management clearly impacted the distribution and uniformity of fruit size, sweetness, maturity and firmness on Tatura Trellis and vase trained trees (see Figure 2, page 3).
- For each crop load treatment (Low, Medium and High), Tatura Trellis resulted in more uniform fruit weight outcomes than vase trained trees (see Figure 2, page 3).

Summary of crop load treatments

Low	Medium	High
Heavy removal of fruit on trees to avoid competition for available nutrients	Moderate removal of fruit on trees to minimise competition for available nutrients.	Minimal removal of fruit on trees to maximise competition for available nutrients
large sweet fruit, penalised yield, grew more pruning biomass	(control) standard or recommended commercial practice	poor fruit size and low sweetness

- The Medium crop load treatment (control) had a target of 1 fruit per 10 cm of fruiting lateral.
- The Low crop load treatment had approximately 20 % less fruit per tree than the Medium crop load treatment.
- The High crop load treatment had approximately 40 % more fruit per tree than the Medium crop load treatment.
- Fruit was hand thinned early in the season (< 12 mm diameter) to maximise cell number and final fruit size. Fruit thinning consisted of initial removal of fruit from end of branches, 'doubles', small, disfigured & damaged fruit followed by even thinning of remaining fruitlets to desired crop load target.

Photos 1 and 2 show the canopy architecture of Tatura Trellis and vase trained trees at the stonefruit experimental orchard, Tatura.

Photo 1. Apricot 'Golden May' Tatura Trellis trained trees

Photo 2. Apricot 'Golden May' vase trained trees

Fruit maturity was measured with a DA meter (I_{AD}, see photo 3) to guide harvest logistics. The key indicator for fruit starting to mature is the production of ethylene and this is correlated to the I_{AD}. Database: DA meter I_{AD} maturity classes

Measuring fruit maturity

Fruit maturity was measured with a DA meter (I_{AD}, see photo 3) to guide harvest logistics.

The DA meter measures the flesh greenness by reflectance of two wavelengths (670 and 720 nm) of light, near the chlorophyll-a absorbance peak.

The reflectance is expressed as an index of absorption difference (I_{AD}) scaled from 0 to 3 (green).

Comparison of I_{AD} with fruit ethylene production for many cultivars has shown a strong inverse relationship supporting the DA meter as a tool to measure fruit maturity.

How to use the DA meter and reference values for cultivars are on the Horticulture Industry Networks website. See database: DA meter I_{AD} maturity classes

Photo 3. DA meter used to measure fruit maturity to guide harvest logistics

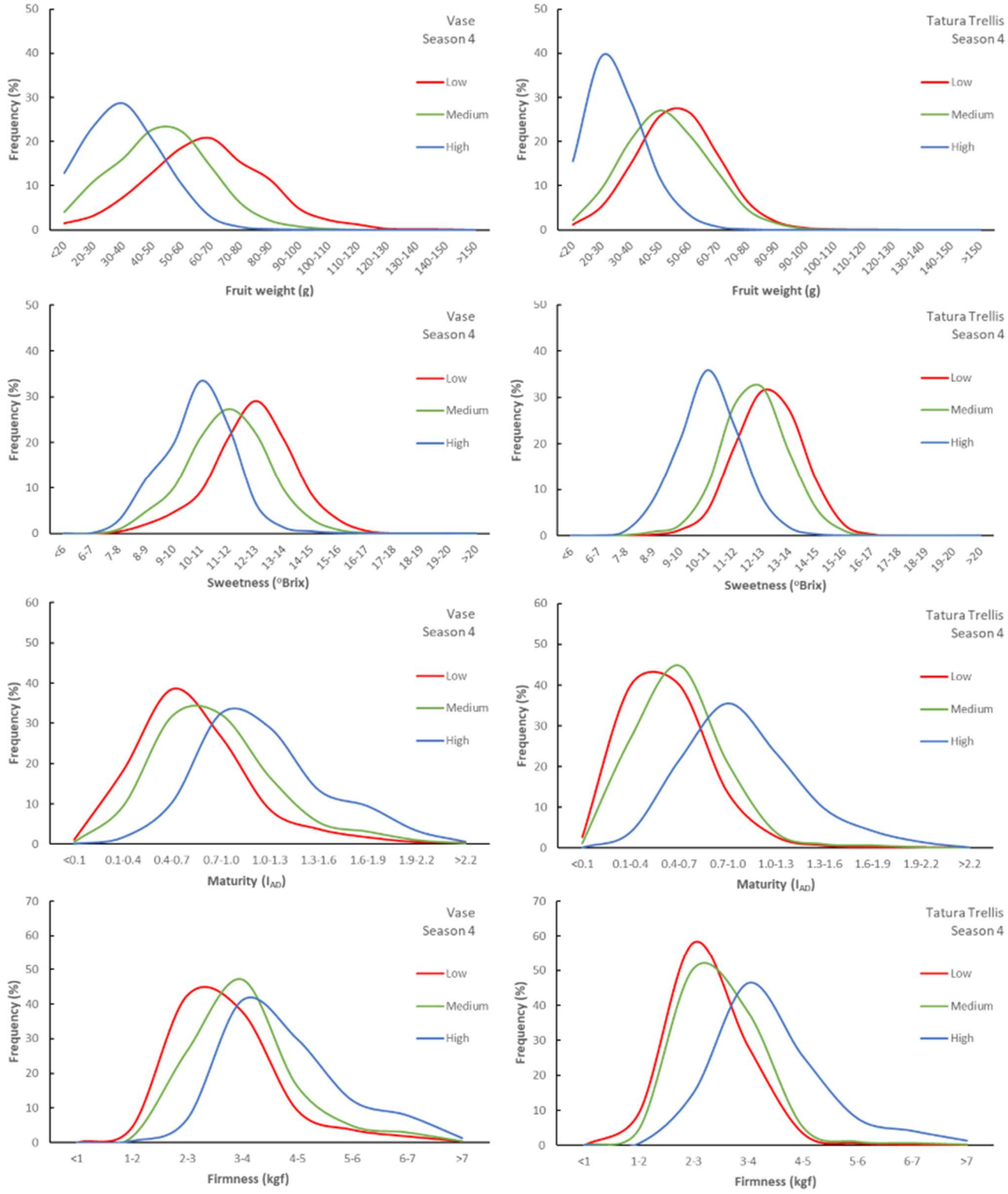

Figure 2. Graphs show the distributions of fruit size, sweetness, maturity and firmness under crop load treatments (low, medium and high) in season 4 on Tatura Trellis and vase trained trees.

Project acknowledgement

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For more information: go to Horticulture Industry Networks website page

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