

# Canopy design options for stonefruit

Mark O'Connell, Agriculture Victoria, Tatura

**Canopy design is an important orchard business decision that should be made before crop establishment as it is very difficult to retrofit an orchard.**

**Canopy design will strongly influence orchard management (irrigation, nutrient, pest & disease), labour inputs, infrastructure (posts, wire, soil anchors) costs, tree light interception, vegetative growth and development, fruit quality and production potential.**

**Open Vase free standing canopy design is very common and represents the current industry standard for peach and nectarine in Australia.**

**Canopy designs range from low-density free standing (Vase) trees to modern high-density 2-dimensional (hedgerow) vertical trellis and 3-dimensional V-trellis systems.**

**Research into canopy design on peach, nectarine, plum and apricot at Tatura using Vase and various trellis systems found canopy design effects tree growth and vigour and impacts yield and fruit quality.**

## Canopy design options

Open Vase canopy design is very common in most stonefruit regions of the world and represents the current industry standard for peach and nectarine in Australia.

The agronomic performance of several canopy designs was compared at the Tatura Stonefruit experimental orchard on peach, nectarine, plum and apricot (Table 1).

The study at Tatura examined canopy designs for future orchards. The experimental orchard was established in 2013 on Shepparton fine sandy loam. Orchard layout includes tree spacing of 4.5 m x 2 m (1,111 trees per hectare) and 4.5 m x 1 m (2,222 trees per hectare), drip irrigation under Vase,

Vertical Leader, Tatura Trellis and Open Tatura canopy systems.

## Tree vigour and production performance

The experimental orchard study provided the unique and direct comparison between canopy designs in terms of vegetative growth, yield and fruit quality. To understand the impact of canopy design, such an analysis requires the same crop-cultivar mix, tree age, tree density and orchard management (rootstock, irrigation, nutrient, pest and disease) to be consistent between the canopy designs.

Crop and Cultivar	Canopy design
Nectarine 'Rose Bright'	Vase
Nectarine 'Autumn Bright'	Vertical Leader
Nectarine 'Autumn Bright'	Tatura Trellis
Nectarine 'September Bright'	Open Tatura
Peach 'September Sun'	Vase
Peach 'August Flame'	Vertical Leader
Peach 'August Flame'	Tatura Trellis
Apricot 'Golden May'	Vase
Apricot 'Golden May'	Tatura Trellis
Plum 'Angeleno'	Vase
Plum 'Angeleno'	Tatura Trellis

Yield and fruit quality performance of peach, nectarine, plum and apricot (see Table 1) for 2015/16 to 2020/21 growing seasons is summarised on the Profitable Stonefruit (Summerfruit) Research website (see Horticulture Industry Network: <http://www.hin.com.au>).

Virtual orchard tours (360 degree) and time series videos of each crop-canopy design is published on the website: <http://www.hin.com.au/networks/profitable-stonefruit-research>.

Overall, findings from the experimental orchard study at Tatura show, irrespective of crop type, Vase canopy systems produced greater vegetative growth and tree vigour (pruning biomass, trunk growth, leader growth) compared to Trellis canopy designs. The various trellis designs give support (wires) to developing laterals during establishment years to provide the capacity for higher fruit number per tree and consequently greater cumulative yields.

Open Vase designs tend to have less even light distribution compared to 2-D and 3-D trellis systems. From a labour input perspective, a greater level of technical expertise and time (labour cost) is required for pruning management on Vase trees relative to trellis canopy designs.

A summary of canopy design options and agronomic comparisons from the experimental orchard study at Tatura on tree vigour and yield and fruit quality is provided below for apricot, plum, peach and nectarine.

### **Apricot 'Golden May' and Plum 'Angelino': Vase and Tatura Trellis**

For apricot and plum, Tatura Trellis out yielded Vase trees in establishment years due to having larger tree size (light interception) and capacity to carry more fruit number. Tatura Trellis resulted in more uniform fruit weight and maturity compared to Vase canopy systems. Greater vegetative growth (pruning biomass, trunk growth) occurred on Vase tree despite having lower tree size (light interception).

### **Peach 'August Flame' and Nectarine 'Autumn Bright': Vertical Leader and Tatura Trellis**

For peach and nectarine, similar production (yield, fruit quality) outcomes were observed between Vertical Leader and Tatura Trellis canopy systems.

From a vegetative growth perspective, trunk size was not different between Vertical Leader and Tatura Trellis canopy systems. However, greater pruning biomass (summer and winter) occurred under Tatura Trellis.

Greater and more uniform light interception occurred under Tatura Trellis canopies despite taller trees under Vertical Leader trees. These light regimes responses reflect the canopy design and architecture of each training system (i.e. V shape 3-D Tatura Trellis canopy versus vertical 2-D hedgerow trellis canopy).

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