



ACE RESEARCH PROJECT

Ultra-High Density Planting (PFR)

Importance

The ultra-high-density planting trial aims to gather knowledge, data and observations. The trial combines two genotypes characterised by architectural features considered to be better suited to high-density growing systems, high productivity and precocity (a key element for Australian conditions) with vigour-controlling rootstocks. UA102 (R36T212), an unreleased University of Adelaide genotype, exhibits fruiting on 'axillary' or 'lateral' buds on long lengths of one-year-old wood, as well as on short shoots arising from 2- and 3-year-old wood. This results in an open canopy with a 'columnar' type branch habit which suggests it may suit a planar canopy system.

Features

Planted in August 2022 with the cultivars 'Carina' on Controller™ 6 rootstock and UA102 (R36T212) on 'Nemaguard', this trial compares two growing systems, each at two densities i.) a tall, narrow "slender pyramid" shaped trees with minimal pruning at densities of 1,111 (4.5 m x 2 m) and 1,428 (3.5 m x 2 m) trees/ha and ii) an informal "planar cordon" type-tree at densities of 740 (4.5 m x 3 m) and 952 (3.5 m x 3 m) trees/ha. The trial occupies eight rows, row 1-4 are planted at a distance of 3.5 m and rows 5-8 at 4.5 m. Row 1 and row 8 are used as border rows and all trees are trained as tall, single trunk trees. The top three trees are used as border trees, from tree 4 the training system changes every block of 5 trees starting with "slender pyramid" shaped trees planted 2 m apart and alternating with the informal planar system with trees 3 m apart.

Results (Last Updated, July 2023)

This trial has been planned with a focus on mechanization of orchard operations. A condition for mechanized harvest, for example, with shake and catch-type machines is to have a trunk height above 80-90 cm. The 'Carina' trees were all already at least 3 m tall at the time of planting so that soon after planting the trunks were cleared up to 1 m height. This was also the height where the future "planar trees" were topped. The topping of the planar trees allowed for the selection of the two branches to train to become the future "cordons" of the planar system. The next step in the training process was to determine a suitable method to ensure the desired position, angle and growth of the two "cordons" of the planar system without relying on a trellised structure



with posts and wires. The use of bamboo stakes and twine was trialed. This system has so far ensured the growth of the cordons at the desired angle, this was obtained by wrapping the shoots loosely around the twine. The shoots have lignified and, for most trees, in January 2023, they had grown to almost the full length required to fill the space between two trees.