



ACE RESEARCH PROJECT

Pruning Responses (PFR)

Importance

The pruning response trial focuses on evaluating almond varieties, rootstocks and management strategies better suited to closer plantings and to better understand how tree management/pruning affects the orchard light environment and crop maturation. The trial aims to assess whether minor modifications to standard nursery practices can have a positive impact on the quality of almond orchards in the future. The trial's findings will provide insights into the effects of pruning practices, nursery management and tree structure on almond orchard performance and inform future cultivation techniques for improved almond production.

Features

Planted in 2018, the trial encompasses a density of Horizon 3, with row spacings of 4.5m and tree spacings of 3m. Various almond varieties ('Nonpareil', 'Maxima', 'Carina', 'Vela' and 'Shasta') are included in the trial, all grafted onto Garnem rootstocks. In contrast to standard practices, starting in the nursery, trees are selected to have a single dominant trunk with multiple side branches. They are then grown in the field with different training/pruning methods to produce the desired narrow tree shape.

Results (Completed, 2023)

The trial has delivered pruning recommendations for growers to maintain high productivity in higher density orchards, together with information on early tree establishment from the nursery to the orchard.

Within each variety and across the four harvests, only minor yield differences were found between pruning methods, i.e., dormant-budded trees had a slight yield advantage over those in other treatments in 2021 (Table 1). Differences in yield between varieties were found over the four seasons. 'Carina' and 'Vela' showed increasing yield from 2020 to 2023, with 'Vela' yielding as high as 4.4 t/ha in this last 2023 season. Yield from 'Maxima' was low in 2022 but it almost doubled in 2023 (from 1.75 t/ha in 2022 to 3.32 t/ha in 2023). 'Nonpareil' produced very small crops in 2023, possibly owing to the bad weather during flowering. The self-fertile varieties did not seem to have been affected by the weather conditions as much as 'Nonpareil'.



However, Shasta, despite being self-fertile, did show a mild drop in yield in 2023 compared with that in 2022.

Table 1. Kernel yield per hectare of 'Carina', 'Maxima', 'Nonpareil', Shasta® and 'Vela' almond trees planted in July 2018 at 4.5 x 3 m spacing (741 trees/ha) at the Almond Centre of Excellence (ACE) in Loxton. Values in each column followed by the same letter are not significantly different ($p < 0.05$).

Cultivar	Yield (t/ha)			
	2020 (2 nd leaf)	2021 (3 rd leaf)	2022 (4 th leaf)	2023 (5 th leaf)
'Carina'	0.12	2.12 c	2.72 b	3.32 b
'Maxima'	0.30	3.50 a	1.76 c	3.32 b
'Nonpareil'	0	2.30 b	3.46 a	2.47 c
Shasta	0.24	1.61 d	2.34 b	2.10 c
'Vela'	0	2.39 b	3.71 a	4.45 a

The general observations from this trial were as follows:

1. Unpruned (Control) trees and the narrow-pruned trees produced trunks with scaffold branches evenly spaced over a zone from 70 to 120 cm above the ground.
2. Small, late-budded trees had a more condensed zone of scaffold branches over a zone from 70 to 90 cm above the ground, as these trees were relatively small when planted.
3. Bare pole trees also produced scaffold branches evenly spaced over a zone from 70 to 120 cm above the ground, but these branches were more horizontal than those on the unpruned trees.
4. Dormant-budded trees grew well but practically all the scaffold branches developed from or in close proximity to the "sleeping eye" bud, which will be a point of weakness as the trees age.