NATIONAL TREE CROP

Intensification In Horticulture Program

(AS18000)

ALMOND

This is a project of the *National Tree Crop Intensification in Horticulture Program (AS18000)*, funded by the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from Plant & Food Research, South Australian Research and Development Institute, Hort Innovation using the Almond research and development levy, and contributions from the Australian Government.

ACE Open Day

Nov 14th 2023

The Team

Roberta De Bei – Senior scientist temperate tree physiology

Wayne Kiely – Research assistant

Nick Timbs – Research assistant

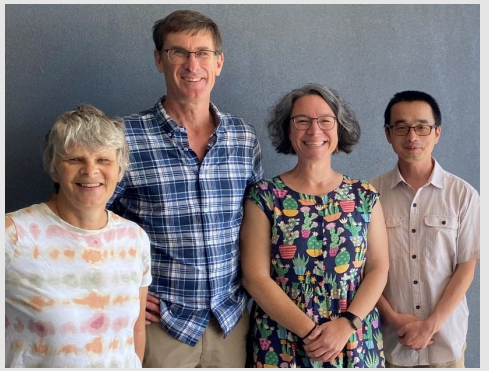
Jill Stanley –Science Group Leader, Fruit Crops Physiology

Ken Breen – Team leader, temperate tree physiology

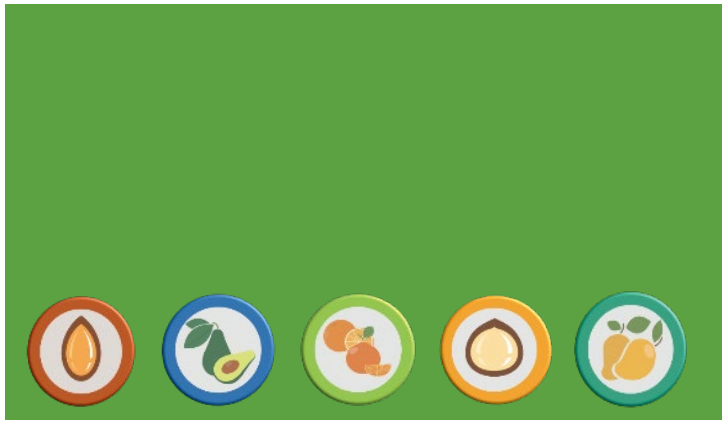
Other contributors:

Lisa Evans and **Brian Cutting** - Pollination Ecology

Junqi Zhu- Modelling, cropping systems and environment



AS18000 Project aims



To increase almond orchards
productivity
and
profitability
by intensifying the production systems used by Australian almond growers

PFR Research Trials at ACE

Architectural studies

(concluded 2022)

AIM: To identify cultivars (15 tested) that are better suited to intensive production systems

Pruning Responses

(Concluded 2023)

AIM: To test training/pruning systems (5 tested: Narrow prune, Late budded, Central leader, Bare pole and dormant budded) suitable for high density orchards (740 trees/ha)

PFR Research Trials at ACE

High Density

AIM: To test the performance of narrow, central leader-type trees at densities of 513, 769, 741 and 1,111 trees/ha

- ✓ Planted in July 2018
- ✓ Cultivars Shasta® and 'Vela'
- ✓ Rootstock: 'Nemaguard' rootstock
- ✓ Treatments: planting densities of
  - 513 (6.5 x 3 m),
  - 769 (6.5 x 2 m),
  - 741 (4.5 x 3 m)
  - 1,111 trees per ha (4.5 x 2 m)

SHASTA®

Harvest 2023

	Planting distance (m)			
	4.5x2	**4.5x3**	**6.5x2**	**6.5X3**
Cumulative yield 2020-2023 (4th leaf) (t/ha)	7.9 a	7.7 a	5.1 b	5.2 b
Kernel yield (t/ha) 2023	3.7 a	3.7 a	1.5 b	1.6 b
Kernel yield (kg/tree) 2023	3.3 b	5.0 a	2.4 c	2.4 c
Kernel defects (% pinching)*	32.7 b	30.3 b	40.7 a	39.2 a
Kernels/tree (number)	2275 b	3358 a	1655 c	1616 c
Irrigation (kL/tree)	14.9	22.3	14.2	21.3
Water use efficiency (L/g kernel)	4.6 b	4.6 b	6.8 a	9.2 a
Trunk diameter (cm)**	8.9 c	10 b	9.7 b	11.3 a
Tree height (m)	3.68	3.68	3.83	3.71
Canopy width (m)	2.29 c	2.31 c	2.60 b	2.89 a

‘VELA’

Harvest 2023

	Planting distance (m)			
	4.5x2	**4.5x3**	**6.5x2**	**6.5X3**
Cumulative yield 2021-2023 (4th leaf) (t/ha)	9.3 a	8.9 ab	8.6 ab	7.9 b
Kernel yield (t/ha)	4.3	3.9	3.6	3.6
Kernel yield (kg/tree)	3.9 c	5.3 b	4.7 bc	7.1 a
Kernel weight (g)	1.67	1.68	1.65	1.67
Kernel defects (% pinching)*	7	7	6	7.5
Kernels/tree (number)	1244 d	1326 c	1535 b	1612 a
Irrigation (kL/tree)	14.9	22.3	14.2	21.3
Water use efficiency (L/g kernel)	4.3 a	4.3 a	3.1 b	3.1 b
Trunk diameter (cm)**	11.7 b	13.5 a	11.8 b	14.1 a
Three height (m)	4.4 a	4.3 a	3.9 b	4.0 b
Canopy width (m)	4.9	5.0	4.7	5.0

PFR High Density trial planted 2018

Shasta® (left) and ‘Vela’ (right) on 4.5 m rows

Red line shows pruning cut position in winter 2023 to improve light penetration

Photo taken in February 2023

PFR High Density trial planted 2018

Shasta® (left) and ‘Vela’ (right) on 4.5 m rows

Red line shows pruning cut position in winter 2023 to improve light penetration

Photo taken in August 2023

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THANK-YOU