

# SARDI

## Early performance of Australian multi-cultivar density optimisation trial



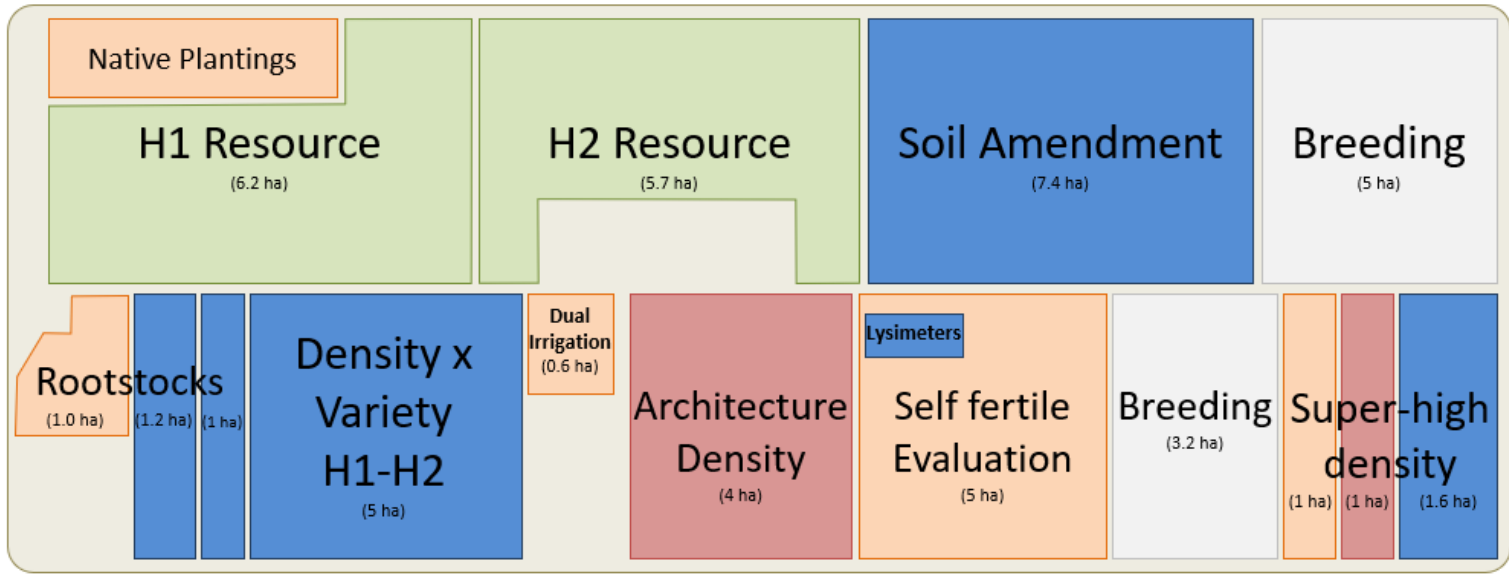
ABA Research & Development Forum  
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# Almond Centre of Excellence

60 ha experimental orchard north of Loxton, SA



# SARDI research questions at ACE

- Optimising planting density
- Canopy metrics and root density / distribution
- Resource use efficiency / stress tolerance
- Soil amendments
- Alternate genotypes



# Harvest operations



# Automated assessment



## Mobile Orchard Phenotyping Platform (MOPP)

LiDAR, Thermal, NDVI, Pyranometer Light Array



## Drone platforms

RGB, Multi-spec, Thermal



**+40 Soil moisture probes**



# Optimising planting density

## Horizon 1

6.5 x 5 m (308 trees/ha)



## Horizon 2

6.5 x 2.5 m (615 trees/ha)



## Horizon 3

4.5 x 1.5 m (1481 trees/ha)



H1-H2 Trial: six step density transition

H2-H3 Trial: three step density transition



# Optimising planting density

## H1 – H2: Variety x Density trial



**Established** 2018/19

**Four varieties** Nonpareil, Shasta, Carina & Vela

**One rootstock** Garnem

<b>Six densities</b> (trees/ha)	308 (6.5 x 5.0 m)	440 (6.5 x 3.5 m)
	342 (6.5 x 4.5 m)	513 (6.5 x 3.0 m)
	385 (6.5 x 4.0 m)	615 (6.5 x 2.5 m)

**NONPAREIL (23%)**

**SHASTA (25%)**

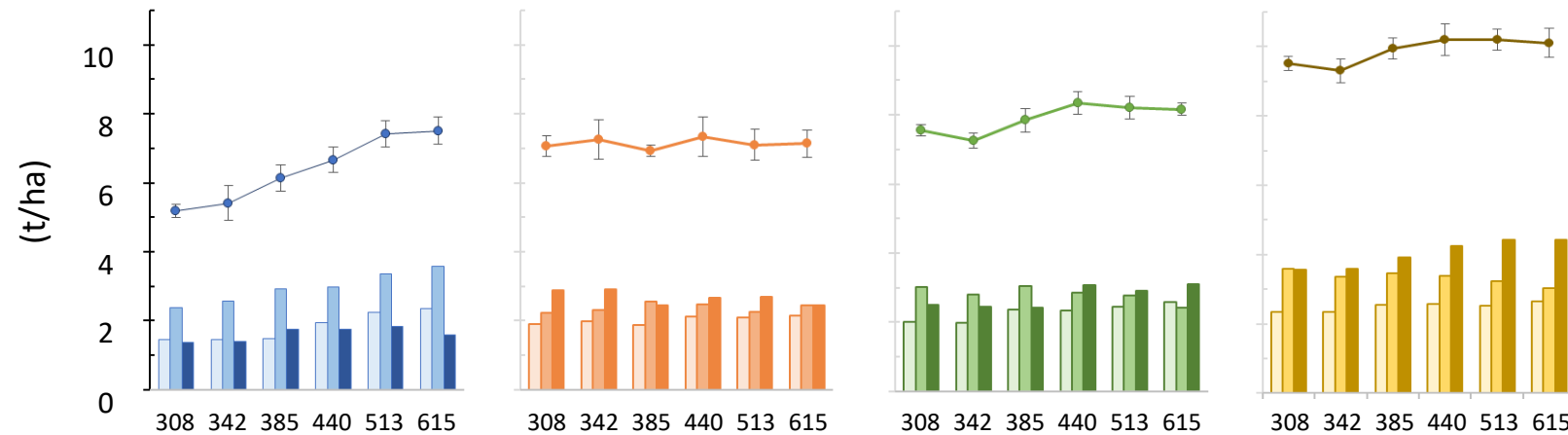
**CARINA (20%)**

**VELA (+32%)**

Kernel size (avg.)



Annual and cumulative kernel yield (5<sup>th</sup> leaf)



Density (trees/ha)



1.6 ha (1520 trees)



# Optimising planting density

## H2 – H3: Variety x Rootstock x Density trial

**Established** 2019/20 (small potted ‘Smart Trees’)

**Two varieties** Shasta & Vela

**Three rootstocks** Controller-6 Controller-7 Rootpac-40

<b>Three densities</b>	635	(4.5 x 3.5 m)
(trees/ha)	889	(4.5 x 2.5 m)
	1481	(4.5 x 1.5 m)





Vela



Shasta





Agromillora Group



SuniTAFE



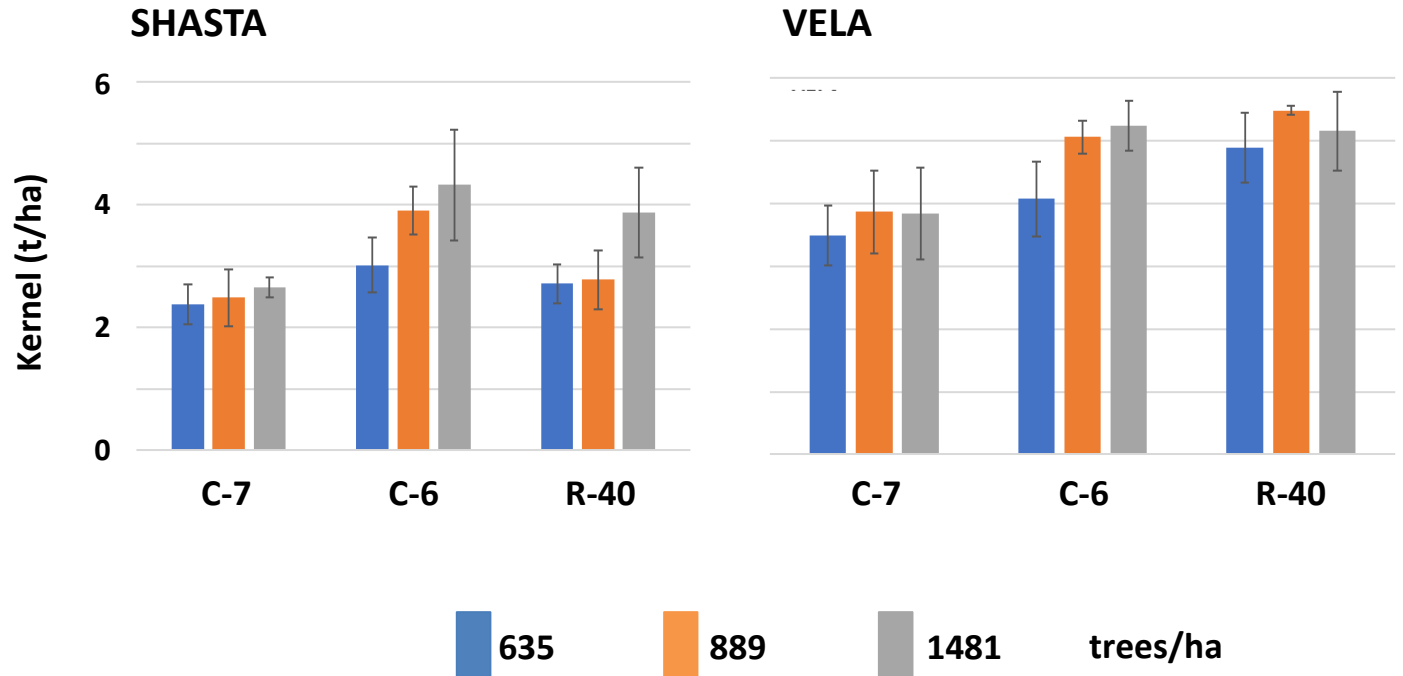
Tenias



Tenias



# Cumulative yields H2-H3 (3<sup>rd</sup> leaf)



# Nut Quality



**Doubles**



**Discoloured**



**Pepper spotting**



**Scabbing**

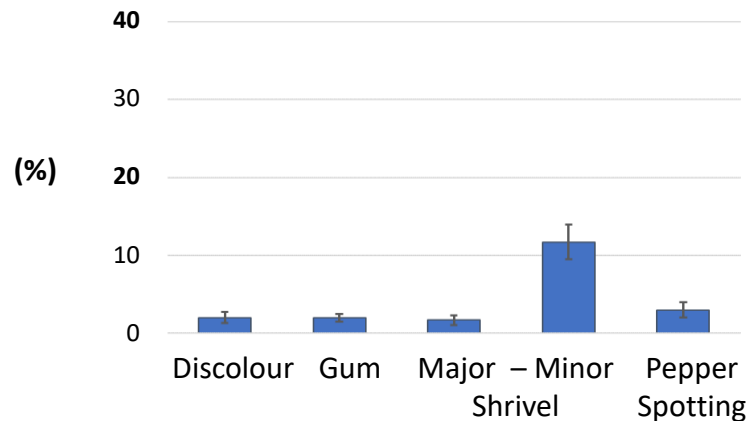


**Shrivel**

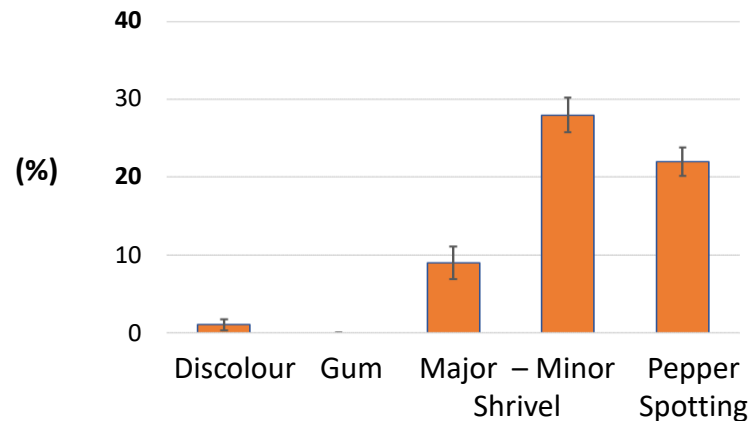


**Gumming**

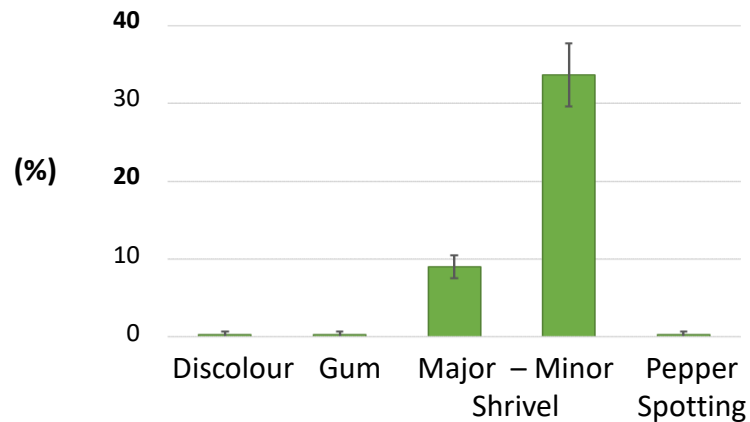
## NONPAREIL



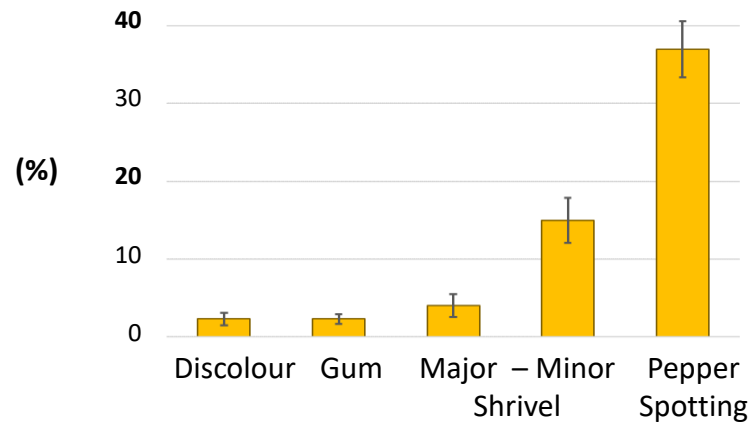
## SHASTA



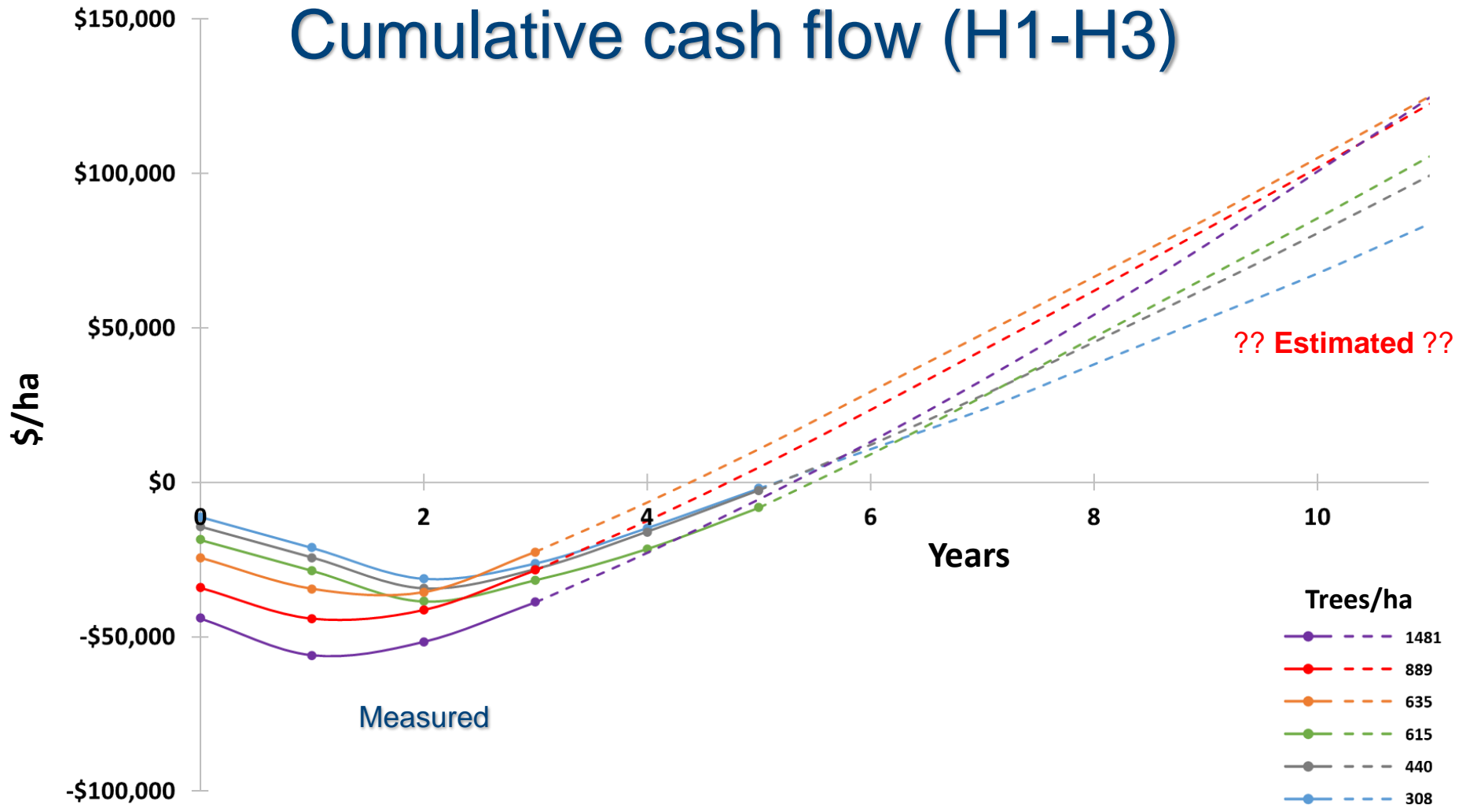
## CARINA



## VELA



# Cumulative cash flow (H1-H3)



# Acknowledgements

## Project Team:

- Nigel Fleming (remote sensing & soils)
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- *Michael Treeby (AVR)*
- Anthony Wachtel (ABA)
- Michelle Wirthensohn (UoA)





# Further information:

SARDI Loxton Research Centre +61 8 8595 9100

SARDI Waite Campus +61 8 8429 2299

[www.horticulture.com.au](http://www.horticulture.com.au)

[tim.pitt@sa.gov.au](mailto:tim.pitt@sa.gov.au)

