

Century Orchards – Almonds – Australia 2024

Harvest Harmonics' CASE STUDY

Time

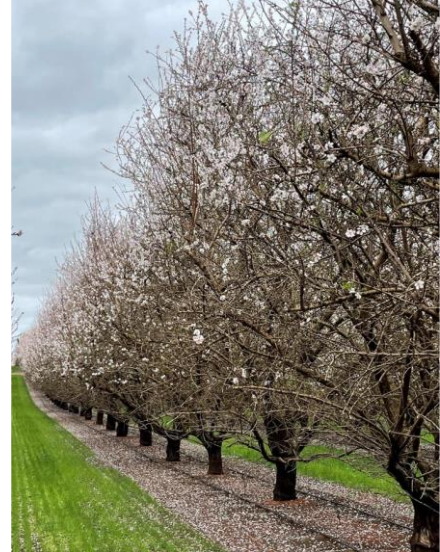
- The almond trees were planted several years ago.
- Flowering date: July-September 2023
- Harvest ended: May 2024.

Location

- Century Orchards, Luxton, Suth Australia

Details

- Crop: mature almonds of five varieties – Nonpareil, Carmel, Monterey, Vela, and Carina.
- Three orchard blocks were treated with KPCB¹, with a total area of 22.56 hectares.
- Three Control blocks were assigned, with a total area of 2.3 hectares. Each of these blocks was assigned to a similar KPCB-treated block, with a matching variety per protocol.
- Each KPCB block had five treatments, each spanning five rows of trees for repeatability:
 - KPCB with 0% reduction of inputs
 - KPCB with 10% reduction of inputs
 - KPCB with 20% reduction of inputs
 - KPCB with 30% reduction of inputs
 - KPCB with 40% reduction of inputs.
- Fertigation was delivered through the same drip irrigation; therefore, each of these reduction rates indicates a specific reduction of both water AND fertigation for each treatment.



Results

A tabulated summary of the results for the 2023-2024 seasons is provided on the next page.

On average, almond trees treated with KPCB achieved significant yield gains over their respective Control blocks, with the following differences in **Overall Yield Gain**:

- Rows 38-42 with 0% reduction: **31% higher yield** vs. Control
- Rows 43-47 with 10% reduction: **29% higher yield** vs. Control
- Rows 58-62 with 20% reduction: **31% higher yield** vs. Control
- Rows 48-52 with 30% reduction: **23% higher yield** vs. Control.
- Rows 53-57 with 40% reduction: this reduction level lost 12% in yield vs. Control, which is not considered a failure, but an intended outcome of this type of trial – to discover the exact limits of water savings and fertigation savings that can be achieved while using KPCB technology. In this case, the grower examined these results and wisely decided to discontinue the 40%

¹ Kyminasi Plants/Crop Booster

reduction and revert it to 0% reduction. This switch would make Rows 53-57 (40% reduction) like Rows 38-42 (0% reduction) which are expected to achieve a yield gain of 31% or thereabout.

- The grower is happy with these results and savings; they will continue using KPCB for the next two seasons, with input reduction levels between 0% and 30%.

Row #	Variety	Weight 1	Weight 2	Trial Treatment	Gross Ton/Row	Approx. Ton/Row	# of Ha	Yield (t/ha)
Tree Block C1								
38	Nonpareil	2.84		HH Control (no reduction)	2.84	0.89	0.15	4.59
39	Carmel	1.74			1.74	0.52	0.15	3.58
40	Nonpareil	2.4			2.40	0.76	0.15	
41	Monterey	1.64			1.64	0.48	0.15	3.25
42	Nonpareil	1.16			1.16	0.37	0.15	
43	Carmel	1.4		10% Reduction	1.40	0.42	0.15	2.70
44	Nonpareil	1.96			1.96	0.62	0.15	4.20
45	Monterey	1.34			1.34	0.39	0.15	2.66
46	Nonpareil	1.94			1.94	0.61	0.15	
47	Carmel	1.22			1.22	0.37	0.15	2.51
58	Nonpareil	2.04		20% Reduction	2.04	0.64	0.15	3.65
59	Carmel	1.2			1.20	0.36	0.15	2.47
60	Nonpareil	1.36			1.36	0.43	0.15	
61	Monterey	1.52			1.52	0.44	0.15	3.01
62	Nonpareil	1.68			1.68	0.53	0.15	
48	Nonpareil	2.1	2.4	30% Reduction	4.50	1.42	0.15	3.23
49	Monterey	1.24			1.24	0.36	0.15	2.46
50	Nonpareil				0.00	0.00	0.15	
51	Carmel	1.28			1.28	0.39	0.15	2.63
52	Nonpareil				0.00	0.00	0.15	
53	Monterey	1.08		40% Reduction	1.08	0.31	0.15	2.12
54	Nonpareil				0.00	0.00	0.15	0.00
55	Carmel	1.06			1.06	0.32	0.15	2.18
56	Nonpareil				0.00	0.00	0.15	
57	Monterey	1.06			1.06	0.31	0.15	

Block Avg	Treatment vs Control	All Treatments vs All Controls	% Improvement from Control
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3.81	122%	131%	31%
3.02	96%	129%	29%
3.04	97%	131%	31%
2.77	89%	123%	23%
1.43	46%	88%	-12%

Row #	Variety	Weight 1	Weight 2	Trial Treatment	Gross Ton/Row	Approx. Ton/Row	# of Ha	Yield (t/ha)
Tree Block G10								
12	Nonpareil	2.14		Control	2.14	0.67	0.17	3.92
13	Carmel	1.72			1.72	0.52	0.17	2.99
14	Nonpareil	2.22			2.22	0.70	0.17	
15	Monterey	1.48			1.48	0.43	0.17	2.48
16	Nonpareil	2.1			2.10	0.66	0.17	

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Season to Season Effect

When comparing the average yield gains attained for the different water and fertilizer reduction levels, we find the following differences between this 2023-2024 season compared to the previous 2022-2023 season:

- In the 0% reduction almonds, the gain of in KPCB over Control has risen from **+20% higher yield** to **+31% higher yield** – an improvement of 55% season to season,
- In the 10% reduction plots, the yield gain of KPCB vs. Control has improved **from +24% to +29%** – an improvement of 21% season to season,
- In 20% reduction almonds, **from +22% to +31%** – an improvement of 41% season to season,
- In 30% reduction almonds, from **+20% to +23%** – an improvement of 15% season to season.

Reduction Level	Gain over Control 2022-2023 season	Gain over Control 2023-2024 season	Improvement (%) season-to-season
0%	20%	31%	55%
10%	24%	29%	21%
20%	22%	31%	41%
30%	20%	23%	15%

The **average 33% improvement** from one season's YIELD GAIN to another seems to indicate **significant soil improvement** in all treated plots.

Conclusions

Upon the results of this almond trial, produced over the span of two seasons, we can draw the following conclusions:

- Almond trees of the varieties Nonpareil, Carmel, Monterey, Vela, and Carina, have achieved improved seasonal yield with Harvest Harmonics' Kyminasi Plants/Crop Booster technology,
- KPCB applied with 0% reduction in water and fertilizer achieved 31% higher yield vs. Control,
- KPCB with 10% reductions in water and fertilizer achieved 29% higher yield vs. Control,
- KPCB with 20% reductions in water and fertilizer achieved 31% higher yield vs. Control – same as 0% reduction but with 20% of water savings and 20% of fertilizer savings,
- KPCB applied with 30% reductions in water and fertilizer achieved 29% higher yield vs. Control,
- The 40% reduction of inputs has proven too drastic for these almond trees, thus satisfying the primary goal of gradual input reduction, which was to identify the breaking point of reduction level,
- Not less importantly, this trial has proven gradual improvement in yield boost from season to season (like we have seen in other crops and other countries) which is attributed to **gradual soil improvement** in plots treated with KPCB technology.