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Case Study: Self-fertile variety block plantings, early observations by GO.FARM's team at Bembaala Orchard

Introduction

Evaluating self-fertile almond varieties in block plantings needs to consider both the benefits and constraints observed when grown under this production system.

GO.FARM's team at Bembaala Orchard, near Katunga in Victoria's Goulburn Valley, provides a commercial example of large-scale plantings of self-fertile varieties grown in 'single block' plantings.

Traditional almond orchards alternate rows of nonpareil with at least one other variety to enable cross pollination. Mixed varietal systems add complexity in management because flowering, irrigation and fertiliser requirements, pest and disease susceptibility, spray timing, growth habit and harvest maturity vary between varieties.

The introduction of self-fertile almond varieties means blocks can be planted with one variety, reducing the variability between rows and providing the opportunity for management practices to be fine-tuned and applied across a more uniform block.

The GO.FARM team have provided a practical grower perspective on various observations including on staff training, spray planning, irrigation and fertigation, harvest logistics and block uniformity.

GO.FARM Bembaala Orchard Profile

Detail	Description
Growing Region	Katunga, Goulburn Valley
Average Annual Rainfall	468mm
Production System	Self-fertiles in single variety block plantings
Property Size	800ha
Varieties	Shasta, Pyrenees
Rootstock	Nemaguard
Planting Density	408 trees/ha (7m x 3.5m)
Planting Years	2023, 2024, 2025

Rethinking orchard design with self-fertile varieties

For GO.FARM, the objective was to assess whether single self-fertile variety blocks ('single block' system) could improve operational consistency and reduce management complexity at Bembaala orchard. The main areas of interest were spray timing, crop protection, irrigation, fertigation, pest and disease scouting, harvest flow, machinery logistics, staff training and pruning consistency. The team summarised the value of the system as "Anything that you can control is simpler when you're only treating one variety

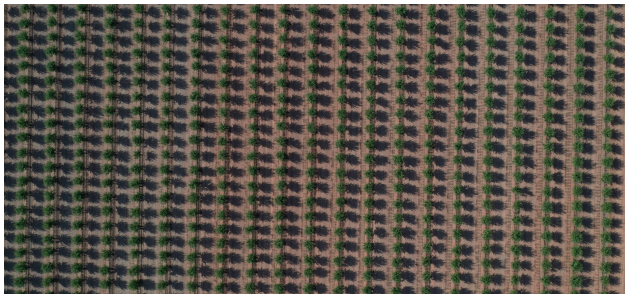
In GO.FARM's experience the system does not remove all complexity; differences in soil type, tree age and block performance still require targeted management, but the overall system has fewer variables than traditional mixed plantings.

Early observations show that block plantings of only one variety allow for simpler day to day operations. With one variety in a block, pruning has one target structure, spraying has one main crop stage and pest monitoring has one variety to focus on. Instructions can be communicated more clearly and applied consistently across large areas. A practical summary was: "We make less mistakes because there's less mistakes that can be made."

For GO.FARM, the value of self-fertile varieties extends beyond their reduced reliance on honeybees for cross-pollination. The greater value is the opportunity to simplify controllable aspects of orchard management and manage them more consistently.

Staff training and communication

The system has also simplified staff training and supervision. Several team members at Bembaala orchard had limited horticultural experience before joining the orchard. Single variety blocks allow staff to learn one tree type, one task and one set of instructions, then repeat that task across a large area. This is particularly useful for pruning, spraying and monitoring.



Birds eye view of Shasta planted in a single self-fertile block planting at GO.FARM's Bembaala Orchard.

Monitoring and spraying

Uniformity also helps with scouting. Where most trees look the same, weak trees, dead trees, replants or stressed trees are easier to identify. The team gave the example of trees affected by water pooling at the end of blocks. They stood out because they looked different from surrounding trees. This does not replace skilled monitoring, but it can make problems easier to see.

Spray planning is simpler because a single recommendation can apply across a large area where the crop stage is generally consistent. This reduces the risk of spraying the wrong row, targeting the wrong variety or missing timing because different rows are at different stages.

Irrigation and fertiliser

The single variety block system has simplified irrigation and fertigation design and planning. Bembaala orchard has variable soils, ranging from sandy areas through to heavier clay areas, so irrigation still varies between blocks. However, the 'single block' system removes the need to install multiple valves to irrigate alternating rows as required for mixed plantings. Fertigation can also be planned more consistently across large areas, with adjustments made where required based on soil tests, tree age and block performance. The trees within the same irrigation unit are at the same growth stage so fertiliser application can be more precise.

Harvest

Harvest logistics are another important outcome. The aim is to work through one block, complete it, then move on. This can reduce machinery movement, simplify staff coordination and make it easier to keep up with machinery maintenance, and have water trucks and harvest equipment close to where work is occurring. The system may also have relevance for smaller orchards where growers want to reduce complexity, simplify harvest timing or avoid repeated passes through the same rows.

Challenges

The system has also highlighted practical challenges. Very uniform blocks can make navigation harder because blocks and headlands look similar. Maps, end of row tags and clear block identification are important.

A future challenge will be managing larger volumes of crop on the ground as trees mature. If a large single variety block is shaken quickly, pickup and transport capacity must keep up. Rain after shaking can add pressure on the harvest process if the crop has been shaken before it has rained and needs to be turned or dried before being picked up. It is expected that the solution will be logistics, machinery and planning rather than changing the single block approach.

Having large continuous plantings of one variety also carries risk and increased exposure to crop losses if that variety has a weakness. GO.FARM manages this by investigating variety characteristics suitable for the location and planting multiple self-fertile varieties in separate blocks across its orchards, spreading variety-specific exposure while retaining the operational benefits of the system.



Aerial image of GO.FARM's Bembaala Orchard, near Katunga in Victoria's Goulburn Valley showing young trees planted in single self-fertile variety blocks.

Lessons for other growers

The GO.FARM experience at Bembaala orchard suggests that single-block plantings can simplify orchard management, particularly where scale, labour training, supervision and machinery logistics are major considerations.

Growers considering this system should assess variety mix across the orchard, harvest capacity, pollination strategy, soil variability, staff systems, navigation and pest and disease susceptibility.

Self-fertile does not mean bees are automatically unnecessary rather it reduces the reliance on honeybees as each bee has greater pollination efficiency as there is less distance to travel to fertilise flowers on the same tree and in the same row. Any change to hive numbers should be supported by local evidence across more than one season.

Key take home messages

1. The system is not only about reducing the reliance on honeybees for pollination, its main value is in simplifying controllable aspects of management and managing them more consistently.
2. Single self-fertile variety block plantings can reduce variability within each block and simplify decision making compared to mixed plantings with alternating rows.
3. At Bembaala orchard, the main benefits observed so far are easier staff communication and training, clearer monitoring and spray planning, less complex irrigation and fertigation requirements and simpler harvest logistics.
4. Don't rely on one variety. Plant multiple self-fertile varieties in separate block plantings, to minimise any potential risk.

This case study was developed as part of the Hort Innovation Project AL22000, Evaluating self-fertile varieties in block plantings for almond growers. For more information about this project please visit: https://www.horticulture.com.au/information-hub/our-projects/project-reports/al22000



Shasta trees at GO.FARM's Bembaala Orchard, near Katunga in Victoria's Goulburn Valley.

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