Department of Primary Industries
and Regional Development

NSW GOVERNMENT

Case study

Boosting on-farm biodiversity with direct seeding

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A practical approach to enhancing pollination, pest control and soil regeneration

Snapshot

Grower: Jascha Saeck, Blueberry Fields
Location: Brooklet, Northern NSW
Crops grown: blueberries, raspberries and blackberries
Farm size: 100 acres
Years in operation: 20 years

The challenge

Over time, Jascha noticed several issues that were preventing the crop from reaching its potential yield and he needed practical solutions. Like many berry growers, he relied heavily on managed honey bees for pollination, which had become harder to obtain and more expensive since varroa mite arrived in Australia. This raised doubts about long-term pollination security.

As well as this, the inter-rows were dominated by grass, offering little habitat or floral resources for native pollinators or beneficial insects. This meant the farm was not using the services available from wild pollinators, predators, and parasitoids.

Further compounding the issue, several blocks were nearing the end of their productive life (over 10 years old). Jascha wanted to rebuild soil fertility before replanting to ensure the next crop established well. He was looking for a practical, minimum-tillage solution that could improve pollination above the ground and soil health below the ground.

Jascha wanted a solution that delivered dual benefits (pollinator support + soil improvement), could be implemented with minimal disturbance to existing plants, was repeatable across multiple blocks and seasons, would fit within the narrow inter-rows of his established blueberry system and did not require expensive or unpredictable external inputs.

Opportunities

To overcome the combined challenges of pollination reliability, declining soil fertility, and grass-dominated inter-rows, Jascha explored a range of management strategies. Each option varied in cost, practicality, and suitability for a permanent blueberry system. He decided that planting species to increase plant diversity was the best approach and explored several equipment and implementation options to do this.

Broadcasting was initially considered due to its low cost. However, seed placement would be uneven, competition from existing grass would be high, and many species require soil contact or light incorporation to establish successfully.

Hiring a contractor offered the advantage of professional machinery and reduced labour demands. The downside was limited availability, a higher cost per pass, and the challenge of finding equipment narrow enough for mature blueberry inter-rows.

Jascha also explored drone seeding, which offers advantages such as avoiding ground traffic, covering large areas quickly and operating in wet or difficult terrain. However, it has limitations, including poor penetration into dense grass, less precise seed placement and strong reliance on prior surface preparation. While promising, drone seeding alone was unlikely to deliver consistent establishment without additional ground-based preparation.

A narrow, direct drill seeder emerged as the best option that combined precision, consistent seed placement, minimal disturbance, and compatibility with existing row spacing.

Practice implemented

A direct drill seeder was the only option that met all criteria. It allowed Jascha to sow flowering species to attract pollinators as well as soil-improving cover crops precisely where he needed them, without ripping up or disrupting the inter-rows. After trialling options and discussing with other growers and advisors, he chose the Cosmo Bully® seven-disc direct drill because of its narrow width, simple design, and ability to operate in compacted rows.

The Cosmo Bully® seven-disc direct drill seeder (Figure 1, left) is narrow enough (1.4 m seeding width, 1.9 m total width) to pass between blueberry rows while seeding the flat section of the inter-row. The machine features:

- a front cutting disc to slice through surface material (Figure 1, right)
- a seeding placement disc for accurate seed delivery (Figure 1, right)
- a ground compaction wheel to ensure seed-to-soil contact
- dual seed trays with adjustable seed rates.

To handle the farm’s compacted soil, heavier springs were fitted to improve disc penetration.

Figure 1. The Cosmo Bully® seven-disc direct drill seeder used to sow pollination/green manure mixes in blueberry inter-rows (left). Some features include a front cutting disc to slice through surface material and a seeding placement disc for accurate seed delivery (right).

Choosing a seed mix containing both annual and perennial species with varied flower colours helps ensure a consistent and long-lasting supply of floral resources in berry systems.

Jascha selected 2 seed mixes (Figure 2) to test with the direct seeder:

1. Pollinator/insectary mix: buckwheat, crimson clover, mustard, tillage radish, chia and field peas. This mix is designed to attract native pollinators, predators, and parasitoids.
2. Green manure winter blend mix: Tetila ryegrass, rye corn, vetch, lupins, chia, oats, cow pea, tillage radish, clover, leafy turnip, and brassica. This mix is designed to build organic matter and cycle nutrients.

Figure 2. The seed mixes trialled using the direct seeder.

Results and observations

The introduction of pollinator-friendly species such as buckwheat, clovers, and field peas resulted in a noticeable increase in flowering diversity across the farm. In the areas where the seed was placed on prepared mounds and lightly scarified inter-rows, these species established quickly and produced abundant flowers throughout the growing period (Figure 3).

Figure 3. Pollinator-friendly species such as buckwheat, clovers, and field peas produced abundant flowers.

While formal monitoring was not undertaken, Jascha observed increased activity from native bees, hoverflies, and other beneficial insects in these seeded zones. These observations suggest improved on-farm biodiversity and pollination, particularly when honey bee activity was reduced.

However, because dedicated research was not conducted, the extent of these benefits remains uncertain, and further work is needed to quantify the true effect on pollination services and beneficial insect populations.

The green manure species (vetch, lupins, rye, and tillage radish) established well (Figure 4) and produced noticeable biomass. After these crops die off or are mowed, the plant residues are expected to contribute organic matter and improve soil structure, water movement and nutrient cycling ahead of replanting.

Deep-rooted species such as tillage radish appeared to help loosen the upper soil profile in some mounds, potentially creating channels for future root growth. While no formal soil monitoring was undertaken, Jascha observed that the soil in treated areas felt more friable and easier to work, suggesting early signs of improvement. Further monitoring would be required to confirm the longer-term effects on soil health and establishment of the next blueberry crop.

Figure 4. The green manure species (tillage radish, cow pea and leafy turnip) established well.

The greatest variation occurred in the inter-rows. Where competition from grasses had been reduced by timely mowing or light scarification, the cover crops established well and shifted the vegetation profile from unproductive grass to a more diverse, functional ground cover.

In high-traffic areas or zones compacted by repeated wheel tracks, germination was consistently poor. Even after adjusting seeding timing, altering mowing height, and trialling light scarification, these heavily compacted strips remained difficult to establish. The direct drill seeder struggled to achieve adequate penetration in this hard soil, and seeds competed poorly with grass species. Options such as targeted decompaction, alternative equipment settings, or different species mixes might need to be explored to overcome this ongoing challenge.

Grower reflections and lessons learned

Jascha's experience demonstrated both the potential and the practical reality of introducing greater biodiversity into a permanent blueberry system. Overall, he found that using a direct drill seeder to establish pollinator mixes and green manure crops was a promising approach, particularly where surface preparation and timing were well managed.

One of the main reflections was that grass competition is the biggest challenge to success. In areas where the inter-row was lightly scarified or well-timed mowing reduced grass pressure, establishment was strong, and the benefits were quickly visible. In contrast, compacted wheel tracks and heavily trafficked zones consistently underperformed, highlighting that soil condition remains a limiting factor despite the precision of direct drilling. Jascha noted that future work might need to explore targeted decompaction, equipment adjustments, or species better suited to compacted soil.

Jascha was encouraged by the increased flowering diversity and the presence of more native pollinators and beneficial insects in seeded areas. While these observations were informal, they suggest that even small increases in floral resources can enhance biodiversity within the crop. Jascha emphasised that the real benefits are likely to accumulate over multiple seasons, reinforcing the importance of persistence and long-term planning.

A significant lesson learned was that equipment choice matters. The narrow direct drill seeder proved to be the only practical option for operating within standard mature blueberry inter-rows, but achieving good results still required fine-tuning seed rates, timing, and spring tension. Jascha found that experimenting with settings and observing results block-by-block was essential.

Overall, Jascha encourages other growers to start small, trial a range of species, and focus first on the areas where establishment is most likely to succeed. He sees strong potential for direct-drilled biodiversity plantings to improve pollination and soil function in berry systems, but notes that ongoing refinement, monitoring, and adaptive management will be essential to unlocking the full benefits. Jascha's advice for other growers wishing to use direct seeding in blueberry inter-rows is: 'The key is finding the sweet spot between mowing the existing inter-rows and sowing the pollination or green manure seed mix. If the grass is too competitive, germination drops significantly, therefore, light preparation, such as a low-mow or scarification, can make a big difference, even in a minimum-tillage system.'

Acknowledgements

This case study was funded under the Storm and Flood Industry Recovery program, jointly funded by the Australian and NSW governments through the Disaster Recovery Funding Arrangement. It is a collaboration between the NSW Department of Primary Industries and Regional Development and Berries Australia.

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ISSN: 1832-6668