DE-RISKING THE SEEDING PROGRAM
FERTILISER PLACEMENT STRATEGIES ON EYRE PENINSULA

Farming systems on Eyre Peninsula have evolved to earlier sowing with the aim to get crops established and away before the colder, slower growing conditions of winter and to reduce exposure to heat and drought stress at the end of the season. In dry starts to the season, this creates challenges to getting crops established, such as poor germination due to 'chasing moisture' by sowing deeper, herbicide damage to emerging crops, poor herbicide control due to high weed pressure, damage to seed that wets just enough to germinate and then dries out multiple times, and fertiliser toxicity.

Research conducted on Eyre Peninsula through a series of projects is aiming to address these challenges.

The following case studies demonstrate two different approaches taken by EP farming businesses to overcome the impact of fertiliser toxicity on seed germination and emergence in dry sowing situations.

CASE STUDY #1 REFINING LIQUID FERTILISER SYSTEMS TO IMPROVE NUTRIENT DELIVERY

BACKGROUND

Tim Polkinghorne and his partner Ellen, along with his parents Andrew and Jenny, farm north of Lock on the Eyre Peninsula. Cropping approximately 6,000 hectares per year, the property includes some of the last cleared areas of land in the district. Soil type consists primarily of grey calcareous sand with high pH values, which is a primary factor in the adoption and use of liquid fertiliser, rather than granular.

Name: Andrew, Jenny & Tim Polkinghorne
Property Size: 7,500 ha
Location: Lock, Eyre Peninsula
Average Rainfall: 387 mm
Main Crops: Wheat, barley, canola, lentils, lupins, and faba beans
Soil Types: Grey calcareous sand; sand over clay; heavy red loam to grey sand

THE DOUBLE-SHOOT, PAIRED ROW SEEDING SYSTEM

The Polkinghorne family have been using liquid fertiliser systems for over two decades.

The fertiliser products and delivery system has changed over the past five years. Previously, Tim and Andrew used phosphoric acid with trace elements (TE), along with UAN at a rate of 25–40 L/ha. Fertiliser was placed 20 mm below the seed.

As they continuously refine their system to improve logistics and reduce costs, they switched from using phosphoric acid to a combination of granular fertiliser, ammonium polyphosphate (APP), and urea ammonium nitrate (UAN).

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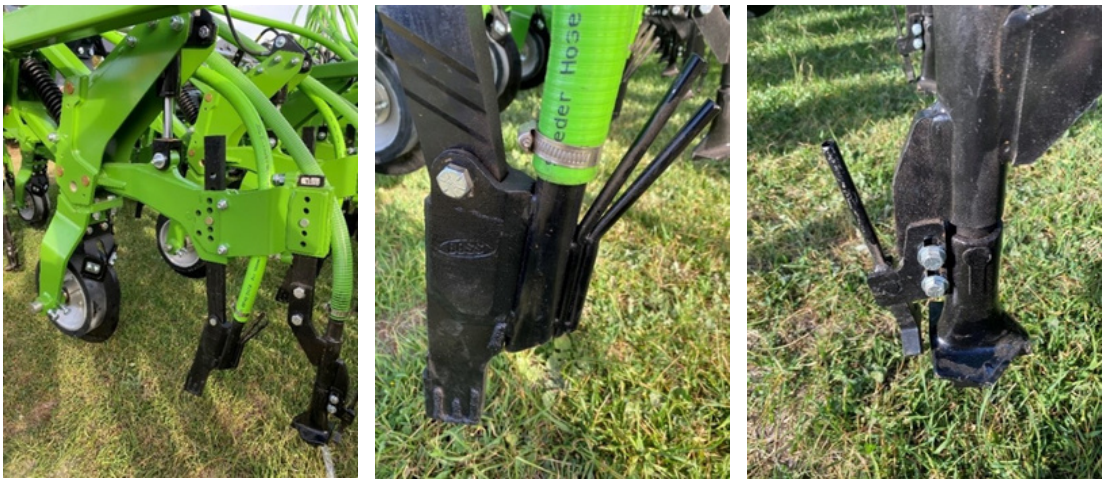

Figure 1: The Boss Agriculture air seeder parallelogram bars the Polkinghorne family recently purchased

Tim purchased two new air seeder bars from BOSS Agriculture, equipped with a parallelogram double-shoot tyne (TX 60) setup, which is a double-shoot paired-row system.

This setup includes a drum coulter, which has an 18-inch disc with 13-inch drum at the front, followed by a fertiliser tyne and a seed tyne (Figure 1).

The parallelogram tynes are also paired, allowing for vertical movement of up to 7 inches upward and 5 inches downward.

THE FERTILISER APPLICATION PROCESS

- 40 kg/ha of Granulock® SS applied through the fertiliser tube
- 14 L/ha of APP and 30 L/ha of UAN with water, to bring the total volume up to 70 L/ha (as fluids are delivered through the middle tyne)
- 200 ml/ha of flutriafol is applied into the fertiliser row with the fertiliser

WHY CHANGE TO A PAIRED-ROW SEEDING SYSTEM?

1. Rising fertiliser costs – fertiliser prices increased drastically during 2020 due to supply issues during the COVID-19 pandemic.

2. Safety concerns – phosphoric acid is highly corrosive and care needs to be taken when using this at high concentrations. Appropriate distribution hardware needs to be used, such as polypropylene fittings.

3. This seeding system reduces the need for swapping fertilisers and systems and is less affected by rain and moisture. It also eliminates the need to transport large volumes of liquid fertiliser into the paddock.

ADVANTAGE OF THE PAIRED-ROW SYSTEM

- After making the change, the system is more cost-effective and offers logistical benefits

DISADVANTAGE OF THE PAIRED-ROW SYSTEM

- Cost of replacing machinery remains a significant consideration

FUTURE PLANS

Over the next few years, the current seeder will be gradually replaced.

"It is a challenge to change the fertiliser regime and reconfigure the entire air seeder," said Tim.

CASE STUDY #2 STRATEGIC FERTILISER PLACEMENT AVOIDS TOXICITY, INCREASES PLANT ESTABLISHMENT

BACKGROUND

Chris Lymn and his wife Leanne, along with their three children, operate a 3,600 hectare mixed farming enterprise located west of Wudinna, on the upper Eyre Peninsula. Approximately 2,000 hectares is cropped annually, with the remaining 1,600 hectares utilised for stock grazing. The predominant soil type is calcareous sandy loam (pH 8).

Name: Chris & Leanne Lymn
Property Size: 3,600 ha
Location: Wudinna and north of Minnipa, Eyre Peninsula
Average Rainfall: 310mm
Main Crops: Wheat, barley and oats
Soil Type: Calcareous sandy loam

WHY CHANGE TO A PAIRED-ROW SYSTEM?

In 2022, Chris switched from a single-shot Atom-Jet® system, to the Atom-Jet® 3-inch paired row system with double shoot (Figure 1).

The single-shoot seeding system placed seed and fertiliser together, at the same depth in the furrow, where fertiliser toxicity was observed when crops were sown dry or fertiliser rates were too high.

The paired-row seeding system allows Chris to place seed on both sides of the furrow and delivers fertiliser from the middle shoot, ensuring separation from the seed.

Chris applied 100 kg/ha of Granulock® SS at sowing on his 2024 season wheat crop and did not observe any signs of fertiliser toxicity. Wheat seeding rates ranged from 60 to 80 kg/ha depending on the variety and seed size.

ADVANTAGES OF THE PAIRED-ROW SYSTEM

- Reduced fertiliser toxicity
- Improved yield
- Increased crop competition with weeds
- Reduction in the number of seeding blocks, as seeds can still flow into the soil even if fertiliser application is blocked

CHALLENGES OF THE PAIRED-ROW SYSTEM

- The cost of changing machinery and farming systems can be significant
- Use of larger ground-engaging tools may lead to a rougher paddock surface
- Reduced trafficability can increase the risk of machinery damage

LEARNING POINTS

- Ensure seed and fertiliser separation is critical in a season with a dry start
- Push boundaries with fertiliser rates due to separation

FUTURE PLANS

As a result of changing his sowing system, Chris now has the option to use a higher N product, like NPK (27:12:18), when needed, which makes him feel more confident in a challenging season with a dry start.

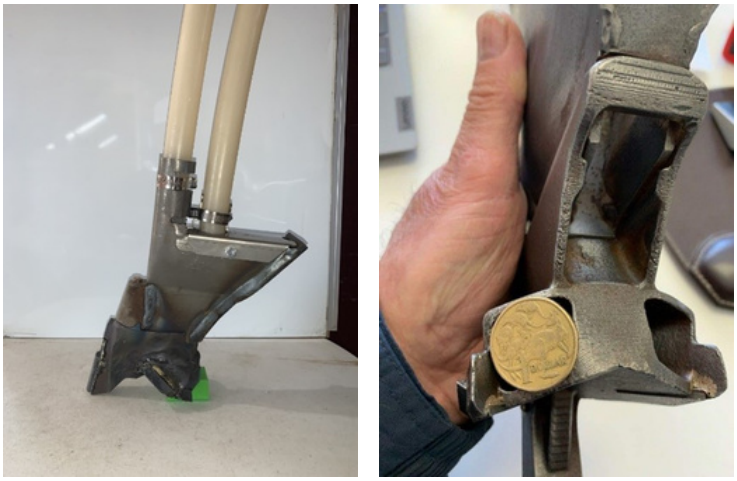

Figure 2: The paired-row seeding tyne Chris has adopted, including a close up with a dollar coin as the scale indicator.

ACKNOWLEDGEMENTS

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FURTHER INFORMATION

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RESOURCES

https://airep.com.au/research/de-risking-the-seeding-program/

https://airep.com.au/research/sa-drought-hub-activities-2022-best-practice-early-sowing-opportunities/

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