



Eyre Peninsula
Agricultural Research Foundation Inc.

Making the change to fluid fertilisers - Patterson

Case Study *May 2015*

KEY POINTS

- Yield advantages can be gained by using fluids on highly calcareous soils.
- The Central Eyre Peninsula Fertiliser Buying Group achieves reduced prices for fluid products for members and provides a good information exchange for growers.
- Mixing issues with fluids can arise and strategies are needed to address them should they arise.
- Safety issues are an important consideration.
- Use of fluids has freed up space in the seeder box and negated the need for additional fertiliser storage.
- Fluids allow flexibility to strategically and easily apply trace elements and fungicides.
- Logistical challenges and extra labour may arise transporting fluid products to paddock.
- Additional water tanks might be required to avoid stress on bores or mains.

Background

Simon and Tanya Patterson together with partners Andrew and Dianne Patterson of Wirrulla have 8,500 arable hectares around Piednippie and south of Wirrulla on Eyre Peninsula, South Australia. They also lease another 2,100 ha of arable land nearby. They crop between 5,500 and 6,500 hectares annually with one machine. Soils types are predominantly grey calcareous loams with occasional red clay flats.

The Pattersons have been using fluids since 2008.

Why the shift to fluids was made

After previously experimenting with fluid fertilisers on the basis of the significant yield increases achieved in Dr Bob Holloway's (Minnipa Agricultural Centre) 2000 trial results, the catalyst for the Pattersons to completely change to a fluid system came in 2007 with the sudden spike in granular fertiliser prices. Already having a fluid cart and most of the system already in place, the change was a 'no-brainer'.

FAST FACTS

Farmer: Simon and Tanya Patterson

Location: Piednippie

Property size: 12,000 hectares

Soil type: Grey calcareous loam

Avg. annual rainfall: 366 mm

Avg. growing season rainfall: 295 mm

Main crops and yields: Wheat, barley and medic pastures

Farming system: No-till disc pasture-cereal rotation with sheep



Simon Patterson, Piednippie

"The price of granular fertiliser almost doubled and the price of liquid phosphorus just stayed the same. It worked out to be considerably cheaper per unit of P than it was for granular fertiliser."

Early on the Pattersons found that crops sown with liquid fertilisers would grow really well early in the season, but those crops sown with granular products would yield approximately the same in the end. Since then the Pattersons have refined their system and are beginning to see yield differences.

"Now we are adding a bit more phosphorus and nitrogen and trying to get it to continue to yield better towards the end of the season - and it seems to be working."

In both independently undertaken un-replicated trials and replicated trials run by SARDI Minnipa Agricultural Centre, the crop strips sown with liquid fertiliser strips out-yielded those using DAP (18:20:0:0) by approximately 0.25 t/ha. This has given Simon the confidence that they are going down the right track.

The fluid system

The Pattersons use a no-till disc seeding system. They built their own 6800 litre fluid cart which is towed behind both the air seeder bin and air seeder bar. Simon says that this user friendly system is hooked up and runs the pump hydraulically from the tractor. A ZYNX X20 (precision agriculture system) controls the fluid cart and is set up as a fourth liquid bin. This allows rates to be changed simply from the tractor cabin and



Full sowing system set up

automatically switches on and off at the ends of runs in conjunction with the seeder, eliminating wastage. It is matched to enable filling times to coincide, minimising stopping and starting, and allowing problems with blockages to be temporarily dealt with on the go. Whilst Simon admits more is required in terms of hydraulic power, he can be assured that the rates he is applying are accurate and this system has advantages over ground-driven pumps.

"If you want to change your rate, it is simply a matter of turning a knob. Also sometimes when I am three quarters of the way through a tank and filters start blocking, I can adjust the hydraulics up to get more pressure instead of stopping and cleaning it all out. As we sow around the clock, this is a huge advantage for us, allowing us to continue sowing and deal with blockage issues in daylight. Whereas with a ground driven one, you could be losing your rate and only be putting it on at 45 litres, if you were trying to get 60 litres per hectare."

The Pattersons use phosphoric acid at a rate of 14 litres to 50 litres of water per hectare. Added to that is 420 grams of elemental zinc in the cheapest available form at the time - usually zinc monohydrate.

Advantages

One of the key advantages the Pattersons see to using a fluid system is the ability to strategically apply micro nutrients really simply.

"We see the benefit of being able to put zinc or whatever nutrient you want, over every hectare of the cropping program really easily. I think that we are getting as much benefit from having zinc freely available in our soil as we are by having the phosphorus freely available as you are supplying a continuous stream of nutrients there for the crop to take up as soon as it puts its roots in the ground."

The Pattersons also feel that use of fluids has added a degree of flexibility to their program, because as they are applying phosphorus and nitrogen at separate points, rates can be easily adjusted or micronutrients added.

Simon says that due to less soil disturbance of their disc machine, they have issues with Rhizoctonia which can be managed through fungicide use. Whilst patches still occur, he says, yields are increasing and more consistent on the patches, due to the use of fungicides.

The use of fluid fertiliser has freed up space in the Patterson's air seeder box which can now be used for seed, increasing the amount of time seeding before filling up. It also negates the need for fertiliser sheds, as the phosphoric acid is stored in 1000 litre shuttles.

As members of the Central Eyre Peninsula Buying Group, the Pattersons feel that not only are they getting a cheaper price for their fertiliser product, but they are reassured by the confidence that being part of a group brings.

"It takes the pressure off me having to make the decision on which day I pull the trigger on my phosphorus input. As a buyers group we meet and put it out to tender, and they come back to us with the best price and then we choose not always the best price - but the most reliable best price. It gives us the confidence to know that we are getting a reasonable price and not being messed over by big business - we make the decision, we decide when we want it and who we want to deal with."



Fluid delivery system

Learning points

For all the advantages experienced by the Pattersons, they do say that the use of fluids adds a level of logistical complexity to their seeding and additional safety considerations.

"Instead of having just one truck to handle grain and fertiliser you have another truck in the paddock transporting the liquid. So every time we fill up, there are three people there - one person filling the air seeder with seed and urea, one person checking over the machine, and one person filling the liquid set up. However, we only fill up every 4 or 5 hours and run our machine around the clock. We are doing around 1000 acres in 24 hours."

The Pattersons only pre-mix water and zinc and the phosphoric acid remains in its shuttle in concentrated form until it is ready to be used. They use a Venturi system that as the water is being pumped into the fluid cart, it sucks the acid out of the shuttles and mixes it as it is going into the tank.

On occasions, water supply has been an issue. Using both mains and bores for supply, the demands of trying to spray and mix phosphoric acid has meant that the Pattersons have run out of water sometimes. They have had to put in a few more tanks so that they are not always relying on one bore or main.

The Pattersons did encounter some issues with settling out and blocked nozzles when they were stopping at night time. However, since moving to around the clock sowing, the problem has reduced. Increasing the water rates and more agitation has also greatly improved this issue.

"Before we went to around the clock sowing, we would just keep going until the tank was empty and then start it up again the next morning and flush it and fill it up again. This seemed to eliminate blockage issues."

Future plans

This year the Pattersons plan to add manganese in place of or in addition to zinc. However having tried this in the early days when using ammonium polyphosphate, they experienced "nightmare" blockages. Now using the more acidic phosphoric acid, Simon is confident it will all stay in suspension and that lifting their water rates has seemed to help with reducing blockages.

The Pattersons say that they will continue to use a fluid system, and even if they reverted to using a granular base product, they would still tow a liquid cart in order to put on trace elements.

"Every year we try a few different things and it seems to be getting better. It is a reasonably robust system and pretty user friendly."

Further information

Simon Patterson
Farmer, Piednippie
Mob: 0427 261 555

Amanda Cook
Research Scientist, SARDI Minnipa Agricultural Centre
Ph: (08) 8680 6200 Email: amanda.cook@sa.gov.au