



Eyre Peninsula
Agricultural Research Foundation Inc.

Making the change to fluid fertilisers - Polkinghorne

Case Study May 2015

KEY POINTS

- Significant yield advantages can be gained by using fluids on highly calcareous soils.
- Mixing issues with fluids can arise.
- The Central Eyre Peninsula Fertiliser Buying Group achieves reduced prices for fluid products for members and provides a good information exchange for growers.
- The corrosive nature of phosphoric acid impacts on fittings.
- More preparation at seeding is required in order to mix and transport fluid products.
- Safety issues are an important consideration.

Background

Andrew and Jenny Polkinghorne, together with son Tim and partner Ellen farm 6,700 hectares north of Lock on Eyre Peninsula, South Australia. Comprising some of the last cleared land in the district, the soils are predominately grey calcareous sand of high pH (8.7). The Polkinghornes crop approximately 5,800 hectares per year and have 1 full time employee.

Why the shift to fluids was made

In early 2000, based on trial results of Dr Bob Holloway of SARDI Minnipa Agricultural Centre, the Polkinghornes made the switch to fluid fertiliser. On soils with high pH and calcium carbonate content yields could be significantly increased using fluids compared to those achieved using granular fertilisers, primarily due to the increased availability of phosphorus. The Polkinghornes were confident that on their soil types a shift to fluids could increase phosphorus efficiency and therefore increase yield.

In addition, trial work had shown that use of fluids could address trace element deficiencies such as zinc, inherent on grey calcareous soils. Andrew feels that using fluids gives them another way of getting trace elements on that might otherwise be fixed (not available to plants) very quickly.

FAST FACTS

Farmer: Andrew and Jenny Polkinghorne, Tim Polkinghorne and Ellen Hardy

Location: 15 km north Lock, SA

Property size: 6,700 hectares

Soil type: Grey calcareous sand

Avg. annual rainfall: 333 mm

Avg. growing season rainfall: 253 mm

Main crops and yields: Wheat, barley, canola and medic pastures

Farming system: No-till fluid system



Andrew Polkinghorne and
Monique Spiers

"Shifting into fluids has given us the biggest yield increase of any technology or practice change that we have been able to implement."

The fluid system

The Polkinghornes started using fluid fertilisers in 2003 and have used them to sow the full cropping program every year since. They use phosphoric acid as a base fertiliser together with granular nitrogen. Trace elements (manganese, zinc and copper) are dissolved into the phosphoric acid.



Full sowing system set up

"We have looked around at other fertilisers that might be more suitable, but we haven't found anything that fits the bill better than the phosphoric acid. Ammonium poly phosphate is an option but it is significantly more expensive and is limited in its ability to be able to mix trace elements with it and that is still important to us."

Stating that their system was relatively simple to put into operation, they initially purchased a 7000 litre liquid cart and pump to put behind their air seeder, tanks for storage of fluid fertiliser and for transportation to the paddock. The Polkinghornes admit that it was a significant expense, but the most expedient way of doing it at the time. They modified their bar to deliver fluids using distribution equipment initially imported from Canada and a simple ground driven pump.

"We chose to use tanks because we wanted to pre-mix trace elements with phosphoric acid. We wanted to have it pre-mixed so that it wasn't a job that we had to do during seeding."

Since 2003 they have upgraded pumps and distribution systems to include electronic pump controllers and monitors that were not available for liquids when they initially set up their system.

Advantages

One of the advantages of moving to a fluid system has been the formation and involvement with the Central EP Fertiliser Buying Group. Comprising a membership of 35 farming businesses, they work together to achieve significantly reduced prices for fluid products compared to acting individually. The group also provides a good source of information exchange amongst farmers.



Fluid cart at rear

"Being part of the Central Eyre Fertiliser Buying Group and learning from other farmers has been a very positive experience as a result of shifting to fluids."

In more recent times, the Polkinghorne have used fungicides to address certain disease issues such as Rhizoctonia and yellow leaf spot (YLS). They feel that the use of a fluid system increases the ease of fungicide application and allows a tailored approach with the ability to turn on or off and adjust rates. For Rhizoctonia, 2014 trial results on their farm did not show a yield increase, possibly due to a particularly dry spring, however less Rhizoctonia patch was observed. Similarly, as the Polkinghorne grow a large proportion of wheat on wheat, the ease of application of fungicide provides a level of insurance against disease.

Besides the yield benefits achieved through the use of fluid fertilisers, the Polkinghorne feel that the additional dry matter production is having benefits, particularly on poorer soils. Anecdotally, they say that these poorer soils are producing better than they used to and seem to be more robust in terms of production.



Fluid delivery (yellow hose)

Andrew says that at seeding time the use of fluids frees up space in his air seeder box, negating the need for a bigger air seeder.

Learning points

As phosphoric acid is highly corrosive, the Polkinghorne learnt very quickly what materials will or won't handle phosphoric acid. 316 stainless steel or high quality poly propylene type fittings are needed for use with phosphoric acid, however they also differ in quality and this has been a learning experience.

At seeding time more preparation is required in order to mix the fluids before transportation to the paddock and mixing issues are sometimes a problem in themselves. However, Andrew says that most of the problems they have encountered arose from trying to mix something else with a fluid that doesn't mix, but provided you stick to the rules there is not much problem.

"We had some troubles with Flutriafol until we clearly understood the need for a higher water rate. We now use Flutriafol without any issues."

With an extra flat bed truck fitted with fluid tanks required in the paddock, logistical challenges arise when shifting paddocks. Andrew says this is due to their set up - whilst not insurmountable, can make things more complicated.

Personal safety is one of the biggest issues associated with the use of phosphoric acid - in particular, eye protection. You can get it on your skin and like normal fertiliser, if you have a cut on your finger, it will sting, but as long as you wash it off straight away, there is no real issue.

Future plans

The Polkinghorne's will continue using fluids.

"We feel the benefits of our fluid system outweigh the negatives by a long shot."

Further information

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