

Mallee farmer digging deep for better moisture retention

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Improving soil moisture retention through clay spreading has at least doubled yields on parts of a continuous cropping farm near Geranium, in the SA Mallee.

The family started a clay spreading program on their 2,650 ha property 13 years ago to improve the cropping potential of poorer soils.

Targeting areas with non-wetting sand that at the outset was best suited to grazing has improved the profitability of their continuous cropping operation, said co-owner Adam Morgan.

“We’re growing miles better crops; doubling or tripling yields compared to what we got off that land before the clay spreading.

“Spreading clay can convert a poor, non-wetting soil with low fertility into useful cropping country, and with a good rotation can easily double yields.”

The Morgans have reaped two to 3 t/ha of cereal from country that previously yielded 1 t/ha.

Non-wetting sand made up 30% of the property when they began clay spreading in 1999. That figure has now been



ADAM MORGAN CHECKS THE PROGRESS OF A CANOLA CROP ON A CLAY-SPREAD Paddock. BEFORE THE CLAY TREATMENT THIS LAND WAS SO NON-WETTING THE Paddock WAS NOT SUITABLE FOR CROPPING.

reduced to 5% and Adam believes the converted soil, which he terms clay sand, now makes up their best cropping land.

“What we like about clay spreading is that once you’ve done it, that soil becomes the easiest soil to manage. It germinates weeds and crops very easily with minimal moisture. It can even be

easier to manage than our good loam.”

Most of their clay spreading has been carried out on higher parts of the property, where the elevation reduces the frost risk.

“The low-lying areas of our farm have quite good loamy soil but they’re vulnerable to frost, so we concentrate our hay crops there,” said Adam. “Once the frost-free higher areas are clay spread, the land there holds the moisture and nutrients better and the crop is generally healthier, making it quite profitable.”

After engaging a clay spreading contractor in the first year, the Morgans invested in machinery to do the job themselves; buying a larger, articulated tractor and a second-hand carry-spreader or grader. The carry spreader cost \$35,000, which Adam believes has, ‘more than paid for itself’.

“The biggest investment is time, as well as diesel,” he said.

Initially the Morgans committed three months each year to their clay spreading program but in recent years, as the area of non-wetting land has been reduced, the time devoted to clay spreading has come back to approximately one month each year.

“You don’t get a lot of acres done per day and there’s a lot of work getting it levelled and incorporated correctly,” said Adam.



CLAYING CAN SIGNIFICANTLY IMPROVE THE PERMEABILITY AND WATER-HOLDING CAPACITY OF NON-WETTING SOILS, AS ILLUSTRATED BY THIS HEALTHY CROP OF CANOLA ON CLAY-SPREAD SAND HILL ON THE MORGANS’ PROPERTY IN EARLY JUNE THIS YEAR.



ABOVE – SPRAYING WHEAT WITH FUNGICIDE IN A CLAYED PADDOCK IN LATE AUGUST LAST YEAR. RIGHT – HAY BALING IN FULL SWING ON THE MORGANS' PROPERTY.

He estimates that spreading can take an hour a hectare, with another half hour a hectare spent incorporating the clay into the topsoil and levelling the paddock.

The first step in the claying process is to locate suitable clay and a site for a clay pit, which will ideally be on flat land close to where the clay is to be spread.

Once a suitable site has been located the top soil or overburden is scraped off and piled, ready to return to the pit once the clay has been removed. Using the spreader, loads of clay are repeatedly scraped from the pit and transported to the spreading site, where it is deposited in strips. Adam estimates that 4,000 tonnes of clay – enough to treat 20 ha of land – can be mined from one six-metre deep pit.

The next step is to spread the clay across the surface of the paddock. This is achieved by dragging a railway iron across the strips of clay – up to four times in some situations – until there is an even cover across the paddock.

The clay is then incorporated into the topsoil using an off-set disc. Adam cautions that this part of the process, which can take up to three passes with the disc, is critical for a successful result.

“If it’s not done properly it can be detri-



mental to your farm,” he said. “Without proper levelling and incorporation you can leave a hard clay crust on top of the soil, which limits growth. This is rare, but it’s important to follow the right process. The end result should be a nice sandy loam.”

Clay spreading costs the Morgans more than \$120/ha but Adam estimates contract clay spreading, excluding levelling and incorporation, would cost about twice that.

While the cost is significant, it is a one-off expenditure, with clayed paddocks not requiring any further treatment, he said. “You only clay-spread a paddock once.

Once it’s done, it’s done.”

Clayed paddocks are seeded as soon as possible to provide coverage for the bare soil.

“Probably the only thing we don’t like about clay spreading is all the tillage that leaves the paddock bare. There’s no stubble on that ground for the first year. We like to see the country sown and covered as soon as possible.

“But once it’s done the land maintains a good loamy profile and just gets better and better as you are able to build stubble.”



KEEPING IT SIMPLE

Adam Morgan's motto for farming is to keep things simple.

Since converting to a no-till system in 2001 the Morgan family have systematically streamlined their operation; pursuing one change each year to make life on the land simpler and more enjoyable.

Those changes have included moving out of livestock to concentrate on cropping; something they did 10 years ago.

"Not having stock has simplified our decision making. We didn't like the compromise that stock brings to a cropping enterprise and we just enjoy growing crops," said Adam.

"We believe that farming should be about picking what you enjoy doing and doing that, because you're more likely to be successful if you enjoy it."

Without livestock the Morgans have more time to dedicate to cropping and their hay operation. They produce up to 600 ha of hay for the domestic and export markets each year.

"Hay is generally very reliable and gives us cash flow throughout the year," said Adam. "It's a lot of work and time-intensive but we get very good returns off that country and it's great for cleaning up grass as well."

As part of their streamlining process the Morgans have developed a system to apply glyphosate through a spray boom on the rear of the mower as they cut their hay. This eliminates the need for an extra spraying pass and is providing better control of grasses and seed set.

"It was a bit of an issue to start with because some of the export companies were concerned about the glyphosate making its way onto the hay," said Adam.

"It was just a matter of us doing some hay testing to check that the MRLs were okay." A Maximum Residue Level (MRL) is the maximum amount of residue legally permitted in or on a product.

Adam farms with his wife Tanja, parents David and Pam and young brother Daniel near Geranium, in SA's Mallee region.

The Morgans crop all of their 2,650 ha property, with a rotation that includes hay, wheat, barley and canola.

They adopted a no-till system in 2001, using an Ausplow DBS machine with knife points and press wheels for eight seasons. In 2009 they bought a larger no-till machine to improve the efficiency of their seeding operation. This change, coupled with an increase in paddock size that enabled them to use larger machinery and cover greater areas of land, represented another effort by the Morgans to simplify their operation.

"We've expanded our blocks by pulling the odd fence out, making it possible to use bigger machines and make everything more efficient," said Adam.

Their seeding rig comprises a 13,500-litre Morris 8370 tow-between bin, the 18-metre Morris Concept 2000, fitted

with Agmaster points on hydraulic tines and press wheels on 300 mm spacing and a TJ 375 New Holland tractor.

The Concept 2000 has impressed Adam with its durability; a particularly important feature since the family purchased rocky country in 2002. "It's such a robust machine. Its durability in the rocks is fantastic."

He also likes its single-shoot set up, which delivers the seed and granular fertiliser down the same tube.

"We find single-shoot it works very well for us. It puts all the fertiliser with the seed, which helps to fight against rhizoctonia.

"It also makes seeding a lot simpler. You've just got one set of hoses and we find the winter fertiliser keeps the seeding heads clean."

Seed burn is not a problem with the single shoot set up because they use low rates of fertiliser at seeding; generally 40 to 50 kg/ha of DAP SOA blend.

This is topped up with sulphate of ammonia and urea applied in crop during the season if the yield potential is good.

Summer spraying is another change the Morgans have made since their move to a no-till system. Retaining moisture is a high priority, so they run a comprehensive spraying program that covers their entire property twice.

"We spray every hectare every year, ensuring good results with no-till," said Adam.

"We're fussier with summer spraying to keep paddocks clean, save moisture, fight root disease and prevent any melon-vine blockages on the seeding machine. And we're trying to reduce the seed bank on all of those summer weeds. I think we're achieving that. We've found our crops were able to hang on better through the tough finishes in 2008 and 2009."

Their summer weed spectrum includes caltrop, common heliotrope, fleabane, couch grass and skeleton weed. They spray in January and again in March, using glyphosate and amine 2,4-D.

The Morgans have recently implemented other strategies to control weeds on their property, including removing lupins from their rotation because, as Adam points out, 'there's no herbicide you can use to control skeleton weed in a lupin crop'.

"Lupins were only a small part of our program and we weren't seeing much return from them, but the lack of ability to control skeleton weed was one of the main reasons we stopped growing them."

In the past two years they have also added Clearfield wheat and barley to their rotation to combat brome grass. Clearfield varieties are tolerant to several specific herbicides that can be used in-crop to control a range of weeds including brome grass, which Adam says is more of an issue than ryegrass on their property.