

Sand mulch rehabilitates dry saline land patches on the upper Eyre Peninsula

SNAPSHOT

Farmer name: Terry and Tom Schmucker

Location: Cootra East, upper Eyre Peninsula

Farm size: 3,700 ha

Enterprise: Cropping and grazing. Cereals and medics; sheep and cattle

Rainfall: 300 mm average, 145mm GSR (2023)

Key messages

- Spreading sand mulch on dry saline land patches can rehabilitate the soil.
- The sand needs to be deep enough to slow moisture wicking to the surface and to have a buffer if there is wind erosion. 8-10 cm of sand appears to be the ideal amount.

TREATMENTS



Sand mulch



Figure 1. Sand strip applied around 2012

INTRODUCTION



Terry (dad) and Thomas (son) Schmucker farm 3,700 ha near Koongawa on the upper Eyre Peninsula. The soils vary across the farm and include deep sand, loam or sand over clay, and loam over rubble.

Dry saline land or 'magnesia patches' are a problem on some areas of loam over rubble and loam over clay. There are about 20 ha of severe patches, and another 50 to 60 ha of transient patches that are present in the dry years but not overly noticeable in average or wet years. Tom estimates these patches yield about 50% less than the rest of the paddock in poor seasons.

The Schmucker's have been rehabilitating their dry saline patches land since about 2010. "We are learning new ways to rehabilitate patches and gaining a better understanding of what works on our farms with every bit of work we do," says Tom. Over the years they have learned that spreading 'a fair amount of sand' as Terry puts it, can completely rehabilitate the patches. In the past they have tried bringing in 8-10 cm sand from adjacent sand hills and spreading them on the saline land patches.

This has the added benefit of making the non-saline clay under the sand hills closer to the surface, which in some cases can then be delved to improve water and nutrient retention in the topsoil.

“We're now seeing those big high sand hills that have deep sand as a resource. We tend to just take a bit off the top, with only 400 mm or so of sand left on the clay. If it's not far to the magnesia or heavy land, we move it with a J&R Ejector bucket and a 450 horsepower tractor,” said Terry.

The sand mulch has completely rehabilitated the dry saline land patches, even in dry years. Tom says the key is having thick enough sand, 8 to 10 cm, to stop the wicking effect bringing saline subsoil water to the surface.

Over time, the sand is incorporated into the topsoil, reducing its efficacy. When using 8 to 10 cm of sand, the sand is thick enough that only the bottom of the seeding point is in the clay and there is limited mixing which helps preserve the sand mulch.

THE TRIAL



The trial compared a control strip and two sand mulch rates:

- A low rate of 150-250 t/ha
- A higher rate of 250-500 t/ha

Eleven months after application, with some erosion and settling, this left around 5 cm of sand on the low rate strip and 7-10 cm of sand on the high rate strip.

Sand was spread in April 2023 and sown to Scepter[®] wheat on May 10.



Figure 2. Aerial image showing sand mulch strip.

EROSION MANAGEMENT



There was some wind erosion immediately after sand spreading (Figure 3). Terry said, “It was all really good until the first northerly ... and tonnes [of sand] ended up in the fence. And you think, ‘now what did I spend all that time and effort doing that?’”

To help manage erosion, the Schmucker's now shallow rip after sand spreading. “Ripping brings a little bit of clay to the surface in rows which create ridges to slow wind velocity and erosion. We don't rip for any other reason except to anchor the sand,” said Tom. Figure 4 shows the clay ridges.

They rip as soon as they can after spreading the sand, ideally before any substantial winds. However, this was not possible on the trial strips as wind blew immediately after spreading. Generally, ripping doesn't compromise the effectiveness of the sand mulch in rehabilitating the patches.



Figure 3. The sand mulch strips were eroded by half a day of strong wind.



Figure 4. Ripped sand strip from 2021. The clay and ridges helping anchor the sand in place.

RESULTS

By September 2023, emergence and biomass differences were evident. Plant numbers increased with mulch depth (Figure 5). Biomass in both sand strips were higher than the control, but were similar, averaging 6 t/ha in the low sand rate strip and 5.8 t/ha in the high sand rate strip.

Yield

Yield increased with sand mulch depth (Figure 7). The high sand rate yielded double that of the control, while the low sand rate yielded 26% more than the control.

Economics

Terry thinks more broadly about sand spreading than the simple economics of sand cost vs yield increase. The logistics of taking small areas out of production - because there is no return sowing into them - is even harder.

“It’s not efficient to cut those [poor areas] out and make our paddocks smaller, and stop-start with the auto steer, the spraying, the air seeder and every other thing,” he said. “So in one sense if we fix those areas, even though it’s a big cost at the moment, every time we sow a crop it’s a winner and it doesn’t cost us more once the sand is there.”

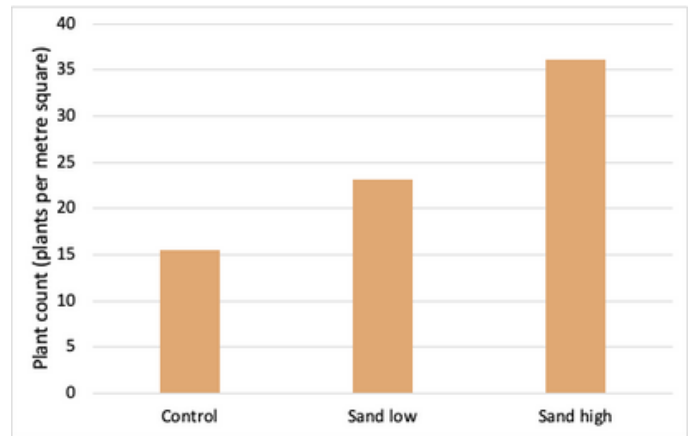


Figure 5. Average plant count

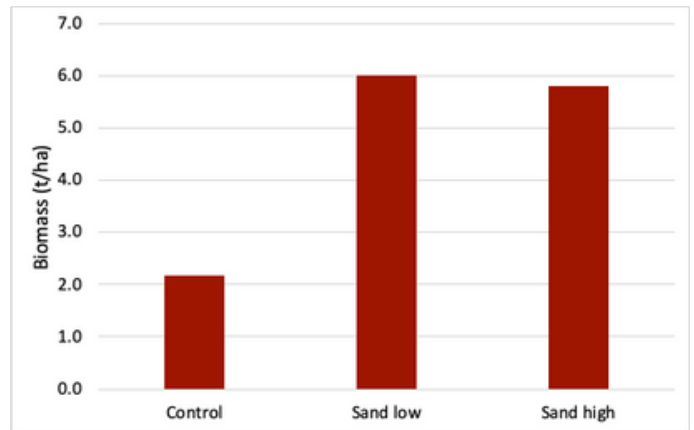


Figure 6. Average biomass

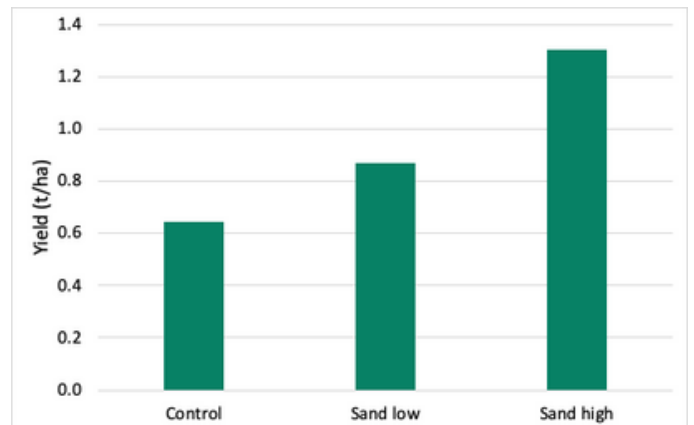


Figure 7. Average wheat yield

“We've made a big difference and we've just got to put the effort in to cover [the soil and] stop the wicking effect. We can change some patches and lift the crop average yield up in the paddock so the good ground doesn't have to subsidise the poor patches,” Terry said.

Time is one element, with it taking about 90 hours to scrape enough sand off the sand hills and spread to treat a 20-hectare patch.

NEXT STEPS



The Schmucker's will keep rehabilitating the dry saline land patches with sand. Terry enjoys the process, thinking of dry saline land rehabilitation as a hobby, working when the conditions are right. “We own a scraper and a tractor and we tend to work on those paddocks that need work. We don't like running the scraper in the wet summers when it compacts the subsoil. And sometimes if there's a lot of cover, we don't break the cover unless we have a need to. So when we have a paddock and after a dry year that's hard and there's not much cover there, we'll get into it.”

Tom notes some other benefits of spreading sand then ripping, on top of rehabilitating the dry saline land patches, are:

- Less damage from either drift on sand hills or water repellent patches.
- More cover on sand hills and flats in dryer seasons.
- Weeds are fresher and not under as much stress, so are easier to kill.



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PROJECT INFORMATION



Trial run by PIRSA.
Thanks to Tom and Terry Schmucker for hosting the trial.

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