Ripping strip demonstration

CASE STUDY 10

SNAPSHOT

Farmer name: Wes Daniell
Location: Poochera, SA
Farm Size: 8000 ha
Enterprise: Cropping & grazing
Average annual rainfall: 300 mm

KEY MESSAGES

- In 2022, there was a significant response to ripping suggesting treatment of a soil physical constraint by ripping.
- The response did not carry over to pasture in 2023.

SANDY SOIL CONSTRAINTS

Low fertility

Compaction

Area of land affected (ha): 200 | Area of land affected (%): <1

Trialled

- Ripping with delving points

INTRODUCTION

The problematic soils at Wes Daniell's 8,000 ha farm at Poochera, South Australia, are white siliceous sands over poorly structured clay. Other soil types on the farm include sandy loam, grey calcareous soils, some red flats, and rocky soils.

The deep sands have always had low fertility with limited water holding capacity, due to very low clay and organic matter content. Due to the poor performance, Wes would like to identify solutions to improve productivity on these soils in future.

In a poor year, the sandy soils yield about 25% less than other soil types and up to 50% in a good year. While the problem is not getting progressively worse, the sands have suffered wind erosion in the past, further reducing fertility. There is some repellence on the sands and the sands are compacted.

In the past, Wes has tried growing cereal rye on the sands as it grows better than wheat and helps provide groundcover. "The neighbour grows cereal rye and it looks magnificent," says Wes. "But although it worked well for two or three years [when we grew it] and provided good cover, it was inconvenient with extra work."

Wes then started sowing cereal twice to get better cover. This has proven to be successful but the deep sands still have lower yields relative to the rest of the paddock.

THE TRIAL

In 2022, Wes set up a deep ripping demonstration strip (15 m x 100 m) with a Lienert ripper. The aim was to alleviate compaction. The ripper brought up a small amount of subsoil clay. The site was sown to Yallara$^{\Phi}$ oats in 2022 and pasture (medic) in 2023.

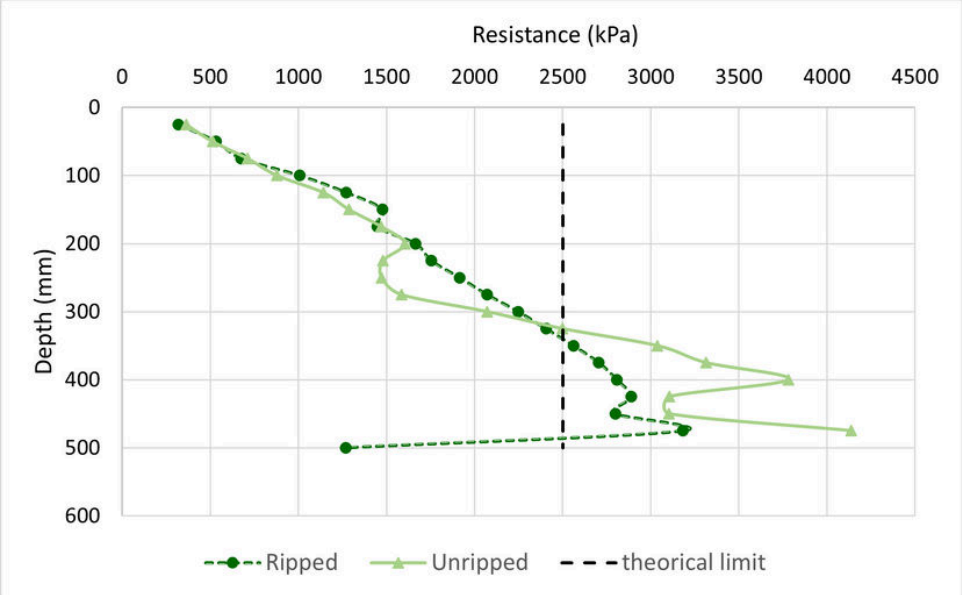

Figure 1. Penetration resistance between ripped and unripped plots. Data collected in December 2023, about 18 months after ripping.

Year	Description	Untreated control	Ripped	Comparison
2022	Mean biomass at harvest (t/ha)	8.7	15.6	+80%
	Grain yield (t/ha)	3.2	3.8	+20%
2023	Average medic plants/m^2	35 (16-56)	38 (32-48)	+8%
	Average NDVI (19 Sept 2023)	0.23	0.23	-
	Dry matter (kg/ha)	958	1169	+22%

Table 1. Biomass, yield and establishment data from 2022 and 2023

RESULTS

Soil compaction

The penetrometer resistance taken in December 2023, after significant rainfall, showed no differences in soil strength between the treatment areas (Figure 1). There appears to have been significant reconsolidation since the initial intervention. Penetrometer readings were generally taken across the plots, and not just confined to the rip line.

RESULTS cont...

Biomass and Yield

In 2022, biomass cuts in the oats in mid-September showed the ripped treatment had 80% more dry matter than the control. By harvest, the ripped plot yielded 3.8 t/ha, 20% more than the unripped plot (control) which yielded 3.2 t/ha. In the 2023 medic pasture, the difference between the ripped strip and the rest of the paddock was less obvious, but there were still improvements in pasture growth (Table 1). Average pasture establishment numbers were similar between the ripped and unripped plots, but numbers in the unripped control were more variable (16–56 plants/m^2) compared to 32-48 plants/m^2 in the ripped plot. NDVI readings were similar, however, dry matter was 22% higher in the ripped strip.

Overall, despite the yield boost in 2022, the rip did not impact the pasture in 2023. This may be because medic is already fairly well adapted to the conditions in the area.

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RESOURCES

AgriKnow: https://www.agriknow.com.au/trial/41

PROJECT INFORMATION

Trial run by Amanda Cook and SARDI Minnipa Agricultural Centre staff.
Many thanks to Wes Daniell for hosting the trial.

Building drought resilience by scaling out farming practices that will enhance the productive capacity of sandy soil landscapes.
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