Deep Ripping Trials, Frances 2009

Trent Potter and Glenn Bailey

Introduction

In order to quantify the effects of deep ripping, gypsum application, and a new cultivation implement known as a Spader, the MFMG established two trial sites in the South East in 2008. Deep ripping has been shown to increase root zone area, break up hard pans, and increase infiltration. Gypsum can improve soil structural problems caused by sodicity thereby increasing root penetration and water infiltration. The Spader mixes the soil profile to a depth of around 30cm and may increase root penetration and water infiltration, thereby improving conditions for plant growth.

Method

Two sites were selected in 2008, one at Cadgee and the other at Frances. The Frances site is a shallow loam over brown clay whereas the Cadgee site is a bleached loamy sand over brown clay. Treatments were applied to the trial plots prior to sowing canola.

Treatments included:

- Control
- Deep ripped
- Deep ripped after Gypsum application at 2.5 t/ha
- Deep ripped after Gypsum application at 5 t/ha plus Spader
- Deep ripped before Gypsum application at 2.5 t/ha
- Deep ripped after Gypsum application at 5 t/ha

After sowing, the trial plots were managed in the same manner as the rest of the paddock.
In 2009 both sites were sown to barley.

Results

Table 1: Cadgee site harvest data summary

Treatment	kg/ha	% site mean	Test wt	1000 grain wt	Screenings	Protein
Nil	3603	103	66.6	35.97	21.5	11.35
Ripped	3537	101	66.2	35.91	25.93	12.05
Ripped after Gypsum at 2.5 t/ha	3434	98	66.8	34.7	25.49	11.85
Ripped after Gypsum at 5 t/ha plus Spader	3497	100	65.9	33.9	29.19	12.55
Ripped before Gypsum at 2.5 t/ha	3479	99	67.2	34.99	24.63	11.45
Site mean	3510					
CV%	8.07				7.6	
lsd(0.05)	NS		NS	NS	*	NS

Table 2: Frances site harvest data summary

Treatment	kg/ha	% site mean	Test wt	1000 grain wt	Screenings	Protein
Nil	2918	86	80.4	33.56	5.34	10.77
Ripped	3378	99	80.1	33.24	4.48	11.23
Ripped after Gypsum at 2.5 t/ha	3631	107	80.6	32.75	4.51	10.87
Ripped after Gypsum at 5 t/ha plus Spader	3540	104	80.9	34.33	5.04	10.97
Ripped before Gypsum at 2.5 t/ha	3537	104	80.3	34.3	5.76	10.1
Site mean	3401					
CV%	7.33					
lsd(0.05)	496.7		NS	NS	NS	NS

The Cadgee site became very wet during winter and early spring and only the southern two replicates were used in the analysis. No significant difference was shown for grain yield or quality except for the Ripped treatment with gypsum and Spader treatment which resulted in higher levels of screenings.

The Ripping and gypsum treatments at the Frances site showed greater yield increases compared to the nil treatment (Table 2). The Frances site was also non-sodic and Gypsum has had little effect indicating that soil structure is unlikely to have been improved and sulphur is not deficient at this site. The Spader treatment showed a yield increase which indicates that the mixing of the soil profile has allowed for increased root growth.

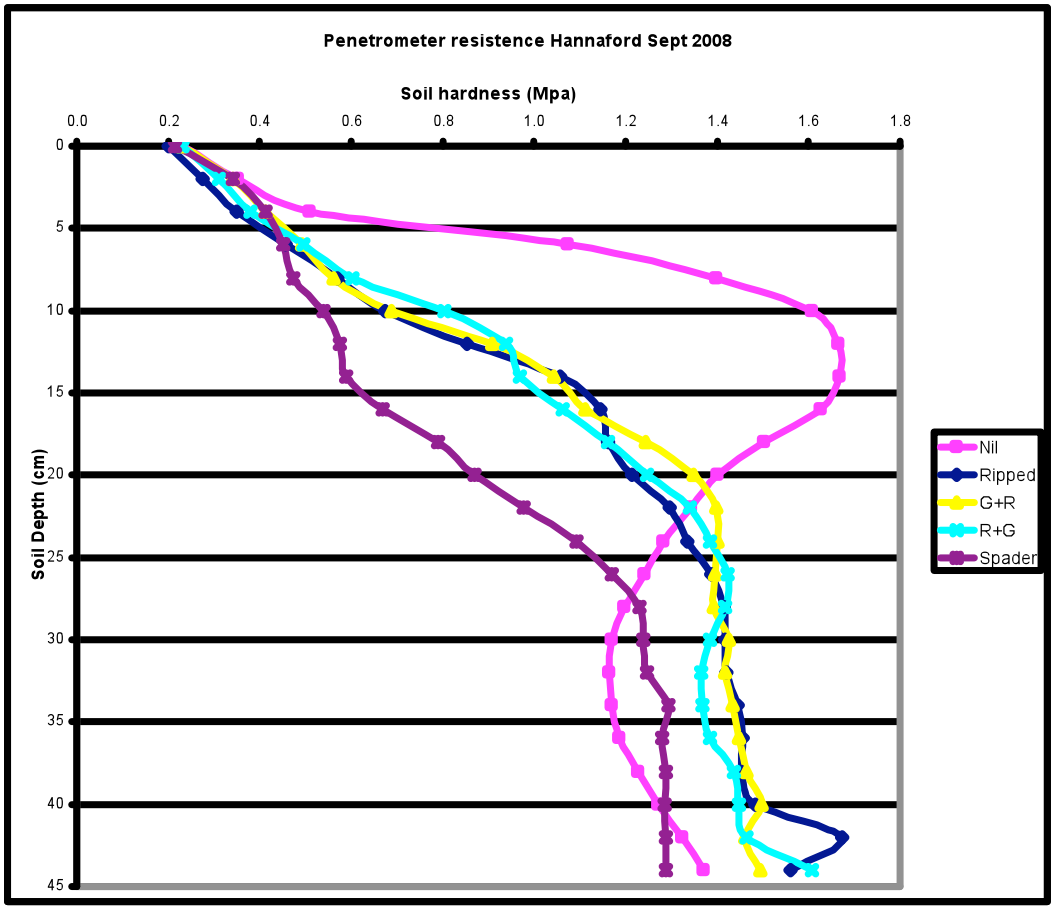

Figure 1. Penetrometer resistance (measure of soil hardness) plotted against soil depth for treatments carried out on a clay soil at Frances. Measurements conducted in September 2008.

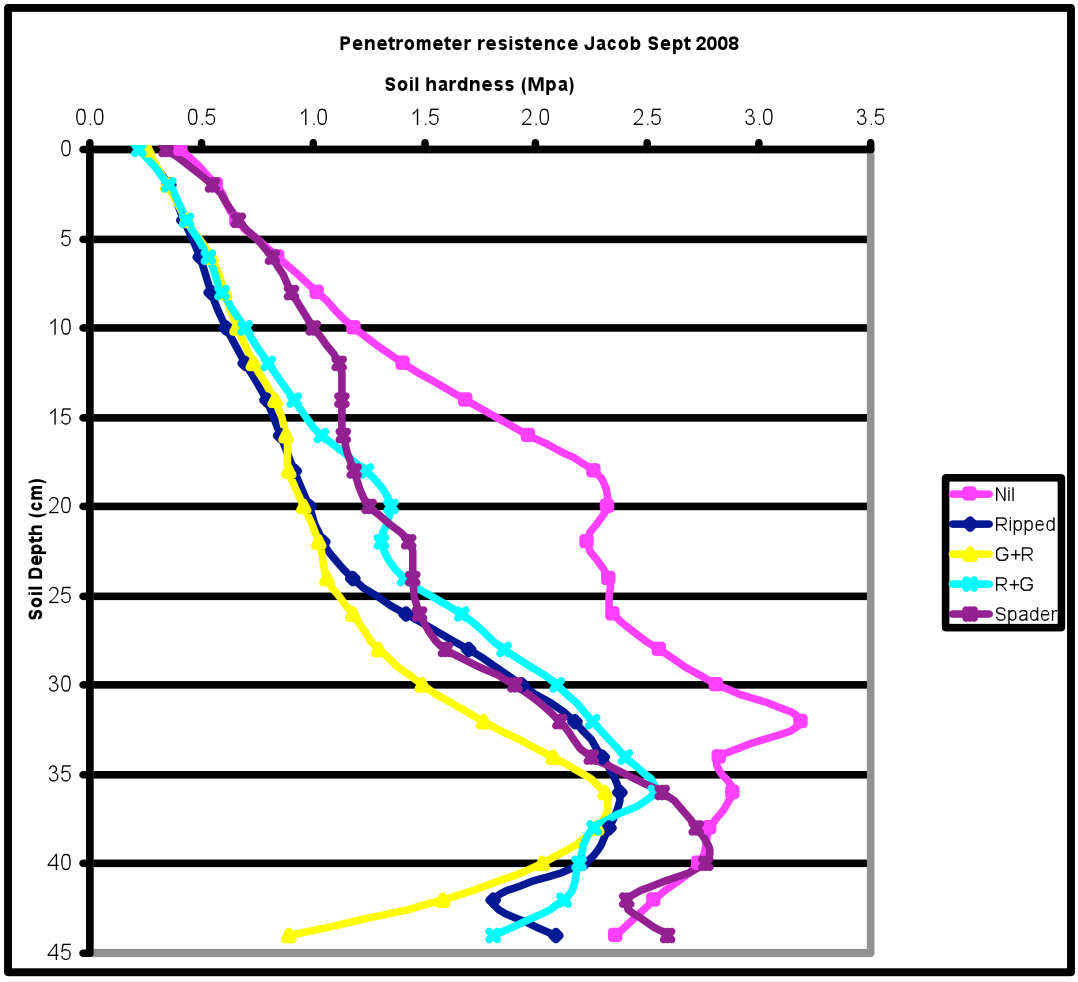

Figure 2. Penetrometer resistance (measure of soil hardness) plotted against soil depth for treatments carried out on a sand over clay soil at Frances. Measurements conducted in September 2008.

The penetrometer measurements show that the nil treatment at both sites had a harder soil profile in the upper 20 cm at Hannafords (clay loam) and down to 35 cm at Jacobs. The reason the Nil treatment at the site of Hannafords shows lower resistance at depth is because this zone was waterlogged (water perched on the clay layer), showing that the ripping and spading have relieved some of the waterlogging.

Acknowledgements
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