

Compaction, Soil Health Demonstration

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Aim

To compare the effects of mouldboard plough, spading and deep ripping on yellow non-wetting sand.

Background

Research has shown that mouldboard ploughing of some soil types can improve yields. This trial aims to compare spading, mouldboard ploughing and deep ripping on yellow non-wetting sand. Inclusion of deep ripping will help determine to what extent the soil loosening effect is responsible for the yield gain compared with the topsoil burial of spading and mouldboard ploughing. If yield gains for mouldboarding and spading are not significantly different from deep ripping it would be plausible to state that the yield improvement from mouldboard ploughing and spading is largely due to the removal of the compaction layer rather than other benefits.

The site chosen to conduct the trial was 1 km long with soil varying from a yellow deep sandy earth (better sand) to pale deep sand (poor sand). The site has never been deep ripped before.

Trial Details

Property	Michael O'Callaghan, Marchagee			
Plot size & replication	1km x 18m x various replications (see results)			
Soil type	Yellow sand			
Soil pH (CaCl₂)	0-10cm: 5.3	10-20cm: 6.1	20-30cm: 4.4	30-40cm: 4.1
EC (dS/m)	0-10cm: 0.138			
Sowing date	22/04/13			
Variety	Coromup lupins			
Seeding rate	110 kg/ha			
Soil amelioration	March 2012: 3 t/ha Lime			
Fertiliser	22/04/13: 80 kg/ha Double phos premium			
Paddock rotation	2010: wheat, 2011: canola, 2012: wheat			
Herbicides	19/04/13: 600 g/ha Simazine, 130 g/ha Metribuzin, 1.6 L/ha Glyphosate, 130 mL/ha Alpha Cypermethrin, 2.7 L/ha Treflan, 0.2% Wetter, 1% Sulphate of Ammonia, 0.2% SP700 17/06/13: 410 mL/ha Clethodim, 270 mL/ha Alpha Cypermethrin, 0.7% Uptake, 1% Sulphate of ammonia			
Growing Season Rainfall	242.5mm			

Table 1: Electrical conductivity and pH results of soil samples taken from the eastern and western ends of the control treatment.

Soil Sample Location within Control	Soil Depth (cm)	Conductivity (dS/m)	pH (CaCl ₂)
Eastern end (Good Soil)	0-10	0.138	5.3
	10-20	0.041	6.1
	20-30	0.023	4.4
	30-40	0.027	4.1
	40-50	0.027	4.2
Western end (Poor Soil)	0-10	0.091	5.7
	10-20	0.025	4.5
	20-30	0.013	4.4
	30-40	0.011	4.3
	40-50	0.010	4.4

Results

Table 1: Yield and quality results for Coromup lupins sown in 2013, Marchagee. Values shown are means and standard errors. Replicates are uneven and control treatment was not replicated due to a set-up error.

Treatment	Reps	Yield (t/ha)		Protein (%)		Fuel (L/ha)	
Control	1	2.79		34.8		8.1	
Deep Ripping	2	2.84	(±0.019)	35.1	(±0.30)	8.4	(±0.10)
Mouldboarding	2	2.97	(±0.091)	35.8	(±0.10)	9.7	(±0.80)
Spading	3	2.73	(±0.062)	35.2	(±0.09)	8.7	(±0.47)

Comments

- The 2013 season was a difficult one for this trial, most likely due to the season and we will get a true representation of the trial in the 2014 season, when planted to a cereal crop.
- The replicates in this demonstration are variable and the control treatment was not replicated due to a set-up error in 2012.

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