

Soil Amendments

Aim: Investigate benefits of soil amendments on acid soil for wheat and triticale

Research Officer: Troy Conley & Luigi Moreschi
Company: CSBP



Farmer: Keith Carter
Location: Jibberding Hall Rd, Wubin

Background: Subsurface acidity has been shown to be the most important soil factor causing low crop yields on yellow sand plain soils in the eastern wheatbelt of Western Australia. Trial work has indicated that in many agricultural farming systems, surface applied gypsum can be a viable method for increasing crop yields on soils with subsurface acidity, due to its ability to leach rapidly to the required depth compared to lime sand. This year CSBP in conjunction with the Liebe Group conducted a trial looking at the effects of different soil amelioration techniques on the growth of wheat and triticale on acid sand plain.

Trial Details:

Plot size and replication	20m x 1 /8m x 3 reps
Soil type	Loamy sand
Sowing date	22 nd May 2003
Conditions at sowing	Drying soil
Machinery	Conserva Pak 9" spacings
Seeding rate	82 kg/ha Wyalkatchem Wheat (with Jockey) 82 kg/ha Tahara Triticale
Fertiliser	Basal – 100 kg/ha Agstar 75 L/ha Flexi-N 100 kg/ha Muriate of Potash
Herbicides and Insecticides	2 L/ha Glyphosate, 1.2 L/ha Treflan + 35g Logran
Paddock History	2002 = Failed Lupins, 2001 = Wheat, 2000 = Pasture
Soil Ameliorants	Applied immediately prior to seeding and incorporated with narrow points

Soil Test:

	pH	Ex. Ca meq/100g	Ex. Mg meq/100g	Ex. K meq/100g	Ex. Al meq/100g	Extract. Al (mg/kg)	ECEC meq/100g
0-10 cm	4.8	1.28	0.36	0.14	0.12	0.1	1.98
10-20cm	4.2	0.41	0.10	0.09	0.53	14.6	1.15
20-30cm	4.4	0.46	0.11	0.08	0.29	6.9	0.95

Results:

	Species	Treatment	Yield
1	Wyalkatchem	Nil	2.66
2	Wyalkatchem	2 t lime	2.72
3	Wyalkatchem	2 t gypsum	2.77
4	Wyalkatchem	2 t dolomite	2.65
5	Wyalkatchem	2 t lime + 2 t gypsum	2.78
6	Wyalkatchem	2 t gypsum + 2 t dolomite	2.72
7	Triticale – Tahara	Nil	2.43
8	Triticale – Tahara	2 t lime	2.40
9	Triticale – Tahara	2 t gypsum	2.57
10	Triticale – Tahara	2 t dolomite	2.45
11	Triticale – Tahara	2 t lime + 2 t gypsum	2.60
12	Triticale – Tahara	2 t gypsum + 2 t dolomite	2.62
	LSD	Treatment LSD (1%)	0.17
		Soil Treatment LSD (5%)	0.12
		Species LSD (1%)	0.07
		Soil Treatment x Species	nsd

Summary:

- There was a significant yield improvement of the triticale to the applied gypsum. The wheat did not show the same response. Whilst the variety Wyalkatchem does have good tolerance to aluminium, Triticale is highly tolerant, and would be expected to be the least likely to respond to changes in levels of toxic aluminium in the subsoil.
- The liming sources of lime sand and dolomite had no effect on yield of either the triticale or wheat in the first year of application. Due to their solubility the effects of these liming sources may be seen in the next few years.
- It has been reported elsewhere that an additive effect on plant growth can be induced by mixing a lime source and gypsum together. This was not demonstrated at this site in 2003 with either species of cereal.
- At the time of writing this article, the analysis of soil samples looking at changes in aluminium and other nutrients induced by the soil ameliorants in both the surface and subsoil had not yet been completed. CSBP will continue this trial for another 2 years.

Technically reviewed by: Luigi Moreschi