Managing barley on acidic soil in southern NSW – Wagga Wagga 2015

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Key findings

- There was no effect on barley yield from applying lime in this experiment, despite the low soil pH_{Ca} of 4.5, potentially due to the low levels of exchangeable aluminium in the soil.
- The highest yield came from planting either Compass or La Trobe on 8 May, applying 80 kg/ha of nitrogen (N) at sowing. Applying N did not increase grain yield in the 28 May sowing treatments.
- The acid tolerant barley variety Litmus yielded less than Compass or La Trobe from the 8 May sowing. Delayed sowing reduced the grain yield of Compass and La Trobe, but not of Litmus.
- Applying phosphorus (P) (20 P kg/ha) did not increase grain yield at either sowing time.

Introduction

Barley cultivation in southern NSW has increased markedly in recent seasons, especially in the higher rainfall zones of the South West Slopes where soils are often acidic. This experiment aimed to evaluate agronomic management options that enhance the yield potential on this specific soil type.

Site details

Soil type	Red dermosol (Table 1)
Previous crop	Canola
Rainfall	333 mm April–October + 160 mm December 2014–March 2015

Table 1. Soil test results for experimental site at Wagga Wagga – 1 May 2015.

	0–10 cm	10–30 cm	0–120 cm
pH (Ca)	4.5	4.7	–
Phosphorus (Colwell mg/kg)	71.0	13.0	–
Exc. aluminium (%)	3.8	3.7	–
Available nitrogen (kg/ha)			115.0

Treatments

Treatment details are summarised in Table 2. Three varieties were sown on two sowing dates. Within each sowing date and for each variety, a 'best bet' rate of nitrogen, phosphorus, fungicide and lime were applied at rates to maximise the yield, which becomes the 'All' treatment. In turn, each nitrogen treatment (80 kg N/ha, applied as urea pre-drilled), phosphorus (20 kg P/ha, applied as Triple Super at sowing), fungicide (300 mL/ha Prosaro applied three times before major rain events in June, July and August) and lime (4 t/ha lime applied and incorporated pre-sowing) were excluded to determine their absolute contribution to grain yield.

Table 2. Sowing date, varieties and treatments applied in a barley experiment at Wagga Wagga 2015.

Sowing dates	Varieties	Treatment	Treatment description
8 May 28 May	Compass[Φ] La Trobe[Φ] Litmus[Φ]	All	N + P + fungicide + lime
		Nil N	P + fungicide + lime
		Nil P	N + fungicide + lime
		Nil lime	N + P + fungicide
		Nil fungicide	N + P + lime

Results

Early sowing resulted in higher grain yield for Compass and La Trobe (Table 3, Figure 1) but not for Litmus.

Table 3. Grain yield (t/ha) of three barley varieties (averaged across treatments) sown at two sowing dates at Wagga Wagga in 2015.

Variety	Grain yield (t/ha)	
	8 May	28 May
Compass	5.49	4.82
La Trobe	5.47	4.36
Litmus	4.70	4.55

Excluding N from the 'All' treatment resulted in a significant grain yield reduction (0.6 t/ha) from the early sowing, but not the later sowing (Figure 1).

Excluding fungicide resulted in a significant grain yield reduction from the later sowing (0.3 t/ha), but not the early sowing. There was no effect on grain yield from excluding lime or phosphorus at either of the sowing dates. Grain quality is yet to be analysed.

Summary

The most important management factors for improving barley yield on this acidic soil site were to sow either Compass or La Trobe early and to apply nitrogen, with delayed sowing and/or excluding nitrogen reducing grain yield. Despite the low soil pH at the site, there was no benefit from applying lime. The effect of liming might not have been apparent as it was applied close to sowing and the exchangeable aluminium level was quite low.

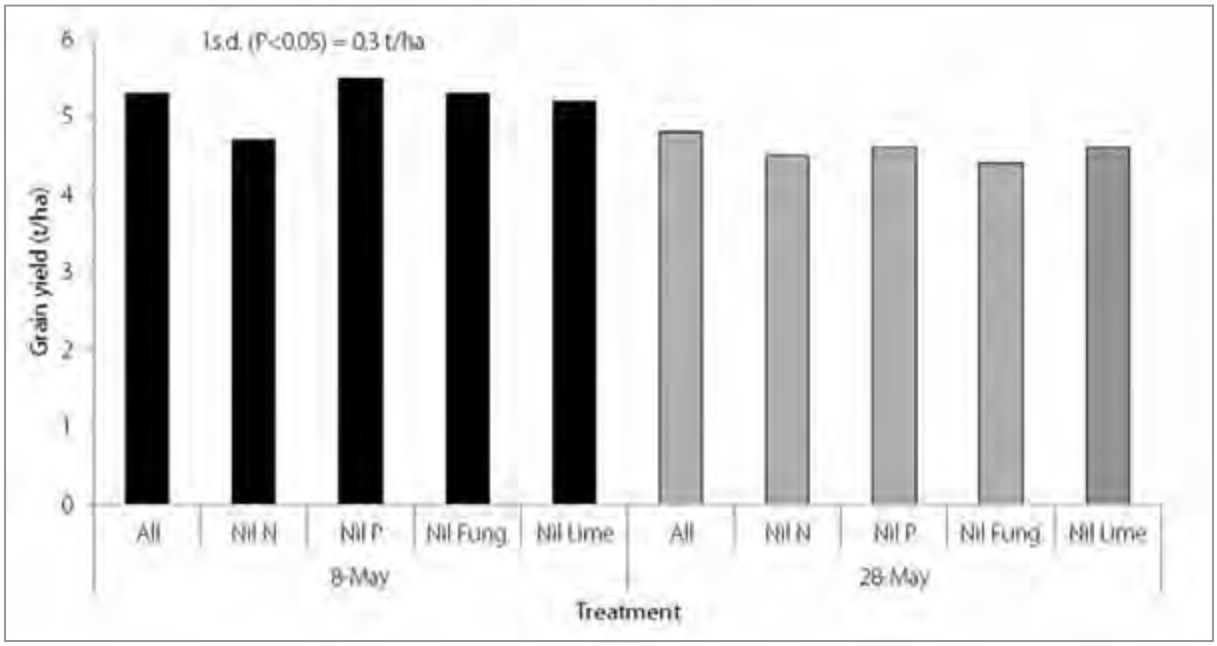

Figure 1. Effect of sowing date and treatment on grain yield of barley (average of three varieties) at Wagga Wagga in 2015.

Acknowledgements

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