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Effect of sowing date on irrigated soybeans in southern NSW 2015–16

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Key findings

- For all varieties, the middle sowing date (4 December) resulted in higher grain yields than the early (11 November) or late (23 December) sowing dates.
- Varieties, N005A-80 and Bidgee[Ⓛ] consistently achieved the highest seed protein concentrations.
- Varieties, Snowy[Ⓛ] and Bidgee[Ⓛ] achieved consistent seed protein concentrations across the three sowing dates, while later sowing dates reduced the seed protein of Djakal, N005A-80 and P176-2 varieties.

Introduction

An experiment was conducted to assess the effect of early, mid and late sowing dates on the grain yield, phenology and seed quality of soybeans grown in southern New South Wales. Soybeans are both thermal and photo-period responsive and, as a result, sowing date can have a major effect on both plant phenology and growth characteristics.

A range of commercial soybean varieties suited to the region were evaluated, including two breeding lines for potential release, N005A-80 and P176-2. Early (11 November) and late (23 December) sowing times were chosen as dates earlier and later than ideal, while the middle (4 December) sowing date represents the middle of the ideal sowing window for the region.

Site details

Location	Leeton Field Station, Yanco NSW
Soil type	Grey, self-mulching clay (vertosol)
Previous crop	Barley
Fertiliser	125 kg/ha legume starter (N=13.3%, P=14.3%, S=9%, Zn=0.81%)
Inoculation method	Peat slurry in-furrow injection
Paddock layout	Raised beds (1.83 m centres) with furrow irrigation
Harvest date	21 April 2016

Treatments

Varieties

Djakal, Snowy[Ⓛ], Bidgee[Ⓛ], N005A-80 and P176-2

Sowing dates

11 November 2015, 4 December 2015 and 23 December 2015

Results

Grain yield

Both sowing date and variety significantly affected grain yield. Grain yield was highest for the middle sowing date (4 December), while the early (11 November) and late (23 December) sowing dates resulted in significantly lower yields (Figure 1).

Averaged across sowing dates, Djakal, N005A-80 and P176-2 achieved the highest grain yields at 3.2 t/ha, 3.1 t/ha and 3.1 t/ha respectively, while Snowy[Ⓛ] and Bidgee[Ⓛ] achieved grain yields of 2.7 t/ha and 2.4 t/ha respectively (Figure 2).

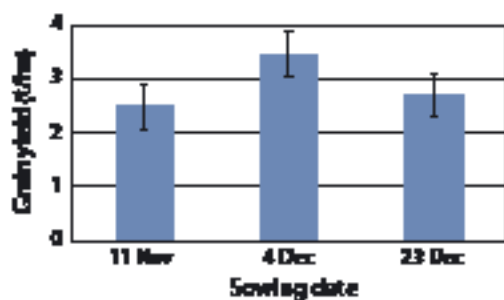


Figure 1. Effect of sowing date on soybean grain yield averaged across all varieties. Bars denote I.s.d. ($P = 0.05$) = 0.4 t/ha.

Seed protein

Sowing date, variety and the interaction between sowing date and variety had a significant effect on seed protein concentration. Snowy[®] and Bidgee[®] achieved consistent seed protein concentrations across sowing times, while the seed protein concentration for Djakal, N005A-80 and P176-2 varieties was reduced at later sowing dates.

Averaged across sowing dates, N005A-80 had the highest seed protein concentration (Figure 3) followed by Bidgee[®], Snowy[®], P176-2 and Djakal at 45.4%, 44.4%, 43.4%, 41.7% and 41.6% respectively.

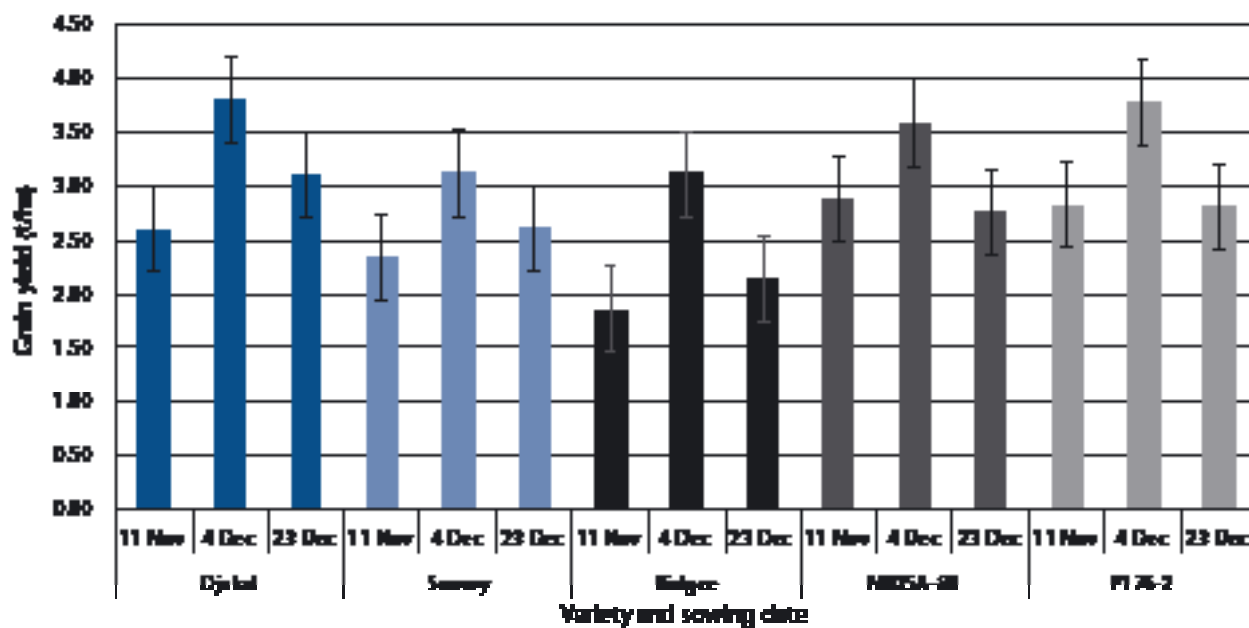


Figure 2. Effect of variety and sowing date on the grain yield of five soybean varieties. Bars denote I.s.d. ($P = 0.05$) = 0.4 t/ha.

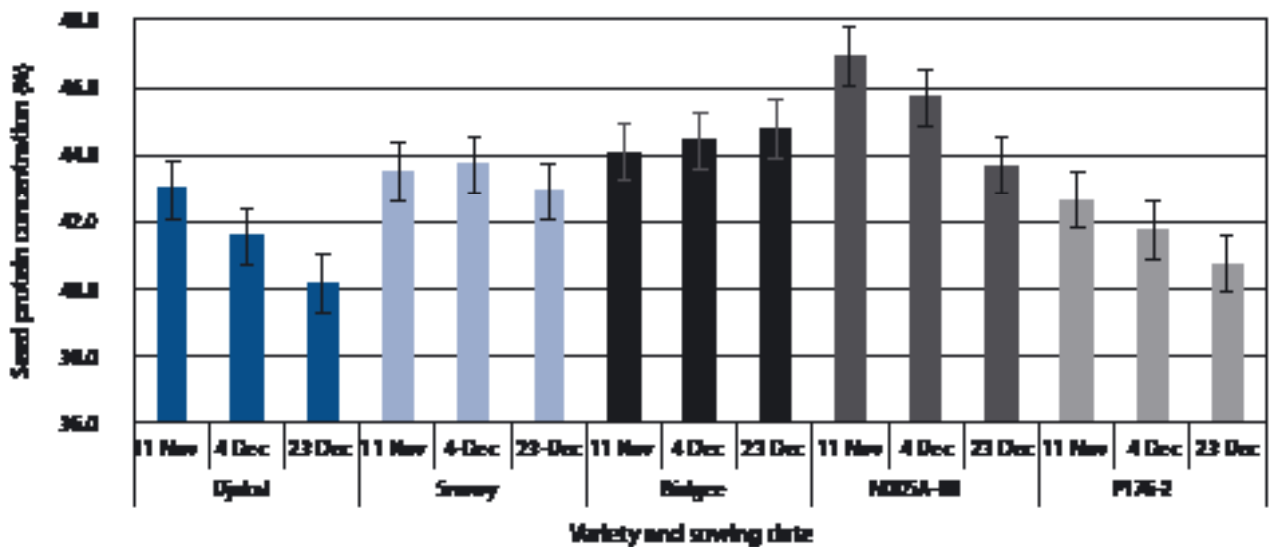


Figure 3. Effect of variety and sowing date on protein concentration (percentage on a dry matter basis) of five soybean varieties. Bars denote 1.s.d. ($P = 0.05$) = 0.85%.

Summary

This experiment showed that sowing soybeans in southern NSW outside the optimum sowing window can result in significant yield losses. Not only did delaying sowing into late December reduce yield, but sowing too early (early November) also had a similar negative effect on yield. Significant reductions in seed protein concentration occurred when sowing was delayed, however, this was not the case for Snowy^{db} or Bidgee^{db}, both of which maintained consistent seed protein concentrations across sowing dates.

Acknowledgements

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