Plant population density soybeans – southern NSW 2014–15

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Key findings

- Bidgee$^{\Phi}$ and Djakal performed best at 45 plants/m^2.
- N005A-80 and Snowy$^{\Phi}$ performed best at 30 plants/m^2.
- Severe lodging occurred in all varieties at the 60 plants/m^2 sowing density.
- Snowy$^{\Phi}$ has poor resistance to lodging, which was exacerbated at higher sowing densities.

Introduction

This experiment was conducted at the NSW DPI Leeton Field Station to test the grain yield and lodging response of three commercial varieties and an unreleased line (N005A-80) to four targeted sowing densities.

Site details

Soil type	Self-mulching medium clay
Previous crop	Chemical fallow
Sowing date	12 December 2014
Establishment irrigation	Pre-watered
Irrigation layout	1.83 m raised beds with furrow irrigation
Row spacing	2 rows/bed (91.5 cm)
Inoculation	Water injected peat slurry Group H
Fertiliser	125 kg/ha legume starter
Herbicides pre-emergent	Glyphosate 450 g/L at 2 L/ha Pendimethalin 330 g/L at 2.5 L/ha
Insecticides	Abamectin @ 300 mL/ha on 30 December 2014, lamdacyhalothrin @ 80 mL/ha on 11 March 2015
In-crop rainfall	104 mm
Irrigations	8 ML/ha (approximately)
Harvest date	23 April

Treatments

Varieties (4)	Bidgee$^{\Phi}$ Djakal Snowy$^{\Phi}$ N005A-80
Targeted plant densities (4)	15, 30, 45, 60 plants/m^2

Results

Lodging

Lodging in soybeans can cause reduced yield and problems with harvest. In this experiment, higher plant densities resulted in increased lodging with all four varieties exhibiting severe lodging at the 60 plants/m^2 sowing density (Figure 1). The poor lodging resistance of Snowy was evident, with severe lodging occurring at the 30, 45 and 60 plants/m^2 sowing densities. Bidgee, with its lower height and biomass responded well with little lodging occurring up to 45 plants/m^2. Above 45 plants/m^2, Bidgee was also prone to lodging.

Grain yield

Grain yield was significantly affected by both plant density ($P < 0.01$) and variety ($P < 0.01$). The interaction between plant density and variety was not significant ($P = 0.46$).

Grain yields were reduced at both the 15 plants/m^2 and 60 plants/m^2 sowing densities for all four varieties (Figure 2). Bidgee and Djakal achieved their highest yield at the 45 plants/m^2 sowing density. N005A-80 and Snowy achieved their highest yield at the 30 plants/m^2 sowing density.

Averaged across all sowing densities, Djakal and N005A-80 yielded significantly higher than Bidgee and Snowy at 4.2 t/ha, 4.1 t/ha, 3.6 t/ha and 3.2 t/ha respectively.

Summary

Through the evaluation of four soybean varieties at four targeted sowing densities, this experiment found that:

- Bidgee and Djakal performed best at 45 plants/m^2

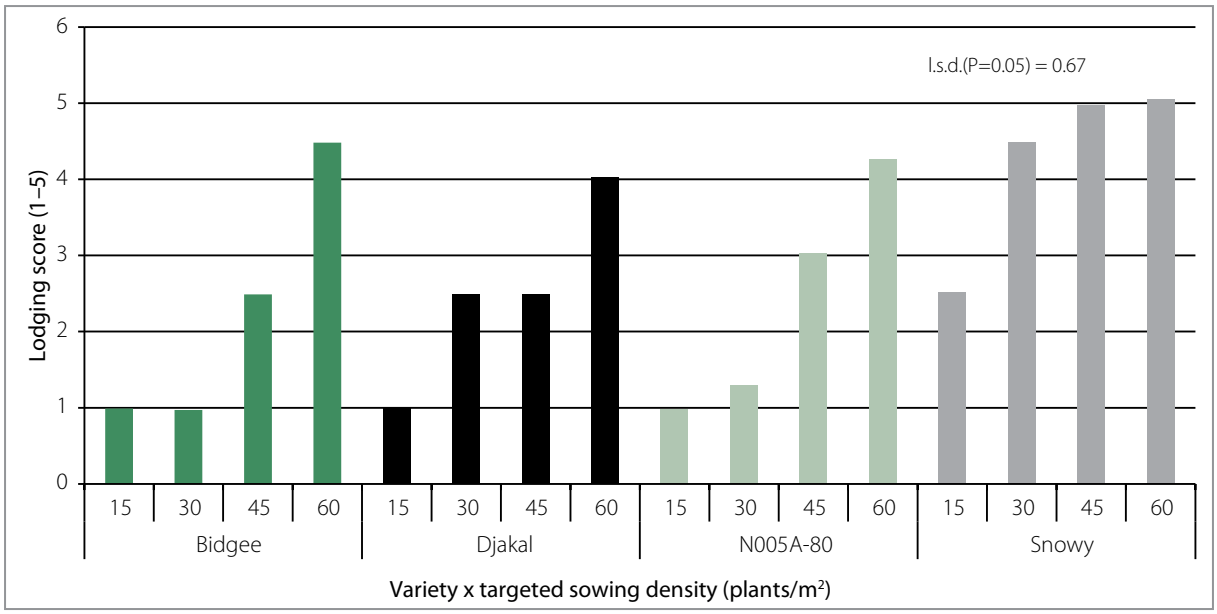

Figure 1. Soybean lodging score for variety and targeted sowing density interaction.
(1 = minimal lodging, 5 = severe lodging).

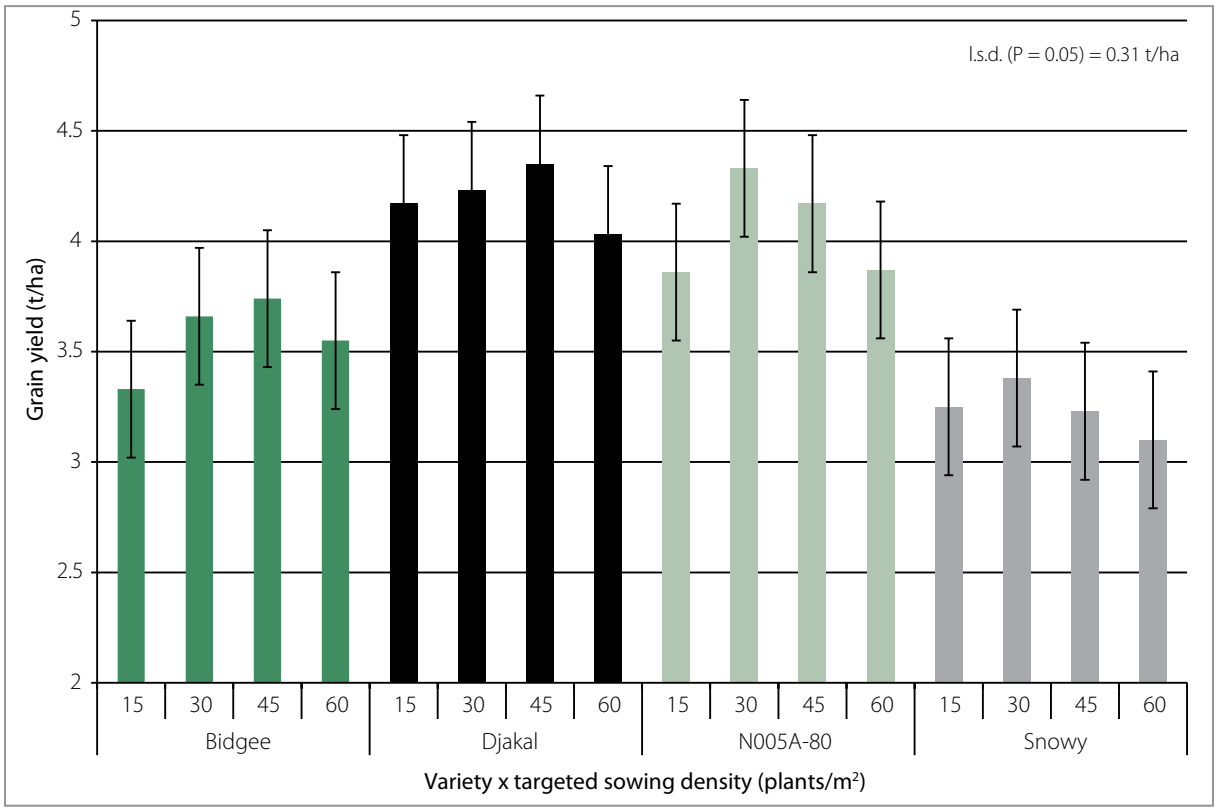

Figure 2. Soybean grain yield for variety and targeted sowing density interaction.

- N005A-80 and Snowy performed best at 30 plants/m^2
- all varieties suffered severe lodging at the 60 plants/m^2 sowing density
- Snowy has poor resistance to lodging, which is exacerbated at higher sowing densities.

Acknowledgements

The experiment is part of the project 'Southern NSW soybean agronomy', DAN00192, 2014–18, which is jointly funded by GRDC and NSW DPI.

Thank you to John Dando, Paul Morris and the NSW DPI farm staff at the Leeton Field Station for their assistance in managing the site. Also thankyou to Dr Neil Coombes from NSW DPI for undertaking the biometrical tasks associated with this project.