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NSW research results

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Advanced soybean breeding line evaluations across time of sowing – southern NSW 2014–15

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Key points

- Average grain yields are maximised by sowing mid-November to early December in southern NSW.
- In northern Victoria, sowing should begin earlier from 1 November until late November.

Introduction

This soybean experiment, conducted at the NSW DPI Leeton Field Station, tested the response of 26 advanced-stage lines and four commercial varieties at two sowing times. The first time of sowing (TOS) was 26 November followed by the second TOS (26 days later) on 22 December. These two sowing times represented the ideal sowing period (26 November) and a later than ideal sowing time for this region (22 December).

The experiment discussed is part of the National Soybean Breeding Program funded by GRDC, NSW DPI and CSIRO. The breeding objectives of that program are to produce soybean varieties for human consumption markets that are high yielding, early maturing, and have high disease tolerance. Recent varietal releases include Bidgee, Snowy and Djakal.

Site details

Soil type	Self-mulching medium clay
Previous crop	Chemical fallow
Establishment irrigation	Pre-watered
Irrigation layout	1.83 m raised beds with furrow irrigation
Row spacing	2 rows/bed (91.5 cm)
Sowing density	35 plants/m^2
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 at 300 mL/ha on 30 December 2014, lamdacyhalothrin at 80 mL/ha on 11 March 2015
In-crop rainfall	113 mm (TOS 1), 104 mm (TOS 2)
Irrigations	8 ML/ha (approximately)
Harvest date	TOS 1: 16/04/2015 TOS 2: 23/04/2015

Results

The 2014–15 season was favourable for growing soybeans with no environmental extremes. Warmer than average temperatures were recorded, with a total of 2,172 growing degree days [(max. temp. + min. temp.)/2) - 5 °C] compared with the long-term average of 1,983.

In Figure 1, grain yield of the 26 advanced-stage breeding lines sown in mid-November (TOS 1) can be seen with the commercial checks of Djakal, Bidgee$^{\Phi}$, Snowy$^{\Phi}$ and Bowyer varieties.

The standout breeding lines included P176-2, P126-37, P213-41, P168-11 and P176-23. These lines will be evaluated further for potential release in the future.

The dashed lines in Figure 1 indicate a significant yield difference from the benchmark variety Djakal, with a least significant difference (l.s.d.) of 0.3 t/ha. N005A-80 is currently under commercial seed increase and evaluation for commercial release.

In comparison, the later than ideal sowing date (TOS 2: 22 December) grain yield results are in line with what we would expect from this TOS (Figure 2). Across all varieties, grain yield from the later sowing date were 0.8 t/ha lower than TOS 1 (26 November).

At the later sowing date, several of the standout breeding lines included P176-30, N005A-80, P176-2, P168-11, P167-14 and P176-23.

Further seed quality analyses showed that all lines met the minimum requirements of protein content on a dry matter basis. Djakal has the lowest acceptable level of protein to meet human consumption standards.

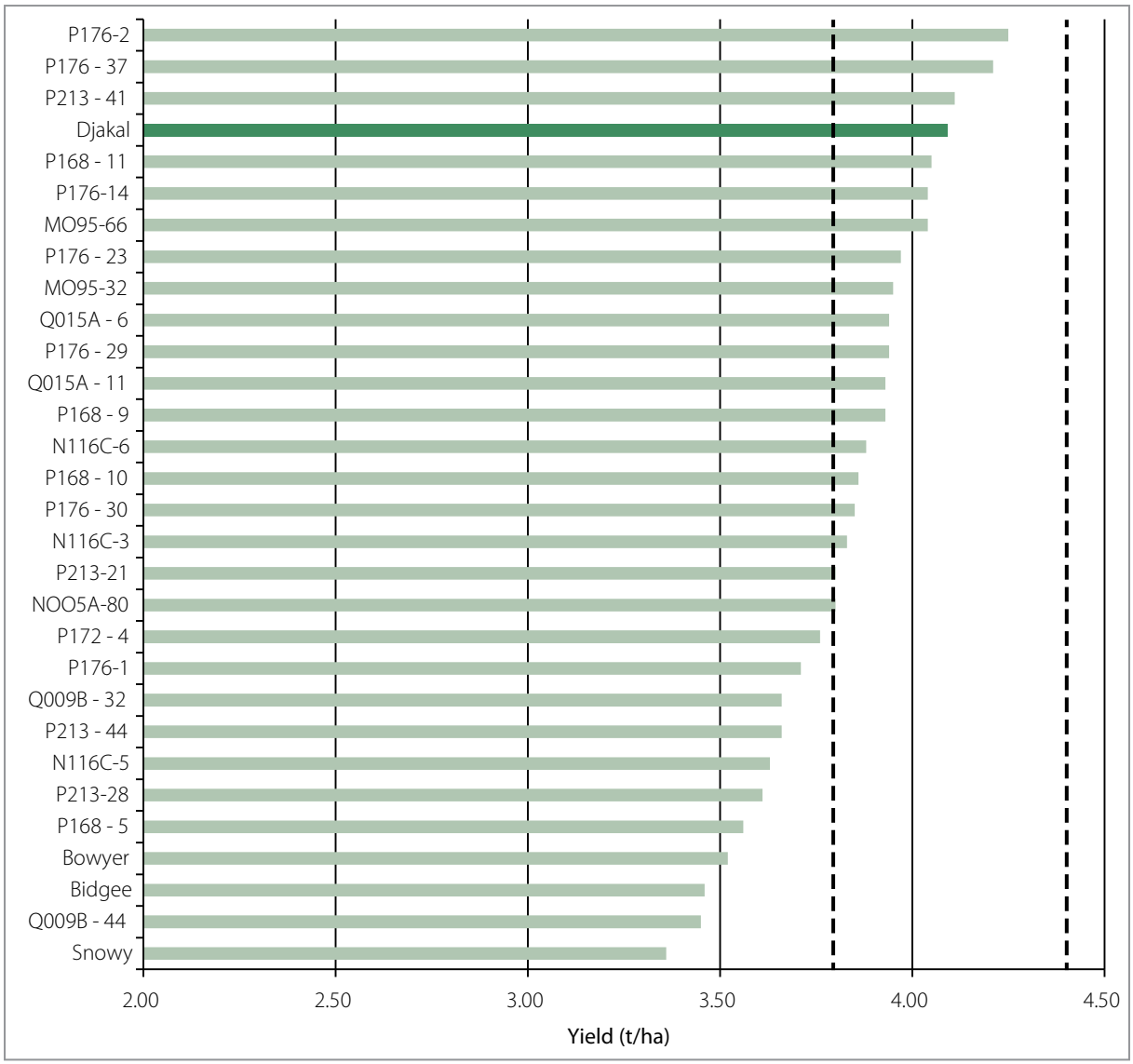

Figure 1: Grain yield of soybean varieties in the core variety trial at Yanco 2014–15, TOS 1 sown on 26 November 2014.

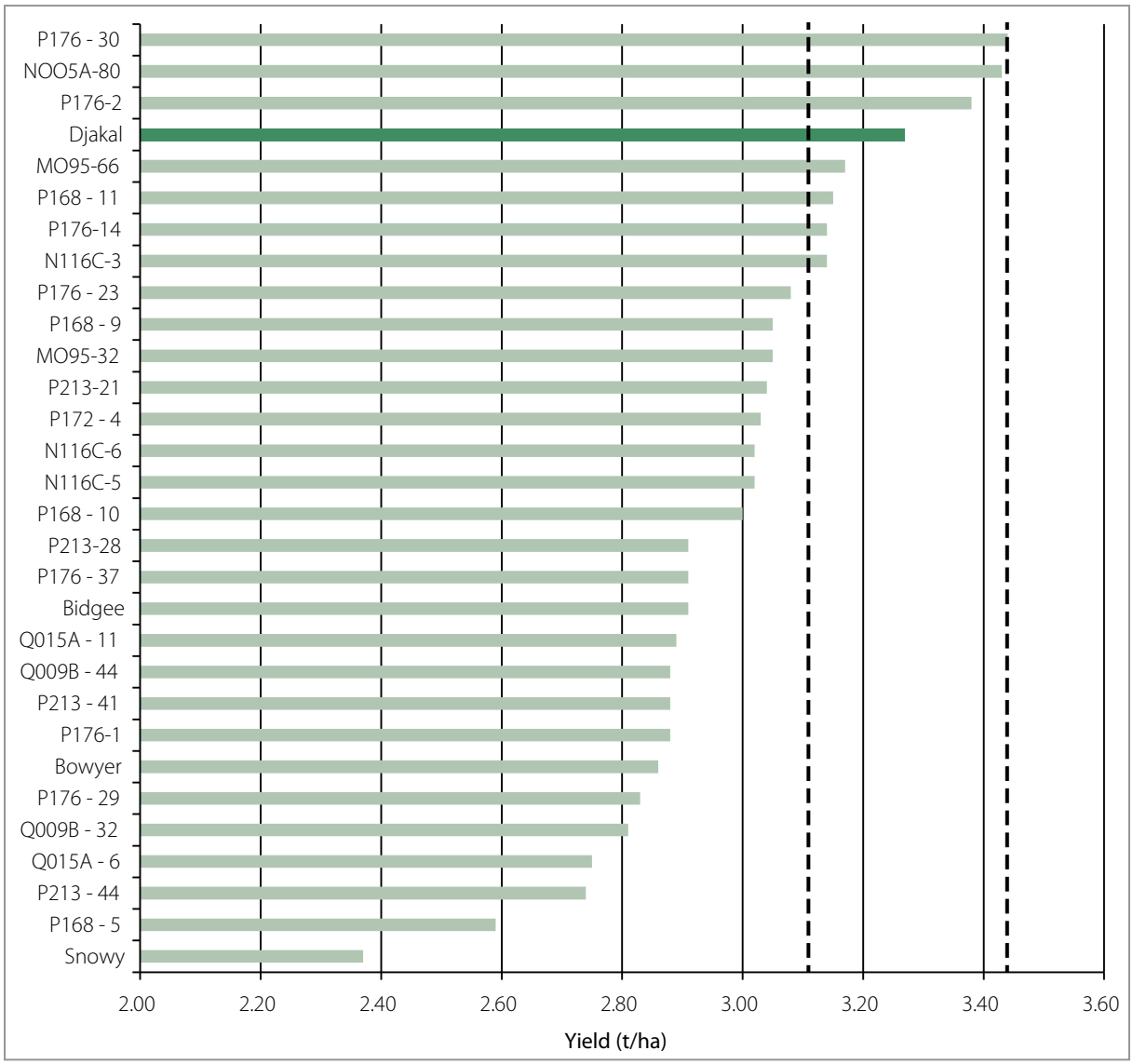

Figure 2: Grain yield of soybean varieties in the core variety trial at Yanco 2014–15, TOS 2 sown on 22 December 2014.

Summary

This year's results, combined with long-term experiments, clearly show that sowing in mid-November to early December maximises average grain yield in southern NSW. Further south into northern Victoria, sowing should begin earlier from 1 November until late November.

Grain yields from the late December sowing date were still acceptable, which indicates that current varieties can effectively fit into double-cropping systems where a later sowing window is often required.

A number of breeding lines are showing potential with many standout characteristics. These lines will be evaluated and tested into the future for potential release.

Acknowledgements

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