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Effect of nitrogen rate and placement on yield of canola—Merriwagga 2013

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Introduction

Past research has highlighted nitrogen as a key driver of grain yield of canola. With the recent development of hybrid canola there is little data on how these canola varieties respond to nitrogen application compared with open-pollinated varieties.

This experiment was designed to test the regional suitability of current commercial canola cultivars as well as determine nitrogen application and rate recommendations for specific canola varieties.

Site details

Soil type	red sandy loam
Available N	97 kg/ha (0–90 cm)
Previous crop	wheat (2012 and 2011)
Sowing date	29 April 2013 with tyne machine
Soil moisture	approximately 40 cm of moist soil
In-crop rainfall	186.5 mm
Starter fertiliser	60 kg Superfect
Harvest date	7 November 2013

Key findings

- Hyola® 50 was significantly higher yielding than all other varieties in this experiment.
- The application of nitrogen resulted in a significant increase in grain yield.
- Rates of 30 kg/ha of N and above applied directly with the seed, reduced grain yield due to negative effects on crop establishment.

Treatments

6 canola varieties	ATR-Stingray, Hyola® 50, Hyola® 555TT, 43Y85 CL, 45Y86 CL, Victory V3002
5 nitrogen rates	0, 15, 30, 60 and 120 kg/ha
2 nitrogen placement strategies	Urea applied directly with seed or urea pre-drilled in a separate pass

Results

There was a significant effect of variety in this experiment (P<0.001) with Hyola® 50 yielding higher than all other varieties (*Figure 1*).

There was an interaction between N rate and application method (P<0.001). As N rate increased so too did grain yield for the pre-drilled N treatment. However, where urea was applied with seed there was a positive grain yield response to the 15 kg/ha N rate but

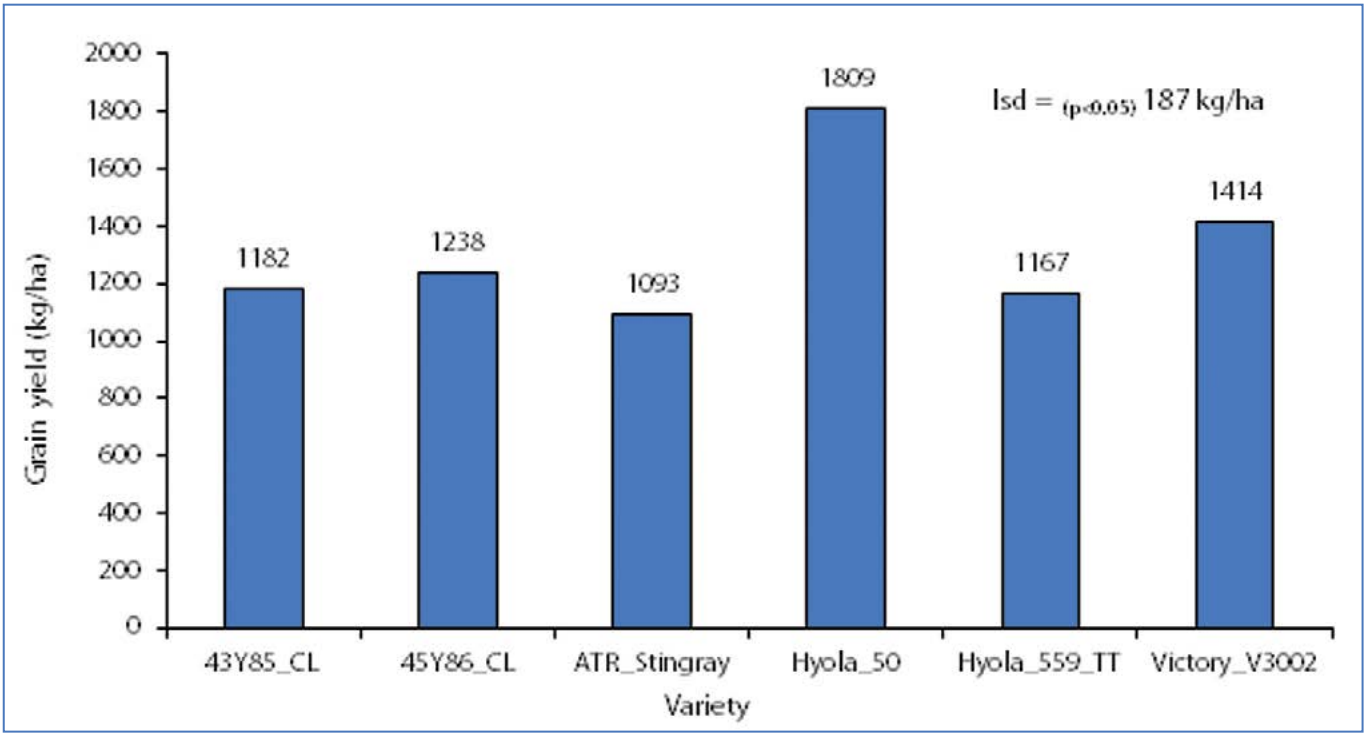

Figure 1: Grain yield of varieties averaged across all nitrogen and fertiliser placement treatments in an experiment at Merriwagga 2013.

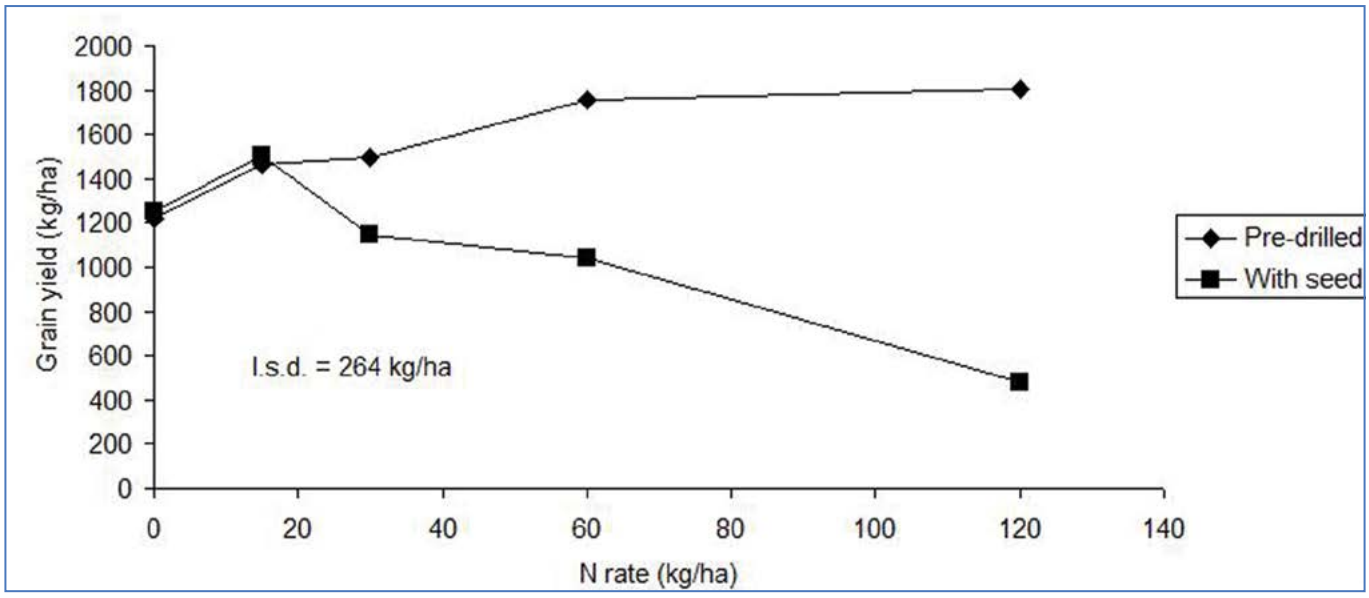

Figure 2: Grain yield of fertiliser placement and nitrogen rate interactions averaged across all varieties in an experiment at Merriwagga 2013.

grain yield then declined as N rate increased further (*Figure 2*). At 30 kg N/ha, grain yield reduced by 0.35 t/ha when N was placed with the seed compared with being pre-drilled. Similarly, at 60 kg N/ha and 120 kg N/ha, the yield reduction was 0.72 t/ha and 1.32 t/ha respectively.

Summary

In this experiment, selection of the correct variety was extremely important. Hyola® 50 exhibited superior early vigour which set it up to respond to growing season rainfall. Strong early vigour is extremely important for high yields in marginal western environments. Hyola® 50 has continually ranked at the top of the trials in this region over several seasons.

Nitrogen application is another important factor in this experiment. There was a strong response to nitrogen application, however, separating nitrogen from the seed at sowing was very important especially when applying rates above 15 kg/ha. This effect was similar in the same experiment when conducted in 2012. These trials have clearly shown that canola is very sensitive to nitrogen rates above 15 kg/ha with seed.

Acknowledgements

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