

DAW00227

Tactical Break Crop Agronomy in Western Australia

13WH13 - Timing of nitrogen in low rainfall canola

Authors

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Location of trial

Liebe site West Dalwallinu/Miling

Summary (Key messages)

- Canola grain yield increased with nitrogen application up to 50 kg N/ha
- Timing of nitrogen application had no effect on grain yield
- Canola oil decreased as nitrogen rate increased
- Applying nitrogen late (12 weeks after sowing) reduced oil%, but only if total N applied was 50 kg/ha
- Overall gross margins were similar at all rates of applied nitrogen or timing of nitrogen application - due to the decline of oil% as nitrogen increased
- Hyola 404RR produced higher yields, oil and gross margins than CB Telfer TT - at all rates and timings of nitrogen application

Background

In general, as long as nitrogen is applied within 8 weeks of sowing, there is no yield penalty.

How canola responds to nitrogen applied later than 8 weeks has not been widely researched. Similarly how new generation canola such as RoundupReady (RR) hybrids respond to nitrogen has not been widely tested, particularly in low and medium rainfall areas. This trial is one of a series of 13 timing of nitrogen experiments DAFWA conducted in 2013.

Aim

To investigate the response to changing the nitrogen rate and changing the time of application. Canola yield and oil will be measured and RR hybrids will be compared with open-pollinated TT types (OP TT).

Trial Details

- Growing Season rainfall (GSR April to October) = 204 mm, GSR + stored water (estimate) = 277 mm, Long term average GSR 222 mm. Dry June and first half of July.
- Soil type: Yellow deep sand (0.47% organic carbon), estimated to be 45 kg N/ha available in paddock from soil and plant residues
- Paddock rotation Wheat 2012, Wheat 2011, Lupin 2010
- 34 treatments: 2 Cultivars (CB Telfer [TT open-pollinated variety] and Hyola 404 RR [RR hybrid variety]) x 14 N treatments (kg N/ha) with timing spread between seeding, and up to 12 weeks after sowing –see Table 1;
- 3 replicates
- Sowing date May 9

Trial Details

- Seeding rate – Target density 30 plants/m² - CB Telfer 2.7 kg/ha, Hyola 404RR 3.4 kg/ha
- Basal Fertiliser 65 kg/ha BigPhos treated with Impact at sowing, 25th June 120 kg/ha Muriate of Potash.

Treatment detail

Table 1 N treatment details

No.	Total N	Treatname	N kg/ha			
			Seeding	4WAS	8WAS	12WAS
1	0	0N	0	0	0	0
2	25	0N 25N	0	25	0	0
3	25	0N 0N 25N	0	0	25	0
4	25	0N 0N 0N 25N	0	0	0	25
5	25	25N	25	0	0	0
6	50	50N	50	0	0	0
7	50	0N 50N	0	50	0	0
8	50	0N 0N 50N	0	0	50	0
9	50	0N 0N 0N 50N	0	0	0	50
10	50	25N 25N	25	25	0	0
11	50	25N 0N 25N	25	0	25	0
12	50	25N 0N 0N 25N	25	0	0	25
13	75	25N 25N 25N	25	25	25	0
14	100	25N 50N 25N	25	50	25	0

Assumptions used in Gross Margins

Oil bonus +/- 1.5% per unit of oil (%) either side of 42%, with no oil ceiling.

Additional costs such as seeding, harvest, insecticides assumed to be \$100/ha.

Nitrogen costs \$1/kg, application costs \$8/ha

RR costs – seed \$31/kg, Herbicides \$28/ha, Grain worth \$482/t (CBH Pool Esperance 5/11/13).

TT costs – seed \$2/kg, Herbicides \$47/ha, Grain worth \$502/t (CBH Pool Esperance 5/11/13).

Results

Both CB Telfer TT and Hyola 404RR responded to nitrogen in the same way in 2013. The yield of both varieties increased in response to nitrogen application up to 50 kg N/ha. Hyola 404RR produced higher yields, oil (mean 50% vs. 46%) and gross margins (mean \$426/ha vs. \$238/ha) at all rates of nitrogen.

For any given rate of applied nitrogen, the timing of the nitrogen application had no effect on grain yield. Thus 50 kg N/ha could be applied either at 4 weeks after sowing (WAS), 8 weeks after sowing, 12 weeks after sowing or in split applications with similar grain yield responses.

Although nitrogen increased the yield of canola, it had a larger negative effect on oil%. Treatments without applied nitrogen averaged 50% oil and oil percentage decreased as nitrogen was applied. The oil% dropped approximately 0.04% for every unit of nitrogen applied up to 75 kg N/ha. Not only did the rate of nitrogen reduce oil%, but the timing of nitrogen also had some effect on percentage oil. Applying nitrogen late at 12WAS reduced oil%, but only where the total rate of nitrogen applied over the season was high (50 kg N/ha). If the total rate of nitrogen applied over the season was 25 kg N/ha then applying nitrogen at 12 weeks had the same effect on oil% as applying nitrogen earlier in the year at seeding, four weeks after sowing or eight weeks after sowing.

There was no net economic gain in applying nitrogen in 2013, since the lost value from the reduced oil% and the cost of N exceeded the value of any increased yield. Similarly when the nitrogen was applied had no overall effect on gross margins.

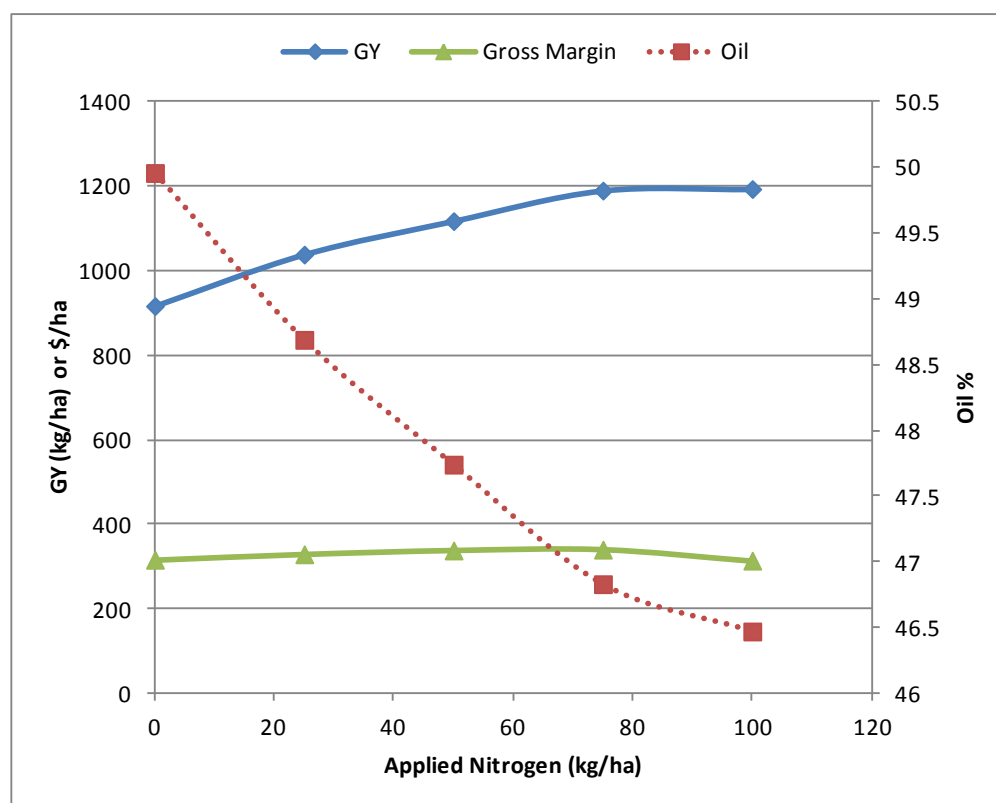


Figure 1 Effect of rate of nitrogen on grain yield (l.s.d = 76 kg/ha), oil (l.s.d. = 0.3%) and gross margins (l.s.d. = \$21/ha) of canola in 2013 (mean of two varieties).

Conclusion

Previous field trials have shown canola to respond to nitrogen up to 8 weeks after sowing. In this trial series in 2013 we have shown in a number of instances that canola responds to nitrogen up to 12 weeks after sowing. We will repeat these trials in 2014 to ensure we are not just seeing the response to a kind spring.

At West Dalwallinu/Miling in 2013 oil decreased at a faster rate than grain yield increased in response to nitrogen. Over recent years there has been a shift to markets with no oil limit. Therefore it will become increasingly important to have a good handle of soil nitrogen, target yield and the likely response of both oil and yield of canola if farmers are to maximise returns. We recommend people actively use tools like SYN to help with their nitrogen management.

Acknowledgements

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For more information contact

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