

DAW00227

Tactical Break Crop Agronomy in Western Australia

Splitting of nitrogen in medium-high rainfall canola (13ED14)

Authors

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Location of trial

Chris Reichstein's Wittenoom Hills

Summary (Key messages)

In this 2013 trial

- Applying nitrogen 12 weeks after sowing had a similar effect as the same total nitrogen rates applied earlier.
- Nitrogen had a minor effect on oil%, with rates above 50 kg N/ha tending to reduce oil.
- Applying higher than 50 kg N/ha to ATR Stingray increased yield but was of little economic benefit.
- Grain yield of Hyola 404RR responded to 150 kg/ha of applied nitrogen, but gross margins were optimised at 75 kg N/ha.

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

- Property: Mt Burdett Farming Co. (Chris Reichstein, Owner)
- Agzone 5, Growing Season rainfall (GSR) = 262 mm, GSR + stored water (estimate) = 411 mm
- Soil type: Loam (1.8% organic carbon)
- Paddock rotation Barley 2012, Wheat 2011, Field pea 1.5 t/ha 2010
- 34 treatments: 2 Cultivars (ATR Stingray [TT open-pollinated variety] and Hyola 404 RR [RR hybrid variety]) x 17 N treatments (kg N/ha) with timing spread between seeding, and up to 12 weeks after sowing –see Table 1;
- 3 replicates

Trial Details

- Sowing date April 26
- Seeding rate – Target density 40 plants/m² - ATR Stingray 2.7 kg/ha, Hyola 404RR 3.9 kg/ha
- Fertiliser (kg/ha) 100 kg/ha of Superphos at seeding, 120 kg/ha of Muriate of Potash and 400 kg/ha of gypsum (17% Ca, 14% S) topdressed over whole site 4 weeks after seeding

Treatment detail

Table 1 Treatment details for 13ED13 at Wittenoom Hills in 2013 (WAS = Weeks after seeding)

No.	Total N	N kg/ha			
		Seeding	4WAS	8WAS	12WAS
1	0	0	0	0	0
2	25	25	0	0	0
3	50	50	0	0	0
4	75	75	0	0	0
5	150	150	0	0	0
6	25	12.5	12.5	0	0
7	50	25	25	0	0
8	75	37.5	37.5	0	0
9	150	75	75	0	0
10	25	8.3	8.3	8.3	0
11	50	16.7	16.7	16.7	0
12	75	25	25	25	0
13	150	50	50	50	0
14	25	6.3	6.3	6.3	6.3
15	50	12.5	12.5	12.5	12.5
16	75	18.8	18.8	18.8	18.8
17	150	37.5	37.5	37.5	37.5

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

1. *Splitting nitrogen applications produced similar or higher canola yield and returns.*

Compared to applying nitrogen at seeding or in a 2 way split (at seeding and 4 weeks after seeding), 3 way and 4 way splits produced equal or higher yields and gross margins.

2. *Increasing nitrogen fertiliser increased canola yields*

Highest grain yields of both Hyola 404RR and ATR Stingray were produced at 150 kg N/ha applied either in a 2 way, 3 way or 4 way split.

3. *Gross margins were maximised at lower rates of nitrogen*

Highest gross margins of ATR Stingray of \$446 to \$496/ha were produced at 50 kg N/ha applied in a 3 way or 4 way split, 75 kg N/ha in a 3 way split or 150 kg N/ha in a 2 way, 3 way or 4 way split.

Highest gross margins of Hyola 404RR of \$518 to \$549/ha were produced at 150 kg N/ha applied either in a 2 way, 3 way or 4 way split or 75 kg N/ha applied in a 4 way split.

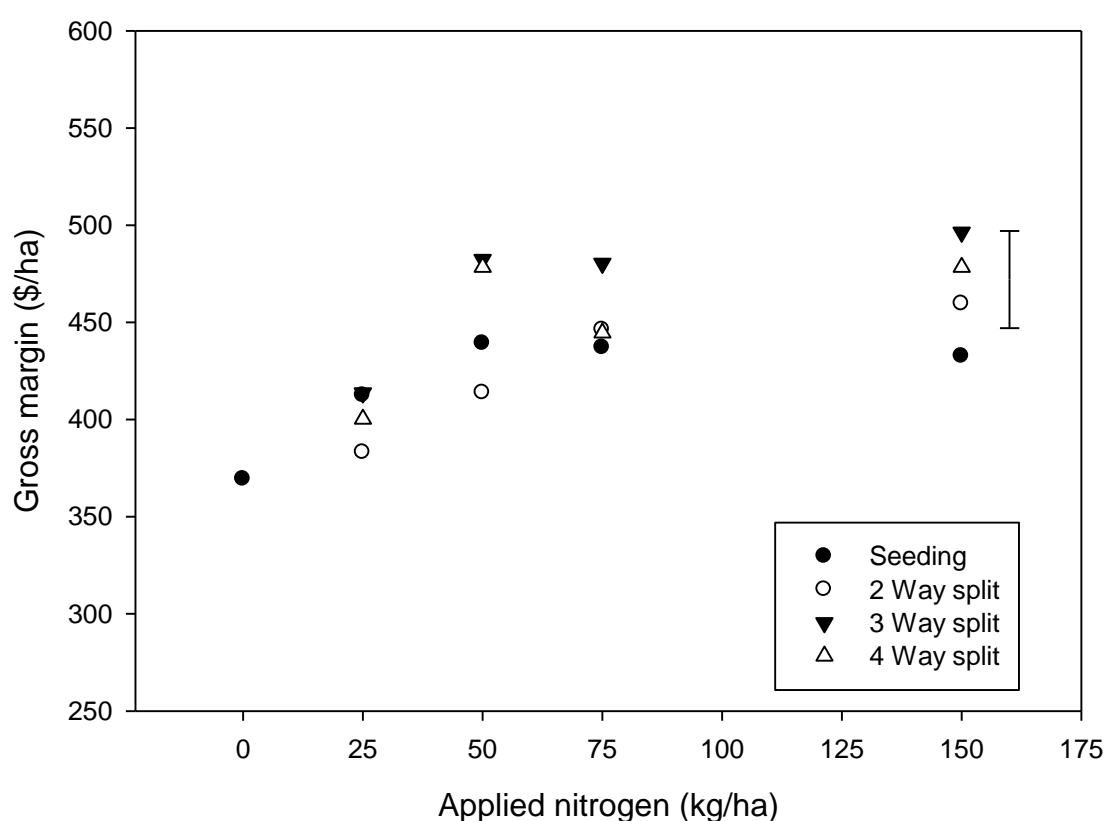


Figure 1 Effect of nitrogen fertiliser and split applications on the gross margin (\$/ha) of ATR Stingray at Wittenoom Hills in 2013

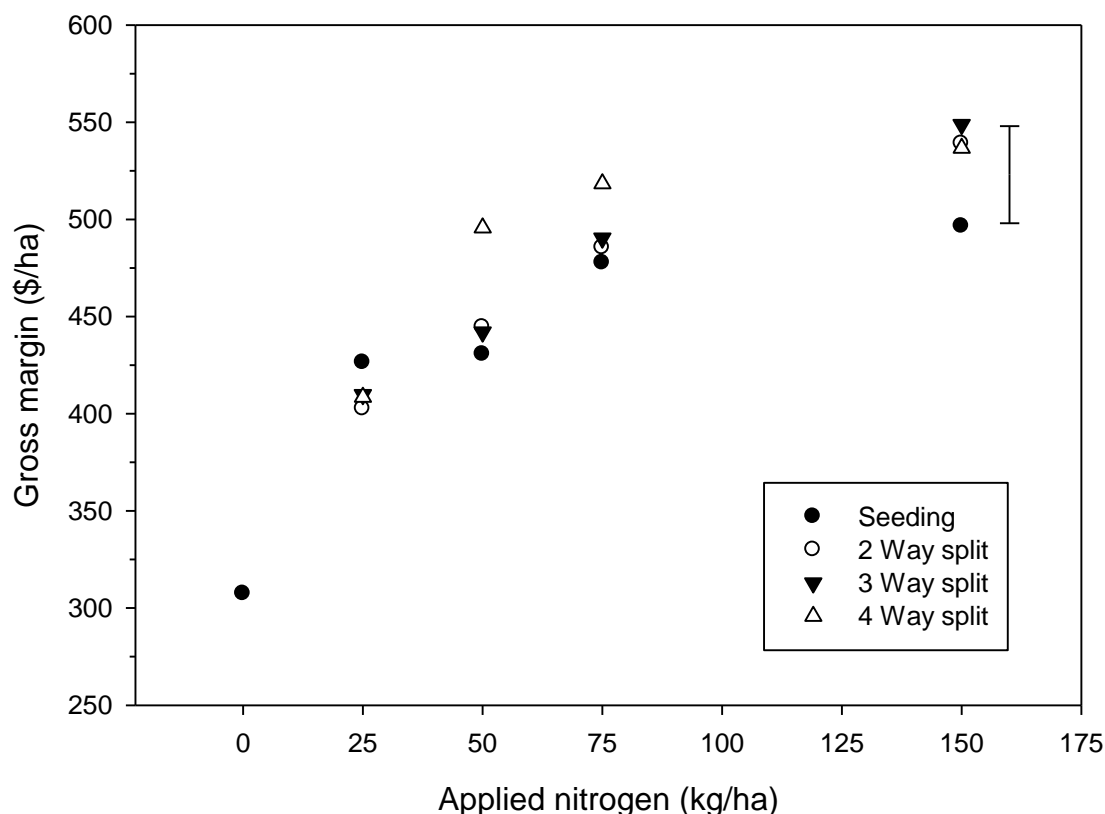


Figure 2 Effect of nitrogen fertiliser and split applications on the gross margin (\$/ha) of Hyola 404RR at Wittenoom Hills in 2013.

Conclusion

Surveys conducted at spring field days throughout WA in 2013 indicated that the majority of farmers apply nitrogen at both seeding and 8 weeks after sowing. Very few farmers apply nitrogen later than 8 weeks after sowing. In this experiment we showed that canola continued to respond to nitrogen applied at 12 weeks after sowing (4 way split). This indicates that farmers may be able to hedge their bets earlier in the season and reduce nitrogen inputs until they have a better idea of their canola crops yield potential and if they believe the crop will respond to further nitrogen inputs they can continue to apply nitrogen to flowering canola.

The highest rates of return (Max GM for least \$/ha invested) for the Hybrid RR variety Hyola 404RR were achieved by applying 75 kg N/ha in a 4 way split. For ATR Stingray they were achieved by applying 50 kg N/ha in a 3 way split. Maximum marginal rates of return of ~ \$4/ha for every extra dollar spent on nitrogen was achieved by applying 50 kg N/ha in a 3 way split for ATR Stingray and a 4 way split for Hyola 404RR.

Growers in higher rainfall areas have requested we look at later times of application - up to 16 weeks.

Acknowledgements

This trial is one of a series conducted throughout WA as part of the GRDC/DAFWA co-funded project "Tactical Break Crop Agronomy in Western Australia". Thanks to Chris Reichstein for hosting the trial and to the Esperance RSU for trial management. Pam Burgess (DAFWA, Esperance) provided technical assistance to ensure all treatments and measurements occurred in a timely and accurate fashion.

Links

For other reports related to this trial see NVTplus

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