

DAW00227

Tactical Break Crop Agronomy in Western Australia

13ED15 Splitting of nitrogen in medium-high rainfall canola

Authors

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Location of trial

Esperance Downs Research Station (EDRS), Gibson

Summary (Key messages)

In this 2013 trial

1. ***Nitrogen applications at 12 weeks produced similar canola yield to earlier applications***
2. ***OP TT and hybrid RR varieties had a similar response to nitrogen timing and rate.***
3. ***The OP TT variety ATR Stingray produced greater grain yields and returns than the hybrid RR variety Hyola 404R***
4. ***Gross margins were maximised at lower rates of nitrogen than grain yield***

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: EDRS (DAFWA, Owner)
- Agzone 6, Growing Season rainfall (GSR) = 393 mm, GSR + stored water (estimate) = 508 mm
- Soil type: Loam (2.8% organic carbon)
- Paddock rotation Barley 2012, Sub-clover Pasture 2008 to 2011
- 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
- Sowing date April 29

Trial Details

- 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 topdressed over whole site 4 weeks after seeding. 400 kg/ha of gypsum (17% Ca, 14% S) topdressed over whole paddock in late March 2013

Treatment detail

Table 1 Treatment details for 13ED15 at EDRS in 2013 (WAS = Weeks after seeding)

No.	Total N	N kg/ha			
		Seeding	4WAS	8WAS	12WAS
1	0	0	0	0	0
2	40	40	0	0	0
3	80	80	0	0	0
4	120	120	0	0	0
5	240	240	0	0	0
6	40	20	20	0	0
7	80	40	40	0	0
8	120	60	60	0	0
9	240	120	120	0	0
10	40	13	13	13	0
11	80	27	27	27	0
12	120	40	40	40	0
13	240	80	80	80	0
14	40	10	10	10	10
15	80	20	20	20	20
16	120	30	30	30	30
17	240	60	60	60	60

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. Nitrogen applications at 12 weeks produced similar canola yield to earlier applications

- Grain yield response to nitrogen was similar regardless of timing of application. Maximum grain yield was produced at 80 to 240 kg N/ha applied in a 2 way, 3 way or 4 way split or 240 kg N/ha applied at seeding.

2. OP TT and hybrid RR varieties had a similar response to nitrogen timing and rate.

3. The OP TT variety ATR Stingray produced greater grain yields and returns than the hybrid RR variety Hyola 404R.

- ATR Stingray yielded 2.7 t/ha and Hyola 404RR 2.5 t/ha.
- Hyola 404RR produced 47.5% oil which was higher than ATR Stingray at 45.5%.
- ATR Stingray produced a gross margin of \$1132/ha which was higher than that of Hyola 404RR which produced \$955/ha.

4. Gross margins were maximised at lower rates of nitrogen than grain yield

- Lowest gross margins were produced by the 0N, 40N in a 3 way split and 240N treatments. All other treatments produced similar gross margins of ~ \$1,100/ha.
- To break even (\$1/ha for every \$1/ha invested) required \$113/ha to be invested in nitrogen and its application (e.g 90 kg N/ha in a 3 way split). But if the target was to double the investment (\$2/ha for every \$1/ha invested) a lower investment in nitrogen of \$60/ha was required.

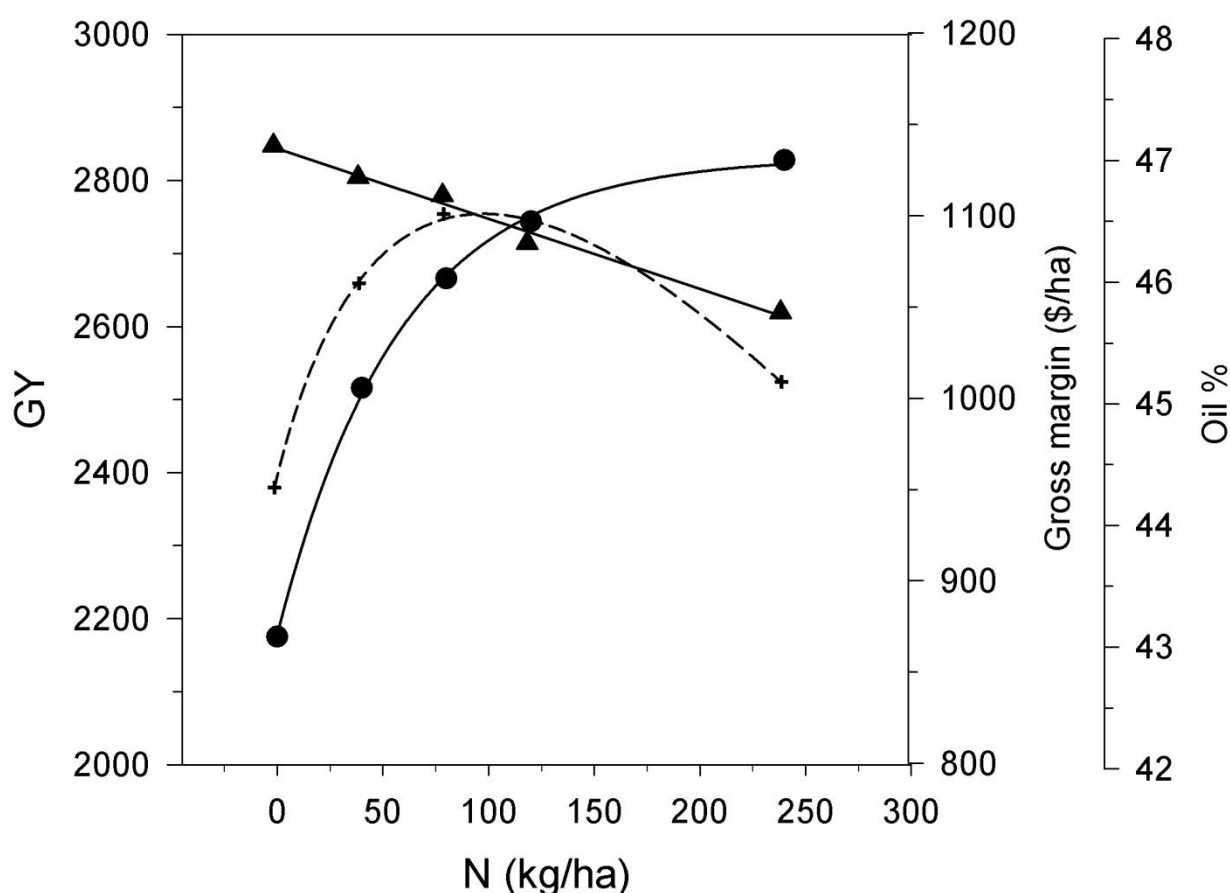


Figure 1 Average response of canola (mean of varieties and timing of N) to nitrogen at Gibson in 2012 (13ED15, EDRS). Symbols – GY (kg/ha) – solid circles, oil % – solid triangles, and gross margin (\$/ha) - crosses

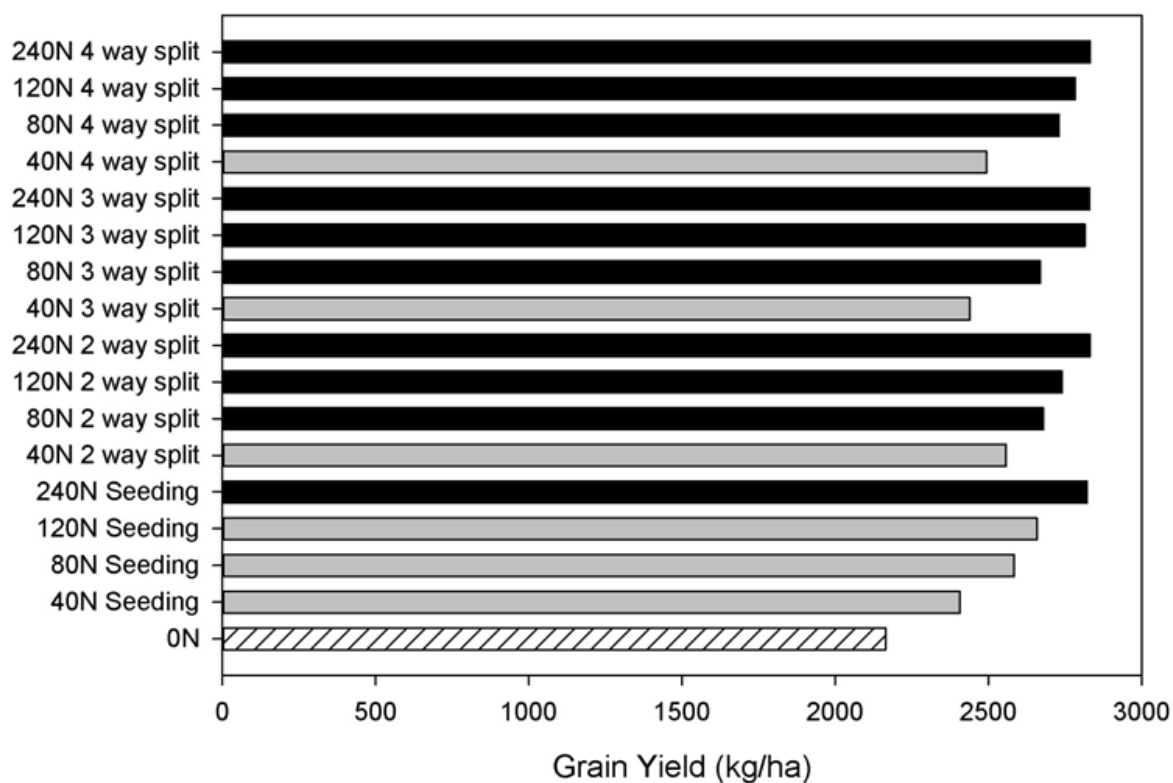


Figure 2 Average grain yield (kg/ha) of canola (mean of ATR Stingray and Hyola 404RR) in response to nitrogen applied either at seeding or in split applications at Gibson (13ED15) in 2013. Solid black bars indicate treatments which produced maximum yield and hatched bar (0N) indicates lowest yielding treatment.

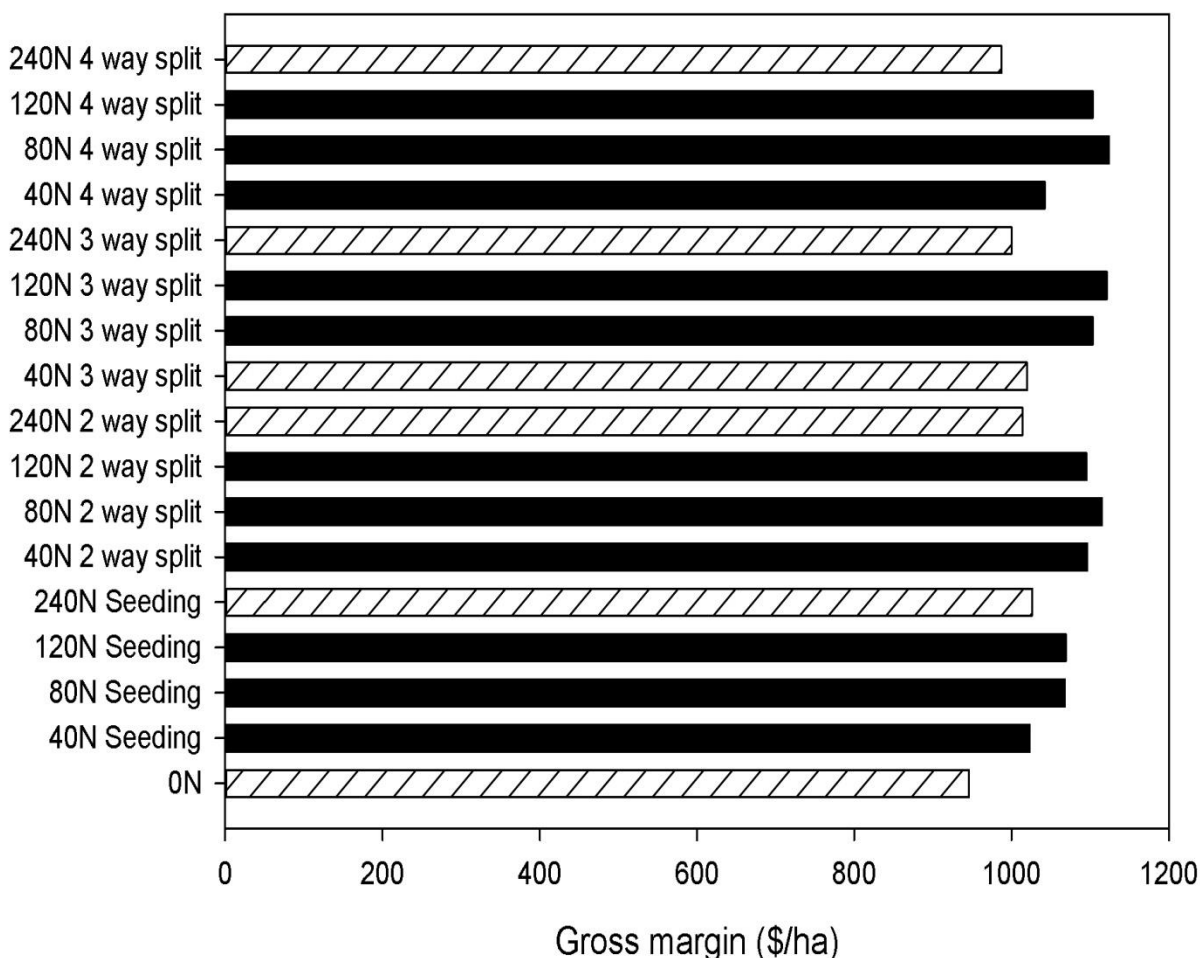


Figure 3 Gross margin (\$/ha) of canola (mean of ATR Stingray and Hyola 404RR) in response to nitrogen applied either at seeding or in split applications at EDRS (Gibson, 13ED15) in 2013. Solid black bars indicate treatments which produced maximum gross margins and hatched bars indicate treatments with lowest gross margins.

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.

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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