

DAW00227

Tactical Break Crop Agronomy in Western Australia

13WH14-Splitting of nitrogen in med-high rainfall canola Wongan Hills

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Location of trial Wongan Hills Research Station

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 reduced on oil%, and late N reduced it more than early N.
- Applying more than 25 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 margin was highest at 75 kg N/ha.

Background

Previous trial results suggest that 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: DAFWA Wongan Hills Research Station.
- Agzone 2, Growing Season rainfall (GSR) = 249 mm, GSR + stored water (estimate) = 286 mm.
- Soil type: Loamy sand (1.01% organic carbon), total mineral N at seeding 52 kg/ha to 50 cm.
- Paddock rotation Wheat 2012, Pasture 2009-2011.
- 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.

Trial Details

- Sowing date May 13.
- 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 Whitgro Extra 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 13WH14 at Wongan 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

Herbicide costs \$28/ha for RR, \$47/ha for TT

RR grain worth \$482/t (CBH Pool Kwinana 5/11/13).

TT grain worth \$495/t (CBH Pool Kwinana 5/11/13).

Results

1. Increasing total N applied increased canola yields but reduced oil content.

Both Hyola 404 RR and ATR Stingray responded to applied N in a similar fashion. Hyola 404 RR had a consistent yield and oil advantage over ATR Stingray at all N application rates.

2. Splitting N application timing produced similar or higher yields to a single application

Mostly splitting N application made little difference to yield. The exception was at 150 kg/ha when applying all N at seeding caused plant toxicity and reduced establishment, and at 50 kg/ha when the 4 way split was significantly better than other splits. There is no clear explanation for this. Late N application at 12 weeks reduced oil when total N application was 50, 75, or 150 kg/ha.

3. Gross margins were maximised at lower rates of nitrogen

There was only a slight increase in gross margin with applied N, and it fell off sharply at N rates above 75 kg/ha. The gross margin for Hyola 404 RR was about \$120/ha greater than for ATR Stingray.

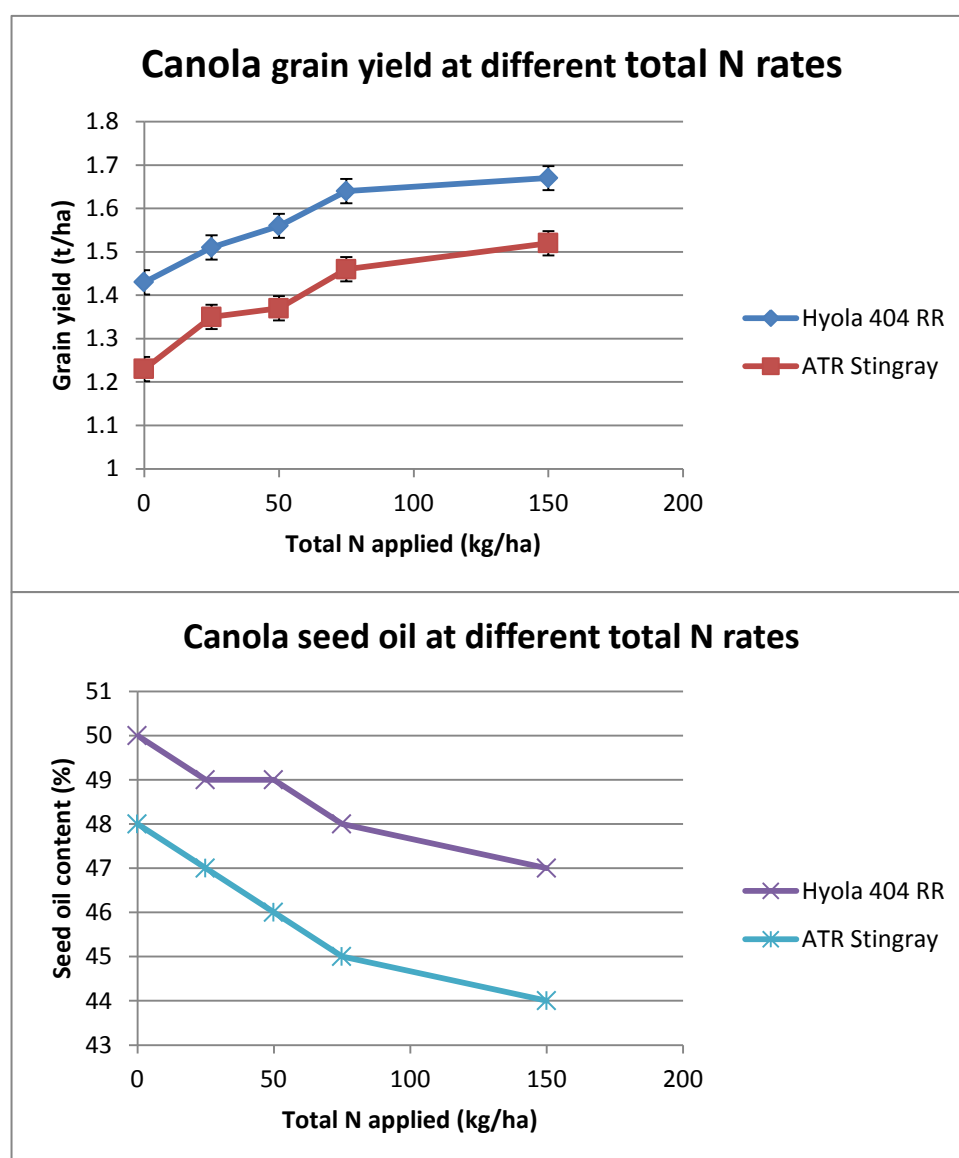


Figure 1 Effect of total N applications on grain yield and oil content of Hyola RR and ATR Stingray at Wongan Hills in 2013

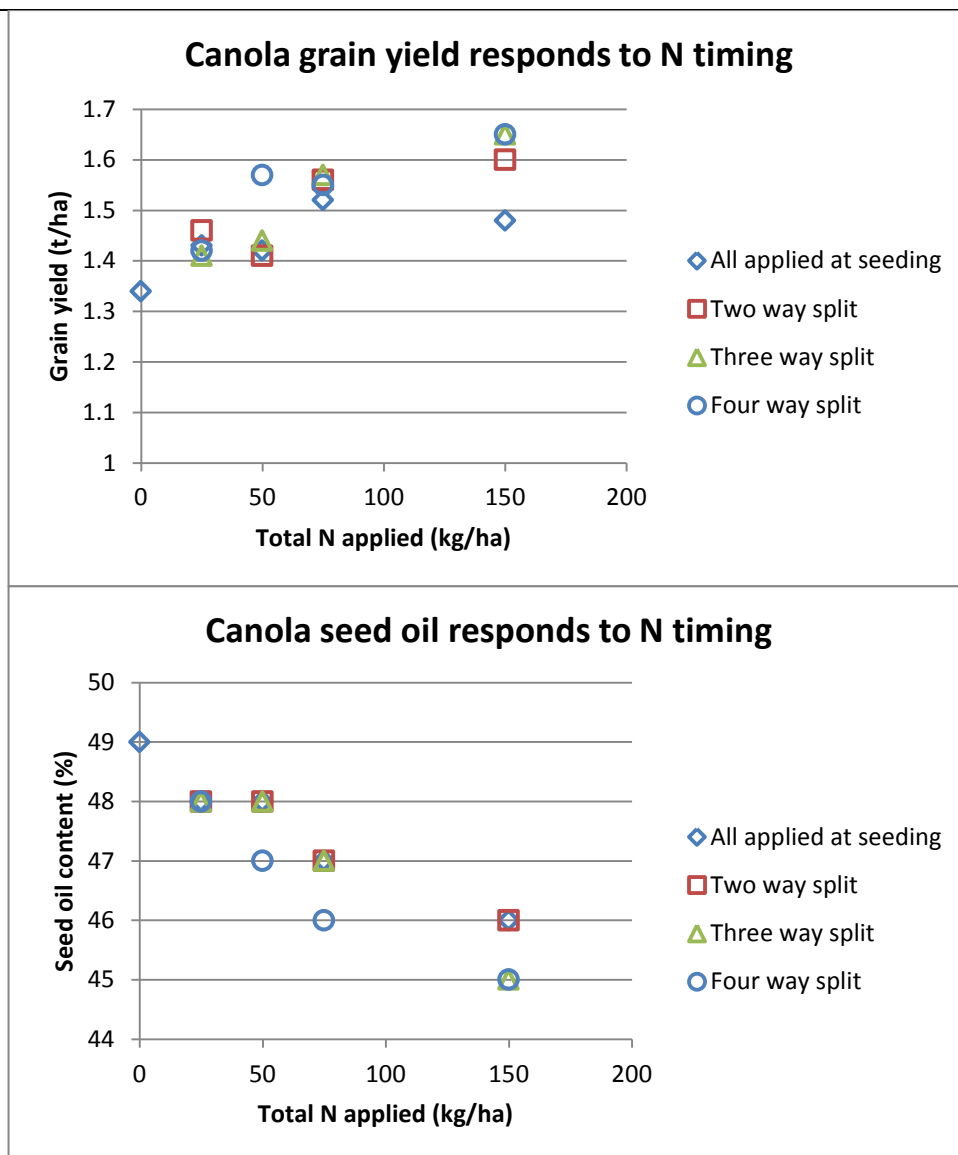


Figure 2 Effect of splitting nitrogen application on canola grain yield and oil content (mean of Hyola 404 RR and ATR Stingray at Wongan Hills in 2013).

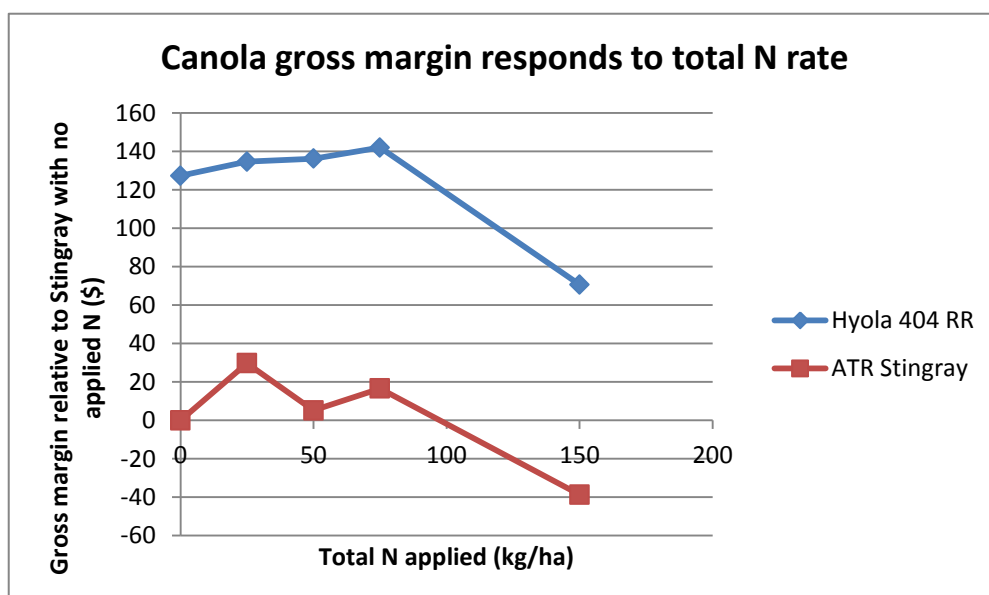


Figure 3 Effect of total N application rate on comparative gross margin of Hyola 404 RR and ATR Stingray canola

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 maximum gross margin for the Hybrid RR variety Hyola 404RR were achieved by applying 75 kg N/ha in a 2 way split. For ATR Stingray they were achieved by applying 25 kg N/ha in a 4 way split. The response to applied N was restricted in this trial by the high level of mineral N already present in the soil

Acknowledgements

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Links

For other reports related to this trial see NVTplus

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