

DAW00227

Tactical Break Crop Agronomy in Western Australia

Splitting of nitrogen in medium-high rainfall canola (13NO28)

Authors

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Location of trial

Cunderdin

Summary (Key messages)

- Hyola 404RR outperformed ATR Stingray.
- Canola yield responded positively to applied N
- Oil decreased as N rate increased
- N had no effect on gross margins
- Timing of nitrogen had no consistent effect on grain yield, oil or gross margins.

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: Cunderdin – WANTFA site
- Growing Season rainfall of 243 mm, Long term average 269 mm
- Soil type: Yellow sandy earth (0.86% organic carbon), estimated to be 61 kg N/ha mineralised from soil and plant residues
- Paddock rotation Barley 2012, Wheat 2011, Pasture 2010, Wheat 2009
- 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 May 7
- 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

Trial Details

kg/ha of gypsum (17% Ca, 14% S) topdressed over whole site 4 weeks after seeding

Treatment detail

Table 1 Treatment details (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.

TT costs – seed \$2/kg, Herbicides \$47/ha, Grain worth \$502/t.

Results

On average the RR hybrid Hyola 404RR yielded 1.0 t/ha, significantly higher than the OP TT variety ATR Stingray at 0.7 t/ha. The RR hybrid variety also had higher oil and gross margins.

Variety	GY	Oil%	GM \$/ha
Hyola 404RR	1009	48.50	197
ATR Stingray	686	44.91	103
LSD	67	0.40	22

Overall there was a positive grain yield response to nitrogen up to the highest rate of 150 kg N/ha, however the gains in yield were offset by a negative response of oil to increasing nitrogen, and when combined with the cost of fertiliser resulted in gross margins being similar at all rates of nitrogen.

N rate	GY	Oil	GM
0	663	47.5	135
25	726	47.5	137
50	808	47.1	149
75	883	46.7	161
150	1027	45.3	156
LSD	66	0.3	39

Timing of nitrogen had no consistent effect on grain yield, oil or gross margins. i.e. at the same rate of total nitrogen applied, if the nitrogen was applied at seeding or in split applications did not consistently change the response.

Conclusion

Hyola 404RR outperformed ATR Stingray.

Canola yield responded positively to applied N, however the combination of reduced oil as N rate increased and associated costs of increasing N resulted in no net economic benefit.

Timing of nitrogen had no consistent effect on grain yield, oil or gross margins. i.e. at the same rate of total nitrogen applied, if the nitrogen was applied at seeding or in split applications did not consistently change the response.

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