DAW00277
Tactical Break Crop Agronomy in Western Australia

Timing of nitrogen in low rainfall canola Merredin (13MR11)

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Location of trial	Merredin Research Station

Summary (Key messages)

In this 2013 trial

- Canola responded to N applied as late as 12 weeks after seeding but not as much as to N applied at 4 or 8 weeks. Hyola 404 RR and CB Telfer responded similarly in terms of yield.
- Nitrogen reduced oil %, and late N reduced it more than early N. Oil was more sensitive to applied N in CB Telfer than in Hyola 404 RR..
- Grain yield continued to respond to 100 kg N/ha but the highest gross margin was at 75 kg/ha in Hyola 404 RR and at 100 kg/ha in CB Telfer.

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 Merredin Research Station
- Agzone 4, Growing Season rainfall (GSR) = 193 mm, GSR + stored water (estimate) = 231 mm
- Soil type: Sandy loam (0.55 % organic carbon), total mineral N at seeding 46 kg/ha to 50 cm
- Paddock rotation Fallow 2012
- 28 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 3

Trial Details

- Seeding rate – Target density 30 plants/m² - CB Telfer 2.7 kg/ha, Hyola 404RR 3.4 kg/ha
- Fertiliser (kg/ha) 50 kg/ha of double super 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 13MR11 at Merredin in 2013 (WAS = Weeks after seeding)

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	0N 50N	0	50	0	0
7	50	0N 0N 50N	0	0	50	0
8	50	0N 0N 0N 50N	0	0	0	50
9	50	25N 25N	25	25	0	0
10	50	25N 0N 25N	25	0	25	0
11	50	25N 0N 0N 25N	25	0	0	25
12	50	50N	50	0	0	0
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

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.

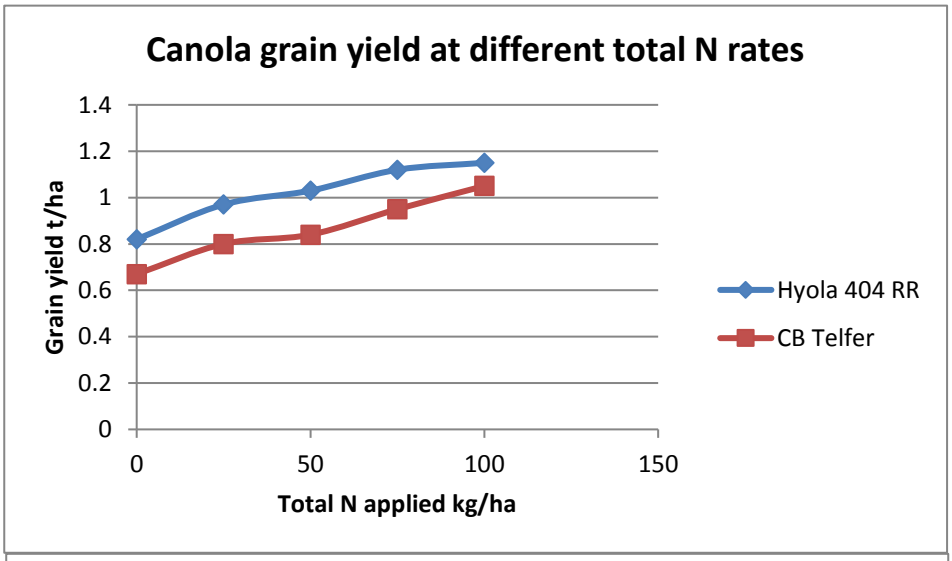
Yield of Hyola 404 RR and CB Telfer responded to applied N in a similar fashion but oil content declined more rapidly with increasing N rate in CB Telfer than in Hyola 404 RR. Hyola 404 RR had a consistent yield advantage over CB Telfer at all N application rates, and greater oil content in all N treatments except the nil.

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

Canola yield responded to N applied as late as 12 weeks after seeding but the response was less than to N applied at 4 or 8 weeks after seeding. Oil was reduced by N more when it was applied 8 or 12 weeks after seeding.

3. Gross margins were maximised at lower rates of nitrogen

Gross margin increased strongly with N application up to 75 kg/ha in Hyola 404 RR and up to 100 kg/ha in CB Telfer. The gross margin for Hyola 404 RR was $100 to $120/ha greater than for CB Telfer at N rates below 100 kg/ha.



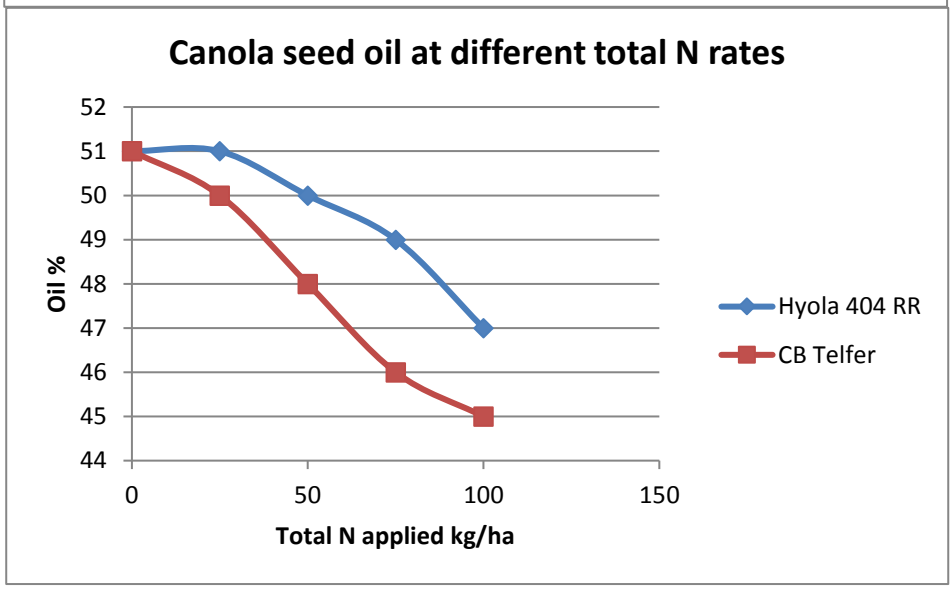


Figure 1 **Effect of total N applications on grain yield and oil content of Hyola 404 RR and CB Telfer at Merredin in 2013**

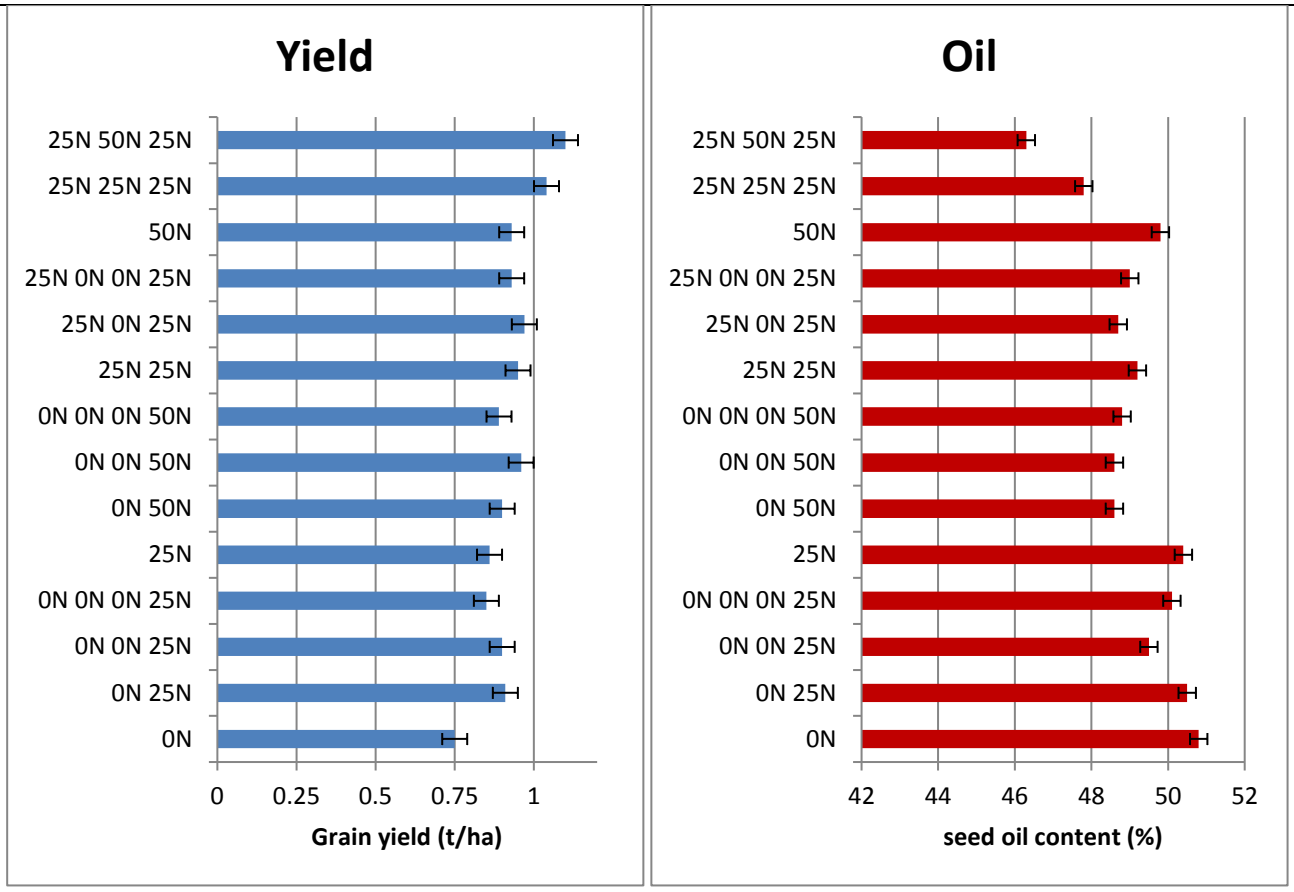


Figure 2 **Effect of N application timing on grain yield and oil content of canola at Merredin in 2013 (mean of Hyola 404 RR and CB Telfer)**

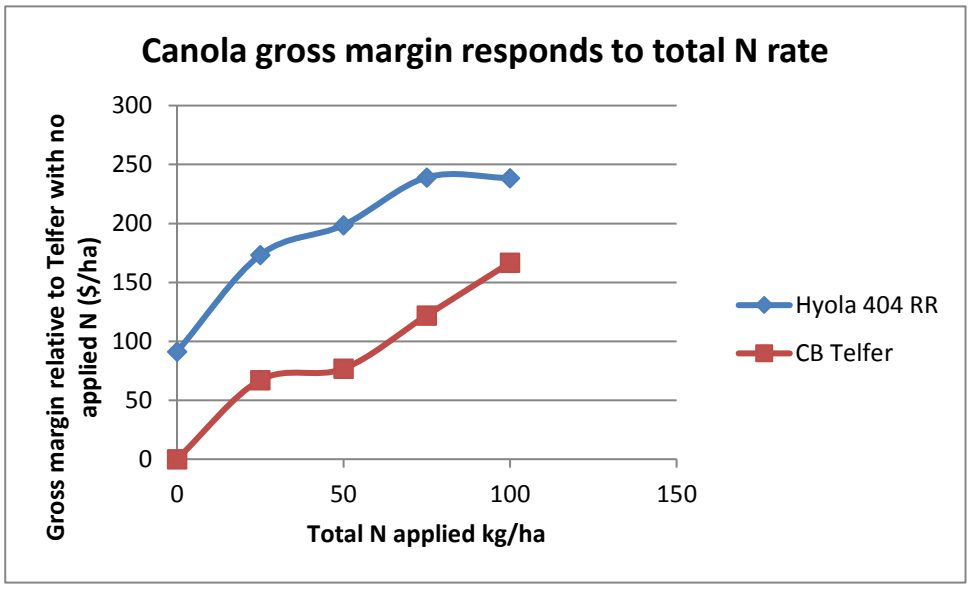


Figure 32 **Effect of total N application rate on comparative gross margin of Hyola 404 RR and CB Telfer at Merredin in 2013.**

Conclusion

Surveys conducted at spring field days throughout WA in 2013 indicated that the majority of famers 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, although the response was usually small when earlier N had also been applied, and it was better to apply it at 4 weeks or 8 weeks, both from the point of view of maintaining yield and oil content . While 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, it is better not to wait that late.

There was a substantial amount of mineral N present in the soil at seeding on this site so we might not have expected a great response to N, but the low organic C levels would have limited the ability of the soil to supply N by mineralisation which probably accounts for the good response. N decisions should be made in the light of good soil test data.

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 Matt Harrod of the Merredin RSU for trial management. Laurie Maiolo (DAFWA. Merredin) 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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