DAW00227
Tactical Break Crop Agronomy in Western Australia

14CH27- Timing of nitrogen in low rainfall canola

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Location of trial	Ogilvie

Summary (Key messages)

- Pioneer 43Y23 (RR) had higher grain yield, oil yield (kg/ha) and gross margins, than Sturt (TT).
- Grain yield responded to applied nitrogen up to ~ 40 kg N/ha
- Both varieties responded similarly to applied nitrogen with no variety x N rate interaction for grain yield.
- Oil yield and gross margins did not respond to applied nitrogen.
- Timing of nitrogen application did not alter the response to nitrogen of both varieties for GY, oil %, oil yield or gross margin.

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.

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: NAG site Ogilvie
- Growing Season rainfall (GSR, April to Sept) = 263 mm, Long term average (LTA, 1974on) 275.
- Soil type: Yellow sandy earth (0.57% organic carbon), estimated to be 58 kg N/ha available in paddock from soil and plant residues
- Paddock rotation: Wheat 2013, Lupin 2012, Wheat 2011
- 22 treatments: 2 Cultivars (Sturt TT [TT open-pollinated variety] and Pioneer 43Y23 RR [RR hybrid variety]) x 11 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
- Seeding rate – Target density 30 plants/m² - Sturt TT 2.4 kg/ha, Pioneer 43Y23 RR 1.5 kg/ha
- Basal Fertiliser: 80 kg/ha of BigPhos + Mn at seeding, 120 kg MOP/ha + 400 Gypsum top-dressed over whole site on June 3.

Treatment detail

		kg N/ha at:			
Treatment ment	Name	Seeding	8WAS	12WAS	Total N
1	Nil	0	0	0	0
2	10N Seeding	10	0	0	10
3	30N in 8weeks	10	20	0	30
4	50N in 8weeks	10	40	0	50
5	70N in 8weeks	10	60	0	70
6	10N seeding and 20N 12WAS	10	0	20	30
7	10N seeding and 40N 12WAS	10	0	40	50
8	10N seeding and 60N 12WAS	10	0	60	70
9	30N in 8weeks and 10N 12WAS	10	20	10	40
10	30N in 8weeks and 20N 12WAS	10	20	20	50
11	30N in 8weeks and 40N 12WAS	10	20	40	70

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 $229/ha.

Nitrogen costs $1.33/kg or $1.5/L, application costs $8/ha

RR costs – seed $76/ha, Herbicides $47/ha, Grain worth $513t (5 Year decile price)

TT costs – seed $5/ha, Herbicides $56/ha, Grain worth $535/t

Results

Pioneer 43Y23 (RR) had higher grain yield, oil yield (kg/ha) and gross margins, than Sturt (TT). Both varieties produced similar oil %.

Table 1: Grain yield, oil %, oil yield and gross margin of two canola varieties at Ogilvie in 2014

	Pioneer 43Y23RR	Sturt TT	P	LSD
Grain yield (kg/ha)	1785	1127	<0.01	81
Oil %	43.4	44.6	0.098	1.8
Oil yield (kg/ha)	778	502	<0.01	30
Gross margin ($/ha)	550	253	<0.01	19

Response to N

Grain yield responded to applied nitrogen up to ~ 40 kg N/ha, attaining yields of 1512 t/ha. Both varieties responded similarly to applied nitrogen with no variety x N rate interaction for grain yield. Maximum oil% was produced at 30 kg N/ha.

Oil yield and gross margins did not respond to applied nitrogen.

Table 2: Grain yield, oil % and gross margin response to nitrogen at Ogilvie in 2014

N	GY	Oil	GM
0	1392	44.6	433
10	1420	44.8	431
30	1387	45.0	391
40	1512	43.8	423
50	1480	43.6	400
70	1493	43.3	382
N			
P	0.017	0.015	0.244
l.s.d.	91	1.2	ns
N x Variety			
P	0.846	0.198	0.841

Timing of Nitrogen

Nitrogen was applied at 8 or 12 weeks or split between 8 and 12 weeks. We found the timing of nitrogen application did not alter the response to nitrogen of both varieties for GY, oil %, oil yield or gross margin.

Conclusion

RR variety Pioneer 43Y23RR outperformed the TT variety Sturt at Ogilvie in 2014.

While canola growth and yield responded to applied N the scale of the response was insufficient to produce an economic response.

Acknowledgements

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Links

For other reports related to this trial see https://www.agric.wa.gov.au/canola/canola-nitrogen-trials

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