DAW00227
Tactical Break Crop Agronomy in Western Australia

14ED15 - Timing of nitrogen in low rainfall canola

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Location of trial	Tim Osborne's Salmon Gums

Summary (Key messages)

- With grain yield of less than 1 t/ha, there was only a small grain yield response to applied N and no economic response to applied N
- Top-up N at 12 weeks gave a similar response to top-up N at 8 weeks.

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: Tim, Dave and Fiona Osborne's, Eldred Road Salmon Gums
- Agzone 5, Growing Season rainfall (GSR, April to Oct) = 175 mm, GSR + stored water (estimate) = 198 mm
- Soil type: sandy loam (0.7% organic carbon), estimated to be 58 kg N/ha available in paddock from soil and plant residues
- Paddock rotation Barley 2013, Wheat 2012, Wheat 2011, Field pea 2010
- 22 treatments: 2 Cultivars (Sturt TT [TT open-pollinated variety] and Pioneer 43Y23RR [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 May 7
- Seeding rate – Target density 30 plants/m² - Sturt TT 2.4 kg/ha, Pioneer 43Y23RR 1.5 kg/ha
- Basal Fertiliser: 400 kg/ha of gypsum (17% Ca, 14% S) top-dressed over whole site before sowing (kg/ha),100 kg/ha of Impact treated Superphos at seeding, 120 kg/ha of Muriate of Potash top-dressed over whole site 4 weeks after seeding

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 $126/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

No difference between varieties therefore we are presenting the mean results only.

Table 1: ANOVA results

	GY	*Oil*	*Oil yield*	*GM*
Variety	ns	ns	ns	ns
N	<.001	<.001	<.001	ns
Variety x N	ns	ns	ns	ns
Time of N[#]	ns	ns	ns	ns
Time of N 30N	ns	ns	ns	ns
Time of N 50N	ns	ns	ns	ns
Time of N 70N	ns	ns	ns	ns
Variety x Time[#]	ns	ns	ns	ns
Variety.Time of N 30N	ns	ns	ns	ns
Variety.Time of N 50N	ns	ns	ns	ns
Variety.Time of N 70N	ns	ns	ns	ns

30N, 50N and 70N

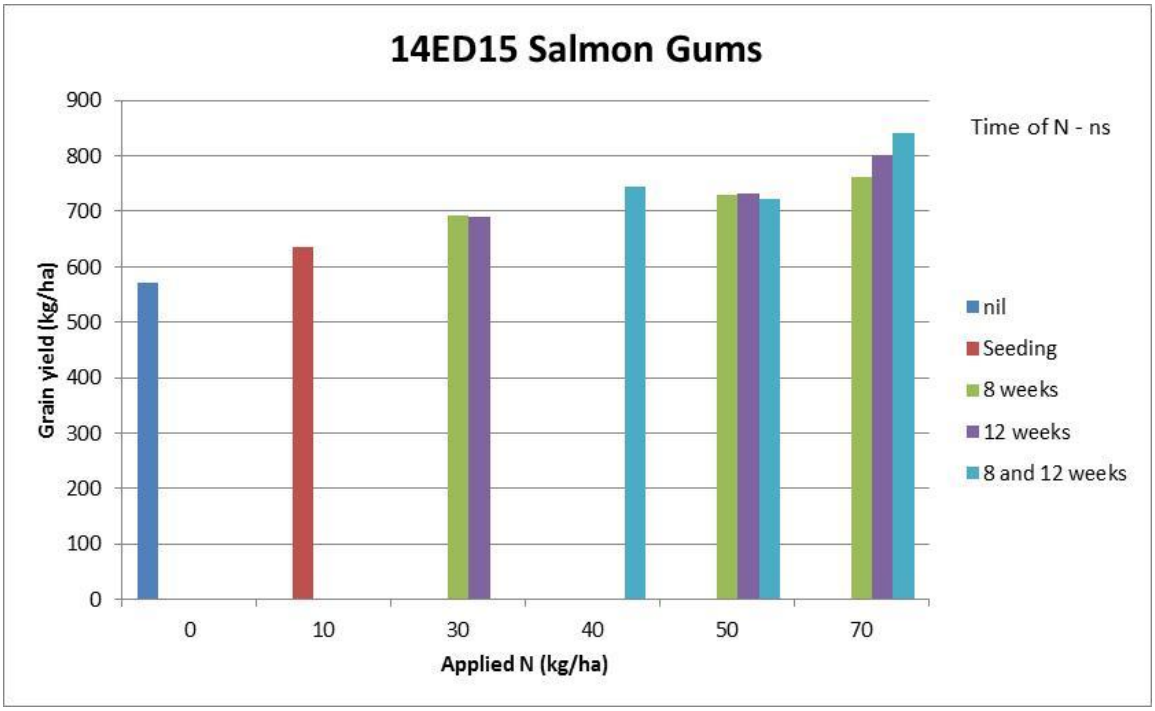

Figure 1 **Effect of nitrogen fertiliser on the grain yield (kg/ha) of canola at Salmon Gums in 2014 (14ED15), LSD = 71 kg/ha.**

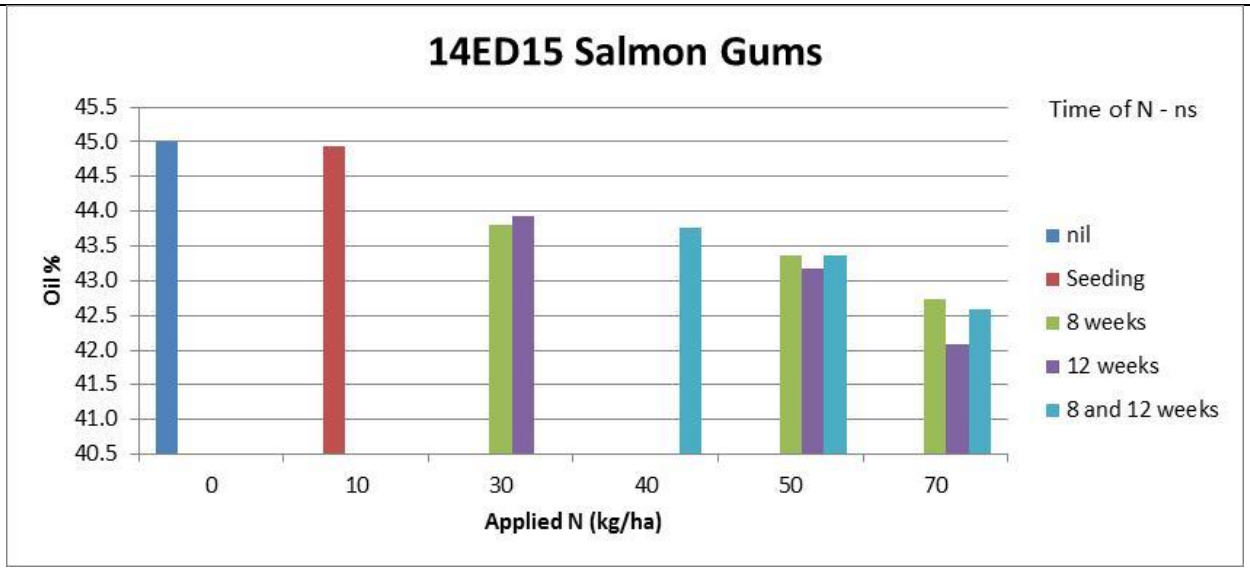

Figure 2 **Effect of nitrogen fertiliser and split applications on the oil content (%) of canola at Salmon Gums in 2014 (14ED15), LSD = 0.6%**

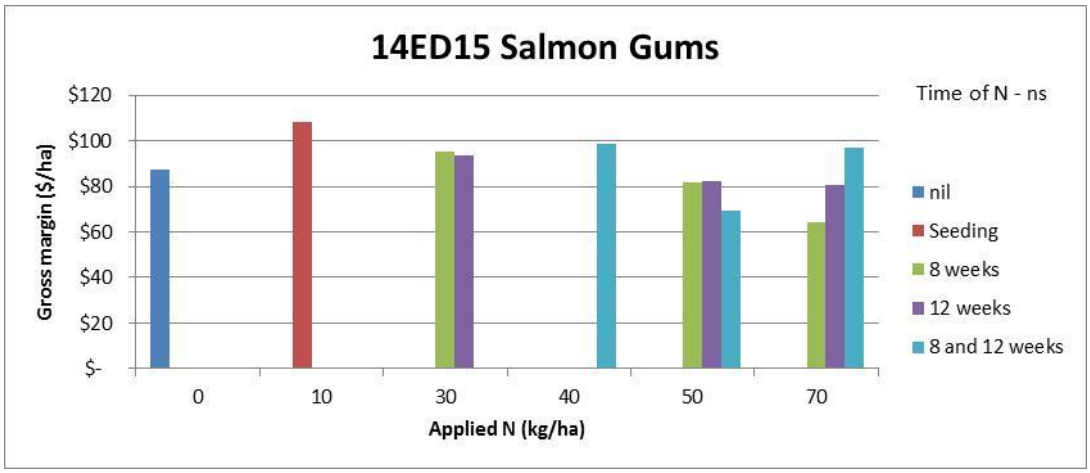

Figure 3 **Effect of nitrogen fertiliser and split applications on the gross margin ($/ha) of canola at Salmon Gums in 2014 (14ED15), LSD = $36/ha**

Conclusion

In a relatively dry growing season at Salmon Gums grain yield responded to around 30 kg N/ha. The gain in yield was relatively small at around 5 kg per unit of N applied and oil decreased with each kg of N. Therefore it was uneconomic to apply N to canola. When N was applied had no effect on the yield or oil response. This experiment is an example where by delaying N top-up until later in the year may have allowed growers to decide not to apply N.

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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