Fluid delivery of fungicides and fertilisers for canola

RESEARCH

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Searching for answers

Location
Wangary - Morgan family
Rainfall
Av. Annual: 525 mm
Av. GSR: 465 mm
Soil Type
Grey loamy clay

Key messages

- **Intake (on fertiliser) and Jockey (on seed) is current standard practice for lower EP canola and reduced Blackleg stem infection. In 2014 this practice also increased grain yield. This remains the recommended practice.**
- **The application method for the fungicide, either as seed treatments or in-furrow, did not increase canola yields in 2015 or 2016.**
- **The source of nutrients and application method, either fertiliser, in-furrow or foliar had no effect on canola yield in 2014, however further research should be undertaken in this area before final conclusions are drawn.**

Why do the trial?

SAGIT funded a project to assess the potential of fluid nutrient delivery systems and disease control strategies compared to current systems. Fluid systems have the potential to increase production through more effective delivery of micro and macro nutrients, use of lower cost trace element sources and improved control of cereal and canola root and leaf diseases.

Blackleg continues to be a major issue facing canola growers especially on lower Eyre Peninsula and fluid delivery systems for fungicides may increase production and improve disease control. With the development of new fungicides and the technology to deliver liquid products around the seed row during the seeding pass, there is now a range of application strategies available to growers to make use of these new products. These trials compared the relative benefits of a range of fungicide strategies for blackleg control on canola compared to current practices.

The individual trials in the given seasons for this project are reported in Eyre Peninsula Farming Systems Summary 2016, *Fluid delivery systems in canola* p77, Eyre Peninsula Farming Systems Summary 2015, Fluid delivery systems in canola p118 and Eyre Peninsula Farming Systems Summary 2014, *Fluid delivery systems in canola* p104.

How was it done?

In each season the base fertiliser was 100 kg/ha of DAP (18:20:0:0) with additional in-furrow fungicides or trace elements delivered as fluids for treatments. The trace element mix was 1.5 kg/ha of Mn, 1 kg/ha Zn and 0.2 kg/ha Cu delivered as sulphates at a water rate of 100 L/ha. The fluid macro fertiliser treatments were equivalent to 100 kg/ha of 18:20:0:0 as phosphoric acid and granular urea banded below the canola seed variety Pioneer 45Y86 (CL). Trace elements were also delivered as foliar applications at 4-5 leaf stage, and also at a half rate, as separate treatments.

The fungicides evaluated for blackleg disease control were Jockey and Intake in all seasons, and new products Aviator and Prosaro in 2016 only. Application methods of fungicides were also assessed; either in-furrow liquids, Jockey as a seed dressing or Intake on fertiliser. In 2016 foliar Aviator and Prosaro were also applied at 400 ml/ha and 550 ml/ha respectively at the 4 leaf stage.

Plant establishment, blackleg infection and grain yield were measured during the season. Blackleg infection was scored by assessing 20 stems per plot, cut at the base, in mid-November.

Most in-crop operations such as chemical weed control, in crop applications of urea and insect control were applied broad acre by the farmer as required.

Data analysis was undertaken using Analysis of Variance in GENSTAT version 18.

What happened?

2014 was the only year in which reliable nutrition data was achieved. In 2015 the nutrition trial at Farm Beach was not harvested as poor establishment, a very dry finish and extensive bird damage near maturity did not allow for fair comparisons between the treatments. In 2016 the nutrition trial site located at Piednippie had poor establishment, and despite re-sowing in early June did not establish due to wind damage. No data was collected from this site.

Table 1. Dry matter and grain yield for Pioneer 45Y86 (CL) in Coulta canola nutrition trial, 2014.

Treatment	Early dry matter (kg/m²)	Yield (t/ha)	Oil (%)	Protein (%)
Phos acid and 0.8 kg/ha MnSO4 liquid and Gran Urea	0.12	1.49	42.5	21.0
DAP and half rate Foliar Trace elements (4-5 leaf stage) Mn @ 0.8 kg/ha, Zn @ 0.5 kg/ha, Cu @0.1 kg/ha	0.10	1.33	42.8	20.9
APP and UAN	0.10	1.33	43	21.0
APP, UAN and liquid TE Mn @ 1.5 kg/ha, Zn @ 1 kg/ha, Cu @0.2 kg/ha	0.07	1.31	43.4	21.3
DAP and Liquid Trace elements Mn @ 1.5 kg/ha, Zn @ 1 kg/ha, Cu @ 0.2 kg/ha	0.10	1.25	43.3	20.7
Control	0.09	1.25	42.9	20.7
Phos acid and 1.5 kg/ha MnSO4 liquid and Gran Urea	0.10	1.24	42.8	21.2
Phos acid and 3 kg/ha MnSO4 liquid and Gran Urea	0.08	1.22	43	20.9
DAP and Foliar Trace elements (4-5 leaf stage) Mn @ 1.5 kg/ha, Zn @ 1 kg/ha, Cu @ 0.2 kg/ha	0.06	1.20	42.7	21.0
Phos acid and urea (equivalent 100 kg/ha DAP)	0.08	1.17	43	20.8
DAP and Foliar Mn @ 1.5 kg/ha	0.07	1.14	42.6	20.7
DAP with Mn coated fertiliser @ 1.5 kg/ha	0.08	1.09	42.1	21.3
Urea only	0.05	0.99	42.8	20.8
Half rate Phos acid (equivalent 50 kg/ha DAP) and urea	0.10	0.94	42.4	21.1
LSD (P=0.05)	*ns*	*ns*	*ns*	*ns*

Table 2. Average yields of CL canola with different nutrition treatments at Coulta trial, 2014.

Fertiliser source	Yield (t/ha)
APP and UAN	1.32
Control	1.24
Phosphoric acid	1.21
Granular fertiliser	1.20
Urea only	0.99
LSD (P=0.05)	*ns*

Canola nutrition – Coulta 2014

There were no differences in plant establishment with the average being 41 plants/m². In 2014 no treatments performed better than the control for early dry matter, yield or grain quality (Table 1). Plant tissue tests (youngest leaf) were taken at late cabbage stage, and showed no trace element deficiencies.

The average yield of the different fertiliser types, granular or fluid; APP and UAN, phosphoric acid, granular DAP or urea only (Table 2) showed no differences at this site in 2014.

Fungicides for Blackleg - Coulta 2014 & 2015, Wangary 2016

In 2014 the treatment with both fungicides applied, Intake in furrow and Jockey seed dressing, increased yield over the nil treatment (Table 3), which is supported by previous research in this region. However, their effect on blackleg were not as clear – there were no differences in the blackleg disease levels between any treatments in the trial. There were also no differences in plant establishment or grain quality between fungicide treatment (data not shown; protein (average 21%), oil (average 43%)).

In 2015 the fungicide trial was located at Coulta within an intensive canola cropping region with potentially high Blackleg disease pressure. The initial soil data showed adequate phosphorus and trace elements at the trial site with 71 mm of soil moisture in the plant root zone.

Establishment was unaffected by fungicide treatments, averaging 34 plants/m². Blackleg infection was lower in 2015 (av. 15%) compared to 2014 (av. 29%). There were no differences in Blackleg infection between fungicide treatments and also no differences in yield (Table 3).

The 2016 trial was located at Wangary within an intensive canola cropping region with a potentially high Blackleg disease pressure. Establishment was reduced by nearly 20% with Jockey on seed (Table 3), but plant numbers were still reasonable at 38 plants/m².

Table 3. Canola establishments, blackleg score and yield for CL canola with fungicide treatments in Coulta trial, 2014-16.

Fungicide treatment	2014			2015			2016		
	Canola establishment (plants/m²)	Blackleg score (% infection)	Yield (t/ha)	Canola establishment (plants/m²)	Blackleg score (% infection)	Yield (t/ha)	Canola establishment (plants/m²)	Blackleg score (% infection)	Yield (t/ha)
Intake (in furrow)	48.3	15.7	1.33 ab	35.0	11.1	2.01	39.7 ab	22 a	2.38
Intake (on fertiliser)	41.7	35.8	1.30 ab	38.6	15.1	2.08	41.8 ab	12 bc	2.68
Intake (in furrow) and Jockey (on seed)	40.6	12.0	1.63 a	32.7	10.2	2.18	38.3 b	9 c	2.15
Jockey (on seed)	42.8	34.8	0.98 b	39.9	22.4	1.87	38.3 b	23 a	2.04
Control - DAP @ 100 kg/ha	45.6	33.0	0.99 b	29.7	12.6	2.09	47.1 ab	20 ab	1.87
Aviator Foliar	*			*			47.1 ab	14 abc	2.29
Prosaro Foliar	*			*			57.5 a	18 abc	2.32
LSD (P=0.05)	*ns*	*ns*	*0.35*	*ns*	*ns*	*ns*	*10.9*	*9.6*	*ns*

**Product was not available*

Blackleg infection was moderate but quite variable across the site as were grain yields. Blackleg stem infection averaged 18% across the site. The blackleg stem infection was reduced by using both a seed dressing and an in-furrow fungicide in 2016, although this did not result in a yield increase (Table 3).

What does this mean?

The canola nutrition trial in 2014 was the only year in which reliable nutritional data was collected and showed no differences in yield with different application methods. The site had no nutrient deficiencies detected so providing trace elements in various forms should not have produced yield benefits. However due to the failure of the other trial sites in 2015 and 2016, due to bird damage and poor plant establishment, further research into the effectiveness of fluid delivery of nutrients in canola should be undertaken before final conclusions are drawn.

In 2014 the fungicide treatments when combined increased yield over the nil fungicide control treatment, however the difference in blackleg disease levels scored was not significant. The application methods for blackleg fungicides trial in the 2015 and 2016 season have shown little or no change in either blackleg disease control or yield. The combined effect of fungicides giving additional protection has been reported in other research, and the early protection of plants is important to reduce blackleg infection early due to rain splash. Further evaluation with the newer fungicide products in the lower EP environment will continue. The selection of resistant varieties of canola with high blackleg ratings is important, as is paddock rotation with other break crops to lower the disease pressure.

Acknowledgements

Thank you to the Morgan family for having the trial on their property and providing in-crop management. Thank you to Nigel Wilhelm and Andrew Ware for scientific input into this research. Trial funded by SAGIT Improving fertiliser efficiency and reducing disease impacts using fluid delivery systems, S614.

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