GOA Trial Site Report

Aphid control in canola: understanding product options & the effect of timing. Wellington 2018.

Trial code:	GOIN00118
Year:	Winter 2018
Location:	'Spicers Run', Wellington
Trial partners:	Sam and Joe Mason

Keywords

GOIN001, canola, aphids, sucking insect pests, Wellington

Key findings

- Application of insecticides can reduce aphid populations.
- There were no differences between application timing or product choice on the final population.
- There were no differences in the yields or oil content for either of the timings or any of the products used.

Background

Aphids are present in most canola crops in low numbers but periodically numbers can build up to levels warranting control. The Grains Research and Development Corporation (GRDC) research has shown that infestations occurring between flowering to podding can cause yield losses of up to 33%. Since 2013 aphid issues in canola have been regularly raised in Grain Orana Alliance's (GOA) Local Research Updates, focussed on thresholds, timing of control and the economics of various control options.

Current recommendations regarding aphid thresholds are not consistent. The GRDC 'Pest Management in Canola' guidelines states the threshold for cabbage and/or turnip aphid is '25 mm (or more) of stem infested in >20% plants', the same document also recommended 'threshold of 10-50 % infestation + limited compensation capacity'.

More recent research by Miles et al 2015[1] shows that the 'compensatory capacity of canola supports the use of less conservative aphid thresholds, and increased consideration of natural enemies in controlling outbreaks'. Further to this the advice is that 'a delay in enacting a spray decision at the 10% infestation level could be low risk and allow time for biological control. If natural enemies were ineffective, spraying on an increasing level of infestation to the 20-25% level would be unlikely to result in irrecoverable crop damage. Similarly, late infestations of aphids are also unlikely to pose a damage threat to canola as the associated raceme disruption mainly affects flowers that contribute little to final yield'.

Aphids are most problematic in drier, lower yielding seasons, and thus questioning the economic justification for insecticide application. GRDC continue to invest into qualifying aphid thresholds, however, there is very little work looking at the timing of control and the effectiveness and economics of various pesticide options.

DISCLAIMER

Following is a report on a scientific experiment. It may contain some herbicide treatments that are not registered for the situation, manner or rate at which they are used in this trial. This document or anything else resulting from, construed or taken from this or by GOA or its representatives should not be taken as a suggestion, recommendation or endorsement for unregistered herbicide use.

Aim

This project has the following aims:

- To see if delaying the timing of aphid control has any influence over final yields.
- Better understand the levels of control and the economic implications of selected pesticide control options.

Methods

Opportunity canola plots were sown on 31.5.2018, adjacent to other 2018 winter trials. These plots were to be used for pest and/or disease trials if needed. Toward the end of August 2018, a build-up of aphids at the site and surrounding paddock was observed and the trial was initiated.

Experimental design

- All plots sown to Victory 7002CL canola @ 2.5 kg/ha on 31.5.2018, harvested 20.11.2018.
- Randomized complete block design with 5 replicates.
- Buffer plots were placed between each treated plot to reduce the influence of pesticide drift.

Treatments

- 2 timings, ~2 weeks apart.
    - Time of application 1 (TOA1): 23.09.2018
    - Time of application 2 (TOA2): 2.10.2018

Each timing consisted of 3 replications applied with a ute mounted boom and 120 L/has water:

1. Pirimor® at 500 mL/ha
2. Transform™ at 50 mL/ha
3. Fastac® Duo at 300 mL/ha + dimethoate at 500 mL/ha

For TOA1, the canola was close to the end of flowering and 80-90% of spikelets were infected with colonies of 10-15 mm in depth. Severe infestations were observed on less than 2% of the spikelets. The population was predominantly cabbage aphids (~75%) and the remainder turnip aphids.

For TOA2, the infected number of heads was similar to TOA1, but the overall population was less. Mummification was visible in most colonies and some colonies were observed to have increased in size. The canola was close to finished flowering.

Results were analysed by ANOVA and results compared by using LSD method with a 95% confidence interval. Any references to differences between treatments should be assumed to be statistically different unless otherwise stated.

For the purpose of analysis and discussion unless otherwise stated, treatments and their effects will be compared to the UTC. Outcomes are statistically analysed by ANOVA at a 95% confidence interval with means compared by the LSD method.

Results

Aphid population

The trial was assessment 12 days after TOA1 (3 days after TOS2). Fifty main stem racemes were assessed for aphid presence.

- The untreated control (UTC) had a population of between 5-6% (**Figure 1**).
- The treated plots had a statistically lower population with less than 1%.
- There was no difference in the population between the timings or products used (**Figure 1**).

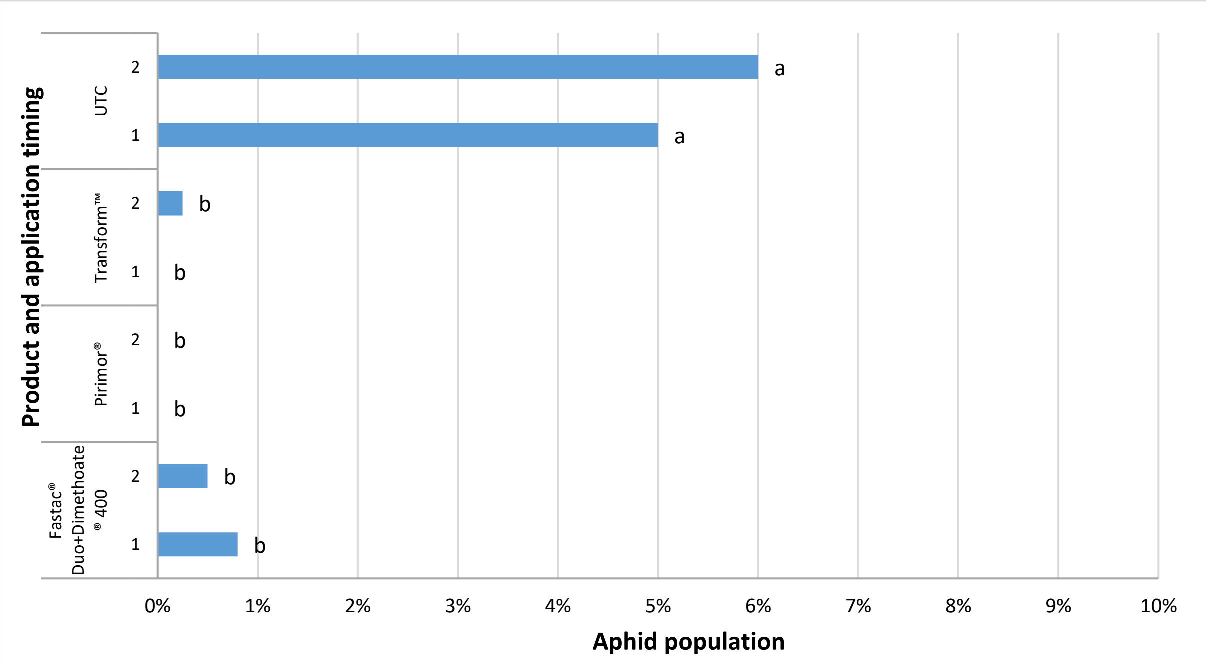

Figure 1. Aphid population (percentage of spikelets infested) assessed 12 days after TOA1.

Yield and grain quality

- The plots were taken through to maturity and harvested with a plot header.
- There were no significant differences in the yields or oil content.

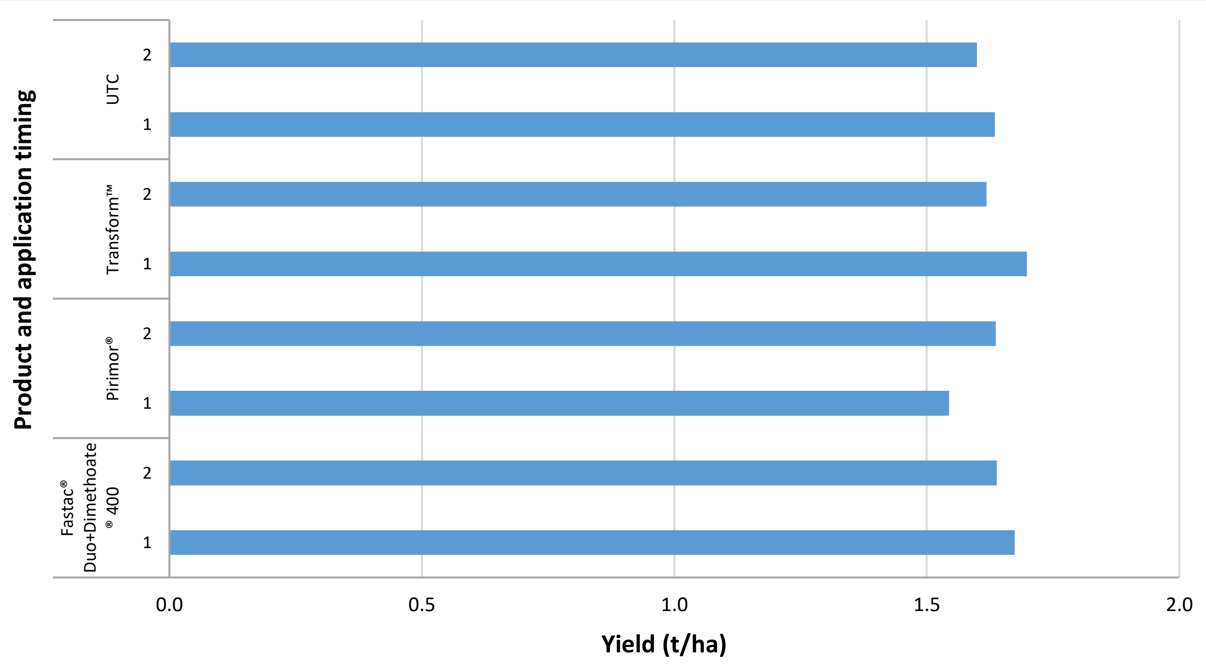

Figure 2. Yield (t/ha)

Discussion

The insecticides used in this trial provided good commercial control of the aphid populations. Pirimor and Transform are promoted as being less disruptive to populations of beneficial insects however these populations were not monitored.

The aphid population naturally declined over the life of the trial. For TOA1, aphids were present on >80% of spikelets. For TOA2, a similar number of spikelets were infected, however the depth of infestation was less. For TOA2, the population in the untreated control dropped to ~5%, in a period of less than 2 weeks. Aphid parasitisation from beneficial insects was also observed.

Yields from this trial show that aphid control, even in heavy infestations on flowering canola is not always economical. Helicoverpa were observed (not assessed) in the site after the aphid population had declined. It was speculated that the Fastac® Duo and Dimethoate® 400 treatments may have provided some residual control, hence suffering less helicoverpa yield damage than other plots.

There were no differences in grain quality between the control and treatments.

These trial results support those of Miles et al 2015[1], that growers can be a little less conservative about aphid thresholds, particularly if they are actively populations of natural predators present. That is:

- delay in enacting a spray decision at the 10% infestation level
- spraying on an increasing level of infestation to the 20-25%.

It must be noted there was not a treatment that excluded aphids from untreated plots and there may have been a yield penalty from aphids before the treatments were applied.

[1] https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2015/02/insect-management-in-fababeans-and-canola-recent-research

Conclusion

Follow the more recent recommendations regarding aphid thresholds (20-25% infestations) and base spray decisions on presence of natural predators.

Acknowledgements

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Appendix

Results

PRODUCT	TOA*	Aphid population^		Yield (t/ha)		Oil (%)	
Fastac® Duo Dimethoate® 400	1	0.8%	b	1.7	ns	41.8	ns
	2	0.5%	b	1.6	ns	41.4	ns
Pirimor®	1	0.0%	b	1.5	ns	41.4	ns
	2	0.0%	b	1.6	ns	41.6	ns
Transform™	1	0.0%	b	1.7	ns	41.8	ns
	2	0.3%	b	1.6	ns	41.5	ns
UTC	1	5.0%	a	1.6	ns	41.0	ns
	2	6.0%	a	1.6	ns	41.1	ns
approximate lsd		1.0%		na		na	

* Time of application

^ Aphid population assessed as the percentage of spikelets in a plot with 0.5 cm colonies of aphids