ForageMax™ herbicide – a new treatment for selective weed control in graze and grain canola

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Summary Graze and grain or dual purpose canola has gained popularity due to improved income versus growing canola for grain only. There are several benefits to this dual purpose approach: increased flexibility with sowing time to spread farm workload; reduced crop biomass for easier windrow and harvest; reduced lodging risk in high yield years; improved grass weed control; winter pasture spelling value; disease breaks; and additional source of income from stock earlier in season rather than just grain at harvest.

Historically, weed control treatments like imidazolinones, triazines or clopyralid have been used in canola for weed control. They can have persistent crop or soil residues, a narrow weed control spectrum, limited product compatibility and have extended grazing withholding periods.

ForageMax™ herbicide with Arylex™ active (100 g L^{-1} Arylex plus 50 g L^{-1} aminopyralid) is already registered for use in rape and turnips in Australia. It has a broad weed control spectrum, shorter soil persistence, improved product compatibility and a shorter grazing withholding period making it a potentially useful alternative for weed management in graze and grain canola. This paper outlines research to determine the selectivity of ForageMax herbicide when used in either spring or autumn sown canola, for dual purpose graze and grain.

Keywords Canola, graze and grain, weeds, ForageMax, Arylex active.

INTRODUCTION

Use of canola for grazing and grain production has gained popularity, due to improved profitability. Dove and Kirkegaard (2014) conducted a review of dual purpose wheat and canola, which showed there was little impact on yield for late maturing types when early sown crops were grazed prior to stem elongation.

Canola may be sown in either spring or autumn. Spring sown canola may be sown, grazed over summer and then stock removed to allow for regrowth, prior to harvest in the following spring. Paridaen and Kirkegaard (2015) showed that spring sown winter canola could be used as a biennial dual-purpose crop, to provide additional forage for summer and autumn grazing, before recovery to produce an oilseed crop.

Autumn sown canola is planted early (late summer), then grazed and stock removed for normal grain harvest. Sprague *et al.* (2015) reported research on canola varieties of winter, winter × spring and spring maturity in various parts of the high rainfall zone. The experiments confirmed the potential of dual-purpose canola across all regions of the high rain zone of Australia when suitable maturity types are sown, managed and grazed appropriately.

There are limited herbicide options for dual purpose canola, so farmers have often used imidazolinone tolerant types (Clearfield® varieties), to allow residual herbicide use during the winter. In some cases the weed spectrum or soil persistence of these treatments has limited their utility. Industry needed another herbicide that had a broad weed control spectrum and shorter soil persistence, with short grazing withholding periods.

This paper outlines new research to determine the selectivity of ForageMax herbicide for use in graze and grain (dual purpose) canola.

MATERIALS AND METHODS

Ten trials were conducted in southern New South Wales and Victoria on commercial farms from 2015–2017 to determine the selectivity of ForageMax. The trials were designed as randomised complete block with three or four replications. Herbicide treatments were applied with gas powered small plot booms delivering 100 L ha^{-1} of spray solution. Data were summarised using Agricultural Research Manager Summary Across Trials software (Gylling 2015) and analysed with analysis of variance at the 5% significance level.

Canola selectivity Ten selectivity trials using commonly grown canola cultivars were conducted in 2015, 2016 and 2017. ForageMax™ herbicide was applied at label rate (100 mL ha^{-1}) and twice label rate (200 mL ha^{-1}) at the 4–8 leaf canola stage, as per the existing label recommendation for forage brassica use. Crop oil concentrate was added at 1% v v^{-1} in all treatments. Crop injury was measured by visual assessment where 0 = no injury and 100 = complete crop loss.

Canola yield At two sites there was sufficient rain or irrigation and conditions allowed grain yield to be taken. Grain yields were taken at normal harvest time and expressed as T ha^{-1} to compare to weed-free untreated control (untreated plots were hand weeded).

RESULTS AND DISCUSSION

Canola selectivity ForageMax applied at 100 or 200 mL ha^{-1} resulted in average injury of 2–3 percent 0–60 days after application (days after application, DAA), 1–2 % injury 60–120 DAA and no injury 120–180 DAA (Table 1). This is commercially acceptable for dual purpose canola.

Table 1. Mean canola injury (%) by ForageMax at 0 to >120DAA.

ForageMax Treatment	Days after application (DAA)		
	0–60	60–120	>120
100 mL	2 a	1 a	0
200 mL	3 a	2 a	0
Weed-free untreated	0 a	0 b	0
LSD (p=0.05)	2.2	0.5	–
N	59–60	24	12

Canola yield ForageMax applied at 100 or 200 mL ha^{-1} resulted in similar yield to weed-free untreated in a trial in Victoria, but slightly lower yield in a trial in southern New South Wales (Table 2). At the site in Victoria, treatments were applied 330 days prior to harvest and the site also had significant rain and some irrigation after herbicide application. At the New South Wales site, treatments were applied 121 days prior to harvest and the crop had little to no rain during the critical flowering to early pod set period in late August to early September, as well as being grazed past the stem elongation stage. We believe both these factors contributed to yield reduction, due to lack of time and conditions for growth compensation after treatment.

Further work is needed to determine the effect of ForageMax use on grain yield in dual purpose canola.

Table 2. Mean canola yield (T ha^{-1}) compared to untreated control, after treatment with ForageMax.

ForageMax Treatment	Trial number	
	163012GW Vic	KA17-0565 NSW
100 mL	3.4 a	2 a
200 mL	3.9 a	1.9 b
Weed-free untreated	3.5 a	2.5 a
LSD (p=0.05)	0.42	0.52

CONCLUSIONS

ForageMax is currently registered for use in forage brassicas. It has significant potential for use in dual purpose canola. Treatment at the early post-emergence 4–8 leaf canola stage resulted in little canola injury across 10 trials. However, further work is needed to determine what the impact, if any, will be on canola yield from treatment at 4–8 leaf canola stage.

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REFERENCES

Dove, H. and Kirkegaard, J. (2014). Using dual-purpose crops in sheep-grazing systems. *Journal of the Science of Food and Agriculture* 94, 1276-83.

Gylling, S. (2015). Agricultural Research Manager, Summary Across Trials. http://gdmdata.com/Products/Summary Across Trials (ST). Gylling Data Management Inc, Brookings, South Dakota.

Paridaen, A. and Kirkegaard, J. (2015). Forage canola (*Brassica napus*): spring-sown winter canola for biennial dual purpose use in high-rainfall zone of southern Australia. *Crop and Pasture Science* 66, 275-86.

Sprague, S., Kirkegaard, J., Graham, J., Bell, L., Seymour, M. and Ryan, M. (2015). Forage and grain yield of diverse canola (*Brassica napus*) maturity types in the high rainfall zone of Australia. *Crop and Pasture Science* 66, 260-74.