

ForageMax™ herbicide for broadleaf weeds in forage brassicas

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Summary In 2012 Dow AgroSciences submitted a registration application for ForageMax™ Herbicide (50 g L⁻¹ aminopyralid + 100 g L⁻¹ Arylex™ Active, common name halauxifen-methyl) for broadleaf weed control in forage brassicas. This product has given excellent control of key weeds including fat hen (*Chenopodium album* L.), capeweed (*Arctotheca calendula* (L.) Levyns), volunteer legumes and thistles, whilst being selective to rape and turnips, which comprise more than 70% of forage brassicas grown in Australia. It will be registered for weed control in brassicas and is a new option for weed management in these crops. Control of these key weeds will enable farmers to maximize forage production and therefore improve profitability through increased milk or meat yields.

This paper summarises new research trials, since Wells and Nott (2013) presented results, to confirm brassica (rape and turnip) selectivity, plantback (crop rotation) safety and weed efficacy on poppies (*Papaver dubium* L.), cleavers (*Galium aparine* L.) and shepherd's purse (*Capsella bursa-pastoris* (L.) Medik.

Keywords Efficacy, selectivity, plantback, control.

INTRODUCTION

ForageMax herbicide has progressed through the registration review process, to the point where it is likely to be available for use in spring 2014. At present there is no commercially registered herbicide available in Australia for weed management in forage brassicas. This paper summarises new work to support additional registration claims for ForageMax in Australia. The proposed label rate is 100 mL ha⁻¹ tank mixed with 1% v v⁻¹ Uptake™ Spraying Oil.

MATERIALS AND METHODS

Trials were conducted in southern New South Wales, Victoria or Tasmania in commercial brassica fields. Selectivity, crop rotation safety or weed efficacy were determined by subjective visual assessment, using a scale of 0 to 100, where 0 = no control or injury and 100 = complete control or crop loss. In selectivity and crop rotation safety trials, ForageMax was applied at 100 and 200 mL ha⁻¹, whilst in weed efficacy trials rates of 50, 75 and 100 mL ha⁻¹ were applied. Uptake Spraying Oil (crop oil concentrate) was added to all treatments at 1% v v⁻¹.

Rape and turnip selectivity Common rape and turnip varieties were planted in summer. ForageMax was applied at the four to eight leaf crop stage. Percent injury as biomass reduction was visually assessed on a 0–100 scale, where 100 = complete crop loss. Crop yield was also recorded as t ha⁻¹ dry matter and are presented as an average percentage of untreated yields. The results are summarised across trials by variety. Crop injury was considered unacceptable if more than 20% biomass reduction occurred or yield was more than 10% less than untreated yield.

Crop rotation safety Treatments were applied to bare fallow soil. Sensitive crops such as clover were then planted either six or 12 months after application, to determine what the safe replanting duration was. Ryegrass was also planted at the same times. Fallow was maintained by the use of glyphosate sprays prior to crop planting. Rainfall was measured at each site or from the nearest Bureau of Meteorology station to determine how much rain fell between application and planting. Planting time was considered unsafe if more than 10% injury occurred in any assessment after planting, from either rate of herbicide.

Weed efficacy Shepherd's purse, long-headed poppy or cleavers were treated at the small rosette stage (up to about 10 cm across). For shepherd's purse, rates of 100 and 200 mL ha⁻¹ were applied. Weed efficacy was considered acceptable if control was higher than 85% at final assessment.

RESULTS

Rape and turnip selectivity ForageMax applied in either summer or winter resulted in slight to obvious injury to rape and turnips and gave similar or slightly reduced dry matter production at the label rate of 100 mL ha⁻¹ compared to weedfree untreated (Tables 1 and 2). Injury was worse in winter trials than for spring or summer trials. This supports our label claim for safe use in rape and turnips in Australia.

Crop rotation safety Results of crop rotation safety trials conducted from 2012–14 are in Table 3. Clover could not be safely planted six months after ForageMax application, but was safely planted at 12 months in all cases, after considerable summer rain. Ryegrass was safely planted at either planting time.

Weed efficacy Results of weed efficacy trials are shown in Tables 4–6. Excellent control of shepherd's purse, long headed poppy and cleavers by the label rate of 100 mL ha⁻¹ was achieved. The results of individual trials are given in table columns.

Table 1. Mean percentage rape and turnip injury from ForageMax.

ForageMax rate (mL ha ⁻¹)	Hunter (n = 5) ^A	Winfred (n = 6)	Greenland (n = 3)	Marco (n = 2)
0	1	1	1	5
100	11	13	15	10
200	18	22	24	19

^An = number of trials.

Table 2. Mean relative rape and turnip yield (% of untreated control) after treatment with ForageMax.

ForageMax rate (mL ha ⁻¹)	Hunter (n = 3) ^A	Winfred (n = 3)	Greenland (n = 2)	Marco (n = 2)
0	100	100	100	100
100	100	87	92	108
200	100	88	88	103

^An = number of trials.

Table 3. ForageMax crop rotation safety to clover or ryegrass planted either six or 12 months after application (MAA).

Site	Rain (mm)	Plant time (MAA)	Clover safe ^A	Ryegrass safe ^A
Elmore, Vic	93	4.5	No	–
	283	8	Yes	–
Trentham, Vic	538	6	No	Yes
	1005	13	Yes	–
Smeaton, Vic	393	7	–	Yes
	538	12	Yes	–
Geddes, Vic	183	5.5	No	–
Forth, Tas	451	7	No	Yes
Cressy, Tas	274	8	No	Yes
Loch, Vic	368	5.5	No	Yes
	1249	12	Yes	–

^ANo means unsafe to plant and **yes** means safe to plant.

Table 4. ForageMax control (%) of shepherd's purse.

ForageMax rate (mL ha ⁻¹)	132002CP	132003CP	132004CP
0	0	0	0
100	93	95	91
200	95	96	94
LSD (P = 0.05)	4	2.5	3.2

Table 5. ForageMax control (%) of long headed poppy.

ForageMax rate (mL ha ⁻¹)	12130#1	12130#3	12130#4
0	0	0	0
50	100	100	100
75	100	100	100
100	100	100	100
LSD (P = 0.05)	0	0.1	0

Table 6. ForageMax control (%) of cleavers.

ForageMax rate (mL ha ⁻¹)	12130#1	12130#2	12104#1
0	0	0	0
50	94	98	76
75	100	100	85
100	100	100	86
LSD (P = 0.05)	2.9	1.9	5

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