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The 22nd International Grassland Congress (Revitalising Grasslands to Sustain Our Communities) took place in Sydney, Australia from September 15 through September 19, 2013.

Proceedings Editors: David L. Michalk, Geoffrey D. Millar, Warwick B. Badgery, and Kim M.

Broadfoot

Publisher: New South Wales Department of Primary Industry, Kite St., Orange New South Wales, Australia

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ForageMax[®] Herbicide – a new product for weed management in forage brassicas in Australia

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Keywords: Weed control, forage brassicas, herbicide, Australia.

Introduction

ForageMax Herbicide (50 g/L Aminopyralid + 100 g/L ARYLEX[™], active ingredient Halauxifen-methyl) is a new herbicide product for selective weed control in rape or turnips in Australia. ARYLEX (development code XDE-729 methyl) is a novel arylpicolinate synthetic auxin herbicide being developed by Dow AgroSciences for post-emergence broadleaf weed in cereals and several other crops. This paper describes the research conducted by Dow AgroSciences that support the application to register the product in Australia.

Methods

Rape and turnip selectivity

Common rape or turnip varieties were planted in either autumn or spring. ForageMax or tankmixes at equivalent rates of active ingredient were applied at 100 mL/ha (5 + 10 g ae/ha) and 200 mL/ha (10 + 20 g ae/ha), at the 4 to 8 leaf crop stage. Uptake Spraying Oil was added to all treatments at 1% v/v. Crop injury and yield were assessed. Crop injury was assessed using a subjective visual assessment scale of 0 to 100%, where 100% equals total crop loss. Yield taken as t/ha dry matter was presented as percent of untreated control, summarised across trials by variety.

Weed efficacy

Commercial fields were located that had high density of fat hen (*Chenopodium album* L.) or other weeds. ForageMax or tankmixes at equivalent rates of active ingredient were applied at 50 mL/ha (2.5 g ae/ha + 5 g ae/ha), 75 mL/ha (3.75 + 7.5 g ae/ha) or 100 mL/ha (5 + 10 g ae/ha) at the small rosette weed stage (up to 15 cm high or across).

Uptake Spraying Oil was added to all treatments at 1% v/v. Weed control was assessed using a subjective visual assessment scale of 0 to 100%, where 100% was complete kill.

Crop rotation safety

Commercial fields were located to apply ForageMax or tankmixes of active ingredient at equivalent rates to 100 mL/ha or 200 mL/ha to bare fallow soil. Sensitive crops were then planted either 6 months after application (MAA) or 12 MAA. Bare fallow was maintained at these sites by the use of glyphosate. Uptake Spraying Oil was added to all treatments at 1% v/v. Clover injury was assessed using a subjective visual assessment scale of 0 to 100%, where 100% was total crop loss.

Rainfastness

Aminopyralid + ARYLEX tankmixes were applied to subclover in a glasshouse trial at the proposed label rate of 5 + 10 g ae/ha with Uptake Spraying Oil at 1% v/v. Simulated rain was then applied at 20mm/hr intensity at 1, 2 or 4 hours after application, for 30 minute duration. Injury to clover was then assessed to determine safety. Clover injury was assessed using a subjective visual assessment scale of 0 to 100%, where 100% equals total clover loss.

Results

Rape and turnip injury by ForageMax at 100 mL/ha varied from 4 to 15%, as compared to 6 to 23% after treatment with ForageMax at 200 mL/ha (Table 1).

Rape and turnip yield after treatment with ForageMax[®] Herbicide at 100 mL/ha (or equivalent) was 97 to 108 % of

Table 1. Average rape or turnip injury (% visual) x variety (n = number of trials).

ForageMax mL/ha	Goliath rape (n=1)	Greenland rape (n=7)	Winfred rape (n=11)	Hunter turnip (n=7)	Marco turnip (n=6)
100 mL	11	11	9	15	4
200 mL	23	16	15	20	6

Table 2. Average rape and turnip dry matter yield x variety, shown as percent of untreated (n = number of trials).

ForageMax mL/ha	Goliath rape (n=1)	Greenland rape (n=4)	Winfred rape (n=9)	Hunter turnip (n=5)	Marco turnip (n=3)
100mL	103	108	97	104	103
200mL	93	90	94	104	98

untreated, whilst ForageMax at 200 mL/ha gave yield of 90 to 104% of untreated (Table 2).

Average fat hen control after treatment with ForageMax at 50 mL/ha, 75 mL/ha or 100 mL/ha (or equivalent) was from 90 to 97% (Table 3).

Crop rotation safety after treatment with ForageMax at 100 mL/ha or 200 mL/ha (or equivalent) was determined by clover injury (Table 4). There was safety (less than 5 % injury) at 12 MAA clover plantings.

Rainfastness of aminopyralid + ARYLEX at 5 + 10 g ae/ha (equivalent to ForageMax 100 mL/ha – proposed label rate) was determined by clover injury in a simulated rain study. Rainfastness was achieved at greater than 1 hour rain free period.

Conclusion

ForageMax was selective to commonly grown rape and turnip varieties, gave excellent control of fat hen, had safe replant time of 12 months for clover and is rainfast in 2 hours. As such it represents a new option for weed management in forage brassica crops in Australia.

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Table 3. Average fat hen control (% visual) across trials (n = number of trials).

Treatment (ForageMax mL/ha)	Control
50 mL	90 (n=6)
75 mL	94 (n=6)
100 mL	97 (n=10)

Table 4. Average clover injury (%), across 7 trials, from planting either 6 or 12 months after ForageMax application.

Treatment (ForageMax mL/ha)	6MAA planting	12MAA planting
100 mL	9	3
200 mL	14	3
Untreated	7	3

Table 5. Average clover injury by aminopyralid + ARYLEX after simulated rain. (^ Tukeys HSD –P=0.05)

Treatment	Clover injury 22DAA
No rain	69 ab^
Rain at 1hr	71 ab
Rain at 2hrs	74 a
Rain at 4hrs	75 a