Evaluation of Rates of Herbicides for Nutsedge Control

K. Umeda and G. Towers

Abstract

Sulfosulfuron showed the highest degree of nutsedge control after the first application among all of the treatments at 4 WAT. Nutsedge control began to decline at 6 WAT after a single application of sulfosulfuron. Halosulfuron, trifloxysulfuron, and penoxulam showed very good nutsedge control at 2 WAT after a second application was made. Trifloxysulfuron at 0.026 lb AI/A and penoxulam at 0.125 lb AI/A performed very similarly to halosulfuron at 0.047 and 0.062 lb AI/A. Halosulfuron and flazasulfuron were more effective at higher rates of application when a series of rates were compared. Halosulfuron at 0.047 and 0.062 lb AI/A were very similar at most rating dates and both rates gave acceptable nutsedge control of 86 to 88% control at the end of the season. The two highest rates of flazasulfuron at 0.023 and 0.047 lb AI/A gave almost acceptable control. Sulfentrazone was not effective in providing acceptable nutsedge control at the rate tested.

Introduction

Several new herbicides are being introduced for use in controlling purple nutsedge, *Cyperus rotundus*, in turfgrass. Sulfosulfuron (Certainty* from Monsanto) is the most recent introduction into the marketplace. Flazasulfuron (proposed Katana* from ISK Biosciences) is still in the development stage as is penoxulam (Dow AgroSciences). Sulfentrazone (component of pre-mix Surge* from PBI Gordon) can control nutsedge in crops when used at high rates. Halosulfuron has a new brand name, SedgeHammer* from Gowan Company that was formerly Manage* by Monsanto. Trifloxysulfuron, Monument*, has become one of the commercial standard products that turf managers are gaining experience in using for nutsedge control. This field experiment was conducted to compare rates of application of several of the herbicides for nutsedge control in turfgrass.

Materials and Methods

A small plot field experiment was conducted on a driving range tee area at the Riverview Golf Course in Sun City, AZ. The tee area was established common bermudagrass maintained at a cutting height of 0.5 inch and mowed regularly. The experiment was established with plots measuring 5 ft by 10 ft and treatments replicated three times in a randomized complete block design. Herbicide applications were made with a backpack CO_2 sprayer pressurized to 25 psi and equipped with a hand-held boom with three flat fan nozzles spaced 20 inches apart. All treatments were applied in 39 gpa water and a non-ionic surfactant CS-7 at 0.25 % v/v was added to all treatments. The first application date for all treatments was 12 July 2005. Sequential applications of halosulfuron, flazasulfuron, penoxulam, trifloxysulfuron, and sulfentrazone treatments were made four weeks later on 09 August. Sequential applications of sulfosulfuron alone or tank-mixed with MSMA were sprayed six weeks apart with the second application on 23 August. Sulfosulfuron was also applied as a sequential treatment on 27 July and 23 August that followed an initial application of MSMA alone on 12 July. All applications were made in the early morning when temperatures ranged from 76 to 80F with variable cloudiness and no winds. The turfgrass and nutsedge were mowed prior to each spray application. Nutsedge percent control ratings were conducted at intervals during the season following applications.

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Results and Discussion

At the end of the summer season in early October, sequential application treatments of sulfosulfuron at 0.06 lb AI/A appeared to give near complete control at 99% of purple nutsedge (Table). Sulfosulfuron gave excellent control when applied at 6 week intervals either alone or as a tank-mix combination with MSMA at 2.0 lb AI/A and as a sequential treatment 4 week apart after an initial MSMA treatment that was two weeks before the first sulfosulfuron application. Sulfosulfuron at 0.06 or 0.094 lb AI/A applied only once in July offered nutsedge control for about 6 weeks after treatment (WAT) and then control declined to less than acceptable levels at the end of the season.

Halosulfuron at 0.031 to 0.062 lb AI/A showed the best nutsedge control at 93 to 95% at 2 WAT of the second application. Halosulfuron at 0.047 and 0.062 lb AI/A were very similar at most rating dates and both rates gave acceptable nutsedge control of 86 to 88% control at the end of the season. The lowest rate tested at 0.031 lb AI/A was not effective in providing acceptable control at most of the rating dates through the summer.

Trifloxysulfuron at 0.026 lb AI/A and penoxulam at 0.125 lb AI/A performed very similarly to halosulfuron at 0.047 and 0.062 lb AI/A. All three herbicides began to show very good nutsedge control at 2 WAT after the second application. Trifloxysulfuron almost completely controlled nutsedge at 4 WAT after the second application similar to sulfosulfuron and the control at the end of the season still exhibited very acceptable control.

Flazasulfuron demonstrated a rate response with the two lowest rates being much less effective than the two highest rates of application. Flazasulfuron at 0.0039 lb AI/A injured nutsedge and gave less than 75% control at most rating dates. A rate of 0.0078 lb AI/A appeared to offer good nutsedge control at 2 WAT of the second application but nutsedge control declined during the remainder of the summer. At 0.0156 lb AI/A, nutsedge control after the second application was acceptable at better than 85% at most rating dates. The two highest rates of flazasulfuron at 0.023 and 0.047 lb AI/A gave almost acceptable control after the first application and then continued to demonstrate good nutsedge control for the remainder of the season after the second applications.

Sulfentrazone at 0.024 lb AI/A appeared to minimally reduce nutsedge at all rating dates compared to the untreated check.

Sulfosulfuron exhibited the highest degree of nutsedge control after the first application among all of the herbicides at 4 WAT. Nutsedge control began to decline at 6 WAT after a single application of sulfosulfuron. Halosulfuron, trifloxysulfuron, and penoxulam showed very good nutsedge control at 2 WAT after a second application was made. Nutsedge control began to decline slightly at 4 WAT after the second application of halosulfuron, trifloxysulfuron, and penoxulam.

Halosulfuron and flazasulfuron were more effective at higher rates of application when a series of rates were compared. Halosulfuron at 0.047 and 0.062 lb AI/A provided much better control than at 0.031 lb AI/A. The two highest rates of flazasulfuron at 0.023 and 0.047 lb AI/A gave almost acceptable control while 0.0156 lb AI/A gave marginally acceptable nutsedge control after the second application. Flazasulfuron at 0.0039 and 0.0078 were less effective and inconsistent in controlling nutsedge. Sulfentrazone was not effective in providing acceptable nutsedge control at the rate tested.

Sulfosulfuron with MSMA added as a tank-mix appeared to be only slightly more effective against nutsedge at most of the rating dates. Sulfosulfuron treatments that were initiated after MSMA was first applied 2 weeks prior also appeared to be only slightly more effective against nutsedge through the season. Further investigation is warranted to evaluate and compare the economic value of beginning nutsedge control with multiple MSMA applications early in the summer and then to follow with sulfosulfuron or other sulfonylurea herbicides near the end of the season.

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Table. Evaluation of rates of herbicides for nutsedge control

Treatment	Rate	Application*	9-Aug	23-Aug	6-Sep	20-Sep	27-Sep	4-Oct
			---------- % control ----------					
untreated check			0	0	0	0	0	0
halosulfuron	0.031	12-Jul, 9-Aug	32	95	48	73	65	78
halosulfuron	0.047	12-Jul, 9-Aug	73	93	75	78	80	86
halosulfuron	0.062	12-Jul, 9-Aug	77	95	83	88	75	88
sulfosulfuron	0.06	12-Jul	95	77	66	78	77	82
sulfosulfuron	0.094	12-Jul	95	73	73	77	75	85
sulfosulfuron	0.06	12-Jul, 23-Aug	93	82	99	96	90	97
sulfosulfuron + MSMA	0.06 + 2.0	12-Jul, 23-Aug	92	95	99	96	99	99
MSMA + sulfosulfuron	2.0 + 0.06	12-Jul, 27-Jul, 23-Aug	95	95	99	97	98	99
flazasulfuron	0.0039	12-Jul, 9-Aug	58	72	45	60	73	75
flazasulfuron	0.0078	12-Jul, 9-Aug	50	90	67	77	72	88
flazasulfuron	0.0156	12-Jul, 9-Aug	47	90	78	85	85	91
flazasulfuron	0.023	12-Jul, 9-Aug	80	87	87	92	83	96
flazasulfuron	0.047	12-Jul, 9-Aug	83	95	88	93	87	93
penoxulam	0.125	12-Jul, 9-Aug	68	95	93	87	78	92
trifloxysulfuron	0.026	12-Jul, 9-Aug	67	95	98	89	83	90
sulfentrazone	0.024	12-Jul, 9-Aug	60	77	67	75	70	82
LSD (p=0.05)			22.6	12.2	37.3	15.0	23.0	10.5

* Application dates of single and sequential treatments.

Sequential treatments of halosulfuron, flazasulfuron, penoxulam, trifloxysulfuron, and sulfentrazone applied at 4-week intervals on 12-Jul and 9-Aug 2005.

Sulfosulfuron sequential treatments applied at 6-week intervals.

Sulfosulfuron + MSMA applied as a tank-mix treatment.

MSMA + sulfosulfuron was MSMA alone on 12-Jul before sulfosulfuron sequential treatment.

Sulfentrazone was applied as pre-mix product including 2,4-D, mecoprop, and dicamba.