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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2019 GREEN EXPO Turf and Landscape Conference. Publication of these lectures provides a readily available source of information covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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POST-EMERGENCE GOOSEGRASS CONTROL WITH SPEEDZONE HERBICIDE

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INTRODUCTION

The objective of this research was to evaluate SpeedZone herbicide alone and in combination with topramezone and triclopyr for post-emergence goosegrass (*Eleusine indica*) control.

MATERIALS AND METHODS

Two separate experiments were conducted in 2018 and 2019 at the Rutgers Horticulture Research Farm No. 2 in North Brunswick, NJ on a simulated low-maintenance golf course fairway with a loam soil.

The site was poor stand of 'Grand Prix' perennial ryegrass blend seeded at 3 lbs/1000 ft^2 in September 2017. Goosegrass cover was uniformly >30% across the entire site with perennial ryegrass composing the remaining 70% when experiments were initiated. This site was mowed at 0.75" weekly with a reel mower and irrigated frequently. Drive XLR8 was applied at 0.4 to 0.55 fl oz/1000 ft^2 periodically to control crabgrass.

Treatments were arranged in a randomized block design and replicated four times. The treatments were applied to 3.5' x 7' plots using a CO_2- powered sprayer calibrated to apply 44 GPA through a single 9504EVS nozzle at 40 PSI. A 6" non-treated buffer strip was maintained between each plot providing a 3' by 7' treated area.

In 2018 single applications of SpeedZone (2,4-D + mecoprop-p + dicamba + carfentrazone-ethyl; 860 + 270 + 80 + 28 g ha^{-1}) alone or in combination with topramezone were evaluated for goosegrass control (Table 1). In 2019, SpeedZone and topramezone were evaluated alone and in a tank-mixture to evaluate goosegrass control and visible goosegrass bleaching (Table 2). Experiments were initiated on 3- to 5-tiller stage goosegrass on 11 July 2018 and 24 July 2019.

Weed control and turfgrass injury were evaluated visually on a 0 (no injury or control) to 100% (complete control) scale relative to the non-treated control. Independent of necrosis, visual bleaching was evaluated on a 0 (no bleaching) to 100% (complete bleaching) scale in the 2019 experiment. Data were subjected to ANOVA in ARM (v2017) and Fisher's Protected LSD (P=0.05) was used to separate means.

RESULTS

No turfgrass injury was observed at any time during either experiment (data not presented), although turfgrass quality was poor so conclusions about turfgrass injury are limited.

2018 Experiment

At 3 and 4 weeks after initial treatment (WAIT), tank mixtures of SpeedZone + topramezone provided greater control (>85%) than SpeedZone alone (45 to 65%). Sequential applications of SpeedZone provided more control than single applications of SpeedZone from 5 to 12 WAIT as new goosegrass seedlings that emerged after application resulted in poor control from single application treatments from 5 to 12 WAIT.

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2019 Experiment

Tank mixtures of topramezone + SpeedZoneEW and topramezone + triclopyr displayed less bleaching than topramezone alone; SpeedZoneEW + topramezone displayed no bleaching while topramezone + triclopyr caused minor bleaching. Goosegrass control was generally similar among all treatments for the duration of the experiment.

CONCLUSIONS

These experiments demonstrate that two sequential SpeedZone applications can control multi-tiller-stage goosegrass but single applications provide poor control. Single applications of Pylex tank-mixed with SpeedZone provides excellent goosegrass control. The SpeedZone + Pylex tank-mixture eliminates visible bleaching symptoms goosegrass typically caused by Pylex alone. Future research should investigate the efficacy of lower SpeedZone rates tank-mixed with topramezone for use in turfgrass species that are less tolerant of 2,4-D-based herbicide mixtures.

Table 1. Herbicide treatments applied for post-emergence goosegrass (*Eleusine indica*) control at Horticulture Farm No. 2 in North Brunswick, New Jersey. Applications A and B were made on 11 July and 10 August, 2018, respectively.

Treatment	Product	Active ingredient	Product Rate (per acre)	Application Code
1	Non-treated	–	–	–
2	SpeedZone	2,4-D + mecoprop-p + dicamba + carfentrazone-ethyl	4 pt	A
3	SpeedZone	2,4-D + mecoprop-p + dicamba + carfentrazone-ethyl	4 pt	A *fb*[1] B
4	SpeedZone + Pylex	[2,4-D + mecoprop-p + dicamba + carfentrazone-ethyl] + topramezone	4 pt + 0.25 fl oz	A
5	SpeedZone + Pylex	[2,4-D + mecoprop-p + dicamba + carfentrazone-ethyl] + topramezone	4 pt + 0.5 fl oz	A

[1]fb = followed by

Table 2. Herbicide treatments applied singly for post-emergence control of goosegrass (*Eleusine indica*) at Horticulture Farm No. 2 in North Brunswick, New Jersey. Treatments were applied on 24 July 2019.

Treatment	Product	Active ingredient	Product Rate (per acre)
1	Non-treated	–	–
2	SpeedZone EW	2,4-D + mecoprop-p + dicamba + carfentrazone-ethyl	4 pt
3	Pylex[1]	topramezone	0.5 fl oz
4	Pylex[1] + SpeedZone EW	topramezone + [2,4-D + mecoprop-p + dicamba + carfentrazone-ethyl]	0.5 fl oz + 4 pt
5	Pylex[1] + Turflon Ester	topramezone + triclopyr	0.5 fl oz + 1 fl oz

[1] Treatments containing Pylex were tank-mixed with methylated seed oil at 0.5% volume/volume.

Table 3. Goosegrass (*Eleusine indica*) control following herbicide treatments applied on 11 July 2018 in North Brunswick, NJ.

		Goosegrass control (%)[1]							
		14 July	17 July	24 July	3 Aug.	10 Aug.	17 Aug.	5 Sep.	6 Oct.
Treatment	Product	3 DAIT[2]	1 WAIT[3]	2 WAIT	3 WAIT	4 WAIT	5 WAIT	8 WAIT	12 WAIT
1	Non-treated	0 b[1]	0	0 c	0 c	0 c	0 c	0 c	0 b
2	SpeedZone	36 a	70 a	88 b	64 b	48 b	21 b	13 c	5 b
3	SpeedZone (4 pt *fb*[4] 4 pt)	29 a	80 a	88 b	65 b	54 b	78 a	85 a	73 a
4	SpeedZone + Pylex (4 pt + 0.25 fl oz)	35 a	85 a	98 a	95 a	86 a	78 a	55 b	0 b
5	SpeedZone + Pylex (4 pt + 0.5 fl oz)	40 a	95 a	99 a	93 a	93 a	84 a	66 ab	5 b
	LSD at 5% =	18	17	7	11	12	17	22	17

[1]Goosegrass control evaluated on a 0 to 100% scale, where 0 = no control and 100 = complete control relative to the non treated control. Mean followed by the same letter are not significantly different according to Fisher's Protected LSD test ($p \leq 0.05$).

[2]DAIT = days after initial treatment

[3]WAIT = weeks after initial treatment

[4]fb = followed by on 10 August 2018

Table 4. Goosegrass (*Eleusine indica*) bleaching and control following herbicide treatments applied singly on 24 July 2019 in North Brunswick, NJ.

		Goosegrass bleaching (%)[1]		Goosegrass control (%)[2]						
		29 July	1 Aug.	29 July	1 Aug.	3 Aug.	12 Aug.	25 Aug.	13 Sept.	25 Sep.
Treatment	Product	5 DAT[3]	8 DAT	5 DAT	8 DAT	10 DAT	3 WAT[4]	4 WAT	7 WAT	9 WAT
1	Non-treated	0 c[2]	0 c	0 c	0 d	0 b	0 c	0 b	0 c	0 c
2	SpeedZone EW	0 c	0 c	70 a	86 ab	91 a	95 b	89 a	85 ab	76 b
3	Pylex[5]	50 a	30 a	45 b	69 c	90 a	99 a	93 a	91 ab	85 ab
4	Pylex[5] + SpeedZone EW	0 c	0 c	65 a	90 a	98 a	100 a	93 a	80 b	81 ab
5	Pylex[5] + Turflon Ester	29 b	11 b	55 ab	78 bc	93 a	100 a	94 a	93 a	88 a
	LSD at 5% =	10	7	20	12	11	3	10	12	11

[1]Goosegrass bleaching evaluated visually on a 0 to 100% scale, where 0 = no bleaching and 100 = complete bleaching relative to the non-treated control. Means followed by the same letter are not significantly different according to Fisher's Protected LSD test ($p \leq 0.05$).

[2]Goosegrass control evaluated visually on a 0 to 100% scale, where 0 = no control and 100 = complete control relative to the non-treated control. Means followed by the same letter are not significantly different according to Fisher's Protected LSD test ($p \leq 0.05$).

[3]DAT = days after treatment

[4]WAT = weeks after treatment

[5]Treatments containing Pylex were tank-mixed with methylated seed oil at 0.5% volume/volume.