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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 2017 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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Dr. Ann Brooks Gould, Editor
Dr. Bruce B. Clarke, Coordinator

WHITE CLOVER CONTROL WITH GAMEON HERBICIDE, 2017

Matthew T. Elmore and Daniel P. Tuck¹

The objective of this experiment was to evaluate GameOn herbicide for post-emergence white clover (*Trifolium repens*) control.

MATERIALS AND METHODS

This experiment was conducted at the Rutgers Plant Science Research and Extension Farm, Adelphia, NJ and the Rutgers Horticultural Research Farm II, North Brunswick, NJ on a simulated lawn. The Adelphia site was a sandy loam soil with a mature stand of white clover; a poor stand of Kentucky bluegrass (*Poa pratensis*) ('Midnight II') (turf cover ~10%) was also present at this location. The site was mowed weekly at 3 inches and irrigated as needed to prevent wilt. No additional fertilizers or plant protectants were applied to the trial. The North Brunswick site was a sandy loam with a mature stand of white clover and 'Falcon IV' tall fescue (*Festuca arundinacea*). This site was mowed at 2 inches weekly with a reel mower and irrigated as needed to prevent wilt. Nitrogen fertilizer (1 lb N per 1000 ft²) was applied in April 2017 and fungicides were applied as needed to prevent Pythium blight and brown patch in July and August 2017. Clover cover averaged 90% and 50% at the Adelphia and North Brunswick locations, respectively.

Treatments (Table 1) were arranged in a randomized block design and replicated four times. The treatments were applied to 4 x 7-ft plots using a CO₂-powered sprayer calibrated to apply 44 GPA through a single 9504EVS nozzle at 44 PSI on 4

May 2017 at the North Brunswick location and on 12 May 2017 at the Adelphia location. A 12-inch wide, non-treated buffer strip was maintained between each plot providing a 3 x 7-ft treated area.

White clover control and turfgrass injury were evaluated visually on a 0 (no control or injury) to 100 (complete control or necrosis) percent scale relative to the non-treated control. White clover injury was evaluated on a 1 (complete necrosis) to 9 (no injury) scale. Data were subjected to ANOVA in ARM (v2017) and Fisher's Protected LSD ($p \leq 0.05$) was used to separate means.

RESULTS

No turfgrass injury was observed at any time during the experiment (data not presented).

Adelphia Location

At the Adelphia location (Table 2), GameOn applied at 3.5 and 4.0 pt per acre caused more white clover injury than Three-Way and Escalade 2 as well as GameOn at 3.0 pt per acre at 10 DAT (days after treatment). The Three-Way caused less injury than Escalade 2 and all rates of GameOn.

GameOn at 4.0 pt per acre and Escalade 2 provided similar white clover control (>95%) from 4 to 13 WAT (weeks after treatment). GameOn applied at 3.5 and 4.0 pt per acre provided similar control on all rating dates and more control than the 3.0 pt per

¹Assistant Extension Specialist in Weed Science and Field Researcher IV, respectively, New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901-8520.

acre rate of GameOn at 8, 12, and 13 WAT. When applied at 3.5 pt per acre, GameOn provided more clover control than the Three-Way at 4 and 8 WAT. When applied at 4.0 pt per acre, GameOn provided more clover control than Three-Way at 4, 8, and 12 WAT.

North Brunswick Location

All treatments provided $\geq 95\%$ control during the experiment (Table 3). Control provided by GameOn at 3.5 and 4.0 pt per acre was similar to that provided by Escalade 2 and Three-Way on all rating dates. GameOn applied at 3.0 pt per acre provided less control than other treatments at 14 and 20 WAT.

CONCLUSIONS

These experiments demonstrate that GameOn provides $>90\%$ clover control for at least 12 WAT. The data also demonstrate that the 3.5 and 4.0 pt per acre rates provide more clover control than the 3.0 pt per acre rate. At the 3.5 and 4.0 pt per acre rates, clover control with GameOn is equal to that provided by Escalade 2, a premium commercial standard.

Table 1. Herbicide treatments applied to stands of white clover (*Trifolium repens*) at the Rutgers Horticultural Research Farm II, North Brunswick, NJ and the Rutgers Plant Science Research and Extension Farm, Adelphia, NJ. Treatments were applied on 4 May and 12 May 2017 at North Brunswick and Adelphia, respectively.

Treatment	Product	Active Ingredient	Product Rate (pt per acre)
1	Non-treated	–	–
2	GameOn	2,4-D choline + fluroxypyr + halauxifen-methyl	3.0
3	GameOn	2,4-D choline + fluroxypyr + halauxifen-methyl	3.5
4	GameOn	2,4-D choline + fluroxypyr + halauxifen-methyl	4.0
5	Three-Way Selective Herbicide	2,4-D + MCPA + dicamba	3.5
6	Escalade 2	2,4-D + fluroxypyr + dicamba	2.5

Table 2. White clover injury and control following herbicide applications made on 12 May 2017 at Adelphia, NJ to a stand of white clover and Kentucky bluegrass.

Treatment	White Clover Injury ^{1,2}	White Clover Control (%) ^{2,3}			
	23 May 10 DAT ⁴	7 June 4 WAT ⁵	7 July 8 WAT	4 Aug. 12 WAT	11 Aug. 13 WAT
Non-treated	9.0 a	0 d	0 c	0 e	0 d
GameOn (3 pt)	4.8 c	93 bc	94 b	85 d	91 c
GameOn (3.5 pt)	4.0 d	97 a	99 a	92 bc	97 ab
GameOn (4 pt)	3.8 d	96 ab	100 a	95 ab	98 ab
Three-way	6.0 b	91 c	95 b	91 c	93 bc
Escalade 2	4.8 c	98 a	100 a	96 a	99 a
LSD at 5% =	0.7	4	2	3	5

¹ Clover injury was evaluated on a scale of 1 to 9, where 9 = no injury and 1 = complete necrosis

² Means followed by the same letter are not significantly different according to Fisher's Protected LSD test ($p \leq 0.05$)

³ Clover control was evaluated on a scale of 0 to 100%, where 0 = no control and 100 = complete control relative to the non-treated control

⁴ DAT = days after treatment

⁵ WAT = weeks after treatment

Table 3. White clover control following herbicide applications made on 4 May 2017 at North Brunswick, NJ to a stand of white clover and tall fescue.

Treatment	White Clover Control (%) ¹		
	28 July 12 WAT ²	11 Aug. 14 WAT	29 Sept. 20 WAT
Non-treated	0 b	0 c	0 c
GameOn (3 pt)	98 a	97 b	95 b
GameOn (3.5 pt)	99 a	99 a	100 a
GameOn (4 pt)	99 a	100 a	99 a
Three-way	98 a	99 a	100 a
Escalade 2	100 a	100 a	100 a
LSD at 5% =	3	2	3

¹ Clover control was evaluated 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 ($p \leq 0.05$)

² WAT = weeks after treatment