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This publication includes lecture notes of papers presented at the 2018 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

POST-EMERGENCE FALSE-GREEN KYLLINGA CONTROL WITH VARIOUS HERBICIDES, 2018

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The objective of this experiment was to evaluate various herbicides for post-emergence false-green kyllinga (*Kyllinga gracillima*) control.

MATERIALS AND METHODS

This experiment was conducted at Stone Harbor Golf Club in Cape May Courthouse, NJ. The site was a golf course rough where the primary turfgrass was Kentucky bluegrass (*Poa pratensis*). False-green kyllinga cover was between 15 and 80% at the beginning of the experiment on a plot-by-plot basis. The site was mowed weekly with a rotary mower at 2.5 inches and irrigated as necessary to prevent wilt.

Treatments (Table 1) were arranged in a randomized block design and replicated four times. Treatments were initiated on 27 June 2018 (application code A) and applied singly or sequentially. Sequential applications were made on 24 July or 8 August 2018 (applications codes B and C, respectively). Sprayable treatments were applied to 4 x 7-ft plots using a CO_2-powered sprayer calibrated to apply 44 GPA through a single 9504EVS nozzle at 44 PSI. Granular treatments were applied to dry turf using a shaker jar. A 12-inch wide, non-treated buffer strip was maintained between each plot providing a 3 x 7-ft treated area. Plots were irrigated 12 to 24 hours after treatments were applied.

False-green kyllinga control was evaluated visually on a 0 (no control) to 100% (complete necrosis or kyllinga absence) scale relative to the non-treated control at 1, 2, 8, and 14 weeks after application A (WA-A). False-green kyllinga cover was visually estimated at 0, 4, 6, 8, and 14 WA-A. False-green kyllinga cover reduction was calculated by transforming the visual assessment of kyllinga cover for each plot on a particular rating date relative to percent cover from the same plot at on 27 June 2018 (0 WA-A). Turfgrass injury was evaluated on a 0 (no injury) to 100 (complete necrosis or death) percent scale. Data were subjected to ANOVA in ARM (v2018) and Fisher's Protected LSD ($p \leq 0.05$) was used to separate means.

RESULTS

Turfgrass Injury

No Kentucky bluegrass injury was observed at any time (data not presented).

False-green Kyllinga Control

All treatments provided < 30% control 2 WA-A (Table 2). By 8 WA-A, sequential applications of Vexis and Sedgehammer as well as all Celero treatments provided the greatest false-green kyllinga control. By 14 WA-A, all Celero treatments controlled kyllinga > 95%. Sequential applications of Sedgehammer on a 6-week interval provided > 80% control, which was statistically similar to that provided by Celero at 14 WA-A. All other treatments provided ≤ 65% control at 14 WA-A. A single application of Vexis and Sedgehammer as well as tank-mixtures of Sedgehammer + Tower and Basagran + Tower provided poor control (< 30%) at 8 and 14 WA-A.

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False-green Kyllinga Cover and Cover Reductions

Trends apparent in false-green kyllinga control data were also apparent in cover and cover reduction data.

At 8 WA-A, sequential applications of Vexis, sequential applications of Sedgehammer at 1.33 oz per acre, and all Celero treatments reduced false-green kyllinga cover the most. At the conclusion of the experiment 14 WA-A, all Celero treatments reduced false-green kyllinga cover > 95% at 14 WA-A. Sequential applications of Sedgehammer at 1.33 oz per acre on a 6-week interval and Vexis reduced cover similarly by 67 to 91% at 14 WA-A.

CONCLUSIONS

Single and sequential applications of Celero at 8 or 14 oz per acre as well sequential applications of Sedgehammer at 1.33 oz per acre on a 6-week interval generally had more efficacy against false-green kyllinga than other treatments. Single applications of Sedgehammer and Vexis as well as single application tank-mixtures of Basagran + Tower and Basagran + Sedgehammer demonstrated limited efficacy against false-green kyllinga. Future research should evaluate various Sedgehammer and Vexis reapplication intervals, as Sedgehammer applied on a 6-week interval tended to provide more control than a 4-week interval in this experiment.

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Table 1. Herbicide treatments applied for post-emergence control of false-green kyllinga (*Kyllinga gracillima*) in Kentucky bluegrass (*Poa pratensis*) turf at Stone Harbor Golf Club in Cape May Court House, NJ. Applications A, B, and C were applied on 27 June, 24 July, and 8 August 2018, respectively.

Treatment	Product	Active ingredient	Product Rate (per acre)	Active Ingredient Rate (oz ai/acre)	Application Code
1	Non-treated	–	–	–	–
2	Celero[1]	imazosulfuron	8 oz wt	6.0	A
3	Celero	imazosulfuron	14 oz wt	10.5	A
4	Sedgehammer[1]	halosulfuron	1.33 oz wt	1.0	A
5	Celero	imazosulfuron	8 oz wt	6.0	A *fb*[3] B
6	Celero	imazosulfuron	14 oz wt	10.5	A *fb* B
7	Sedgehammer	halosulfuron	1.33 oz wt	1.0	A *fb* B
8	Sedgehammer	halosulfuron	1.33 oz wt	1.0	A *fb* C
9	Sedgehammer	halosulfuron	0.66 oz wt	0.5	A *fb* C
10	Sedgehammer + Tower	halosulfuron + dimethenamid-p	0.66 oz wt + 21 fl oz	0.5 + 17.1	A
11	Basagran[2] + Tower	bentazon + dimethenamid-p	32 fl oz + 21 fl oz	16.0 + 17.1	A
12	Basagran + Tower	bentazon + dimethenamid-p	32 fl oz + 32 fl oz	16.0 + 25.6	A
13	Vexis G	pyrimisulfan	–	0.8	A
14	Vexis G	pyrimisulfan	–	1.0	A
15	Vexis G	pyrimisulfan	–	0.8	A *fb* B

[1] Treatments containing Sedgehammer and Celero were tank-mixed with non-ionic surfactant (Activator 90) at 0.25% v/v

[2] Treatments containing Basagran were tank-mixed with Agridex crop oil concentrate at 0.5% v/v

[3] *fb* = followed by

Table 2. False-green kyllinga control following single and sequential post-emergence herbicide applications initiated on 27 June 2018 at Cape May Courthouse, NJ.

Treatment	Herbicide	False-green Kyllinga Control (%)[1]			
		3 July 1 WA-A[2]	10 July 2 WA-A	22 Aug. 8 WA-A	9 Oct. 14 WA-A
1	Non-treated	0	0 b	0 d	0 f
2	Celero[3] (8 oz)	8	28 a	98 a	96 a
3	Celero (14 oz)	5	31 a	99 a	97 a
4	Sedgehammer[3] (1.33 oz)	3	20 a	25 c	8 ef
5	Celero (8 oz *fb*[4] 8 oz)	3	29 a	99 a	100 a
6	Celero (14 oz *fb* 14 oz)	0	29 a	100 a	100 a
7	Sedgehammer (1.33 oz *fb* 1.33 oz) (4-wk interval)	5	20 a	96 a	65 bc
8	Sedgehammer (1.33 oz *fb* 1.33 oz) (6-wk interval)	3	20 a	87 a	83 ab
9	Sedgehammer (0.66 oz *fb* 0.66 oz) (6-wk interval)	3	20 a	83 a	86 ab
10	Sedgehammer (0.66 oz) + Tower (21 oz)	5	23 a	18 cd	20 def
11	Basagran[5] (32 oz) + Tower (21 oz)	15	18 a	9 cd	5 f
12	Basagran (32 oz) + Tower (32 oz)	3	18 a	0 d	12 ef
13	Vexis G (0.75 oz ai per acre)	0	21 a	16 cd	0 f
14	Vexis G (1.0 oz ai per acre)	3	20 a	56 b	34 de
15	Vexis G (0.75 *fb* 0.75 oz ai per acre)	10	10 a	83 a	43 cd
	LSD at 5% =	NS	9	20	26

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

[2] WA-A = weeks after application A

[3] Treatments containing Sedgehammer and Celero were tank-mixed with non-ionic surfactant (Activator 90) at 0.25% v/v

[4] *fb* = followed by

[5] Treatments containing Basagran were tank-mixed with Agridex crop oil concentrate at 0.5% v/v

Table 3. False-green kyllinga cover and cover reduction following single and sequential post-emergence herbicide applications initiated on 27 June 2018 at Cape May Courthouse, NJ.

		False-green Kyllinga Cover (%)[1]					False-green Kyllinga Cover Reduction (%)[2]			
Treatment	Herbicide	27 June 0 WA-A[3]	24 July 4 WA-A	7 Aug. 6 WA-A	21 Aug. 8 WA-A	9 Oct. 14 WA-A	24 July 4 WA-A	7 Aug. 6 WA-A	21 Aug. 8 WA-A	9 Oct. 14 WA-A
1	Non-treated	45	29 b	48 b	59 a	44 ab	13 c	-10 e	-38 h	0 e
2	Celero[4] (8 oz)	56	23 b	5 c	4 d	3 e	62 ab	88 abc	95 a	96 a
3	Celero (14 oz)	64	13 b	3 c	3 d	2 e	81 a	96 a	96 a	98 a
4	Sedgehammer[4] (1.33 oz)	50	22 b	15 c	23 bcd	35 abc	53 ab	63 d	50 def	38 b-e
5	Celero (8 oz *fb*[5] 8 oz)	56	31 b	4 c	5 d	0 e	45 b	92 ab	91 abc	100 a
6	Celero (14 oz *fb* 14 oz)	58	23 b	4 c	5 d	0 e	64 ab	94 a	92 ab	100 a
7	Sedgehammer (1.33 oz *fb* 1.33 oz) (4-wk interval)	48	14 b	5 c	4 d	13 cde	70 ab	88 abc	92 ab	72 ab
8	Sedgehammer (1.33 oz *fb* 1.33 oz) (6-wk interval)	50	23 b	19 c	13 cd	5 e	61 ab	68 bcd	75 a-d	91 a
9	Sedgehammer (0.66 oz *fb* 0.66 oz) (6-wk interval)	44	20 b	10 c	11 d	7 de	56 ab	72 a-d	67 b-e	81 a
10	Sedgehammer (0.66 oz) + Tower (21 oz)	54	19 b	19 c	35 b	51 de	63 ab	64 cd	33 f	13 de
11	Basagran[6] (32 oz) + Tower (21 oz)	61	60 a	70 a	76 a	56 a	3 c	-5 e	-12 g	11 e
12	Basagran (32 oz) + Tower (32 oz)	59	55 a	58 ab	68 a	48 a	9 c	5 e	-14 gh	27 de
13	Vexis G (0.75 oz ai per acre)	65	30 b	21 c	34 bc	41 a	53 ab	67 cd	47 ef	37 cde

(Continued)

Table 3 (continued).

Treatment	Herbicide	False-green Kyllinga Cover (%)[1] 27 June 0 WA-A[3]	24 July 4 WA-A	7 Aug. 8 WA-A	21 Aug. 8 WA-A	9 Oct. 14 WA-A	False-green Kyllinga Cover Reduction (%)[2] 24 July 4 WA-A	7 Aug. 8 WA-A	21 Aug. 8 WA-A	9 Oct. 14 WA-A
14	Vexis G (1.0 oz ai per acre)	61	23 b	16 c	21 bcd	33 ab	63 ab	74 a-d	65 cde	46 bcd
15	Vexis G (0.75 *fb* 0.75 oz ai pr acre)	56	21 b	6 c	11 d	18 b-e	63 ab	87 a-d	79 abc	67 abc
	LSD at 5% =	NS	23	21	22	28	31	25	25	35

[1] False-green kyllinga cover visually evaluated on a 0 to 100% scale, where 0 = no cover and 100 = complete cover. Means followed by the same letter are not sigificantly different according to Fisher's Protected LSD test ($p \leq 0.05$)

[2] False-green kyllinga cover reduction calculated by transforming the visual assessment of kyllinga cover for each plot on each rating date relative to percent cover from the same plot at 0 WA-A. Means followed by the same letter are not sigificantly different according to Fisher's Protected LSD test ($p \leq 0.05$)

[3] WA-A = weeks after application A

[4] Treatments containing Sedgehammer and Celero were tank-mixed with non-ionic surfactant (Activator 90) at 0.25% v/v

[5] *fb* = followed by

[6] Treatments containing Basagran were tank-mixed with Agridex crop oil concentrate at 0.5% v/v