The Effects of Mowing Delay on Proxy Efficacy for Poa annua Seed Head Suppression

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Alec Kowalewski and Brian McDonald
Oregon State University
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Research Summary (Year 1)

- Proxy applications significantly reduced seed head formation and size vs. untreated.
- Mowing on the date of Proxy application reduced Proxy effectiveness on only one rating date – 5 weeks after initial treatment and 11 days after the second application.
- Proxy applications lightened turf color slightly.
- Proxy applications improved turf quality vs. control by significantly reducing visible seed heads.

Introduction

Annual bluegrass seed head production on putting greens results in a number of detrimental effects including, but not limited to, reduced putting green speed and consistency, and reduced aesthetics. As a result, herbicides and plant growth regulators are often used to suppress seed head flushes. Research and practical field applications have shown that Embark (mefluidide) and Proxy (ethephon) provide the best reduction in seed head production. However, because of the phytotoxicity that often occurs with Embark (and it was recently removed from the market), Proxy has become the product of choice for suppression of annual bluegrass seed heads, however, its effectiveness - especially in the Midwest - is often inconsistent. Recent research conducted in the greenhouse has shown that Proxy absorption and translocation from the flag leaf substantially improves seed head suppression. However, daily mowing removes the flag leaf. The objective of this research was to determine if mowing delays prior to and following the application of Proxy will affect the seed head suppression of annual bluegrass during the spring flush (See Figure 1 for mowing schedule).

Treated, mowed every day (Left); Untreated, mowed every day (Center); Treated, only mowed 3 days Before & 3 Days after (Right)

April 20 – 18 Days after 2nd Proxy Application (5.0 oz/1,000 ft^2)

Year 1 Findings

The application of Proxy PGR significantly reduced seed head production on April 6th – 4 weeks after treatment and all dates following (Table 1). The main effect of mowing delay **before Proxy application** was only significant on one rating date – April 13th – 5 weeks after the initial application of Proxy and 11 days after the second Proxy application. Mowing on the day of application reduced the effectiveness of

the Proxy application on ratings taken April 13th, which resulted in a 36.5 percent reduction in seed head counts versus the control and was significantly worse than the other three mowing treatments which had a 48.8, 51.2 and 53.8 percent reduction when the last mowing occurred 3, 2, and 1 day before application, respectively. The main effect of mowing delay **after Proxy application** was not significant on any date.

Although there were much fewer seed heads in plots treated with Proxy, the actual number was much higher than expected. As you can see from Table 1 (April 13th and after), generally more than 200 seed heads per square foot were present on the plots treated with Proxy, but their size was much smaller and thus less visible than the seed heads on the untreated plots. As a result, the visual seed head ratings on plots treated with Proxy were relatively low (Table 2).

The Proxy application reduced turfgrass quality by ½ a point on the rating scale because of a slight lightening of color (Table 3). However, because seed head production increased over time on the untreated plots, the plot quality on these plots decreased over time, and as a result, rated much worse than the plots, treated with Proxy, regardless of mowing timing. The difference in seed head counts on April 13th was not enough to affect the quality ratings of the plots because of the small size of the seed heads, as mentioned above.

Future Research

In 2016 the protocol will be include an increased number of mowing delay treatments **prior to Proxy application** (6, 5, 4, 3, 2 and 1 days prior) and mowing delay treatments **after Proxy application** (1, 2, 3, 4, 5 and 6 days after). Hopefully increasing the number of mowing delay days prior to and/or after application will allow for a more mature flag leaf; therefore, generating the anticipated increase in seed head suppression provided by Proxy applications.

Figure 1: Mowing Timing – Days Before and After Proxy Application (5.0 fl. oz. per 1,000ft^2)

		Days Mowed (Shaded in Blue) Before (-) or After (+) Proxy Application						
Trt #	**Proxy?**	**- 3 Days**	**- 2 Days**	**- 1 Day**	**0**	**+ 1 Day**	**+ 2 Days**	**+ 3 Days**
1	**Yes**	■				■	■	■
2	**Yes**	■					■	■
3	**Yes**	■						■
4	**Yes**	■	■			■	■	■
5	**Yes**	■	■				■	■
6	**Yes**	■	■					■
7	**Yes**	■	■	■		■	■	■
8	**Yes**	■	■	■			■	■
9	**Yes**	■	■	■				■
10	**Yes**	■	■	■	■	■	■	■
11	**Yes**	■	■	■	■		■	■
12	**Yes**	■	■	■	■			■
13	**No**	■	■	■	■	■	■	■

Note: After this schedule, the plots were mowed 7 days a week until the end of the trial.

Table 1: Poa annua Seed Head Counts per Square Foot

(Proxy Treatments applied March 9th and April 2nd – Mowing Treatments began March 6th and March 30th).

Trt #	Last Mowing Before Proxy App (Days)	First Mowing After Proxy App (Days)	Proxy?	4/27 7 WAIT** 3 WA 2nd Trt**	4/20 6 WAIT 2 WA 2nd Trt	4/13 5 WAIT 1 WA 2nd Trt	04/06 4 WAIT 4 DA 2nd Trt	03/30 3 WAIT	3/23 2 WAIT	03/16 1 WAIT	03/09 0 DAT
1	3	1	Yes	251	409	295	168	96	128	71	36
2	3	2	Yes	281	325	351	218	198	154	87	14
3	3	3	Yes	248	335	302	161	171	78	102	9
4	2	1	Yes	313	302	315	128	241	125	72	9
5	2	2	Yes	257	315	328	143	198	85	61	7
6	2	3	Yes	287	370	257	196	177	99	61	13
7	1	1	Yes	273	257	214	121	135	75	66	5
8	1	2	Yes	244	370	305	203	169	111	108	18
9	1	3	Yes	190	303	332	155	236	110	95	8
10	0	1	Yes	288	433	385	180	174	78	87	20
11	0	2	Yes	264	314	351	159	181	93	85	8
12	0	3	Yes	281	377	434	205	181	88	108	15
13	0	1	No	1,263	964	639	428	223	170	59	23
		LSD @ .05		**177**	**136**	**136**	**147**	**ns**	**ns**	**ns**	**ns**

** Note: "WAIT" = Weeks after initial Proxy treatment. "WA 2nd Trt" = Weeks after second Proxy treatment.

Table 2: Visual Seed Head Ratings 1 – 9; 1 = None, 9 = 100% Cover

Trt #	Days Before Proxy App	Days After Proxy App	Proxy?	Visual Seed Head Rating 1 - 9; 1 = None; 9 = 100% Cover							
				03/09	03/16	03/23	03/30	04/06	04/13	04/20	04/27
1	3	1	Yes	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.3
2	3	2	Yes	1.5	2.0	2.0	2.0	2.3	2.5	2.3	2.3
3	3	3	Yes	1.5	2.0	2.0	2.0	2.5	2.3	2.0	2.0
4	2	1	Yes	1.5	2.0	2.0	2.0	2.8	2.3	2.3	2.3
5	2	2	Yes	1.5	2.0	2.0	2.0	2.5	2.3	2.0	2.0
6	2	3	Yes	1.5	2.0	2.0	2.0	2.5	2.0	2.0	2.0
7	1	1	Yes	1.5	2.0	2.0	2.0	2.3	2.0	2.0	2.3
8	1	2	Yes	1.5	2.0	2.0	2.0	2.3	2.3	2.0	2.0
9	1	3	Yes	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
10	0	1	Yes	1.5	2.0	2.0	2.0	2.0	2.3	2.0	2.0
11	0	2	Yes	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0
12	0	3	Yes	1.5	2.0	2.0	2.0	2.5	2.3	2.0	2.0
13	0	1	No	1.6	2.0	2.3	3.0	4.3	4.0	6.0	6.8
		LSD @ .05		**ns**	**ns**	**ns**	**0.32**	**0.66**	**0.41**	**0.42**	**0.45**

Table 3: Turfgrass Quality 1 – 9; 9 = Best

Trt #	Last Mowing Before Proxy App (Days)	First Mowing After Proxy App (Days)	Proxy?	Quality Ratings 1 - 9; 9 = Best							
				03/09	03/16	03/23	03/30	04/06	04/13	04/20	04/27
1	3	1	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
2	3	2	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
3	3	3	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
4	2	1	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
5	2	2	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
6	2	3	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
7	1	1	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
8	1	2	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
9	1	3	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
10	0	1	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
11	0	2	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
12	0	3	Yes	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
13	0	1	No	8.0	8.0	8.0	7.9	7.1	7.0	6.4	6.0
		LSD @ .05		**ns**	**ns**	**ns**	**0.1**	**0.1**	**ns**	**0.1**	**ns**