

2015-19-534

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

Alec Kowalewski, Brian McDonald, and Micah Gould
Oregon State University

Research Summary (Year 3)

- Year 3 investigated the effects of mowing 1, 2, 3, 4, 6, 8, and 24 hours after a Proxy application. Year 1 and year 2 research did not show meaningful differences when delaying mowing prior to application and 1, 2, and 3 days after the application.
- Hourly mowing timing had the following impacts on annual bluegrass seed head counts:
 - Mowing 24 hours after the Proxy application had the fewest seed head counts when averaged across all rating dates, however, it was not significantly different than most of the other mowing timings.
 - Mowing 1 hour after the Proxy application appeared to reduce the length of seed head suppression as these plots had average seed head counts that were not significantly different than the untreated control on the last two rating dates – June 15th and June 22nd.
- All treatments with Proxy resulted in fewer seed heads and better turf quality vs. the untreated.

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.

Year 1 Objective and Findings (Spring 2015):

Objective

- The initial objective 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. In year 1, we investigated all daily combinations of the last mowing prior to

the application from 3 days prior to and beginning mowing again 1, 2 and 3 days after application.

Findings

- Results obtained in 2015 suggest mowing should be delayed the day of Proxy application until after the product is applied (data not shown).

Year 2 Objective, Materials and Methods, and Findings (Spring 2016):

Objective

- The objective of year two research was to determine if increasing the number of days the last mowing occurred before the application of Proxy would impact seed head suppression. Letting the turf grow for 3, 6, 9, and 12 days would allow for the development of a larger flag leaf prior to the application of Proxy. In this trial, we did not investigate timing of mowing after the Proxy application (i.e. all plots were mowed 24 hours after the Proxy application).

Findings

- No differences in seed head suppression were observed when the last mowing was 0, 3, 6, 9, or 12 days prior before the Proxy application.
- Regardless of the mowing timing, Proxy decreased seed head production in comparison to the control.

Year 3 Objective, Materials and Methods, and Findings (Spring 2017):

Objective

- The objective of year three research was to determine if mowing immediately after (ranging from 1 to 24 hours) the application of Proxy reduced the effectiveness of seed head suppression.

Materials and Methods The trial was initiated at the Oregon State University Lewis-Brown Horticulture Farm in Corvallis, Oregon. The trial site was an annual bluegrass putting green built in April of 2009 by placing annual bluegrass sod (Bos Sod, Canada) over 12 inches of USGA specification sand. The sand was placed on flat drain lines which lay on 'Malabon' series silty clay loam soil.

The trial was initiated on May 9th (the historical peak of seed head flowering in Corvallis) by applying Proxy across the entire trial area at 8 am. The untreated plots were covered with plastic. Before the trial, the green was mowed five times per week at 0.125 inches with a Jacobsen Eclipse 322 triplex. Mowing treatments were applied with a Jacobsen Eclipse walk mower set at 0.125 inches beginning 1 hour after the Proxy application.

The trial was set up as a Randomized complete block design with four replications. The plot size measured 20 inches wide (1 mower pass) by 9 feet long. Visual Quality and Seed Head Ratings were taken on May 26th and 31st, and June 8th, 15th, and 22nd. Seed head counts were made on May 31st, June 8th, June 15th, and June 22nd. To count the seed heads, a cup cutter sized hole (12.6 in²) was made in a small piece of plywood. The plywood was lightly tossed on each plot 3 times (i.e. 3 subsamples per plot) and the seed heads were counted. The three counts were then averaged for each plot.

Treatments were as follows:

Trt #	Mowing Timing	PGR
1	1 hour after application	Proxy @ 5 oz
2	2 hours after application	Proxy @ 5 oz
3	3 hours after application	Proxy @ 5 oz
4	4 hours after application	Proxy @ 5 oz
5	6 hours after application	Proxy @ 5 oz
6	8 hours after application	Proxy @ 5 oz
7	24 hours after application	Proxy @ 5 oz
8	24 hours after application	No Proxy

Results

Mowing timing did not have an impact on turf quality on plots treated with Proxy. All plots treated with Proxy had significantly better turf quality than the untreated control as the untreated control had more seed heads. However, the untreated plots were slightly darker in color as Proxy tends to lighten turf color slightly (data not shown).

On 4 of the 5 rating dates, there were no differences in visual seed heads on plots treated with Proxy. On the first rating date, May 26th, the plots mowed 24 hours after application had statistically fewer visual seed heads (1.8 percent seed head cover) than all the other treated plots which ranged from 2.5 to 3.8 percent seed head cover. The untreated control had 7.8 percent visual seed head cover on this date (data not shown).

Additionally, the plots mowed 24 hours after application had the lowest average seed head counts across all dates. In fact, the order of treatments with the three lowest seed head counts from low to high was 7, 6, 5 (24 hours, 8 hours, and 6 hours after application, respectively). This result gives some indication that there is a negative effect from mowing too soon after application, but the effect is small.

When looking at seed head counts on June 15th and June 22nd, mowing 1 hour after application was not any better than the untreated control. This result implies that not all of the Proxy applied was absorbed at the time of application which reduced the length of control (Table 1).

Based on these results, waiting 24 hours after a Proxy application would be recommended. However, if that timing is not possible, waiting at least two or three hours to mow a putting green after a Proxy application would be the next best option. Lastly, if putting greens needed to be (or accidentally were) mowed 1 hour after the Proxy application, the next Proxy application should be made two weeks earlier than normal, if seed head pressure is expected to continue.



Figure 1: Trial site 23 days after treatment on May 31, 2017.

Table 1: Effects of mowing time after the Proxy application on analysis of variance and mean for separation for seed head counts observed on 31 May and 15 June, 2017 in Corvallis, OR.

Source of Variation	Num DF	Den DF	31-May	15-Jun
			Pr > F	
Mowing after Proxy application	7	21	**	*

Mowing [‡] prior to Proxy application [‡]	31-May		15-Jun	
	Seed Heads per 12.6 inch ^{2†}			
1 hour after application	53.4	b	70.8	ab
2 hours after application	60.5	b	56.7	bc
3 hours after application	49.8	b	58.3	bc
4 hours after application	54.8	b	59.7	bc
6 hours after application	52.3	b	57.9	bc
8 hours after application	51.1	b	50.8	c
24 hours after application	43.1	b	56.3	bc
24 hours after app - No proxy	93.1	a	86.0	a

* Significant at a 0.05 level of probability; ** Significant at a 0.01 level of probability; † Surface area of a 4 inch diameter cup cutter;

[‡] Proxy applied at 5 oz./1,000 ft² on 9 May 2016, except where noted; [‡] Mowing applied beginning May 9th; [±] lower case letters represent a significant difference at a 0.05 level of probability. Mean separations were obtained using Fisher's LSD.