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

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Research Summary (Year 2)

- Eliminated treatments after proxy application due to non-significant results from year 1.
- Spread out treatments before the Proxy app to 12, 9, 6, 3, and 0 days (including one untreated at 0 days before mowing).
- Regardless of the number of days mowing is delayed prior to application, Proxy decreased seed head production in comparison to the control.
- No differences were observed when mowing was continued 0, 3, 6, 9, or 12 days before Proxy application.

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.

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):

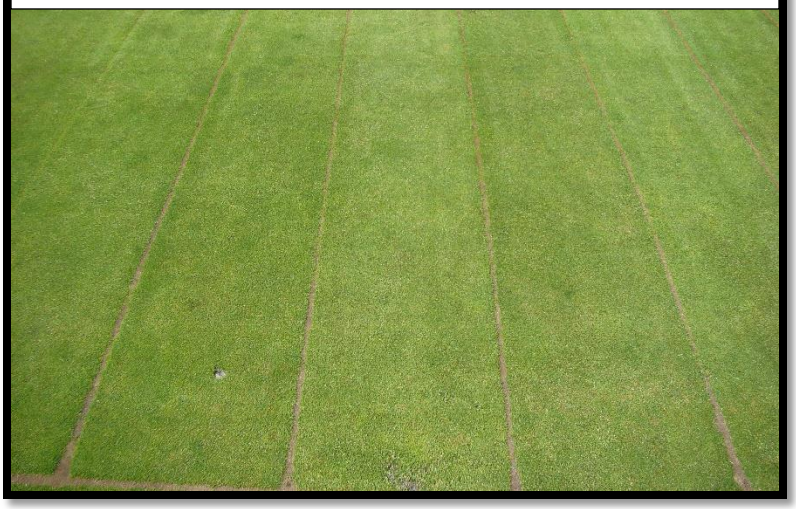
Objective

- The objective of year two research was to determine if increasing the mowing delays, allowing for the development of a larger flag leaf, prior to the application of Proxy will affect the seed head suppression of annual bluegrass during the spring flush (Figure 1).

Materials and Methods

Application of Proxy PGR significantly reduced seed head production as of June 7th at a 0.01 level of probability. The prior week, May 31st was not significant (Table 1). The main effect of mowing delay **before Proxy application** was not significant on any date. The only significant differences between treatments was that of the control that received no proxy and the rest of the treatments that received Proxy and mowing (Image 1).

Image 1: Effects of Proxy on Poa seed head suppression 2 weeks after application in Corvallis, OR.



Poa spring seed head flush exhibited by treatment without Proxy (middle) versus plots with Proxy and mowing before application (left and right plots).

This year, Proxy was applied on 3/4/16 at 5 fl. oz./1,000 ft.^{2} on the entire green to control seed heads early in the year before the trial started. The idea was to look at the Poa seeding later in the spring to take advantage of faster turf growth from warmer temperatures, however, seed heads did not develop to a great degree, which limited results.

Results obtained in 2016 findings suggest putting greens can be mowed the day of Proxy application without an effect on seed head suppression. However, the question remains how soon (how many hours) after Proxy application can the putting green be mowed without effect seed head suppression.

Year 3 Research (Spring 2017):

Objective

- The objective of future research (spring 2017) will explore how soon mowing can be done after Proxy application.

Mowing treatments after application in 2017 will include 1, 2, 3, 4 and 6 hours after Proxy application (Table 2). Proxy will be applied at 5 oz./1,000 ft^2 and may include up to 3 separate applications during the spring seed head flush, which will begin in March of 2017. The mowing timings will occur according to the date of Proxy application.

Figure 1: Mowing timing – days before Proxy application (5.0 fl. oz. per 1,000ft^2) in 2016 in Corvallis, OR, days mowed before Proxy application (shaded in blue).

Proxy?	Last Mowing Date Before App		**- 12 Days**	**- 9 Days**	**- 6 Days**	**- 3 Day**	**0**
Proxy @ 5.0 fl. oz./M	12						
Proxy @ 5.0 fl. oz./M	9						
Proxy @ 5.0 fl. oz./M	6						
Proxy @ 5.0 fl. oz./M	3						
Proxy @ 5.0 fl. oz./M	0						
Untreated	0						

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

Table 1: Effects of mowing date prior to Proxy application on analysis of variance and mean for separation for seed head counts observed on 31 May and 7 June, 2016 in Corvallis, OR.

			31-May	7-Jun
Source of Variation	Num DF	Den DF	*Pr* > F	
Mowing prior to Proxy application	5	15	ns	**

Mowing ¥ prior to Proxy application¥	31-May		7-Jun	
	Seed Heads per 12.6 inch^{2}ǂ			
0 days before app	14.5	a±	9.4	b
3 days before app	14.9	a	9.3	b
6 days before app	18.8	a	13.0	b
9 days before app	14.7	a	9.0	b
12 days before app	16.9	a	10.7	b
No proxy	24.9	a	18.9	a

ns = Not significant; ** Significant at a 0.01 level of probability; ǂ Surface area of a 4 inch diameter cup cutter;

¥ Proxy applied at 5 oz./1,000 ft^2 on 17 May 2016; ¥ Mowing applied beginning May 5th; ± lower case letters represent a significant difference at a 0.05 level of probability. Mean separations were obtained using Fisher's LSD.

Table 2: Expanded mowing treatments after Proxy application, research to be conducted in spring of 2017 in Corvallis, OR.

Mowing after Proxy‡ application
1 hour after application
2 hours after application
3 hours after application
4 hours after application
6 hours after application
No Proxy

‡Proxy will be applied in March 2017 at 5 oz./1,000 ft^2, with possibly up to 3 apps through the growing season.