Application of Proxy PGR for Poa Seed Head Suppression, 2000

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Abstract

Proxy (ethephon) was applied to 100% pure stands of Poa annua as either a single or repeat application 24 days apart at both a five and ten-ounce product rate per 1000 square feet. Percent plot seed heads were decreased significantly on three of five evaluation dates before either the loss of treatment effect and/or environmental conditions triggered profuse flowering (by 20 April, 2000). The five-ounce rate produced moderate seed head suppression at 16 and 25 days after the first treatments by which afterwards, control was minimal. By April, the five-ounce repeat applications were no better in suppression of seed heads than either of the single applications, regardless of application timing (March 3 or 29).

The ten-ounce rates generally produced 40% - 80% greater seed heads suppression than the five-ounce rate treatments. Maximum seed head control was achieved by the repeat applications (March 3 and 29) of the ten-ounce rate, which consistently produced between 8% and 19%, seed head cover up until the first ten days of April 2000.

Proxy, when applied at the five-ounce/M rate had the greatest effect in seed head suppression early in the test (10 March). Perhaps earlier season applications at the five-ounce rate may be necessary to manifest greater suppression initially, and perhaps in a cumulative fashion for season long control.

Introduction

Poa annua (annual bluegrass) is the most cosmopolitan weed on golf course turf. The seasonal germination in the early fall produces a discordant surface on greens, which culminates in unsightly flower production in early to late spring. Pre-emergence control is extremely marginal (on greens) and not possible with registered materials for fall bermudagrass overseeded with ryegrass or other cool season grasses.

Post emergence control is elusive, due to potential phytotoxicity to the turf and efficacy in control/suppression. Consistent suppression of vegetative and/or floral production would offer some control options.

With this in mind, Proxy (ethephon), was applied to a 100% Poa annua turf at different rates and timings to assess the potential of Proxy to reduce seed head emergence of Poa annua.

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Material and Methods

The area selected for the test was a golf course rough mowed at 1.5 inches at the Country Club of Green Valley, 25 miles south of Tucson, Arizona. Plots were arranged as 20" x 72" strips across the end of a turf area that exhibited 100% Poa annua.

The plots were sprayed with a single 8004-E nozzle jet at 56 GPA, including a 0.5% non-ionic surfactant. Treatments were designed to apply different rates of Proxy either once or twice at the beginning of the peak seed head period (March). This treatment structure would answer questions regarding (1) the ideal rate response (2) timing response, and (3) the response to multiple (two repeat) sequential applications on solid stands of Poa annua. Treatments were as follows in March 2000.

Proxy 5oz/M	March 3, 2000
Proxy 10oz/M	March 3, 2000
Proxy 5oz/M	March 3, 2000 & March 29, 2000
Proxy 10oz/M	March 3, 2000 & March 29, 2000
Proxy 5oz/M	March 29,2000
Proxy 10oz/M	March 29, 2000

Roughs were moved 2-3x week with a reel 5 gang rough mower. Plots were rated prior to mowing to maximize visible seed head expression. Data assigned to plots included % Poa annua seed heads (March 10, 18, April 4, 9, 20, and 27). Visual suppression of seed heads was scored using a scale of 1-6 where 1=no suppression, 6=severe suppression, on the dates of March 27, April 4, and April 9.

Each plot was rated in one-third increments, and the "average' was analyzed using SAS software, using the ANOVA model option. Each treatment appeared four times in a RCBD field design. Polynomial contrasts were devised to determine the effects of selected treatment comparisons of rate, timings and "all" proxy treatments versus the untreated control plots. Duncans NMRT values were calculated as the mean separation statistic only when the P value for treatment main effect F ratio was significant at P=0.05, or less.

Results and Discussion

Single Application Results:
The first applications were made on March 3, at both the 5 and 10-ounce/M rate.

Percent plot Poa seed heads were affected by the Proxy treatments on 8, and 25 days after the first applications, but not at 16 days after the first treatment.

On March 10 (8 DAT/1), the 10-ounce rate had the greatest reduction in percent plot seed heads (8.8% and 11.3%), (Table 1, Figure 1). The 5-ounce plots had 12.5% and 22.5% plot seed heads, on average. While spatial variation between plots most likely caused differential responses between treatments receiving the same rates (either as initial, or as the first applicator in a repeat sequence), the ten-ounce rate caused the greatest treatment effect, (Table 1, Figure 1).

On March 18, 2000 (16 DAT/1), the overall treatment effect was non-significant. The untreated control averaged 28.8% Poa seed heads, while the five-ounce treatments averaged 16.3% to 18.8% percent plot Poa seed heads. The ten-ounce rate averaged 23.8% and 19.5% seed heads as well, (Table 1, Figure 1).

On March 27, 2000 (25 DAT/1), there were very noticeable differences in seed head suppression, with both the five and ten-ounce rates having significantly less Poa annua seed heads compared to that of the untreated controls. The ten-ounce rate provided 40% to 60% more control than the five-ounce treatments, which averaged 14.3%: 15.8% and 19.5%: 28.3%, percent plot seed heads, respectively. The untreated controls had 46.3% percent plot seed head cover, (Table 1, Figure 1).

Seed head culms were also visibly suppressed, as the culms were observed to remain in the boot stage, among Proxy treated plots. Visual suppression of seed head culms was assigned to plots on 27 March, using a scale of 1-6 where as 1=no suppression, 4=moderate, and 6=severe suppression. The ten-ounce rate caused more boot suppression (3.0:3.0) vs. that achieved by the five-ounce applications (2.3:2.5), (Table 2, Figure 2).

On March 29, the repeat sequential applications, and the first "late season" applications at both the five and ten-ounce rates were applied.
On April 4 (6 DAT/2) the treatment affect was non-significant, and percent plot Poa seed heads were greatly reduced as well (probably from a recent mowing event). All treatments averaged between 15% to 20% Poa annua seed heads, (Table 1, Figure 1). Most likely, seed heads were removed by a recent mowing event. All treatments except the single "late" season application of ten-ounces/M, showed slight suppression, (Table 2, Figure 2).

On April 9, 2000 (22 DAT/2) seed head suppression was again significant due to Proxy treatments. The repeat treatment at the ten-ounce rate produced the least amount of seed heads per plot (12.5%). All other treatments had 21% to 26% plot seed heads, on average. The control average was 26.3%. All five-ounce treatments produced near identical responses, which were not different from that of the untreated control, (Table 1, Figure 1). Likewise, the greatest suppression occurred for the repeat ten-ounce applications, (Table 2, Figure 2).

The flower head expression peaked in late April. **On April 20, (22 DAT/2),** the mean percent seed head cover for untreated turf was 71% seed heads. All proxy treated turfs had between 65% -70% seed head plot cover, as well. Any previous affect of Proxy was overcome at this time as heavy seed head expression was evident, (Table 1, Figure 1).

The test was evaluated for the last time on **27 April (29 DAT/2)**. The treatment effect was not significant, and overall percent plot cover seed heads ranged from 15% to 30% seed heads. Perhaps of interest, is the fact that the single ten-ounce rate applied (once) 60 days earlier had the largest amount of seed heads present. This may be a latent response from regrowth from the PGR effect. This often occurs (to turf) after PGR or injury response several weeks after treatment, (Table 1, Figure 1).

Conclusions

1. Proxy (ethephon) was applied to 100% pure stands of Poa annua as either a single or repeat application 24 days apart at both a five and ten-ounce product rate per 1000 square feet.

2. Percent plot seed heads were decreased significantly on three of five evaluation dates before either the loss of treatment effect and/or environmental conditions triggered profuse flowering (by 20 April, 2000).

3. The five-ounce rate produced moderate seed head suppression at 16 and 25 days after the first treatments by which afterwards, control was minimal.

4. By April, the five-ounce repeat applications were no better in suppression of seed heads than either of the single applications, regardless of application timing (March 3 or 29).

5. The ten-ounce rates generally produced 40% - 80% greater seed heads suppression than the five-ounce rate treatments.

6. Maximum seed head control was achieved by the repeat applications (March 3 and 29) of the ten-ounce rate, which consistently produced between 8% and 19%, seed head cover up until the first ten days of April 2000.

7. Proxy, when applied at the five-ounce/M rate had the greatest effect in seed head suppression early in the test (10 March).

8. Perhaps earlier season applications at the five-ounce rate may be necessary to manifest greater suppression initially, and perhaps in a cumulative fashion for season long control.

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Table 1. Percent *Poa annua* seed heads present after single and double applications of Proxy at 5 & 10 oz. product per 1000 ft^2.

	10-Mar 8 dat#1	**18-Mar** 16 dat#1	**27-Mar** 25 dat#1	**4-Apr** 6 dat#2	**9-Apr** 11 dat#2	**20-Apr** 22 dat#2	**27-Apr** 29 dat#2
proxy @ 5oz March 2, 2000	**12.5 abc**	**18.8**	**19.5 c**	**15.0**	**26.3 a**	**66.3**	**18.8**
proxy @ 10oz March 2, 2000	**11.3 bc**	**23.8**	**14.3 c**	**15.0**	**25.0 a**	**72.5**	**30.0**
proxy @ 5oz March 2 & 29th, 2000	**17.5 abc**	**16.3**	**23.8 bc**	**20.0**	**26.3 a**	**71.3**	**17.5**
proxy @ 10oz March 2 & 29th, 2000	**8.8 c**	**19.5**	**15.8 c**	**13.8**	**12.5 b**	**67.5**	**17.5**
proxy @ 5oz March 29, 2000	**22.5 ab**	**31.3**	**36.3 ab**	**17.5**	**27.5 a**	**70.0**	**21.8**
proxy @ 10oz March 29, 2000	**23.8 a**	**31.3**	**37.5 ab**	**17.5**	**21.3 a**	**65.0**	**15.0**
non-treated control	**16.3 abc**	**28.8**	**46.3 a**	**20.0**	**26.3 a**	**71.3**	**17.5**
test mean	16.1	24.2	27.6	17.0	23.6	69.1	19.7
Pr > F	*****	ns	******	ns	******	ns	ns

Note: Means with the same letter are NOT significantly different from one another.

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Table 2. Percent *Poa annua* seed head suppression after single and double applications of Proxy at 5 & 10 oz. Product per 1000 ft^2.

	27-Mar 25 dat#1	**4-Apr** 6 dat#2	**9-Apr** 11 dat#2
proxy @ 5oz March 2, 2000	**2.3 ab**	**2.3 a**	**1.5**
proxy @ 10oz March 2, 2000	**3.0 a**	**2.0 ab**	**1.8**
proxy @ 5oz March 2 & 29th, 2000	**2.5 ab**	**2.0 ab**	**1.8**
proxy @ 10oz March 2 & 29th, 2000	**3.0 a**	**2.5 a**	**3.0**
proxy @ 5oz March 29, 2000	**1.5 bc**	**2.0 ab**	**1.0**
proxy @ 10oz March 29, 2000	**1.0 c**	**1.0 b**	**1.5**
non-treated control	**1.0 c**	**1.0 b**	**2.0**
test mean	2.0	1.8	1.8
Pr > F	**	*	ns

note: Means with the same letter are NOT significantly different from one another.

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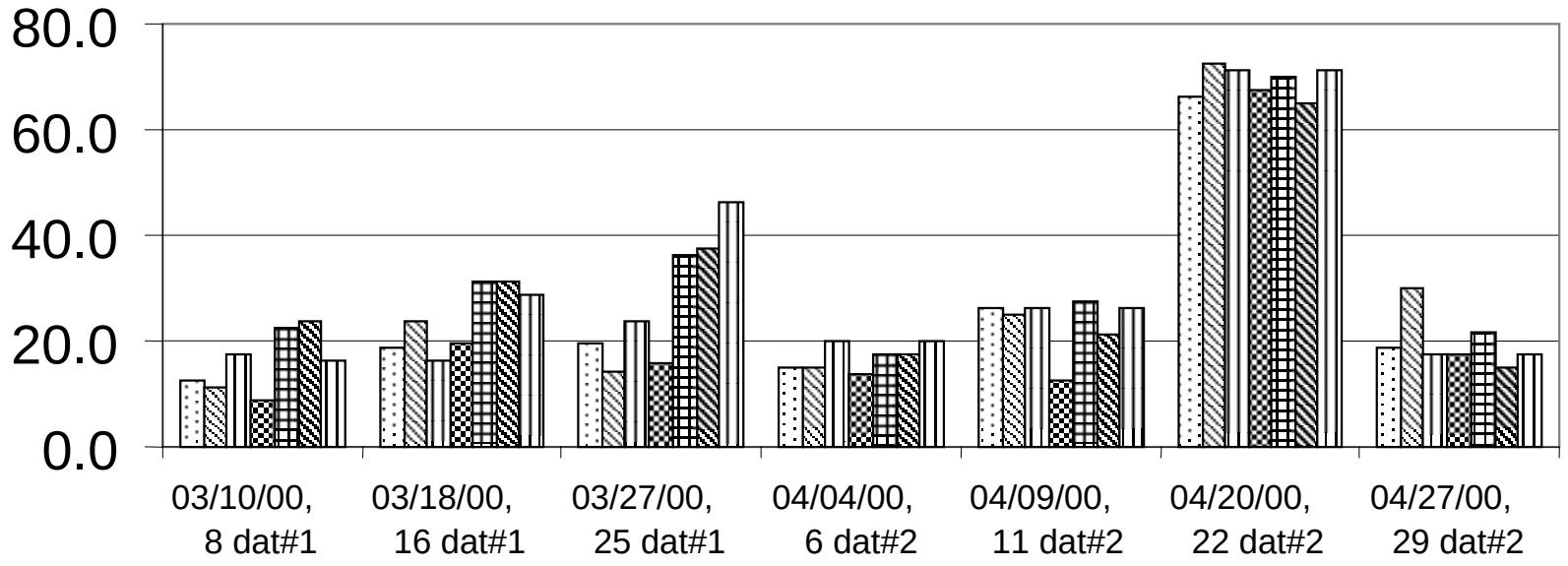
Figure 1: Percent Plot Poa Annua Seed Heads/Proxy



- proxy @ 5oz 03/02/00
- proxy @ 10oz 03/02/00
- proxy @ 5oz March 2 & 29th, 2000
- proxy @ 10oz March 2 & 29th, 2000
- proxy @ 5oz 03/29/00
- proxy @ 10oz 03/29/00
- non-treated control

Figure 2: Poa Annua Seed Head Suppression/Proxy