

How to Suppress Seedheads on Annual Bluegrass Putting Greens

By J.A. Borger, T.L. Watschke,
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To some degree, annual bluegrass (*Poa annua*) is present on most putting greens in the Mid-Atlantic. In fact, annual bluegrass can be the predominant species.

Although botanically, annual bluegrass is a winter annual and considered a weed in most turfgrass communities, it is often the desirable species on putting greens. When a turfgrass manager chooses to cultivate annual bluegrass as the dominant population, it's not considered a weed. In fact, if the desired turfgrass is annual bluegrass, then creeping bentgrass (*Agrostis stolonifera*) or any other turfgrass present in the sward should be considered a weed. Some of the highest-quality putting surfaces often consist of more than 80 percent annual bluegrass.

If annual bluegrass is the species of choice,

If the seedhead is visible (beyond "boot" stage), PGRs cannot suppress that seedhead.

the turfgrass manager must manage the seedhead production of the annual bluegrass because it can adversely affect the playability of the putting surface. In addition, when annual bluegrass produces a seedhead, carbohydrates are diverted to the production of that seedhead at the expense of growth in other areas of the plant. This diversion of carbohydrates is evident shortly after the seed matures and shatters from the plant.

At this time, the annual bluegrass has become weakened and less competitive. As a result, the turfgrass manager must take extra care in the cultivation of the annual bluegrass to provide the necessary quality for the playing surface.

Mechanical cultivation (verticutting) can eliminate some of the seedheads on a putting green after emergence. Groomers or brushes attached to the greens mower will remove some of the seedheads, but these tactics do not prevent the formation of seedheads. When such



The green blocks are where annual bluegrass seedheads have been suppressed using PGRs.

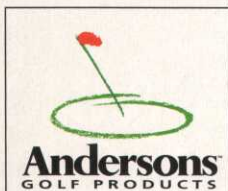


(Left to right) Late "boot" stage, seedhead emerged, and early "boot" stage. Notice the position of the swollen area just below the leaves on the annual bluegrass plant during the late "boot" stage of seedhead development.

mechanical means are employed, the equipment must be properly adjusted to avoid damage to the turfgrass plants. This mechanical removal of seedheads will need to continue until the seedhead production ceases.

Plant growth regulator (PGR) use has become more commonplace over the past several years and can be effective for the suppression of annual bluegrass seedheads (Picture 1).

PGR application timing is critical for success.



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TABLE 1

Evaluations of selected treatments for chemical phytotoxicity, turf quality, and percent annual bluegrass seedhead suppression on an annual bluegrass/creeping bentgrass putting green.¹ (Source: Original research, Jeff Berger at The Penn State University, 2003)

TREATMENT	FORM	RATE oz/M	TIMING	5/2/03 PHYTO ²	5/20/03 QUALITY ³	5/20/03 SUPPRESSION ⁴
PROXY	2SL	5	BOOT	8.7	8.2	88.3ab
PRIMO MAXX	1MEC	.125	BOOT			
PROXY	2SL	3	BOOT	8.7	6.7	73.3bcd
PRIMO MAXX	1MEC	.125	BOOT			
PROXY	2SL	3	BOOT/3WAT ⁵	8.7	9.2	93.3a
PRIMO MAXX	1MEC	.125	BOOT/3WAT			
EMBARK T/O	0.2L	.9	BOOT	5.3	6.3	85ab
EMBARK T/O	0.2L	.9	BOOT	8.3	7.2	73.3bcd
FEROMEK	L	5	BOOT			
CHECK				10	5.7	0f
PROXY	2SL	5	BOOT	7.7	8.2	88.3ab
PRIMO MAXX	1MEC	.125	BOOT			
MACROSORB FOLIAR	L	4	BOOT			
PROXY	2SL	5	BOOT	9	8.5	86.7ab
PRIMO MAXX	1MEC	.125	BOOT			
MACROSORB FOLIAR	L	8	BOOT			
PROXY	2SL	3	BOOT	9.3	8.5	81.7a-d
PRIMO MAXX	1MEC	.06	BOOT			
MACROSORB FOLIAR	L	8	BOOT			

1 – Product use contained in this table may not be according to label recommendations.

2 – The rating scale is from 0 to 10 where 0 = complete phytotoxicity, 7 = acceptable, and 10 = no phytotoxicity.

3 – The rating scale is from 0 to 10 where 0 = worst quality, 7 = acceptable, and 10 = best quality.

4 – Means followed by same letter do not significantly differ ($P \leq 0.05$ Duncan's New MRT).

5 – This treatment was applied twice, once at the "boot" stage then again three weeks later.

Annual bluegrass will begin to form seedheads in the spring of the year. Therefore, the PGRs must be applied at the "boot" stage of development, which is prior to the seedhead emergence from the turfgrass plant. To determine the seedhead growth stage, a sampling of the annual bluegrass is necessary. Turfgrass managers who have managed the same site for several years have noticed earlier seedhead emergence on certain greens. Consequently, these greens can be used as an effective monitoring tool.

Three examples of seedhead development are shown in Picture 2. To determine the "boot" developmental stage, select an annual bluegrass

plant from the site and remove the outer leaves. At the "boot" stage, a small stem will be evident growing from the crown of the plant (Picture 3). The annual bluegrass plant may also have a noticeable bulge at the base. This is the seedhead forming and also considered the "boot" stage of development (See Picture 4).

If the seedhead is visible (beyond "boot" stage), PGRs cannot suppress that seedhead. The window of timing ("boot" stage) for PGR application can range from one or two days to a week. Therefore, daily monitoring of the development stage is required. If the PGR

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Seedhead Formation
At Boot Stage

Photo: JA Berger, Penn State University



Seedhead formation within and excised from an annual bluegrass plant.

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application is made too early, then the annual bluegrass may produce seedheads later in the spring if a second PGR application is not made.

In most areas of the Mid-Atlantic region, one properly timed PGR application will effectively suppress annual bluegrass seedheads. Multiple PGR applications may be required where

When Proxy and Primo Maxx are tanked mixed, annual bluegrass seedheads can be suppressed on putting greens.

the seedhead production persists beyond the limits of a single PGR application.

There are several other factors to consider when using PGRs to suppress annual bluegrass seedheads on putting greens. Some PGRs can be phytotoxic, causing a temporary yellowing or tip burn of the turfgrass. The phytotoxicity, combined with the amount of annual bluegrass seedhead suppression (plus other factors) can affect the overall quality of the putting surface. Quality is subjective. The turfgrass manager must decide the acceptable level of quality required for the putting surface.

Many researchers have documented the effectiveness of Embark Turf and Ornamental Growth Regulator (mefluidide) for the suppression of annual bluegrass seedheads. Embark T/O is a "class C" PGR (Watschke and DiPaola). This class of PGRs are mitotic inhibitors that prevent cell division, which is required for seedhead formation.

When applied alone, Embark T/O can suppress 85 percent or more of the annual bluegrass seedheads. However, there can be some temporary (seven to 10 days) phytotoxicity (turf yellowing) associated with the application. To reduce this temporary phytotoxicity, Embark T/O can be tanked mixed with Ferromec AC Liquid Iron (15-0-0), which contains nitrogen, iron and sulfur. When Ferromec is added, a general trend has been observed in which seedhead suppression decreases by 10 percent to 15 percent.

In the Mid-Atlantic region, a single application of Embark T/O, with or without Ferromec, usually suppresses seedhead formation for the season. However, some turf managers prefer two applications applied about four weeks apart because of the potential for prolonged seedhead development. Normally, seedhead suppression will last for about six weeks from a single application of Embark T/O.

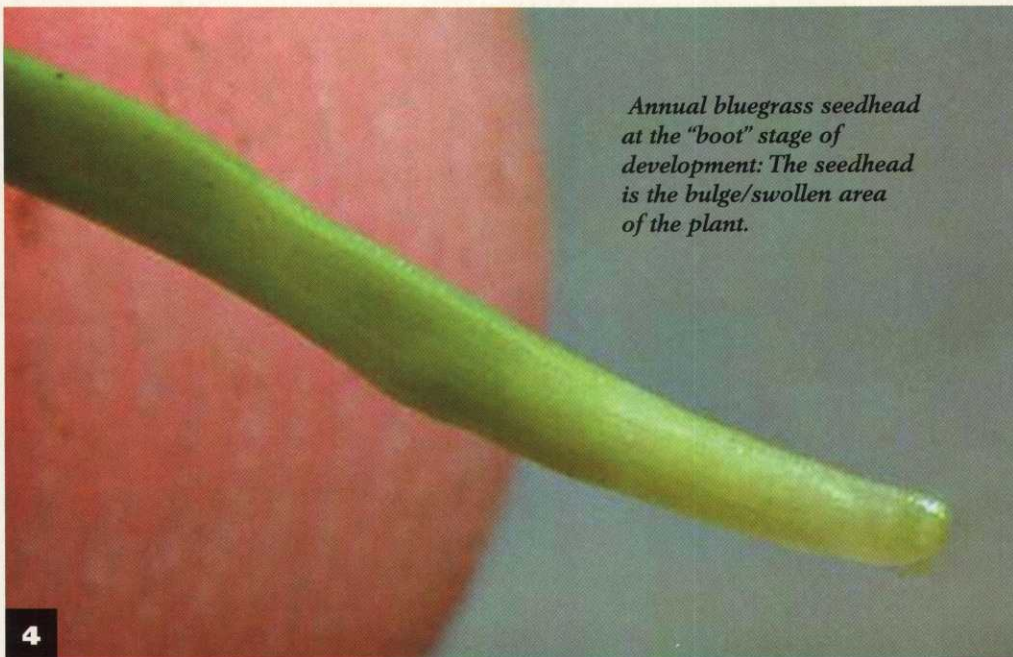
There is inconsistency associated with the effectiveness of Proxy (ethephon) on the suppression of annual bluegrass seedheads. On the



An emerging annual bluegrass seedhead.

QUICK TIP

The Scotts Booth (#1626) will be hosting the QUIZ SHOW during trade-show hours at GCSAA, and we are looking for contestants. The Quiz show will test contestants on golf trivia and science, with great prizes and the opportunity to win scholarship money for your university. If you are interested in participating or learning more about this exciting event, you can visit our Web site, www.scottsproseed.com. GCSAA should be an exciting event and we look forward to seeing you there.



Annual bluegrass seedhead at the "boot" stage of development: The seedhead is the bulge/swollen area of the plant.

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West Coast, acceptable seedhead suppression has been documented when Proxy is used but it appears less effective when used on the East Coast. Proxy is a "class E" PGR. This class of PGRs acts hormonally in the plant to prevent growth.

Primo Maxx (trinexapac-ethyl) provides little annual bluegrass seedhead suppression. Primo Maxx is a "class A" PGR. This class of PGRs blocks



An annual bluegrass seedhead at a greens' mowing height.

the production of gibberellic acid late in the production pathway in order to encumber the 1103-elongation of plant cells to reduce plant growth. Seedhead production is primarily driven by cell division, not cell elongation.

However, when Proxy and Primo Maxx are tanked mixed, annual bluegrass seedheads can be suppressed on putting greens.

In a two-year study at Penn State, this PGR combination has consistently provided more than 85-percent suppression of the annual bluegrass seedheads on putting greens with only slight phytotoxicity. In this study, multiple applications of the Proxy/Primo Maxx tank mixed combination, applied three weeks apart, provided greater than 90 percent seedhead suppression. Additionally, when MacroSorb Foliar (an L-amino acid bio-stimulant) was added to the tank mixture, the small amount of phytotoxicity was reduced even further while annual bluegrass seedhead suppression remained constant.

Turfgrass managers who choose to cultivate the annual bluegrass populations on putting greens can use PGRs to suppress the seedheads. This tactic will improve the overall annual bluegrass plant health and provide the golfer with a higher-quality playing surface.

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REFERENCE:

Watschke, T. L. and J. M. DiPaola. *CSSA Division C5 Plant Growth Regulator Slide Monograph* (unpublished).