

# ANNUAL BLUEGRASS SEEDHEAD SUPPRESSION WITH EMBARK OR PROXY + PRIMO MAXX WHEN APPLIED AT VARIOUS TIMINGS.

J.E. Kaminski and T. Lulis

Department of Crop and Soil Science  
The Pennsylvania State University, University Park

## INTRODUCTION

Annual bluegrass (*Poa annua*) is a prolific producer of seed during the spring and early summer months. Even at low mowing heights, annual bluegrass seedheads can be produced thus creating an uneven playing surface on golf course putting greens. While two chemical management regimes are available, they are often met with a lack of efficacy due to challenges of applying them at the correct timing. The objectives of this study were to evaluate the ability of Embark or Proxy + Primo MAXX to suppress annual bluegrass seedheads when applied at various timings.

## MATERIALS & METHODS

A field study was conducted at the Joseph Valentine Turfgrass Research Center in University Park, PA. The area was a research putting green with a rootzone that was comprised of a sandy loam with a pH 7.8 and an OM of 0.27%. Turfgrass used for evaluation was predominantly comprised of annual bluegrass with less than 10% creeping bentgrass (*Agrostis stolonifera*). The area was maintained as a bentgrass green and mowed six times per week to a height of 0.125 in. All treatments were applied with a CO<sub>2</sub> pressurized (40 psi) sprayer equipped with an air-induction flat fan nozzle (AI9508E) and calibrated to deliver 2.0 gal water per 1000 ft<sup>2</sup>. Plots measured 3 ft x 6 ft and were arranged in a randomized complete block with four replications. All treatments, rates, and application timing are listed in the data tables.

*Poa* seedhead severity was assessed by estimating the seedhead coverage on a 0 to 10 scale where 0 = no seedhead present and 10 = maximum seedhead production. Turfgrass quality was visually rated on a 1 to 9 scale where 1 = entire plot brown or dead and 9 = optimum greenness and density. Turfgrass injury was rated on a scale of 0 to 5 where 0 = no injury visible,  $\geq 3.0$  = unacceptable injury for a golf course green, and 5.0 = entire plot area brown or dead. All data were subjected to analysis of variance and means were separated at  $P \leq 0.05$  according to Fisher's Protected Least Significant Difference Test.

## RESULTS & DISCUSSION

Annual bluegrass seedheads were low to moderate at the study site and began to develop near the end of April. On 7 May, plots treated with 6 fl oz of Embark on 2 or 15 Apr or receiving a total of 6 fl oz of Embark applied in split applications resulted in the greatest reduction of annual bluegrass seedheads when compared to the untreated control plots (Table 1). No other treatments reduced seedhead production. Although the aforementioned treatments resulted in the greatest suppression of annual bluegrass seedheads, injury to the turf was moderate to severe and considered unacceptable ( $\geq 3.0$ ) on most rating dates (Table 2). For unknown reasons, plots receiving Embark (6.0 fl oz) on 8 Apr resulted in less injury than plots treated 1 week prior to after.

## ACKNOWLEDGEMENTS

We thank David Livingston and the staff at the Valentine Turfgrass Research Facility for assisting in the maintenance of the research plots. This research was funded by the Pennsylvania Turfgrass Council.

Table 1. Seedhead severity on a golf course putting green following the application of Embark or Proxy + Primo MAXX at various timings and rates.

Treatment and rate per 1000 sq ft	Application	Seedhead <sup>y</sup>
	Code <sup>x</sup>	7 May
Embark 2S IVM 6 fl oz/a .....	A	1.8 c
Embark 2S IVM 6 fl oz/a.....	B	3.3 bc
Embark 2S IVM 6 fl oz/a.....	C	2.5 c
Proxy 5 fl oz/1000ft <sup>2</sup> + Primo Maxx 0.125 fl oz/1000ft <sup>2</sup> .....	A	6.3 a
Proxy 5 fl oz/1000ft <sup>2</sup> + Primo Maxx 0.125 fl oz/1000ft <sup>2</sup> .....	B	4.3 b
Proxy 5 fl oz/1000ft <sup>2</sup> + Primo Maxx 0.125 fl oz/1000ft <sup>2</sup> .....	C	4.3 b
Embark 2S IVM 3 fl oz/a.....	AC	2.5 c
Untreated.....		4.2 b
Untreated.....		4.5 b

<sup>y</sup> Poa seedhead severity was assessed by estimating the seedhead coverage on a 0 to 10 scale where 0 = no seedhead present and 10 = maximum seedhead production.

<sup>x</sup> Treatments were applied as follows: A = 2 Apr, B = 8 Apr, C = 15 Apr.

<sup>w</sup> Means in a column followed by the same letter are not significantly different at P ≤ 0.05 level according to the Fisher's protected least significant difference t-test.

Table 2. Turfgrass injury and overall quality of a golf course putting green following the application of Embark or Proxy + Primo MAXX at various timings and rates.

Treatment and rate	Application Code <sup>x</sup>	Injury <sup>z</sup>			Quality <sup>y</sup>	
		23 Apr	30 Apr	7 May	30 Apr	7 May
Embark 2S IVM 6 fl oz/a .....	A	3.8 a <sup>w</sup>	3.5 a	3.5 a	4.3 e <sup>w</sup>	5.0 cd
Embark 2S IVM 6 fl oz/a.....	B	2.0 bcd	2.5 b	2.5 bc	5.5 bcd	5.5 bcd
Embark 2S IVM 6 fl oz/a.....	C	2.5 bc	3.0 ab	3.3 ab	5.0 cde	5.5 bcd
Proxy 5 fl oz/1000ft <sup>2</sup> + Primo Maxx 0.125 fl oz/1000ft <sup>2</sup> .....	A	1.0 d	1.3 d	1.3 d	6.8 a	6.8 a
Proxy 5 fl oz/1000ft <sup>2</sup> + Primo Maxx 0.125 fl oz/1000ft <sup>2</sup> .....	B	1.5 cd	2.3 bc	2.0 cd	5.8 abc	6.0 ab
Proxy 5 fl oz/1000ft <sup>2</sup> + Primo Maxx 0.125 fl oz/1000ft <sup>2</sup> .....	C	1.8 cd	2.3 bc	2.5 bc	6.0 abc	5.8 bc
Embark 2S IVM 3 fl oz/a.....	AC	3.0 ab	3.0 ab	3.3 ab	4.5 de	4.8 d
Untreated.....		1.0 d	1.5 cd	1.7 cd	6.4 ab	6.1 ab
Untreated.....		1.5 cd	2.3 bc	2.0 cd	5.8 abc	6.0 ab

<sup>z</sup> Turfgrass injury was rated visually on a 0 to 5 scale where 0 = no injury; ≥ 3 unacceptable injury for a golf course putting green; and 5 = entire plot area brown or dead.

<sup>y</sup> Turfgrass quality was rated on a 1 to 9 scale where 1 = entire plot area brown or dead; 7 = minimum acceptable quality for a golf course putting green; and 9 = optimum greenness and density.

<sup>x</sup> Treatments were applied as follows: A = 2 Apr, B = 8 Apr, C = 15 Apr.

<sup>w</sup> Means in a column followed by the same letter are not significantly different at P ≤ 0.05 level according to the Fisher's protected least significant difference t-test.