

Reduction of *Poa annua* in Established Kentucky Bluegrass Turf

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Summary

Two trials were initiated in late August, 2005 to examine the effects of various herbicides and growth regulators on the reduction of *Poa annua* in Kentucky bluegrass turf. This trial has commenced at two locations, Windermere Golf and Country Club and an Olds College on existing varietal trial plots. The first application of products took place in late August 2005 and then was applied again in the spring and fall of 2006.

Initial *Poa annua* percent of infestation was from 66-80% at Windermere. Following the winter of 2005-06 there was a significant reduction in the *Poa annua* population for the two Betasan treatments. There was also a *Poa annua* reduction in the Bonzi treated plots, however, the differences were not considered to be significant. When rated in the fall, the *Poa annua* had recovered completely in the untreated and the Proxy/Primo treatments. However, the effect of the Bonzi and Betasan treatments was still evident. The two rates of Betasan had significantly lower *Poa annua* infestations and significantly higher Kentucky bluegrass populations.

At Olds, a slight yellowing of the turf was noticed fourteen days after the first application of the Ethrel/Primo treatment in year one. The Proxy/Primo showed a *Poa annua* reduction at the spring rating, while the Proxy/Primo and Betasan showed lower infestations than did the Bonzi at the fall rating time.

The third trial was initiated on an A-4 Creeping Bentgrass putting green in the fall of 2006 at the Carstairs Community Golf Course. Data collections will begin in the spring of 2007.

Introduction

Poa annua or annual bluegrass is a persistent problem in Kentucky bluegrass and creeping bentgrass turf. It is very adaptable to climatic conditions of the Prairie Provinces and as a result predominates on turf that is maintained at a high level. Unfortunately, it is not very tolerant of winter injury and as a result can leave large areas of damaged turf in the spring.

Betasan 4.8E is the only product registered for the control of *Poa annua* in turf in Canada. It is a pre-emergent herbicide and must be applied prior to the germination of seed. Paclobutrazol, a growth regulator, is the active ingredient in Bonzi and is registered for greenhouse use in Canada. It is registered for use on turf in the United States. Primo is registered as a growth regulator for turf and Ethrel is registered for agricultural crops in Canada.

This trial was established to determine the effectiveness of various products for reduction of *Poa annua* in Kentucky bluegrass creeping bentgrass turf.

Methodology

Two sites were established in the fall of 2005 to test the efficacy of one selective herbicide and three plant growth regulators to control a moderate to a heavy infestation of *Poa annua* in established Kentucky bluegrass turf.

The first trial was established at the Windermere Golf and Country Club (Windermere) located at Edmonton, Alberta. Test plots measuring 1x 2 metres were laid out along a heavily *Poa annua* infested rough off the sixteenth fairway. Each treatment was replicated four times within a randomized complete block trial design (Table1).

The second trial was established at the Prairie Turfgrass Research Centre (Olds) research site located at Olds College, Olds, Alberta. Utilizing an existing Kentucky bluegrass/fescue variety trial, each variety plot was divided into four sub plots each measuring 1x 1 metre. Limited by the number of available test plots, only the lower application rate for each product was tested. Each treatment was replicated four times within this split plot trial design (Table 1).

Table 1- Treatment information for *Poa annua* reduction trial, 2005.

Products	Classification	Active Ingredient(s)	Application Rate(s)	Test Site(s)
Betasan 4.8E	Selective Herbicide	bensulide 480g/l	300mls/100m ²	Windermere Olds
Betasan 4.8E	Selective Herbicide	bensulide 480g/l	450mls/100m ²	Windermere
Bonzi	Plant Growth Regulator	paclobutrazol 0.4%	225mls/100m ²	Windermere Olds
Bonzi	Plant Growth Regulator	paclobutrazol 0.4%	450mls/100m ²	Windermere
Ethrel & Primo Maxx	Plant Growth Regulators	ethephon 21.7% trinexapax-ethyl 11.3%	100mls/100m ² 3.5mls/100m ²	Windermere Olds
Ethrel & Primo Maxx	Plant Growth Regulators	ethephon 21.7% trinexapax-ethyl 11.3%	200mls/100m ² 7mls/100m ²	Windermere
Untreated Control				Windermere Olds

In late August 2005, after an initial assessment of the *Poa annua* infestation, treatments were applied at both sites. The Olds site was treated on August 26th and the Windermere site on August 29th. The products were evenly applied to the turf using a compressed CO₂ sprayer calibrated to deliver a spray volume of 8.14L/100m². Following application, the treatments were watered in. In 2006, applications were applied in spring and fall.

The treatments were not evaluated for the effectiveness of the product in 2005. Evaluations took place in spring and fall at times when *Poa annua* was easily differentiated from the Kentucky bluegrass.

The third trial was initiated at the Carstairs Community Golf Club (Carstairs) in Carstairs Alberta in the fall of 2006 in order to determine the effect of Betasan on *Poa annua* reduction in A-4 Creeping Bentgrass. The application was made with a compressed CO₂ plots sprayer with a single TeeJet 8004 even flat fan nozzle calibrated to apply 8.14 l/100m². Plots sizes were 0.5 by 0.5 metres and the treatments were replicated four times in a randomized complete block design. Plots were assessed for percent infestation of *Poa annua*.

Table 2 - Treatment information for *Poa annua* reduction trial, Carstairs:

Products	Classification	Active Ingredient(s)	Application Rate(s)
Betasan 4.8E	Selective Herbicide	bensulide 480g/l	300ml/100m ²
Betasan 4.8E	Selective Herbicide	bensulide 480g/l	225 ml/100m ²
Betasan 4.8E	Selective Herbicide	bensulide 480g/l	150 ml/100m ²
Untreated Control			

Results

Initial *Poa annua* percent of plot area affected was rated in the fall of 2005, prior to the first application of product (data not shown). The level of infestation was from 66-80% and the individual treatments were not considered to be significantly different.

There was a significant reduction in the *Poa annua* population following the winter of 2005-06 for the two Betasan treatments at Windermere (Table 3). There was also a reduction in the Bonzi treated plots, however, the differences were not considered to be significant. When rated in the fall, the *Poa annua* had recovered completely in the untreated and the Proxy/Primo treatments. However, the effect of the Bonzi and Betasan treatments was still evident. The two rates of Betasan had significantly lower *Poa annua* infestations and significantly higher Kentucky bluegrass populations. There were no statistical differences for quality between the treatments.

Table 3 - *Poa annua* reduction trial Windermere Golf and Country Club, 2006.

Product & Rate	Spring 2006			Fall 2006			Turf Quality
	Poa	Kentucky	Bare	Poa	Kentucky	Bare	
	% of plot area						1- 9 scale
Untreated control	29b ¹	21a	50a	78c	22b	1a	6.4
Proxy 100ml/100m ² + Primo Maxx 3.5ml/100m ²	25b	16a	60a	71bc	28b	1a	6.7
Proxy 200mls/100m ² + Primo Maxx 7ml/ 100m ²	22b	27a	50a	75bc	25b	0a	6.4
Bonzi 225ml/100m ²	15ab	38a	48a	56bc	43b	0a	6.5
Bonzi 450ml/100m ²	16ab	27a	58a	51b	46b	3a	6.5
Betasan 300ml/100m ²	3a	43a	54a	15a	75a	10b	6.7
Betasan 450ml/100m ²	2a	58a	40a	9a	89a	3a	7.0
LSD _{0.05} =	18	n/s	n/s	26	25	6	n/s

¹Within a column and for each source of variation, means followed by the same letter are not significantly different at p=0.05.

At Olds, a slight yellowing of the turf was noticed fourteen days after the first application of the Ethrel/Primo treatment (data not shown) in year one. This discolouration was more prevalent within the fescue plots than within the Kentucky bluegrass plots. There were no signs of phytotoxicity in year two of this study. The Proxy/Primo showed a *Poa annua* reduction at the spring rating, while the Proxy/Primo and Betasan showed lower infestations than did the Bonzi at the fall rating time (Table 4).

Table 4 – Treatments effects on *Poa annua* population, Olds 2006.

Product & Rate	Fall 2005	Spring 2006	Fall 2006
	—— % infestation ——		
Untreated control	----- ¹	49b	52ab
Proxy 100ml + Primo MAXX 3.5ml/ 100m ²	-----	44a	51a
Bonzi 225mls/100m ²	-----	50b	54b
Betasan 300mls/100m ²	-----	48b	50a
	LSD _{0.05} =	2	2

¹Within a column and for each source of variation, means followed by the same letter are not significantly different at p=0.05.

Discussion

Betasan at both the mid and high rates showed significant reductions in *Poa annua* during the spring and fall ratings at the Windermere. This effect was not shown at the Olds site. The fact that the damage occurred following the winter period would indicate that the mortality occurred as a result of winter injury.

Site differences may have been a factor in this study. The Windermere site was shaded while the Olds site was in full sun. Previous research has shown that plants may not fully acclimate for the low temperatures of winter if they are shaded in the fall. This observation may be worthy of further study.

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