

# ***Poa annua* Control in Bermudagrass Fairways**

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## **Introduction**

Annual bluegrass is a genetically diverse weedy grass species that exhibits both annual (*Poa annua ssp. annua*) and perennial nature (*Poa annua ssp. reptans*) and is well adapted for germination and growth across many climatic regimes. Annual bluegrass proliferates under the extreme conditions found in the deserts of Southern California's Coachella Valley as well as the moderate Mediterranean climates found in the Monterey Peninsula of central coast California.

Annual bluegrass seed germination is greatest during the late summer and early fall. In California significant increases in annual bluegrass populations are generally observed from October to December. Regular sprinkler irrigation plus late fall and early winter rains enhance the potential for successful germination and development. Maximum seedhead proliferation is most often observed in Southern California from February through April. Optimum germination of annual bluegrass has been observed with maximum temperatures of 75-80 °F, moderate minimums and the presence of light, however, field observations would indicate that specific biotypes are well adapted to germinate and grow at higher and lower temperatures.

Surface disruption enhances the potential for annual bluegrass invasion. Cultural management practices such as aeration, vertical mowing and drill seeding which are designed to enhance surface quality may actually create a more favorable environment for annual bluegrass germination while reducing the short term competitive nature of the existing turf stand. The percent germination of annual bluegrass seed increases following mechanical operations which open the turf canopy and allow light to penetrate. In those cases where overseeded bermudagrass fairways or solid stand perennial ryegrass fairways are utilized, these management practices will enhance the problems associated with annual bluegrass invasion.

An example of the tenacity and competitiveness of annual bluegrass can be observed on golf courses in Palm Springs, California with overseeded bermudagrass fairways. In preparation for overseeding bermudagrass fairways many superintendents (a) reduce irrigation to dry down the surface, (b) allow bermudagrass to grow to 3/4" to 7/8", (c) flail mow to open the turf canopy, (d) sweep, (e) scalp to 1/4", (f) sweep, and (g) broadcast perennial ryegrass at rates of 600-700 pounds per acre.

Based on field observations conducted in the Southern California desert region of Palm Springs, it appears that the dynamic surface disruption that occurs during preparation for overseeding may be the trigger that activates annual bluegrass germination.

The objective of this research was to review both postemergent and preemergent philosophies for the control of annual bluegrass in overseeded bermudagrass fairways.

## Materials & Methods

Through the cooperative efforts of the Hi-Lo Desert GCSA Tournament Research Committee, Novartis Crop Protection Inc. and AgrEvo USA Company, four *Poa annua* control field research trials were conducted on three golf courses in the Coachella Valley during the summer and fall of 1997 and the winter and spring of 1998.

Replicated field trials were deployed at Desert Dunes Golf Club, Desert Princess Country Club and Resort and The Springs Club. Timing and rate studies were deployed with Prograss 1.5 EC (ethofumesate: AgrEvo USA Company) and Barricade 65 WG (Prodiamine: Novartis Crop Protection Inc.) prior to, during and following perennial ryegrass overseeding.

Individual treatment plots measured 10' x 10' with a 5' x 10' in plot check and 24" aisleways. Treatments were replicated four times in a randomized complete block design. A calibrated CO<sub>2</sub> propelled spray system pressurized to 26 psi and equipped with 11004LP Tee-Jet nozzles applied treatments at a spray volume of 65 gallons per acre.

Field plots were prepared for perennial ryegrass overseeding from October 1 to October 11, 1997. Sites were flail mowed, swept, scalped and swept. The perennial ryegrass overseeding rate varied per site from 320 to 700 pounds per acre.

Treatment evaluations were conducted once per month from August 1997 to May 1998. The following evaluations were conducted during each rating date: percent perennial ryegrass cover versus the in-plot check, perennial ryegrass injury, percent annual bluegrass cover and control. Data were summarized and statistically analyzed. Differences between means were determined via LSD.

## Results and Discussion: Barricade 65 WG (prodiamine) Field Trial

The concept behind this field trial was to determine the rate and application timing for the use of Barricade prior to and/or after perennial ryegrass overseeding for preemergent control of annual bluegrass without significantly influencing the stand density and surface quality of perennial ryegrass.

### *I. Preemergent Control of Poa annua with Barricade: The Springs Club*

**Table 1. The Influence of Barricade 65 WG on Germination and Density of Perennial Ryegrass. The Springs Club: Mike Kocour, Supt. MMM & Associates. 1998.**

Treatments	Rate lb AI/A	4 WAOVS Percent Cover
◆ Untreated check	*	100.0
◆ Barricade: 8 weeks before OVS	1.0	91.3
◆ Barricade: 8 weeks before OVS	0.75	95.0
◆ Barricade: 6 weeks before OVS	0.75	86.9
◆ Barricade: 6 weeks before OVS	0.5	91.3
◆ Barricade: 4 weeks before OVS	0.5	93.8

◆ **Take Home Message: Barricade and Perennial Ryegrass Density**

- *With proper irrigation stand density is reduced by less than 10% after 6-8 weeks.*
- *Barricade combined with dry conditions during seed establishment will slow grow-in and reduce stand density.*
- *A 2X overlap safety margin has not yet been established.*

**Table 2. Evaluation of Barricade 65 WG for Control of *Poa annua* in Overseeded Common Bermuda Fairways. The Springs Club: Mike Kocour, Supt. MMM & Associates. 1998.**

Treatments	Rate lb AI/A	March 30,1998 Percent <i>Poa</i> Control
◆ Barricade: 6 weeks before & 6 weeks after OVS	0.75/0.5	92.5 f
◆ Barricade: 8 weeks before & 6 weeks after OVS	0.75/0.5	89.8 f
◆ Barricade: 6 weeks before OVS	0.75	89.8 f
◆ Barricade: 4 weeks before & 6 weeks after OVS	0.5/0.75	86.4 f
◆ Barricade: 8 weeks before OVS	1.0	84.7 f
◆ Barricade: 8 weeks before OVS	0.75	76.3 ef
◆ Barricade: 6 weeks before OVS	0.5	72.2 def
◆ Barricade: 4 weeks after OVS	0.5	20.3 ab
◆ Barricade: 4 weeks after OVS	0.75	40.7 bc
◆ Untreated check	*	0.0

◆ **Take Home Message: Preemergent Control of *Poa annua* with Barricade**

- *Under these soil and turf conditions and under these timing and rate formats, Barricade provided the best preemergent control of *Poa annua* when applied six or eight weeks prior to overseeding at rates of 0.5 to 1.0 pound of active ingredient per acre. Applying Barricade four weeks after overseeding resulted in very poor control.*
- *Sequential treatments of Barricade applied six weeks before (0.75 lb AI/A) overseeding and six weeks after (0.5 lb AI/A) exhibited the best control.*
- *Single treatments of Barricade applied 6 weeks (0.75 lb AI/A) or 8 weeks (1.0 lb AI/A) before overseeding exhibited very good control.*
- *Single treatments of Barricade applied at rates of 0.5 and 0.75 lb AI/A four weeks after overseeding show 20.3% and 40.7% control, respectively. From these data it would appear that 60% to 80% of annual bluegrass germination occurs before the four week after overseeding date (November 24) at The Springs.*

## Results and Discussion: Prograss 1.5 EC (ethofumesate) Field Trial

### *I. Control of Poa annua with Prograss 1.5 EC: Desert Dunes and Desert Princess*

The concept behind these field trials was to determine the rate and application timing for the use of Prograss 1.5 EC (ethofumesate) as a postemergent herbicide for the control of annual bluegrass without causing damage to common or hybrid bermudagrass. Bermudagrass exhibits poor tolerance to Prograss applications.

**Table 3. Evaluation of Prograss 1.5 EC for Control of *Poa annua* in Overseeded Bermudagrass Fairways. Desert Princess Country Club, Ken Graves, Supt. and Desert Dunes Golf Club, Bill Kostas, Supt. MMM & Associates. 1998.** Overseeding Conducted October 1, 1997

Treatments	Rate	Percent Poa Control 4/20/98	
		D. Princess	D. Dunes
◆ Prograss: Single Application 11/13	0.5 gal /A	2.6	17.6
◆ Prograss: Single Application 11/13	0.75 gal/A	-10.3	0.0
◆ Prograss: Single Application 11/13	1.0 gal /A	-2.6	35.3
◆ Prograss: Seq. Appl. 11/13 & 12/29	0.5 gal/A	12.8	47.1
◆ Prograss: Seq. Appl. 11/13 & 12/29	0.75 gal/A	28.2	68.2
◆ Prograss: Seq. Appl. 11/13 & 12/29	1.0 gal/A	67.2	88.2
◆ Untreated check		0.0	0.0

#### ◆ **Take Home Message: Control of *Poa annua* with Prograss, 1.5 EC**

- *Significant variability in percent control was observed between locations.*
- *Under these soil and turf conditions, these timing and rate formats, and this localized weed pressure, Prograss provided the best postemergent control of *Poa annua* when applied as sequential treatments at a rate of 1.0 gallon of product per acre on November 13 and December 29, 1997.*
- *As *Poa* pressure increases more escapes are observed as the Prograss application rate is decreased from 1.0 gallon per acre to 0.75 gallons per acre. The severity of escapes will also be influenced by the genetic diversity in the stand, the percentage of annual or perennial biotypes, and the sensitivity of these biotypes to Prograss applications.*
- *The Prograss rate and application timing should be based on (a) local knowledge at your particular course, (b) turf type, common or hybrid bermudagrass, (c) occurrence of the first and second frost, and, (d) historical annual bluegrass pressure.*

#### ◆ **Take Home Message: Bermudagrass Injury Potential with Prograss 1.5 EC**

- *Prograss caused injury to common and hybrid bermuda. Common recovered more rapidly than hybrid. No injury was noted with common during the spring/summer*

transition. Hybrid (328) bermudagrass showed greater sensitivity to Prograss. Only minor injury was noted on 328 during the spring and summer transition. Additional research work to more thoroughly define the susceptibility of hybrid types to Prograss injury is recommended.

**Table 4. Evaluation of Turf Injury on 328 Hybrid Bermudagrass Fairways with Prograss 1.5 EC. Desert Dunes Golf Club: Bill Kostas, Supt. MMM & Associates. 1998.**

Treatments	Rate	6/28/98 Injury 0-10 Scale
◆ Prograss: Single Application 11/13	0.5 gal/A	1.5
◆ Prograss: Single Application 11/13	0.75 gal/A	2.0
◆ Prograss: Single Application 11/13	1.0 gal/A	2.0
◆ Prograss: Seq. Appl. 11/13 & 12/29	0.5 gal/A	2.0
◆ Prograss: Seq. Appl. 11 / 13 & 12 / 29	0.75 gal/A	2.0
◆ Prograss: Seq. Appl. 11/13 & 12/29	1.0 gal/A	2.3

## ***II. Control of Poa annua with Prograss and Barricade: Desert Dunes Golf Club***

**Table 5. Evaluation of Prograss 1.5 EC and Barricade 65 WG for Control of Poa annua in Overseeded Bermudagrass Fairways. Desert Dunes Golf Club: Bill Kostas, Supt. MMM & Associates. 1998.**

Treatments	Rate/A	March 30,1998 Percent Poa Control
◆ Barricade: 6 weeks after OVS	0.5 lb ai	-7.1 a
◆ Barricade: 6 weeks after OVS	0.75 lb ai	19.6 b
◆ Barricade: 6 weeks after OVS	1.0 lb ai	10.7 ab
◆ Prograss: 6 weeks after OVS	0.75 gal	19.6 b
◆ Prograss: 6 & 12 weeks after OVS	0.75 gal	90.4 c
◆ Prograss+Barricade (Single) 6 WAOVS	0.75 gal/0.75 lb ai	72.5 c
◆ Prograss+Barricade (Seq) 6 & 14 WAOVS	0.75 gal/0.75 lb ai	86.8 c

### **◆ Take Home Message: Control of *Poa annua* with Prograss and Barricade**

- *Under these soil and turf conditions and under these timing and rate formats, Prograss provided the best postemergent control of Poa annua (90.4%) when applied as sequential treatments six and twelve weeks after overseeding at a rate of 0.75 gallons of product per acre.*
- *Single treatments of Prograss applied six weeks after overseeding resulted in unacceptable control (19.6%).*
- *A tank mix of Prograss plus Barricade applied once six weeks after overseeding significantly enhanced Poa annua control (72.5%) when compared to a single application of Prograss alone (19.6%).*