PRE AND POST EMERGENCE CONTROL OF ANNUAL BLUEGRASS

T.M. Carlson and B.E. Branham
Department of Crop and Soil Sciences
Michigan State University

Annual bluegrass has for a long time been a problem weed on golf courses. Four possible control tactics exist for annual bluegrass. One is the use of plant growth regulators, another is cultural practices which make the turf environment undesirable to annual bluegrass, and the other two being biological control and the use of herbicide, both of which selectively removes annual bluegrass from of desirable turf.

Prograss is a herbicide that selectively controls annual bluegrass. This paper will discuss some recent research done at Michigan State University using Prograss.

Early research found that Prograss effectively controlled annual bluegrass with fall applications but little if any control was seen with spring and/or summer applications.

With our field efficacy studies we still see variable control from fall applications of Prograss, which appears to be associated with temperature. Little is known about the effects of temperature before or after application of Prograss. The majority of our present research is focused on understanding the effects of temperature on Prograss activity.

Converting a predominantly annual bluegrass fairways to bentgrass has been an area where Prograss use has resulted in consistent, effective results. Prograss is used to selectively control annual bluegrass during bentgrass establishment. The renovation process, consists of killing the existing fairway with Roundup, reseeding with bentgrass, and then follow up with Prograss. The timing of the Prograss applications are critical to a successful renovation program. Data from 1989 and 1990 show the effects of Prograss on bentgrass establishment (Table 1). The data in table 1 shows the injury to the bentgrass at various rates used and the percent control of annual bluegrass from the Prograss applications.

This study showed that a 0.75 lbs a.i./A application at 4 weeks after germination(WAG) with an additional 1 or 2 applications will give the best annual bluegrass control. Notice from the data that several treatments gave some injury with the 0.75 lbs a.i./A rate at 4,6, and 8 WAG being most noticeable. All injury recovered nicely during the spring and was not noticeable during the summer. The most surprising results from this study was that the earliest seeding dates had the most annual bluegrass. In the past, our recommendations have been to begin fairway renovation before annual bluegrass germination which is heaviest from the first to mid-September. We expected less annual bluegrass with the earlier seeding dates and more for the later seeding dates. This, however,

was not the case. We believe that the maximum activity from Prograss comes when the herbicide is not watered in after application. So as the earliest seeding dates were being treated with Prograss the plot area was also being watered frequently during the germination periods of the later seeding dates resulting in reduced Prograss activity.

Once the annual bluegrass is controlled the next concern is to keep annual bluegrass from reestablishing through preemergence control. Two studies on preemergence control of annual bluegrass have been conducted with one on bare soil and the other on fairway turf.

The bare soil study was initiated in the fall of 1987 to evaluate Prograss as a preemergence control. This study gave us excellent results. All rates of Prograss gave good control of annual bluegrass in comparison to the check plot (Table 2).

This last fall a study was initiated to develop a preemergence strategy for annual bluegrass control. A fairway type area was used and the turf was kept in the most natural state. First the preemergence herbicides were applied and then watered in. Then six, $1^{1}/_{2}$ inch circles were sprayed in each plot with Roundup. There was two purposes for the circles. One was for evaluation purposes because every two weeks we would count the number of new germinants in these circles and then respray with Roundup. The second reason was to keep the turf in a natural state and not dramatically effect the microclimate, moisture level, and/or ultraviolet rays reaching the soil surface and affecting the preemergence barrier. Prograss and other preemergence herbicides typically used by turf managers were included in this study. Results showed that little or no control of annual bluegrass was achieved with Prograss under these conditions (Table 3). The general preemergence herbicides gave excellent annual bluegrass control (Table 4).

Prograss has always been thought to be an excellent preemergence control for annual bluegrass but the fairway study indicates that this may not be true. This raises the question of why was Prograss so effective in the bare soil study but gave little control in the fairway turf study. The bare soil study area was rototilled, incorporating the thatch layer into the top 4-6 inches of soil and bring soil to the surface. In the fairway turf study the turf was left in a natural state. In the bare soil study, there was little organic matter on the soil surface. Thus, the presence of organic matter may bind the Prograss making it ineffective as a preemergence control.

In summary, post emergence control of annual bluegrass with Prograss has had variable results but temperature appears to influence the level of control that is achieved. We plan to continue research on the effect of temperature on Prograss activity. For preemergence control on bare soil Prograss gives excellent control. The fairway turf study showed that Prograss was

not as effective as many of the commonly used preemergence herbicides. This may be due to the presence of organic matter at the soil surface. The preemergence herbicides will be evaluated in the spring of 1991 to determine the effective period of control. We can then begin to develop a preemergence control plan for annual bluegrass.

Table 1. Effect of Prograss on turf injury and annual bluegrass control during fairway renovation.

Prograss Rates (lbs AI/A) and Timing	TURF INJURY							% Poa		
	10/30/89			11/13/89			4/12/90	5/14/90		
	Seeding Date			Seeding Date			Avg. of Seeding Dates	Seeding Date		
	8/18	9/1	9/15	8/18	9/1	9/15		8/18	9/1	9/15
0.75 4 WAG + 0.75 8 WAG[+]	8.8	8.5	7.7	8.3	7.7	7.3	6.6	10.7	3.3	0.3
0.75 6 WAG + 0.75 10 WAG	8.0	8.7	9.0	7.3	8.0	8.7	7.1	5.3	14.7	2.3
0.75 4 WAG + 0.75 8 WAG + 0.75 12 WAG	8.0	7.8	8.0	7.3	7.5	7.3	6.7	5.0	1.0	0.3
0.75 4 WAG + 0.75 6 WAG + 0.75 8 WAG	7.3	7.5	8.2	7.2	6.2	7.7	4.9	1.3	0.7	0.3
0.5 4 WAG + 0.5 6 WAG + 0.5 8 WAG	8.0	8.5	8.0	7.5	7.5	7.5	6.5	5.7	1.3	0.7
0.75 4 WAG + 0.75 7 WAG	8.0	7.8	8.3	7.7	6.8	7.7	6.5	13.3	4.0	1.0
0.75 4 WAG + 1.25 6 WAG	8.8	7.3	8.3	8.7	6.5	7.7	5.8	21.7	0.0	0.3
0.38 2 WAG + 0.75 5 WAG	7.8	8.5	8.3	7.8	8.0	7.3	5.9	14.0	3.3	0.3
Control	8.7	9.0	9.0	8.0	8.5	8.3	6.9	26.7	38.3	30.0
LSD (P=0.05)	0.9	0.9	0.9	1.2	1.2	1.2	0.8	7.4	7.4	7.4

[+]WAG - Weeks after germination

Table 2. Annual bluegrass control with preemergence application of Prograss on bare soil.

Prograss	**Percent Annual Bluegrass**	
LBS AI/A	4/12/88	5/20/88
2.0	0.3	2.0
1.5	0.3	4.0
1.0	1.0	4.0
0.5	4.0	18.0
Control	50.0	63.0
LSD (P=0.05)	9.0	11.0

Table 3. Annual bluegrass control with preemergence application of Prograss on fairway turf.

Prograss	**Average Germinants/Circle**
LBS AI/A	10/22/90
2.0	3.7
1.5	4.3
1.0	3.5
0.5	3.5
Control	5.5
LSD (P=0.05)	N/S

Table 4. Annual bluegrass control with preemergence application of general preemergents on fairway turf.

Product LBS AI/A	Average Germinants/Circle 10/22/90
DCPA(S) 10.5	0.0
DCPA(S) 15.0	0.0
Lescosan(S) 12.5	0.0
Prodiamine(S) 0.5	0.0
Prodiamine(S) 0.75	0.0
Ronstar(G) 2.0	0.0
Ronstar(G) 4.0	0.0
Balan(G) 2.0	0.5
Balan(G) 3.0	0.0
Dimension(G) 0.38	0.9
Dimension(G) 0.25	0.1
Dimension(S) 0.38	0.1
Dimension(S) 0.5	0.0
Pendimethalin(S) 2.0	0.1
Pendimethalin(S) 3.0	0.0
Control	4.3
LSD (P=0.05)	1.4

(S) = Sprayable

(G) = Granular