PROGRASS - A SELECTIVE ANNUAL BLUEGRASS CONTROL

B.E. Branham and K.V. Hanson

Prograss (common name - ethofumesate) is a herbicide which will selectively control annual bluegrass in perennial ryegrass, Kentucky bluegrass, and creeping bentgrass turf. This is the first herbicide which has an adequate safety margin between the undesirable annual bluegrass and the other desirable turfgrasses. Prograss has both preemergence and postemergence action on annual bluegrass. That is, it will kill existing annual bluegrass while also killing germinating annual bluegrass seeds.

Trials were initiated at the Hancock Turfgrass Research Center to determine the tolerance of annual bluegrass and creeping bentgrass to Prograss applications and to determine whether the initial rate or final rate of the split applications of Prograss caused the most annual bluegrass damage.

Tables 1 and 2 show the results of identical Prograss rate studies conducted on both annual bluegrass and creeping bentgrass. Prograss applications for selective annual bluegrass control work best when two applications of Prograss are spaced four weeks apart. In these two studies rates of 0.75, 1.0, 1.25 and 1.5 lbs AI/A of Prograss were applied in all possible combinations (Tables 1 and 2). Two observations were apparent. First, the Penncross creeping bentgrass was largely unaffected by the highest rates of Prograss, 1.5 plus 1.5 lbs AI/A. However, the low rate of 0.75 + 0.75 lbs AI/A gave five percent annual bluegrass kill while the high rate of 1.5 plus 1.5 lbs AI/A gave 67 percent annual bluegrass kill. Thus, there is an adequate safety margin between annual bluegrass and creeping bentgrass to use this product and, by choosing the correct rate, the amount of annual bluegrass kill can be constrolled. Secondly, from the data on annual bluegrass in table 1 it is apparent that the second application rate is more injurious than the first rate. The first application sets up the annual bluegrass for injury from the second application.

Two studies were also conducted on bentgrass maintained at putting green height. A study similar to the previous two was conducted at the Hancock Center on an Emerald creeping bentgrass turf maintained at a 1/4" height of cut. Prograss rates of 0.5, 0.75, 1.0, and 1.25 lbs AI/A were applied in all combinations on September 17, 1986 and October 21, 1986. The data in table 3 shows that initial rates of 1.0 or 1.25 lbs AI/A caused significant injury when compared to the control during the late fall. However, only rates of 1.25 + 1.0 and 1.25 + 1.25, the highest rates tested, caused unacceptable injury. By the spring of 1987 all plots had recovered and there was no significant difference in injury from any of the treatments.

A second study was initiated at Blythefield Country Club in Grand Rapids, MI in the fall of 1986. Four rate combinations of 0.5 + 0.5, 0.75 + 0.75, 1.0 + 1.0, and 1.0 + 0.5 lbs AI/A were tested (Table 4). None of the rates caused unacceptable injury at any time and all rates gave some annual bluegrass control. The highest rate of 1.0 + 1.0 lbs/A gave 91% control whereas the low rate of 0.5 + 0.5 lbs/A gave 60% control. The 65% control observed with the 1.0 + 0.5 lbs AI/A rate confirms the importance of the second rate in determining the severity of annual bluegrass kill. The results

seen in this study were quite dramatic and show that ethofumesate has good potential on putting green turf as well as on fairway turf.

The above studies demonstrate that Prograss has the potential to revolutionize annual bluegrass control on golf course turf. Much more research needs to be done on this herbicide before it is used routinely by golf course superintendents. Any superintendent wishing to use this herbicide should first experiment on small test strips on the golf course before making applications to general areas.

TABLE 1. Response of Annual Bluegrass to ethofumesate applications.

Rates (lbs ai/A)[a]	Injury[b]		% Control[c]
	10/20/86	11/4/86	5/27/87
0.75 + 0.75	8.7	7.3	5.0
0.75 + 1.0	8.7	7.3	13.3
0.75 + 1.25	8.7	6.7	23.3
0.75 + 1.5	8.7	7.0	26.7
1.0 + 0.75	8.3	7.3	6.7
1.0 + 1.0	8.0	6.7	15.0
1.0 + 1.25	8.7	6.7	13.3
1.0 + 1.5	8.7	6.7	56.7
1.25 + 0.75	8.7	8.7	6.7
1.25 + 1.0	9.0	8.0	21.7
1.25 + 1.25	8.7	7.8	33.3
1.25 + 1.5	9.0	7.7	58.3
1.5 + 0.75	9.0	8.3	15.0
1.5 + 1.0	9.0	8.0	26.7
1.5 + 1.25	9.0	7.7	41.7
1.5 + 1.5	9.0	8.0	66.7
Control	7.2	7.8	0
0.75 + x[d]	8.4	7.1	17.1
1.0 + x	8.4	6.8	22.9
1.25 + x	8.8	8.0	30.0
1.5 + x	9.0	8.0	37.5
x + 0.75[e]	8.4	7.9	8.3
x + 1.0	8.4	7.5	19.2
x + 1.25	8.4	7.3	27.9
x + 1.50	8.4	7.4	52.1

a - Initial application on 9/16/86 and second application on 10/17/86.

b - Injury on a scale of 1-9 with 9 = no phytotoxicity and 1 = completely dead turf.

c - % Control was a visual estimate of annual bluegrass kill.

d - The means reported are averaged over all values of the 2nd rate. (e.g. the means for 0.75 + x are the average of (0.75 + 0.75) + (0.75 + 1.0) + (0.75 + 1.25) + (0.75 + 1.5).

e - The means reported are averaged over all values of the 1st rate.

TABLE 2. Prograss tolerance on a Penncross Creeping Bentgrass Fairway.

	INJURY RATINGS			
Rate lbs/A	10/2/86	10/20/86	11/4/86	6/2/87
0.75 + 0.75	8.5	8.5	8.7	8.3
0.75 + 1.0	8.5	8.5	8.5	8.2
0.75 + 1.25	8.5	8.7	8.5	9.0
0.75 + 1.50	8.5	8.5	8.5	8.3
1.0 + 0.75	8.5	8.3	7.8	8.5
1.0 + 1.0	8.5	8.3	7.7	8.5
1.0 + 1.25	8.5	8.3	7.0	8.5
1.0 + 1.50	8.8	8.3	7.8	9.0
1.25 + 0.75	7.3	7.2	6.8	8.0
1.25 + 1.0	7.7	7.2	7.2	8.8
1.25 + 1.25	7.3	7.3	6.3	8.7
1.25 + 1.5	7.3	7.2	6.7	9.0
1.5 + 0.75	8.5	8.4	8.3	8.7
1.5 + 1.0	8.3	8.3	8.3	9.0
1.5 + 1.25	8.3	8.2	8.0	8.7
1.5 + 1.5	8.3	8.2	7.7	8.3
0	8.5	8.1	8.1	8.5
0.75 + x	8.5	8.5	8.5	8.5
1.0 + x	8.6	8.3	7.6	8.6
1.25 + x	7.4	7.2	6.7	8.6
1.5 + x	8.4	8.3	8.1	8.7
x + 0.75	8.3	8.1	7.9	8.4
x + 1.0	8.3	8.1	7.9	8.5
x + 1.25	8.2	8.1	7.6	8.7
x + 1.5	8.3	8.0	7.7	8.7

TABLE 3. Prograss Tolerance of Greens Emerald Creeping Bentgrass

		INJURY RATINGS		
Rate lbs/A	10/2/86	10/22/86	11/4/86	6/2
0.5 + 0.5	9.0	8.8	8.3	7.5
0.5 + 0.75	8.5	8.7	8.3	7.0
0.5 + 1.0	8.2	8.5	8.7	6.7
0.5 + 1.25	9.0	9.0	9.0	7.6
0.75 + 0.5	8.5	8.2	8.0	7.5
0.75 + 0.75	8.5	8.2	7.3	7.0
0.75 + 1.0	8.7	8.8	8.0	7.5
0.75 + 1.25	8.8	8.3	7.0	7.2
1.0 + 0.5	7.8	7.8	6.7	7.3
1.0 + 0.75	8.2	7.3	6.7	7.8
1.0 + 1.0	8.5	8.2	7.0	7.2
1.0 + 1.25	8.2	7.8	6.3	7.5
1.25 + 0.5	8.0	8.0	6.3	7.5
1.25 + 0.75	8.5	7.3	7.0	7.8
1.25 + 1.0	8.0	7.0	5.0	7.5
1.25 + 1.25	8.2	7.0	5.0	8.0
	9.0	9.0	8.7	7.5
LSD	NS	0.9	1.4	NS

TABLE 4. Blythefield Putting Green Test.

	Injury Ratings[a]			Poa Control[b]		
Prograss rate (lbs ai/A)	10/20/86	11/6/87	5/27/87	Initial 8/12/86	Final 5/27/87	% control
0.5 + 0.5	8.8	8.8	8.8	30.8	12.1	59.5
0.75 + 0.75	8.2	7.9	8.4	30.8	3.8	85.7
1.0 + 1.0	7.4	7.3	7.1	32.9	2.7	91.3
1.0 + 0.5	7.7	7.5	8.5	26.5	9.5	65.3
Control	9.0	8.9	9.0	30.6	58.3	0
LSD (P = 0.05)	0.4	0.6	0.7	-	4.5	13.2

a - Injury rating on a scale of 1 - 9 where 1 = dead turf and 9 = no injury.

b - Initial and final poa annua populations estimated visually.