

## 1986 PGR and Weed Control Research

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### Rooting Studies

In 1986 an exciting technique for measuring rooting was used to study the effect of preemergence herbicides on Kentucky bluegrass root development. The technique is called a minirhizotron and uses a 2" ID plexiglass tube inserted into the soil at a 30° angle to the soil surface. The tubes are installed into the plots prior to the initiation of treatments. A total of nine tubes are installed for each treatment. Data is recorded by lowering a special camera through the tube and recording the images of the roots on videocassette tape. The tapes are then viewed on a monitor and the number of root observations per frame is recorded. Data are presented as the number of roots counted per 5 cm of soil depth.

The preemergence herbicide treatments were DCPA 75WP at 10.5 lb/A, bensulide 4E at 10.5 lb/A, benefin 2.5 G at 2.0 lb/A, oxadiazon 5G at 2.0 lb/A, pendimethalin 60WDG at 1.5 lb/A, and an untreated control. Root pictures were taken weekly throughout the summer. This is a new technique and the results were inconclusive. Data in table 1 shows the root counts for every 5 cm interval through the soil profile for pictures through July 1. Because of the extreme variability with this technique, there were no significant differences in the top 20 cm of the soil profile, even though there appeared to be large numerical differences. The only statistical difference occurred at the 20-25 cm depth where the control plot had higher root numbers than all of the herbicide treated plots.

The technique has tremendous potential but needs to be correlated with traditional methods of root measurement such as taking deep cores and washing the soil from the roots. If the extreme variability with this method can be reduced, the amount of information we can collect on rooting will be quite large with tremendous potential for practical application.

TABLE 1. Root Observation at Various Soil Depth for a Kentucky Bluegrass Turf

Herbicide	Soil Depth in cm.					
	0-5	5-10	10-15	15-20	20-25	25-30
<u>DATE: 5/29</u>						
DCPA	40.9	10.6	21.7	8.2	2.1	0.8
Bensulide	38.2	6.1	37.8	16.9	3.9	6.0
Oxadiazon	35.9	1.9	7.1	2.4	0.4	0.0
Pendimethalin	49.1	8.3	4.4	2.0	0.3	0.0
Benefin	60.8	6.4	8.2	3.7	1.7	2.6
Control	22.0	2.3	14.1	8.9	9.2	2.2
LSD	NS	NS	NS	NS	5.2	NS
 <u>6/3</u>						
DCPA	62.9	20.7	23.7	16.3	2.7	0.6
Bensulide	41.8	6.4	16.1	6.7	1.6	2.0
Oxadiazon	46.8	3.8	9.3	3.6	0.0	0.0
Pendimethalin	52.4	12.5	9.8	4.0	2.6	0.1
Benefin	40.0	8.3	7.8	3.2	0.1	2.4
Control	45.3	11.6	19.1	13.1	16.1	3.3
LSD	NS	NS	NS	NS	8.3	NS
 <u>6/17</u>						
DCPA	37.7	2.2	2.9	1.8	0.8	0.0
Bensulide	11.5	0.7	36.7	2.0	4.7	2.7
Oxadiazon	19.5	1.6	6.6	0.9	0.0	0.0
Pendimethalin	35.8	1.4	1.9	2.9	0.8	0.3
Benefin	67.6	2.9	8.9	3.1	0.1	2.9
Control	25.4	2.8	14.6	6.2	11.3	3.0
LSD	NS	NS	NS	NS	6.4	NS
 <u>7/1</u>						
DCPA	24.1	6.1	3.4	5.3	1.8	0.2
Bensulide	16.0	2.6	30.3	19.8	5.0	3.4
Oxadiazon	17.6	1.9	1.9	2.0	0.0	0.0
Pendimethalin	50.9	0.4	0.8	1.8	0.8	0.6
Benefin	32.2	3.0	3.0	3.0	0.1	3.1
Control	23.3	6.6	7.2	7.8	11.9	3.9
LSD	NS	NS	NS	NS	6.5	NS

## 1986 Preemergence Trials

Table 2 shows the results of the preemergence trial conducted on an annual bluegrass turf. Several experimental herbicides including GC 88 and BC 23 from Monsanto and Cinch herbicide from Shell development were tested along with currently available products. This was a year characterized by extreme crabgrass pressure and many of the herbicides did not provide the degree of control expected. Ronstar 50 WP at 1.5 and 2.0 lbs/A gave excellent control of crabgrass. DCPA gave very good control but with a small amount of crabgrass infestation. Team, a 2:1 mixture of benefin to trifluralin, gave good control at the higher rate of 3.0 lb/A. Bensulide and pendimethalin did not provide good control in 1986. Of the experimental compounds, GC88 performed very well at rates of 1.0 lb/A or higher. GC88 appears to have excellent potential as a preemergence annual grass herbicide for turf. BC 23 and Cinch did not perform well under the conditions of our trial.

TABLE 2.

1986 Preemergence Herbicide Results

<u>Herbicide</u>	<u>Rate</u>	<u>% CRABGRASS</u>		<u>INJURY</u>	
		8/7	8/29	5/27	6/11
GC 88 3EC	1.0 1b/A	0	0	8.7	9.0
GC 88 3EC	2.0 1b/A	0	0	9.0	8.7
GC 88 3EC	4.0 1b/A	0	0	8.7	6.7
Ronstar 50 WP	2.0 1b/A	0	0	5.3	5.0
Ronstar 50 WP	1.5 1b/A	0	0	6.3	7.7
Ronstar 2G	3.0 1b/A	0.7	1.3	9.0	9.0
DCPA 75 WP	10.5 1b/A	0	1.3	8.7	9.0
Team 28 WDG	3.0 1b/A	1.0	2.0	8.3	7.0
Team 2G	3.0 1b/A	0.7	2.3	8.7	8.3
BC 23 4EC	0.5 1b/A	0.3	2.3	9.0	9.0
Ronstar 50 WP	1.0 1b/A	0	2.7	7.7	8.0
GC 88 3EC	0.25 1b/A	2.3	4.0	9.0	9.0
Team 2G	2.0 1b/A	1.0	4.7	8.3	8.7
GC 88 3EC	0.125 1b/A	2.3	6.7	9.0	9.0
BC 23 4EC	1.0 1b/A	1.0	6.7	9.0	9.0
Bensulide 4E	12.0 1b/A	1.7	6.7	9.0	9.0
Team 28 WDG	2.0 1b/A	1.7	6.7	9.0	9.0
Cinch 0.5G	0.75 1b/A	5.3	7.0	6.0	6.0
Benefin 2.5G	2.0 1b/A	3.0	7.3	8.3	9.0
Cinch 0.5G	1.0 1b/A	1.7	7.3	5.0	4.7
Team 28 WDG	2.0 1b/A	2.3	7.3	9.0	8.3
GC 88 3EC	0.5 1b/A	2.0	7.7	9.0	9.0
Pendimethalin 60 WDG	2.0 1b/A	2.7	8.3	7.3	6.0
BC 23 4EC	2.0 1b/A	4.7	10	9.0	8.7
Cinch 0.5G	0.5 1b/A	4.0	10	6.7	7.7
Control		7.7	11.7	9.0	9.0
Control		4.3	12.3	8.7	8.7
Benefin 60 DF	2.0 1b/A	10.0	15.0	8.7	8.7
Control		9.3	15	9.0	9.0
Control		10.0	18.3	9.0	9.0
	LSD P = 0.05	5.8	7.8	0.7	0.9

TABLE 3. Application Timing for Seedhead Suppression of Annual Bluegrass

<u>Application Timing</u>	<u>Calendar Dates</u>		
	1984	1985	1986
25 GDD	4-26	4-19	4-7
40 GDD	4-29	4-20	4-19
50 GDD	5-3	4-21	4-25
75 GDD	5-14	4-23	4-28

Figure one shows the results obtained over the last three years when using mefluidide, or Embark, to control annual bluegrass seedheads. The last two years show an interesting pattern developing, applications at 25 GDD seem to give equal or better control than the more commonly used target of 50 GDD. An additional advantage to using the 25 GDD application timing is that the discoloration observed with these applications occurs earlier in the spring and thus is less apparent to most golfers. The dates of application versus growing degree days are shown in table 3. In light of the difficulty many superintendents have in measuring the growing degree days, research in 1987 will focus upon the earlier application times before 100 percent green up.

Research with Prograss herbicide for selective removal of annual bluegrass from fairway turf accelerated in 1986 based upon results observed in the spring of 1986 from applications made in the fall of 1985. Data from table 4 shows the percentage of Kentucky bluegrass in plots treated with various rates of Prograss in the fall of 1985. The plots were maintained at a fairway height of cut and contained a ratio of 95/5 annual bluegrass/Kentucky bluegrass at time of application. While rates above 1.0 lb/A caused some outright kill of annual bluegrass, rates of 0.75 lb/A seem to weaken the annual bluegrass allowing a shift to Kentucky bluegrass over the winter and early spring periods. The results were so promising that four more trials were put out including one on a golf course green at Blythefield Country Club. The results of these trials will not be known until the spring of 1987.

TABLE 4.

The percent Kentucky Bluegrass cover in plots treated with Ethofumesate.

<u>Treatment Dates</u>	<u>% Kentucky Bluegrass</u>
1.5 lbs/A: 9/15, 10/16	50.3
0.75 lbs/A: 9/15, 10/16	46.7
1.0 lbs/A: 9/15, 10/16	43.8
0.75 lbs/A: 9/6, 10/2, 11/1	30.4
0.75 lbs/A: 10/2, 11/1	13.4
0.75 lbs/A: 9/6, 10/2	10.7
Control	5.4

LSD<sub>5%</sub> = 14.0

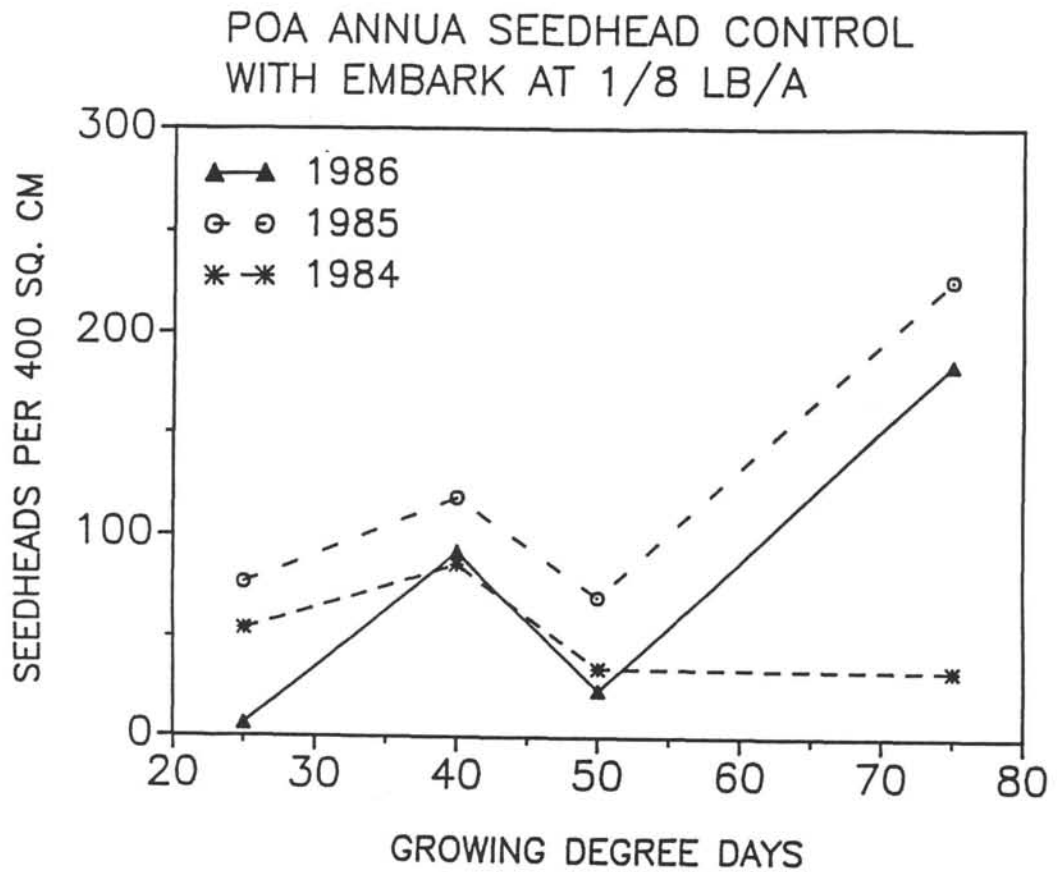


FIGURE 1