

CULTURAL FACTORS IN ANNUAL BLUEGRASS AND CREEPING BENTGRASS COMPETITION

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Two golf course management factors currently receiving a great amount of attention are the removal of clippings from fairway turf and the use of plant growth regulators (PGR's). A field study was initiated in the spring of 1984 at the Hancock Turfgrass Research Center to examine these two practices as well as irrigation rate, fertility and overseeding with bentgrass on the species composition of a mixed annual bluegrass-creeping bentgrass turf. Proposed duration of the study is three years with termination after the 1986 growing season. The following is a report on the methods and results of the first year of this study.

The study area is a mixed annual bluegrass-creeping bentgrass stand maintained at a 0.5 inch (1.25 cm) height of cut with a triplex mower. The area is divided into nine irrigation blocks allowing for three irrigation treatments replicated three times. The irrigation treatments are watering to 110% of open pan evaporation, 75% of open pan evaporation, and watering at wilt. Within each irrigation treatment half the block has clippings removed, the other half clippings returned. Fertilizer was applied at two rates, 2 lbs/N/1000 ft²/yr (1/2 lb in June, July, September and November) and 6 lbs/N/1000 ft²/yr 1 lb/month in May through September and November). Embark (1/8 lb/A), EL-500 (1.5 lb/A) and a check were applied on May 15. In mid-August half the plots were broadcast overseeded with "Penncross" bentgrass at 1 lb/1000 ft². Data collection included monthly visual color estimates and species counts. Before treatments were applied, species counts were obtained to determine the amount of annual bluegrass and bentgrass in each plot. Species counts were obtained again in the fall to determine what, if any, effect the treatments or combination of treatments had on species composition.

Results of the individual treatments and their effect on color are shown in Table 1. Only treatments found to be statistically different are listed.

The clippings returned plots displayed higher color ratings on all evaluation dates. This is due to the addition of nitrogen and other mineral elements when the clippings are returned to the turf. The color ratings obtained on 5/21 found Embark plots to have substantially lower color ratings than both the check and EL 500 plots. This phytotoxic response is characteristic of turf soon after application of Embark. However, on the 6/22 evaluation Embark plots had a higher rating than the check or EL-500 plots. This increase in color or "color enhancement" is also characteristic of Embark after the initial phytotoxic response. By the 7/24 evaluation both PGR's had dissipated and PGR plots did not differ from the check plots.

Results of fertility treatments were as expected with the 6 lb/N/yr rate exhibiting higher color ratings than the 2 lb/N/yr rate on all three evaluation dates.

Finally, and perhaps the most interesting, is the result of the species counts. After only a year of treatments a species shift occurred and could be attributed to one of the main treatments. The clipping treatments, regardless of any of the other treatments applied, had a marked influence on the composition of the mixed stand. Plots where the clippings were removed displayed a 5.5% decrease in annual bluegrass while plots in which clippings were returned displayed a 1.4% increase. The remaining two years of this study will determine if this response will continue and also determine the long term effects of the other treatments applied.

As a companion to the overseeding portion of the field study, a study was conducted in the greenhouse to investigate the effect on germination of EL-500 at 7 rates (0.25, 0.50, 0.75, 1.0, 1.5 and 2.0 lbs/A and a check) on annual bluegrass and creeping bentgrass. Plots were planted individually with 25 seeds each Penncross creeping bentgrass and field harvested annual bluegrass, then treated with respective rates of EL-500. After 10 days the number of plants which germinated in each pot were counted and the data analyzed.

Results of this study (Table 2) indicated a severe drop in germination of both species at the 1.5 and 2.0 lb/A rates. Also, both species did not differ in their response to increasing rates of EL-500. Further investigation is necessary to substantiate these findings.

Table 1. Mean visual color ratings (1 = least green, 9 = most green) of statistically different treatments in annual bluegrass/creeping bentgrass competition study. Hancock Turfgrass Center. Michigan State University, 1984.

Treatment	Date of rating		
	5/21	6/22	7/24
Clippings			
Returned	6.3	6.3	6.9
Removed	5.6	5.6	5.7
PGR			
Embark	4.5	7.0	6.8
EL-500	6.6	5.0	6.8
Check	6.6	6.5	6.6
Fertility			
6 lb/N	7.0	7.0	7.7
2 lbs/N	4.8	5.6	5.7

Table 2. Means for EL-500 rates averaged across species for number of germinants per plots (X/25) 10 days post treatment.

Rates (lbs/A)	Mean
Check	21
0.25	19
0.50	17
0.75	17
1.00	16
2.00	8
1.50	7

L.S.D. at P = 0.05 = 5