Creeping Bentgrass/Annual Bluegrass Competition

R. E. Gaussoin, B. E. Branham and P. E. Rieke
Crop and Soil Science
Michigan State University

Investigations continued in 1985 on cultural factors in annual bluegrass/creeping bentgrass competition.

Additional data were collected on a study initiated in the spring of 1984 investigating five management factors and their effect on species composition of a mixed annual bluegrass/creeping bentgrass turf.

The study area is a mixed annual bluegrass-creeping bentgrass stand maintained at a 0.5 inch height of cut with a triplex mower. Irrigation treatments are watering at 110% open pan evaporation (OPE), 75% OPE and at wilt. Within each irrigation treatment half the block has clippings removed and the other half has clippings returned. Fertilizer was applied at two rates, 2#N/M/YR and 6#N/M/YR. Plant growth regulator (PGR) treatments applied in the spring were Embark (1/8#ai/A) Cutless (1.5#ai/A in 1984, 1.0#ai/A in 1985) and a check. In mid-August half the plots were broadcast overseeded with "Penncross" bentgrass at a rate of 1#/M. Before treatments were applied, species counts were obtained to determine the amount of annual bluegrass in each plot. Species counts were obtained again in the fall of 1984 and 1985 to determine what effect, if any the treatments or combination of treatments had on species composition.

Results of analysis of variance for year one, two and combined years are shown in Table 1. (NOTE: Proceedings of the 55th Michigan Turfgrass Conference indicated results not consistent with results presented here. This is due to an error in data input in 1984. The authors apologize for this discrepancy.) The significant irrigation X clipping treatment X fertility interaction shown in Table 1 indicate that the response observed is due to a combination of these three factors and not any one factor by itself. At 75% OPE (Figure 1) the high N fertility level with clippings returned caused the smallest decrease of annual bluegrass. High N with clippings removed and low N treatments, regardless of clipping treatment, resulted in a net decrease in annual bluegrass. The 110% OPE treatment (Figure 2) with clipping removal, regardless of fertility level, showed a net decrease in annual bluegrass greater than that when clippings were returned. When plots were irrigated at wilt (Figure 3) low fertility and clipping removal resulted in the greatest decrease in annual bluegrass when compared to all other treatment combinations.

No significant change in annual bluegrass population was attributable to either the overseeding or PGR treatments.

A second study was initiated to investigate the effects of compaction and coring on annual bluegrass-creeping bentgrass competition. Compaction treatments were applied using a water filled roller 3 times per week. Compaction treatments were initiated in the Summer of 1984 and coring treatments (1X/YR, 3X/YR and a check) were initiated in 1985. The above treatments were applied in conjunction with the previously described irrigation and clipping removal treatments for a four factor investigation. Data analysis found that

compaction treatments significantly increased the annual bluegrass population (Figure 4). Unfortunately, it is not possible to separate the effects of compaction from wear, because the roller used in this study clearly applies a significant amount of wear to the test area. Wear stress, therefore, should also be considered as a contributory factor in the observed response.

Measurement of soil water potentials (related to soil moisture content) were done on the 75% and 110% OPE irrigation treatments in late June of 1985 (Figure 5). It is interesting to note that these two treatments which differ by 35% in the amount of water applied maintain soil moisture at levels well above the minimum requirement for healthy grass growth. It appears that a more frequent, light irrigation may save water and maintain soil moisture at well above acceptable levels. Further, more extensive work is planned to investigate this possibility.

Work will continue at Michigan State University concerning annual bluegrass-creeping bentgrass competition.

Table 1. Analysis of variance. Creeping Bentgrass/Annual Bluegrass Competition. Five Factor Yield Study.

	SPECIES SHIFT		
	YEAR 1	YEAR 2	COMBINED
Clipping Treatment (CR)	**	NS	**
Fertility (F)	NS	**	**
Irrigation X CR X F	*	NS	*

*,**, and NS indicate significance at P = 0.05, 0.01, and non-significant, respectively.

FIGURE 1. The effects of two clipping treatments, returned (C+) and removed (C-), two N fertility treatments, 6 lbs N/M/YR (6#) and 2 lbs N/M/YR (2#) under daily irrigation at 75% of open pan evaporation on the percent change in annual bluegrass. Hancock Turfgrass Research Center, East Lansing, MI.

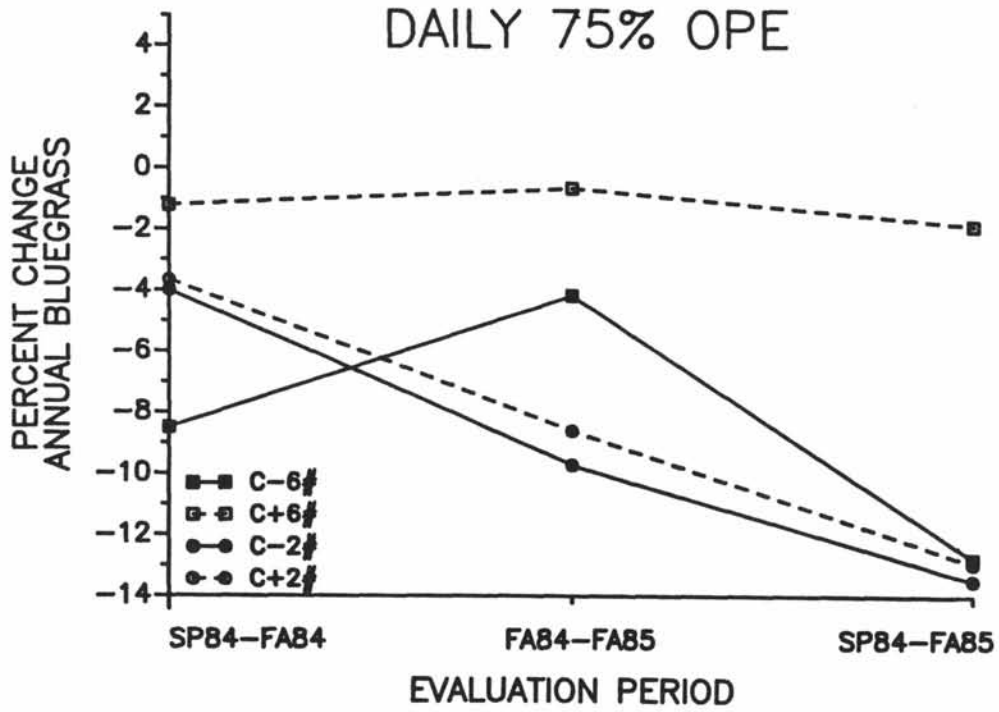

FIGURE 2. The effects of two clipping treatments, returned (C+) and removed (C-), two N fertility treatments, 6 lbs N/M/YR (6#) and 2 lbs N/M/YR (2#) at 3/week irrigation at 110% of open pan evaporation on the percent change in annual bluegrass. Hancock Turfgrass Research Center, East Lansing, MI.

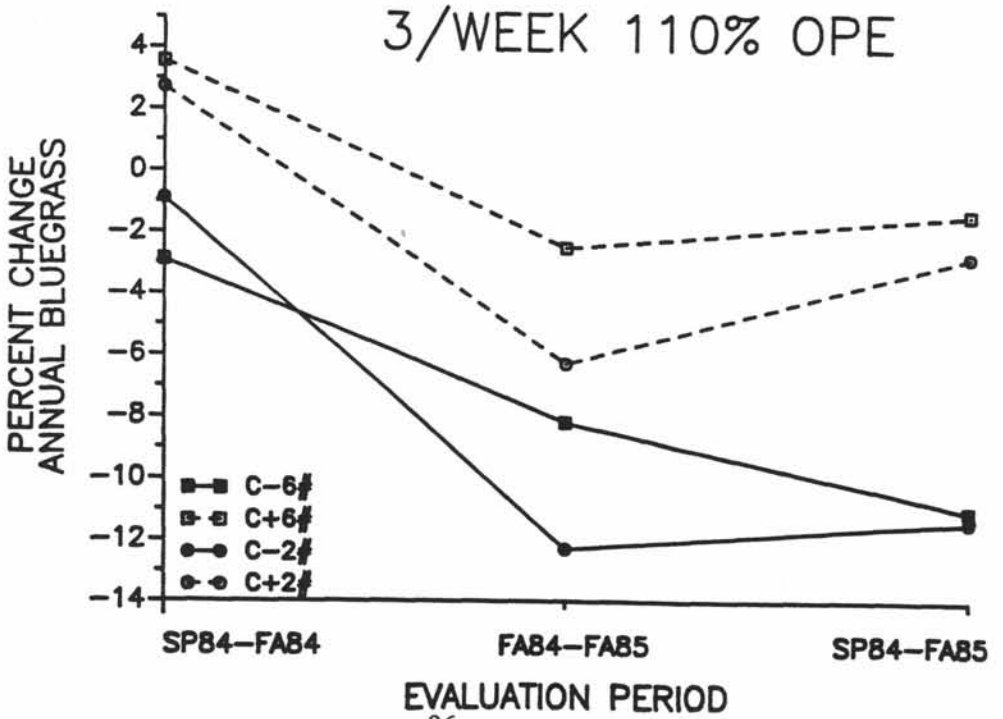

FIGURE 3. The effects of two clipping treatments, returned (C+) and removed (C-), two N fertility treatments, 6 lbs N/M/YR (6#) and 2 lbs N/M/YR (2#) under irrigation at severe wilt on the percent change annual bluegrass. Hancock Turfgrass Research Center, East Lansing, MI.

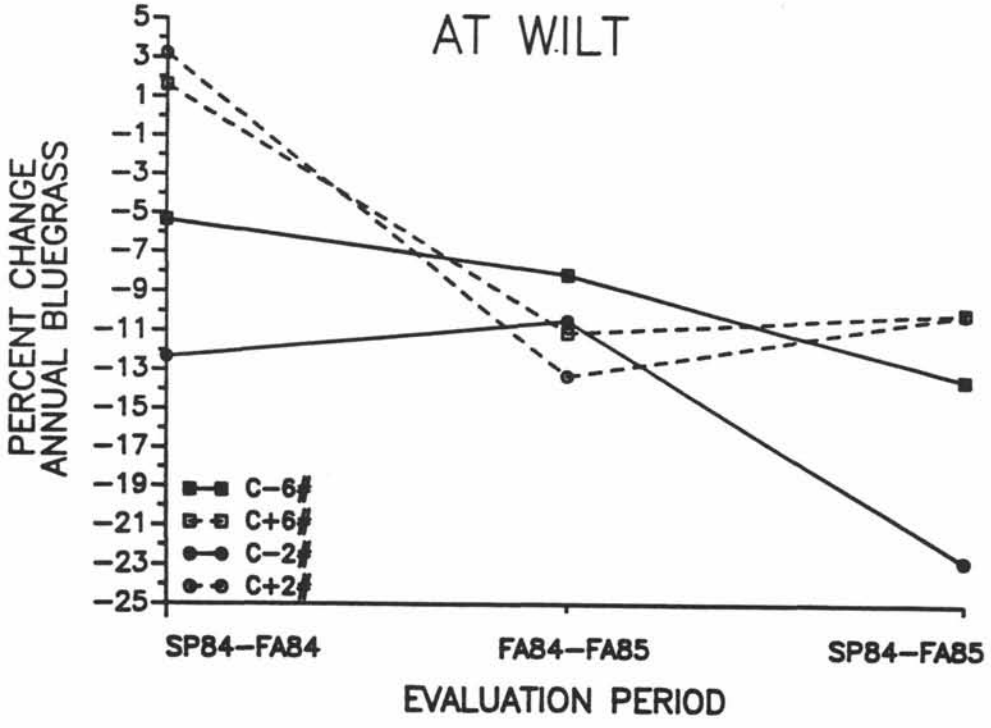

FIGURE 4. Effects of compaction on annual bluegrass population. 1985. Hancock Turfgrass Research Center, East Lansing, MI.

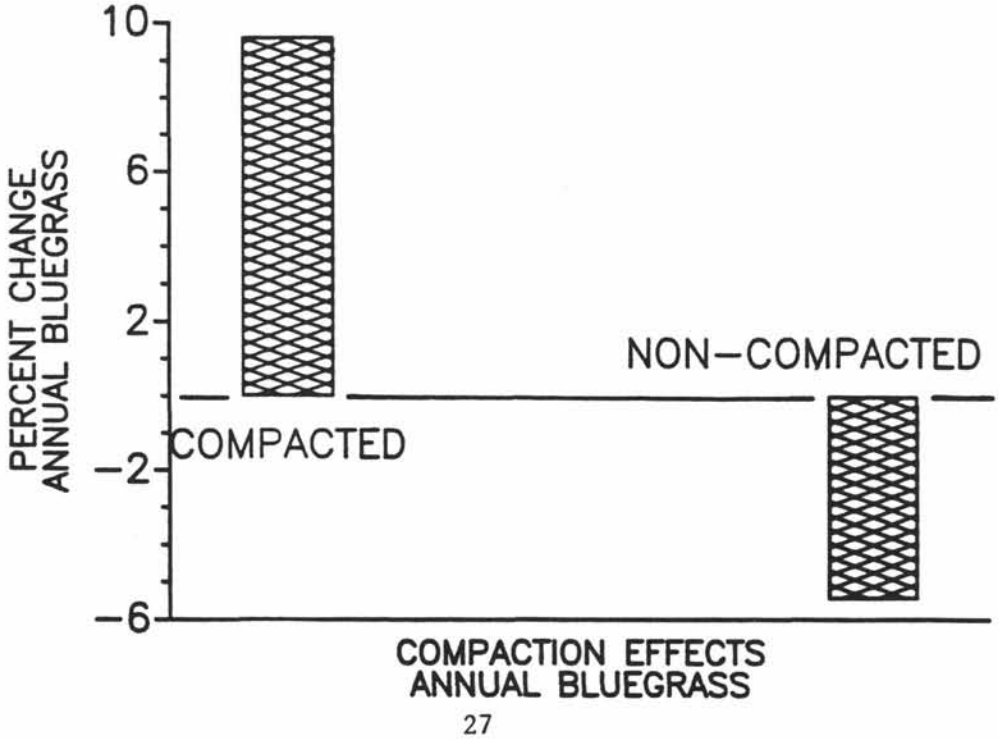

FIGURE 5. Effects of two irrigation treatments, 75 and 110% of open pan evaporation, on change in soil water potential over time. Time zero equals 9:00 a.m. June 28, 1985. Arrow and starred arrow indicate point of irrigation for 75% and 110% treatments, respectively. Hancock Turfgrass Research Center, East Lansing, MI.