

A three year study was completed in the fall of 1986 measuring the effects of five cultural practices on the competition between annual bluegrass and creeping bentgrass maintained under fairway conditions. The five cultural practices were irrigation [daily at 75% replacement of open pan evaporation [OPE], 3x/week at 100% OPE, and irrigation at wilt], clippings removed or returned, nitrogen fertility level [2 lb N/M/YR or 6 lb N/M/YR], plant growth regulator treatment [mefluidide 1/8 lb/A, flurprimidol 1.0 lb/A and a control] and overseeding with 'Penncross' creeping bentgrass or no overseeding.

The results show that clipping removal is the single most important factor, in terms of increasing creeping bentgrass populations, of the variables studied. Over a three year period removing clippings resulted in a 22.6% decrease in annual bluegrass where as returning clippings resulted in a 9.5% decrease.

The other significant main effect was bentgrass overseeding. While not significant over any single year, when averaged over three years overseeding resulted in a highly significant 18.1% decrease compared to a 14.1% decrease without overseeding.

Lowered nitrogen fertility resulted in a significant annual bluegrass decline in one of the three years, however, when averaged over all three years no effect was seen due to lowered N fertility. This points to a significant effect due to environmental interactions. Neither plant growth regulator treatment nor irrigation treatment played a significant role in annual bluegrass reduction.

Another study was concerned with the effects of compaction [compaction and no compaction] and coring [no coring, coring 1x/YR, and coring 3x/YR] on annual bluegrass and creeping bentgrass competition. Over a two year period, compaction resulted in significantly more annual bluegrass in the compacted plots than in plots receiving no compaction. Compacted plots saw a 6.1% decrease in annual bluegrass compared to a 16.3% decrease for non-compacted plots.

A separate two year study comparing flurprimidol rates and timings has shown no significant effects on the competition between annual bluegrass and creeping bentgrass. All of these studies confirm a previously held principle that creeping bentgrass is a more aggressive species than annual bluegrass. This is seen in our studies where we quantitatively measure the distribution of these species and in each year the overall species composition increased by several percentage points in favor of creeping bentgrass. However, because of annual bluegrass's unique ability to reseed itself, it can rapidly fill in any void left from disease, insect or other damages. Clipping removal is the best method for reducing annual bluegrass from fairway turf.

**MICHIGAN STATE UNIVERSITY** - Dr. Richard E. Chapin, Principal Investigator

Turfgrass Information Center

1986 Grant - \$55,000 [fourth year of ongoing support]

In the spring of 1984, the USGA and Michigan State University signed an agreement whereby the MSU Library would design and develop a bibliographic computer database to provide access to published materials reporting the results of research that affects turfgrass and its maintenance.

The original statement of purpose of the USGA Turfgrass Information Center was to provide efficient and effective access to all published and processed materials reporting the results of research affecting turfgrass and its maintenance. Three goals were identified as necessary for the successful completion of the Project.

1. Michigan State University continues to acquire, maintain, and preserve all appropriate printed and processed materials reporting on research related to turfgrass growth, development, and maintenance.
2. Bibliographic access to the turfgrass collection is provided by on-line access to the Project's retrieval system. The Turfgrass Information File is housed in an ALPHA MICRO computer, using STAR software. Both the hardware and software work well. By June 30, 1986, 8,300 records were in the database.
3. Michigan State University Library continues to search telephone requests on demand and provide a custom bibliography to users, provide loans or appropriate photocopies for those needing access to the collection, and to finalize arrangements for direct remote access to the file, including software and documentation.

**MICHIGAN STATE UNIVERSITY** - Dr. Paul E. Rieke, Principal Investigator

Hollow and Solid Tine Cultivation Effects on Soil Structure and Turfgrass Root Growth

1986 Grant - \$5000 [fourth and last year]

Hollow and solid tine cultivation effects as influenced by soil compaction and moisture content during cultivation were evaluated on the basis of soil structural qualities and root growth.

As expected, compaction resulted in pronounced detrimental effects on soil structure and root growth. Both cultivation methods resulted in positive and negative effects on soil structure. Cultivation increased the amount of large soil pores with hollow tine coring being the most effective in producing this response. Regardless of compaction level, solid tine cultivation increased the amount of intermediate sized pores when compared to hollow tine cultivation. Therefore, hollow tine cultivation produced the most beneficial changes in soil porosity.

Soil strength within the zone of cultivation [surface 2-3 inches] was reduced after cultivation. Initially, solid tine cultivation was more effective in loosening the surface soil than hollow tine cultivation, however this effect was reversed by the end of this study. Water conductivity rate dropped dramatically after cultivation, indicating compaction at the bottom of the cultivation zone restricted water flow.

Compaction stress decreased root growth while cultivation had a limited effect on root growth. Cultivation decreased surface rooting in noncompacted soil but had no influence on rooting in compacted soil in November, 1985. Cultivation in noncompacted soil tended to increase rooting in June of 1986 but again, had no effect on rooting in compacted soil. Throughout the study, hollow tine cultivation ranked equal to or higher than solid tine cultivation in visual quality.

**UNIVERSITY OF MINNESOTA** - Dr. Donald B. White, Principal Investigator

Breeding of Poa annua for Improved Cultivars

1986 Grant - \$15,000 [third year of support]

We are very encouraged by the progress made during the last year. New breeding material was added from California, Ohio, Minnesota and Europe. Seed collections have been made from original crosses and have proven to possess some desirable characteristics. Superior genotypes have been advanced one to five generations.