

One means of conserving water on turfgrasses is to reduce irrigation frequency; thereby, allowing the turfgrass to undergo a greater degree of drought stress before irrigation. By evaluating turfgrass performance under non-limiting to moderate moisture stress conditions, minimum water use requirements for a given level of turfgrass quality can be formulated. Also, the measurement of physiological and morphological plant responses will provide insight into drought avoidance and tolerance mechanisms for the three warm season grass species in this study.

During 1986, twenty-seven research units were installed under field conditions. Each unit had individually controlled irrigation capability. Moisture sensing probes were installed at three soil depths to monitor water extraction relative to rooting patterns. The three grasses [Tifway bermudagrass, Meyer zoysiagrass, and common centipedegrass] were established with each species irrigated under a range of soil moisture from non-limiting [soil = -0.40 b] to moderate stress [soil = -9.0 b]. Detailed measurements of water use and growth parameters were initiated several times starting in mid-July. However, the TDR unit used to determine soil water content did not function properly and was returned to the manufacturer for upgrading. Intensive data collection is scheduled by 1987 and 1988 growing seasons. All scientific equipment to be provided by the University of Georgia in this joint project has been obtained and a graduate research assistant has been assigned to the project.

UNIVERSITY OF GEORGIA - Dr. Robert N. Carrow, Principal Investigator

Cultivation Methods on Turfgrass Water Relationships and Growth Under Soil Compaction

1986 Grant - \$5000 [first year of support]

Soil compaction can increase water use on recreational turfgrass sites by 25 to 50%, primarily by promoting light, frequent irrigation due to low water infiltration rates. Evaporation losses are enhanced by the moist soil surface in conjunction with an open canopy that is often warmer from solar radiation absorbed by the soil. Also, water losses may occur by greater runoff or leaching beyond the shallower root systems compared to noncompacted turfgrasses.

The primary cultural tool to help alleviate soil compaction is cultivation. During 1986, we initiated a research project to study the relative effectiveness of five cultivation techniques in alleviating compaction stress with particular emphasis on factors influencing water use efficiency. Since compaction affects water relations, each treatment/replication combination required a research plot that could be irrigated separately from all others. This system was installed and grassed with Tifway bermuda. Respective plots have been subjected to compaction several times and cultivation treatments applied twice. These treatments will be continued with intensive data collection in 1987 and 1988. In this joint project between the University of Georgia and USGA, all scientific equipment and technician support to be provided by University of Georgia has been obtained.

MICHIGAN STATE UNIVERSITY - Dr. Bruce Branham, Principal Investigator

The Effect of Seven Management Factors and their Interaction on the Competitive Ability of Annual Bluegrass and Bentgrass

1986 Grant - \$15,000 [second year of three year study]

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.