The experiment is being performed in a climate-controlled greenhouse at the G.C.Horn turf field laboratory at the University of Florida in Gainesville. Floratam St.Augustinegrass is being compared with a mix of ornamentals including canna, nandina, ligustrum and allamanda. Plant material is growing in 80-gallon plastic pots in an Arredondo fine sand. There are three fertilizer treatments (16-4-8 quick-release, 15-0-15 quick-release, 8-4-12 slow-release) applied at 1.0 lb. N/1000 sq. ft. every other month. There are four replications.

Leachate is collected at three intervals following treatment and analyzed for nitrate and phosphate content. Quality ratings are taken weekly and multispectral reflectance readings are taken biweekly. Water is applied to meet the evapotranspiration. Turfgrass tubs are mowed biweekly by hand.

In this preliminary work, turf was more responsive than ornamentals to fertilizers and preliminary data indicate best turfgrass response from quick release 16-4-8 and 15-0-15 treatments. During the establishment period, water use was lower in turf than ornamentals.

Fertilization of St. Augustinegrass And Environmental Implications

Dara M. Park, John L. Cisar, George H. Snyder and Karen E. Williams

A multi-faceted field-scale study evaluating the effect of turfgrass nitrogen fertilization and irrigation maintenance practices on turfgrass performance and N leaching from St. Augustinegrass lawns was conducted over six bimonthly cycles. Water samples were collected and analyzed for NO3-N and NH4-N. Other data collected included clipping yields and turfgrass visual quality ratings throughout the year.

As expected, excessive N fertilization at approximately double standard recommendations resulted in significantly more N leaching. Conversely, reducing the N rate by half of the recommended rate did not significantly reduce N leaching but did lower turf quality ratings to levels below minimally acceptable values as the experiment progressed for sod grown with lower soil organic matter.

Homeowners should be encouraged to apply the appropriate amount of fertilizer N, since excess N results in adverse environmental impact. Too little N could result in the eventual overuse of fertilizer and pesticides to improve the quality stand of turf and/or result in the replanting of turf sod which also has environmental consequence.

The rate of irrigation played a role in reducing N leaching during several dry season cycles. During rainy weather, reduced scheduled irrigation was not effective in reducing N leaching. Slow-release N sources did not consistently reduce N leaching. This experiment compared readily soluble N from urea versus N from urea encapsulated with a sulfur/polymer barrier as a means to provide controlled N release. Further research on the influence of other N sources to reduce N leaching is suggested to gage the effectiveness of other products to reduce N leaching.

The level of soil organic matter (SOM) in sod had significant impacts on N leaching. Higher SOM resulted in higher N concentrations in percolate before the initiation of N fertilization and in more N leaching after N fertilizer applications were made. However, higher SOM improved turf quality and clipping growth. Based on this research, N fertilization strategies could be optimized to provide quality turf with reduced potential N leaching by accounting for N contributions from SOM during the first year after planting. The influence of SOM over time needs further study to quantify the extent of N release over several years.

Evaluating Methods of Predicting Irrigation Needs of Warm-season Turfgrasses

Joon H. Lee and Laurie E. Trenholm

Water is one of the greatest limiting factors influencing turfgrass growth. Due to increased pressure to preserve water resources, there is interest in development of sensor-based technologies to indicate turfgrass irrigation requirements. This study is designed to determine what technologies might reliably and accurately predict

irrigation scheduling needs of warm-season turfgrass.

Floratam St. Augustinegrass and SeaIsle 1 seashore paspalum were established in 19-inch tubs in the Envirotron Turfgrass Research facility in Gainesville in the spring of 2002. Each grass was subjected to repeated dry-down cycles where irrigation was withheld. Data were collected on: a) shoot quality, leaf rolling, leaf firing, turf color; b) spectral reflectance data within 450 to 930nm; c) soil moisture content; d) leaf relative water content (RWC); e) chlorophyll content index. These evaluations were used to determine if irrigation scheduling could be determined.

Results of this study indicated that turf quality was highly correlated with visible range spectral reflectance (P= 0.001), reflectance indices (P= 0.001), and with soil moisture (P= 0.001) throughout the dry-down cycle. As turf quality declined below acceptable levels, these sensor-based technologies were able to predict the need for irrigation scheduling.

Grasses

Evaluation of Ultradwarf Bermudagrass Cultural Management Practices

John L. Cisar and George H. Snyder

Florida leads the USA in numbers of golf courses and, with over 66 million rounds of golf played annually, there is great interest in improved putting surfaces. New ultradwarf bermudagrasses have been developed for better putting performance and are being planted in new and reconstructed greens. We are conducting research to develop information on ultradwarfs from which to base sound cultural management recommendations for golf course superintendents.

Thanks to the great support of the Florida turfgrass industry, we initiated in late September 1999, an ultradwarf cultural management research trial in south Florida at the Ft. Lauderdale Research and Education Center. The United States Golf Association has provided funds for the past two years to continue the research. This project was designed to identify the optimal cultural practices for best performance of three popular ultradwarfs and thus form the basis for management recommendations of these grasses under Florida conditions.

The grasses were selected based upon their use in Florida: Champion, TifEagle, and Floradwarf. The grasses were planted into an existing USGA green soil mix on a site near the Otto Schmeisser Research Green at the University of Florida's Fort Lauderdale Research and Education Center in south Florida.

Cultural management practices evaluated included fertilizer at two N rates (30 and 60 g N/sq. m.) which translated to 6 and 12 lbs. N/1000 sq. ft. and three N:K ratios (1:1, 2:1, and 1:2). In April of 2001, the fertilizer component was changed to 60, 90, and 120 g N/sq. m and the N:K ratios were reduced to 1:1 and 2:1 in order to evaluate a greater range of N rates. This fertilizer regime was continued through 2002.

Other cultural management treatments were light topdressing frequency (weekly vs biweekly) and shallow verticut frequency (3.4 mm setting weekly vs. biweekly). There were four replication of each treatment. The daily mowing height was set at 3.0 mm -3.4 mm (0.13-0.14 inches) during the period. Because of the number treatments (288 plots), the size of the new green was approximately 930 sq. m. (1/4 acre) in area. Evaluations were based upon visual turfgrass quality ratings, visual disease ratings, thatch ratings, turf leaf blade clippings and shoot counts. Significant treatment effects were observed for all parameters.

Influences of Shade on Dwarf-Type Bermudagrasses

Grady L. Miller, Russell T. Nagata, and Jeffry Edenfield

Golf course superintendents are often faced with major challenges due to tree shade on turfgrasses, particularly on putting greens. An increase in available sunlight or an increase in leaf area enables the turfgrass to increase in leaf area, which enables the plant to increase carbohydrate synthesis and storage processes critical for withstanding the many stresses inherent to putting green turf.

This study addresses the dilemma golf course superintendents have when managing putting greens subjected to light stress from excessive tree shade. We evaluated physiological and growth responses of the new ultradwarf bermudagrass cultivars (Champion, FloraDwarf, TifEagle and Reesegrass) when subjected to various levels of shade. We also evaluated potential advantages of slightly raising the mowing height. It was hypothesized that a slight increase in mowing height would result in an exponential increase in carbohydrate synthesis, potentially facilitating a more stress-resistant turf. Results indicate that TifEagle and Champion bermudagrasses are capable of sustaining quality better than other dwarf bermudagrass cultivars when grown under reduced-light conditions.

FloraDwarf also responded slightly better to shaded conditions than Tifdwarf. None of the tested grasses performed well under dense shade or long periods of shade.

Weeds

Control of Goosegrass using Foramsulfuron (Revolver) as an alternative to MSMA

Philip Busey

Goosegrass is the most serious weed as reported by South Florida golf course superintendents and sports turf managers. MSMA and diclofop-methyl (e.g., Illoxan) are widely used for postemergence control of goosegrass in bermudagrass turf. Diclofop is usually inadequate for control of mature goosegrass plants. Repeat application of a mixture of MSMA + metribuzin (e.g., Sencor) controls mature goosegrass. MSMA contains arsenic. The Florida Department of Environmental Protection says that excessively high arsenic concentrations can frequently occur in South Florida golf course soils and water, associated with the use of organic arsenical herbicides such as MSMA. Alternative methods of controlling goosegrass are sought.

There were two experiments: at Sunrise Golf Course and Broward County's Brian Piccolo Park ballfield, involving mature stands of goosegrass emerging in a hybrid bermudagrass matrix.

At Sunrise, foramsulfuron in Revolver at rates of 0.4 and 0.6 liquid oz/1000 sq ft was compared with MSMA at 0.9 oz/1000 sq ft., with a second application of both products nine days after initial treatment. During 25 days after treatment, Revolver by itself at 0.6 oz/1000 sq ft caused a peak of 52 percent goosegrass injury (mean of six replications), compared with 42 percent injury from MSMA. There was no injury in either case to bermudagrass. In comparison, the MSMA + Sencor (at 0.33 lb/acre) caused a peak of 93 percent goosegrass injury, and a peak of 52 percent injury to bermudagrass. Sencor was not included as a tank mix with Revolver.

At Brian Piccolo Park, Revolver at 0.6 oz/1000 square feet was compared with MSMA at 1.0 oz/1000 square feet. Both products were mixed in all combinations with Sencor at 1, 2, 3, 4, and 5 ounces by weight/acre. Sencor was also used by itself at the same rates, and with untreated controls there were 16 treatment combinations in three or four replications. During 23 days after treatment, the MSMA mixtures required at least 3 oz/acre Sencor to achieve 80 percent goosegrass control, whereas Revolver achieved 80 percent control with no Sencor. Revolver + Sencor at 2 oz/acre achieved 100 percent goosegrass control, whereas MSMA mixtures required 4 oz/acre Sencor to achieve 100 percent control. There was more bermudagrass injury from Revolver mixtures than MSMA mixtures, at the same rate of Sencor. Revolver was as effective as MSMA in postemergence control of mature goosegrass, and observed injury to bermudagrass in these two experiments was acceptable. More research and pilot testing is needed to understand the use of foramsulfuron in the full range of environmental conditions in Florida golf courses.

Following this research, the foramsulfuron was labeled by Bayer Environmental Science as a new postemergence turfgrass herbicide Revolver, in accord with the approval of the US Environmental Protection Agency. It may be applied to bermudagrass and zoysiagrass on golf courses. A Florida pesticide registration is pending, therefore at the time of this writing, the product cannot be legally applied for golf course maintenance in Florida. This is not to be considered an endorsement or a recommendation to use foramsulfuron or Revolver in golf course turf. Any person who applies pesticides must adhere to the label and all other regulations. There is no data on its effects on tropical signalgrass and some other important weed species.