

CENTER FOR TURFGRASS ENVIRONMENTAL RESEARCH AND EDUCATION

College of Agriculture and Life Sciences N.C. State University

Mission and Primary Objectives

The Center will promote environmental research on turfgrass systems. The mission is to create a multidisciplinary research 'culture' that develops new, environmentally sustainable management strategies. Emphasis will be on basic research to resolve underlying processes that can lead to long-term solutions. Drawing upon advantages of the vertical integration of disciplines within the land grant university, basic research will be closely aligned with practical research projects and outreach. Education of graduate students is a high priority in all Center activities.

The long-term objectives are:

- Elucidate the ecology of insect, disease, and weed pests and develop alternative strategies for their control.

Numerous pesticides currently used in turfgrass management are suspected of being problematic for human health and the environment, and they are being phased out by EPA regulation. Research will pursue pest control methods that reduce or eliminate chemical applications.

- Investigate the fate of nitrogen and pesticides applied to turfgrass systems and determine impacts on the surrounding environment.

Water quality is a major concern in North Carolina and throughout the southeastern U.S. Projects will determine the biological and physical factors controlling nitrogen and pesticide movement and the extent of surface and groundwater pollution.

- Select and develop adapted varieties.

Development of improved, adapted varieties of turfgrass is a key strategy to increase stress and disease tolerance and reduce the need for pesticides and nutrients. Projects will evaluate performance of turf species and individual varieties for fitness in the North Carolina and Southeastern environments. Molecular biology projects will be directed at development of disease resistant and cold tolerant germplasm through genetic engineering.

- Initiate new outreach technologies.

Decision-aid models are being developed that allow on-site pest identification and real-time management solutions that are environmentally acceptable and cost effective. A new, interactive web site is being brought on line that allows industry and the public access to new information generated in the turfgrass environmental research projects.

Importance of Center

Environmental problems are inherent to turfgrass systems in the southeastern United States. Turf species are not native vegetation in this geographical region. Without continuous management, it is not possible to maintain high quality turfgrass and prevent intrusion of natural vegetative succession. Historically, turfgrass maintenance has relied upon significant inputs of fertilizers and pesticides. There is growing public concern that chemicals used in turfgrass management are adversely affecting human health and water quality.

New environmental management strategies are needed to support the viability of the turfgrass industry, one of the most important economic sectors in the state. A recent economic survey by the North Carolina Department of Agriculture and Consumer Services estimated the economic impact to be 4.7 billion dollars. The survey used 1999 data. Turfgrass acreage is increasing in proportion to population, about 4.0 to 4.5% annually, so the current economic value is considerably higher. The turfgrass industry, therefore, is one of the largest industries in the state; and it is a leader as agriculture adjusts to new economic realities and urbanization.

Relationship with Academic Departments, Colleges, and other Centers and Institutes

The unique aspect of the Center will be the enhancement of interdisciplinary research that has not existed previously. By initiating and funding large-scale cooperative research projects, the Turfgrass Center will complement other organizational units within the College, N.C. State University, and the University System.

Faculty involved in interdisciplinary projects that the Center funds are drawn from departments in the College of Agriculture and Life Sciences and College of Physical and Mathematical Sciences. They include Crop Science; Entomology; Marine, Earth, and Atmospheric Sciences; Plant Pathology; Soil Science; and Toxicology. Furthermore, cooperative projects have involved faculty from North Carolina A&T.

Biological/physical systems, like those of turfgrasses, are extremely complex. Basic research directed at practical goals requires an integrative approach to be successful. Large-scale research projects in turfgrass areas have not been possible in the past because of lack of funding. United States Department of Agriculture competitive grant programs, for example, are focused on 'food and fiber'. It is intended that the Turfgrass Center will fill this niche – identifying high priority research areas, encouraging the formation of interdisciplinary groups and providing long-term financial support so projects can be successful. The Center also will support interdisciplinary efforts involving modelers and programmers that develop new methods for communicating research results to stake holders and in the classroom.

No other Center of this type exists in the country. Because of the prevalence of turfgrass use for home lawns, recreational facilities, roadsides, etc. turfgrass management reaches into the everyday lives of all citizens in North Carolina. An aggressive environmental research program coupled with effective outreach can involve a large portion of the population in environmental efforts to move toward sustainability.

Organizational Structure

The principal administrative authority for the Center is the Dean of the College of Agriculture and Life Sciences. Day-to-day operations of the Center are being overseen by three Co-Directors: Drs. Thomas Rufty, Fred Yelverton, and Rick Brandenburg, who are faculty members in the Departments of Crop Science (TR, FY) and Entomology (RB). The Associate Director is Ms. Emily Erickson, an Instructor in the Department of Crop Science, who oversees outreach activities and manages a Center office in 1105 Williams Hall.

A seven member Industry Advisory Board has been established. Five members of the Board are appointed by the Dean of CALS from different sectors in the turfgrass industry. The industry members rotate on a 2 to 3 year basis. The sixth and seventh members are representatives from CALS and North Carolina A&T University, appointed by the respective Deans. The Board offers advice to the Directors on Center plans and program implementation. They also review proposals submitted to the Center and make recommendations for funding.

Financial Structure and Accountability

Funding allocations and accounting for the Turfgrass Research Center are handled within College of Agriculture and Life Sciences. The Operational Unit Code is 113801.

This is a non-member Center. A budget of \$850,000 per year is provided by State and Federal legislation. In 2001, the General Assembly of North Carolina established a yearly appropriation of \$600,000 that comes to the Center for support of environmental research projects. And in 2004, the U.S. Congress established an annual appropriation of \$250,000 to the Center to supplement funding by the State. It is anticipated that the appropriations will continue indefinitely.

All funding allocations by the Center are proposal based. In the spring of each year, a call for proposals is sent to all departments in the College of Agriculture and Life Sciences at N.C. State University and to the Dean of Research at North Carolina A&T. Interested faculty submit proposals in April to the Associate Director of the Turfgrass Research Center. The proposals are sent to a select group of faculty at other major universities involved in turfgrass/environmental research for peer review. Subsequently, the Board of Advisors meets for a one-day research symposium, where authors present individual projects and respond to questions. The Board of Advisors then makes recommendations on the projects to be funded. The Directors implement the recommendations. Authors receive notification of decisions in June and funds are disseminated as soon as the appropriations arrive, usually late summer or early fall.

Progress of individual projects is taken into account during each funding cycle by peer reviewers and the Advisory Board. Funding amounts vary, depending on objectives and the costs involved, but generally range from \$30,000 per year for individual graduate student projects to \$60,000 per year for large-scale projects. Approximately 12 to 14 projects have been funded on a yearly basis during the Center planning period.

Space and Capital Expenditure Needs

The offices used for administration of the Center are located in Williams Hall within space allocated by the Department of Crop Science. Current plans project that Center offices, long-term, will be housed in the new Sports Education Building that will be located on Centennial Campus adjacent to the N.C. State Golf Course. The building will include classrooms,

research areas, and offices for coaches and administrators associated with the N.C. State golf teams.

The most significant need in the future will be continued development and expansion of the Turfgrass Field Laboratory located at University Field Labs on Lake Wheeler Road. Space requirements for laboratory programs funded by the Center appear adequate at this time, as individual faculty use space and equipment allocated within their home departments.

The Turfgrass Field Laboratory is an essential part of the applied research being funded by the Center. The Laboratory has ~ 7 acres of managed turfgrass under irrigation, and another 10 acres without irrigation. New irrigated plots are continually being developed as new research objectives evolve. One large equipment storage building has been constructed and a second maintenance/office building is being planned. Funding for Field Laboratory construction and operations is being supplied by the Turfgrass Center and CALS.

Relationship to Instructional Programs

The Center has an intense focus on graduate and undergraduate education. Graduate students are involved in virtually all research projects funded by the Center. For the 2004-2005 funding cycle, the Center was funding stipends and tuition for 12 graduate students. Also, the Center is contributing funding to the Field Research Laboratory with state of the art environmental assessment equipment, and much of the graduate student research will be conducted there.

The Turfgrass Field Laboratory also provides an important resource for education and outreach. Numerous demonstrations, field days, and workshops are held throughout the year. And, it allows hands-on experiments in undergraduate teaching programs and is a key element of the turfgrass internship program for students in the 2- and 4-year degree programs.

A main goal of the Center is to increase the environmental awareness of students. It is hoped that an expanded population of trained, environmentally conscious graduates will carry the ideal of sustainability into the workforce.

The Center is funding development and operations of the web site 'Turffiles', which has an important role in outreach and in education. The site is the main electronic conduit for information transfer to industry and the public, and it currently receives approximately 2 million inquiries per year. 'Turffiles' also contains information and lecture material for turfgrass courses offered to undergraduate and graduate students.

Administrative Structure

As stated above, four individuals are responsible for the organization, planning and operations of the Turfgrass Center. Drs. Thomas Rufty, Fred Yelverton, and Rick Brandenburg serve as Co-Directors and Ms. Emily Erickson, the Coordinator of Turfgrass Educational Programs, serves as the Associate Director. The Directors are accountable to the Dean of the College of Agriculture and Life Sciences. While not administratively associated with Departments at N.C. State, the success of the Turfgrass Center is dependent on close relations with Department Heads. Every effort is made to keep key Department Heads informed about Center activities as they evolve.