Research *You Can Use*

The National Turfgrass Research Initiative

A new initiative spearheaded by industry leaders offers hope for basic turfgrass research.

BY KEVIN MORRIS

The annual value of the turfgrass industry in the United States is estimated at $40 to 60 billion.[2,3] It is estimated that turfgrass covers 50 million acres in the U.S., making turf the fourth largest U.S. crop in acreage. According to estimates, there are more than 31 million acres of irrigated turfgrass in the U.S.,[4] making turfgrass the largest irrigated U.S. crop.

TURFGRASS RESEARCH IN THE U.S.

Turfgrass research in the U.S. is almost exclusively conducted by state universities or private, for-profit companies. Private companies conduct research on fertilizers, new grass cultivars, pest control products, etc. for their own internal use in research, development, and marketing. However, the information obtained from for-profit companies' research is proprietary and most often not released to the public.

There are several non-profit organizations, such as the United States Golf Association (USGA), Golf Course Superintendents Association of America (GCSAA), National Turfgrass Evaluation Program (NTEP), Turfgrass Producers International (TPI) and others that also fund turfgrass research at state universities. The USGA has the largest research funding program, averaging about $1.3 million annually. There are also various state and local turfgrass organizations that provide funding to state university research programs. In total, it is estimated that private companies and not-for-profit organizations support $10 million in turfgrass research annually.

Table 1
Acreage of Selected Crops in the U.S.[1]

Crop	Acreage
Corn (grain & silage)	74,914,515
Soybeans	72,399,844
Hay/Forage (all crops)	64,041,337
Turfgrass (all uses)[2]	50,000,000
Wheat	45,519,976
Cotton	12,456,162
Orchards	5,330,439
Barley	4,015,654
Vegetables	3,698,744
Oats	1,996,916
Peanuts	1,223,093

[1]2002 Census of Agriculture, USDA, National Ag. Statistics Service (NASS)
[2]Estimated acreage; NASS collects data only on turfgrass sod production

Turfgrass acreage was estimated to be approximately 50,000,000 acres in the U.S. in 2002, making it the fourth largest crop overall and the largest irrigated crop in the nation.

Many states have at least one university with a turfgrass research program to serve the needs of the citizens and the turfgrass industry in that state. Funds for those research programs come from the private entities listed above, state government funding, as well as through the Federal Government's United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES). CSREES, with an annual budget of $1 billion, provides funding to state universities for agricultural research, education, and extension-related activities. Very little, if any, CSREES funding is directed to turfgrass research. Therefore, the activities of state university researchers are mostly limited to what the states themselves, private industry, and organizations such as USGA and NTEP are willing to fund.

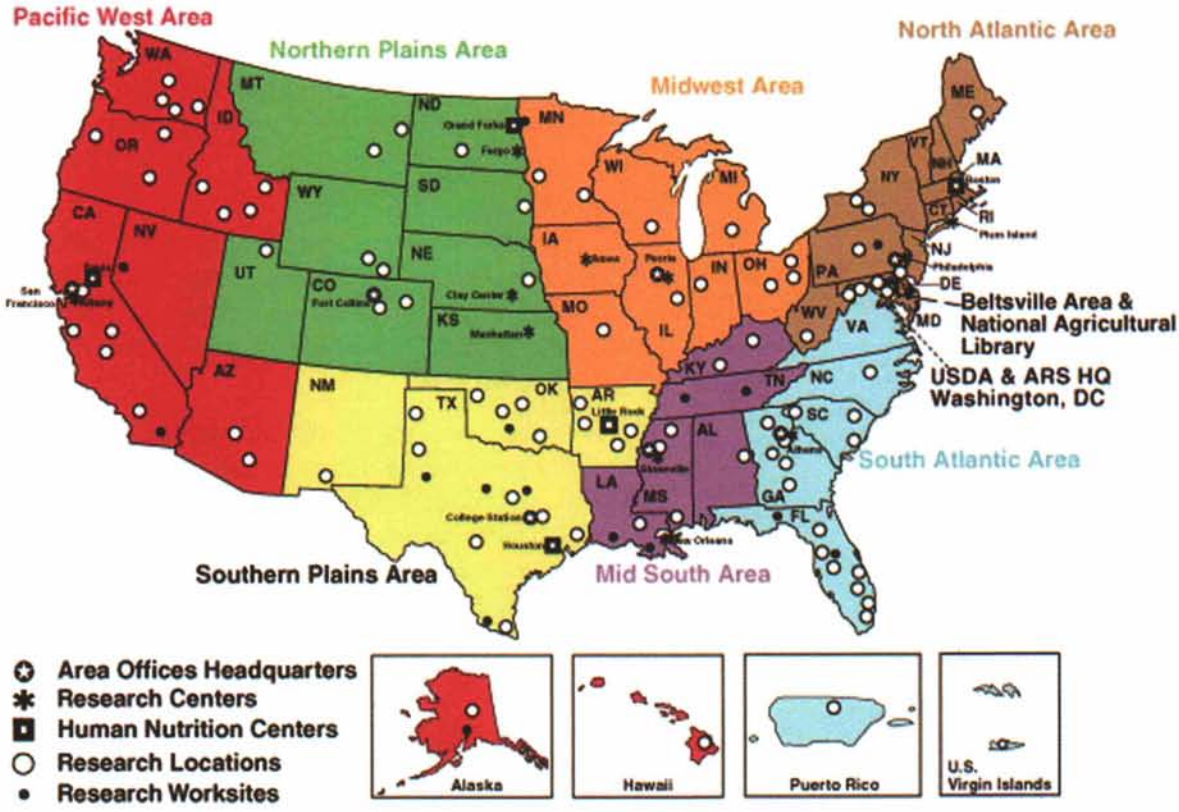
APPLIED VERSUS BASIC RESEARCH

Almost all turfgrass research dollars are provided by the turfgrass industry or industry associations to fund applied research, rather than basic research. Applied research is problem-solving research, addressing and solving problems that are seen in the field by end-users such as golf course superintendents, athletic field managers, or agronomists. The shortcoming of applied research is its reliance on short-term problem solving.

Basic research lays down the foundation for applied research to follow. For example, the Human Genome project, a highly successful effort to identify the location of genes for disease susceptibility, abnormalities, and critical human traits, is classic basic research. The rewards are often large breakthroughs resulting in quantum leaps of understanding problems, development of new technologies, and important improvements in management strategies.

ISSUES FACED BY THE INDUSTRY

There are significant issues that must be addressed to ensure that the benefits of



USDA's Agriculture Research Service has scientists at 100 locations in the U.S., many housed at or close to state land-grant universities.

turfgrass are available to all our citizens. Some of these issues are:

Reduce water used and utilize recycled water. Drought conditions in many areas of the U.S. have resulted in watering bans on lawns, landscapes, and golf courses, and restrictions on planting turfgrass by local jurisdictions. Due to incredible population growth in the drier western states, many areas have instituted lawn watering restrictions, including Las Vegas, Nev., and Denver, Colo. Even the less arid midwestern and eastern states have enacted watering bans or are considering doing so.

Reduce pesticide use and develop biological controls. Concerns over the impact of pesticides on human health have resulted in pesticide bans in some local communities. The city of Toronto, Canada, has banned the use of pesticides on lawns, parks, golf courses, commercial properties, and other turfgrass sites. In addition, more jurisdictions in Canada and the U.S. have enacted at least partial bans, or are considering banning the use of pesticides on turf.

Reduce fertilizer use and protect surface water and groundwater. Nitrate and phosphorus pollution of waterways and groundwater supplies have prompted some states and jurisdictions to require reduced fertilization of turfgrass. Minnesota recently passed regulations restricting the use of phosphorus on turf due to the possibility of surface water and groundwater contamination. In an effort to improve and protect the quality of Chesapeake Bay water, the Maryland legislature passed nutrient management guidelines for turf. Other states are considering adopting similar proposals to regulate turfgrass fertilization.

Safety concerns on athletic fields and in parks. A recent report stated that 25% of injuries in high school soccer are related to the playing surface. In some cases, these unsafe conditions lead to parental concern and action. The Parents United for D.C. Public Schools commissioned a law firm to study and report on public school athletic facilities in the District of Columbia. Their report states, "... D.C. Public Schools today fail to meet the most basic standards of adequacy for athletic programs and facilities ... and run the risk of millions of dollars in legal liability in the almost certain event of a student-athlete's serious injury."

Increase turfgrass genetic diversity. Germplasm improvement is a critical component of plant science, and having a wide range of germplasm available is important for breeding better grasses. Unfortunately, unlike most other crop species, very little turfgrass germplasm is collected and placed into public germplasm banks.

Morris and Hossain[5] reported that of 38 publicly funded germplasm collection trips for grasses, only two specifically targeted turfgrass; the rest were forage grasses. Very little turfgrass

CONNECTING THE DOTS

A Q&A with KEVIN MORRIS, president of the National Turfgrass Federation, Inc., on the National Turfgrass Research Initiative.

Q: You stated that turfgrass represents a $40 to $60 billion per year industry covering an estimated 50 million acres. Do you think that most people would find that surprising?

A: Yes, we find that people are surprised by those figures. We even had trouble initially convincing Congressional staff that they were real. However, if you consider that there are more than 700,000 athletic fields, 80-100 million home lawns, more than 17,000 golf courses, and millions of miles of roadsides in the U.S., those figures are not hard to believe.

Q: Why do you think that, historically, as a crop, turfgrass has received much less federal research support than other much smaller crops?

A: This is a struggle many segments of the Green Industry (i.e., landscaping, floriculture, nursery crop production, cut flowers, turf, etc.) have faced. It is because we are not traditional agriculture that produces food crops on farms. However, urban agriculture is becoming more accepted within USDA.

Q: If NTRI is successful and federal dollars are forthcoming, do you think that national and state organizations currently funding turfgrass research may feel that they can provide less funding than they do now?

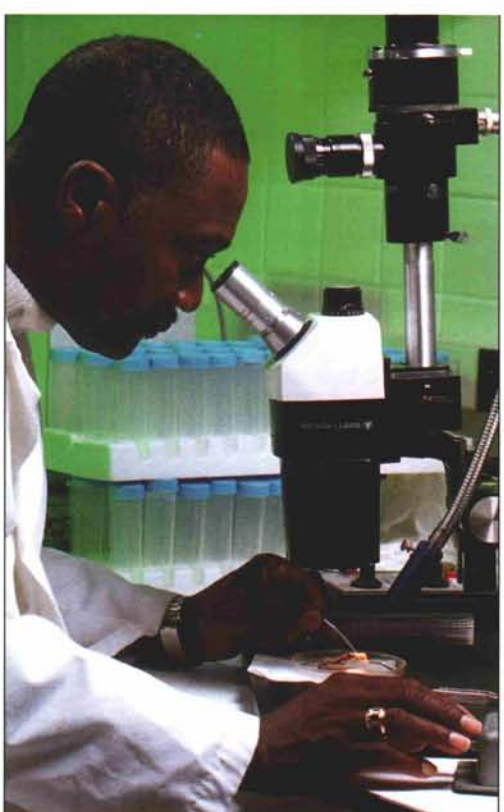
A: Right now, state turfgrass research programs are being pinched by declining state support. Therefore, more and more research at state universities needs to be funded by private organizations. NTRI will not reduce the need for research at universities and, therefore, dollars for applied research will still be needed by universities. However, NTRI funding that goes to universities will help ease the pressure on state and national organizations and also allow the universities to conduct research that they never were able to do because of limited resources.

germplasm is held by the Federal Government, which stifles overall turfgrass improvement.

Better documentation on the benefits of turfgrass. There is little understanding among the general public of the importance of turfgrass in protecting soil and water, heat reduction, dust control, etc., even though there are data to support these claims.[1] One avenue to obtaining and releasing information on turf's benefits is through large, coordinated research programs.

HOW THE FEDERAL GOVERNMENT CAN HELP

The Federal Government, through the USDA, funds basic and applied research on many crops and for many agricultural industries. The USDA's Agricultural Research Service (ARS) is the in-house research arm of the USDA, with a $1 billion annual budget, and 2,100 scientists at 100 locations. ARS has significant programs for the big crops such as corn, wheat, and soybeans.



ARS has over 2,100 scientists nationwide, most conducting basic research on crops and animals.

However, ARS also has significant programs for industries such as aquaculture (fish farming) and floriculture (floral and nursery crops). This research is critical for these industries, helping them make giant strides in advancing the science in their industry and making large improvements that benefit end-users.

WHAT IS THE TURFGRASS INITIATIVE AND WHY IS IT IMPORTANT?

The National Turfgrass Research Initiative (NTRI) is the blueprint for a coordinated national research program to be funded through USDA-ARS and conducted through a coalition including the USDA, the university research community, and the turfgrass industry. NTRI discusses the industry, the crucial need for this research, and specifically identifies priority research goals and key programs.

Federal attention to the issues and research goals identified in NTRI is

Q: You stated several issues faced by the turfgrass industry that need research. Do you think water issues may be a higher priority for turfgrass research and, as such, should receive funding sooner than other issues, such as reducing pesticide use and developing biological controls?

A: I definitely feel that our best chance to convince Congress to fund NTRI is to focus on the issues and ask for funding for specific problem-solving projects. Water use is the number-one priority research area as identified by the industry and ARS. More than ever, Congress is requiring the Federal Government to be accountable, and it is easier to sell a program to a Congressional staffer if specific problems are identified and research to solve those problems is proposed. There are way too many Congressional programs that simply look bad and are therefore considered pork-barrel spending. We want to make certain any funding we receive is justified and supported by industry needs and an understanding of the issues by Congress.

Q: How important is it for the reader of this article to become involved with this effort? How much influence can the industry have on Congress?

A: One of the hallmarks of this country is our ability to voice our opinion to our representatives. This is the way a democracy works, and if no voices are heard on an issue, that issue is not deemed important. After being involved with this effort for the last several years, I can tell you from firsthand experience that Representatives and Senators respond to their constituents. They note every letter and phone call that comes in on a particular issue. Therefore, it is vital that turf industry members, individually and collectively, contact their Senators and Representatives to express support for NTRI. Without the "grass roots" support from the turf industry, NTRI will never be funded and implemented.

JEFF NUS, PH.D., *manager, Green Section Research.*

critical to the continued success of the turfgrass industry. A basic premise of NTRI is that federal research dollars should be directed toward programs that cannot be funded adequately by states or industry, particularly programs where the Federal Government can play a coordinating role not possible for any other entity.

HOW DOES THE TURF INITIATIVE WORK?

For NTRI to get off the ground, funding has to be appropriated by Congress. NTRI proposes $450,000 be appropriated for each research scientist position within USDA-ARS. The $450,000 is distributed as follows: $300,000 is used to hire a researcher and staff and purchase equipment at an ARS location. The remaining $150,000 is allocated for that researcher to conduct cooperative research with universities. If NTRI is fully funded ($32.4 million), this will allow ARS to hire 72 turfgrass researchers and allocate more than $10 million annually to universities through cooperative research.

Agricultural engineer Kevin King examines discharge water from a turfgrass system in central Ohio as part of a research program designed to assess how land uses and management affect water quality. This research is funded, in part, by the USGA's Turfgrass and Environmental Research Program.

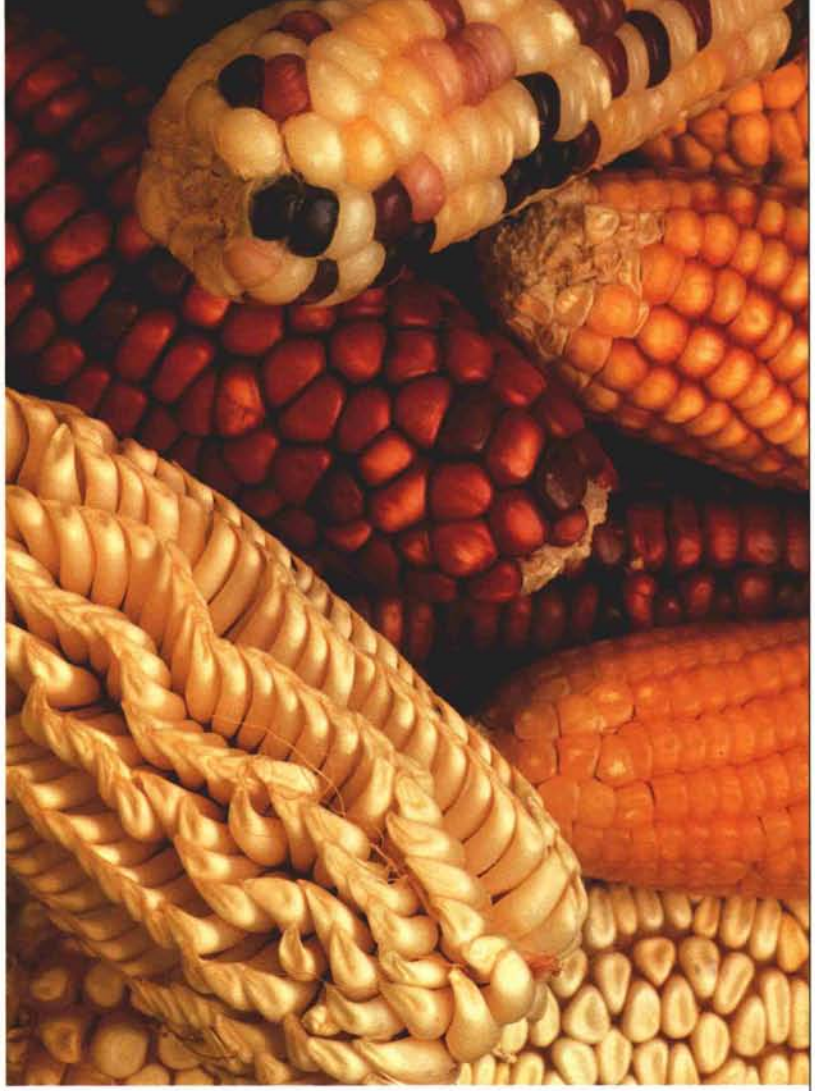
NTRI will be largely implemented by research teams. These teams will frequently involve multiple research locations spread across several states to ensure the right mix of scientific skills is available for a systematic research strategy. The research dollars will be coordinated by and through the Agricultural Research Service budget. In turn, ARS will work with university and private industry researchers to establish research teams.

RESEARCH COMPONENTS OF NTRI

NTRI consists of the following six broad research areas:

1. Water.
2. Germplasm.
3. Pests.
4. Environment.
5. Soil.
6. Integrated turf management (ITM).

Within each component are several



To increase the genetic diversity of U.S. corn, ARS collects and combines exotic germplasm, such as this unusually colored and shaped maize from Latin America, with domestic corn lines. ARS collects and improves germplasm of many other crops, as well.

research priorities. For instance, the critical research needs in Component 1 (water) are the need to improve turfgrass water use efficiency and irrigation efficiency and the need to investigate the use of recycled or saline irrigation water. The germplasm component (Component 2) focuses on collecting valuable germplasm, developing a better understanding of the genetic systems and genes in turfgrass species, and using this material and knowledge to develop and release improved germplasm leading to improved turfgrass cultivars.

PROGRESS TO DATE

Over the past five years, we have had many meetings and contacts with ARS and USDA officials, U.S. Senators, House members, Congressional staff, and the Secretary of Agriculture. We have stressed the size and scope of the turfgrass industry, the important issues facing the industry, and the need for federal research dollars to solve these problems.

We have convinced the U.S. Congress to allocate funding for ARS to hire a research scientist at Beltsville, Md. (2002); conduct cooperative research in Logan, Utah (in conjunction with Utah State University); and hire a full-time research scientist in 2006 at Beaver, West Virginia. And in the proposed ARS budget for fiscal year 2007 (starting October 1, 2006), an additional $1.88 million has been allocated for turfgrass research. This will allow ARS to hire three to four researchers in the southwest U.S. and develop cooperative projects with universities focusing on turfgrass water use issues. For this year, we also are asking Congress to include funding for five additional research positions at four different locations. We are looking for larger increases for NTRI in the future.

So what can you do to help? First, learn more about the National Turfgrass Research Initiative at:

www.turfresearch.org
or
www.turfinitiative.org

Next, contact your Senators and Representatives in Congress to let them know the importance of federal funding for turfgrass research by USDA-ARS. Ask them to support funding for the National Turfgrass Research Initiative. Finally, ask your local and state turfgrass associations and supplier companies to make a contribution to the National Turfgrass Federation, Inc., in support of this effort. The future of the turf industry is at stake. Since turfgrass is a $40-60 billion industry and encompasses 50 million acres in the U.S., we have a good case to make!

Editor's Note: The complete report on this topic can be found at *USGA Turfgrass and Environmental Research Online* at: http://usgatero.msu.edu/v05/n10.pdf.

REFERENCES

1. Beard, J. B., and R. L. Green. 1994. The role of turfgrass in environmental protection and its benefits to humans. *Journal of Environmental Quality* 23(3):452-460.

2. Fender, D. 2002. Economic value and benefits of responsible landscape management. Pp. 15-17. *In* Water Right — Conserving Our Water, Preserving Our Environment. International Turf Producers Foundation, East Dundee, Ill.

3. Hall, C. R., A. W. Hodges, and J. J. Haydu. 2005. Economic impacts of the green industry in the United States. University of Tennessee, Knoxville, Tenn.

4. Milesi, C., S. W. Running, C. D. Elvidge, J. B. Dietz, B. T. Tuttle, and R. R. Nemani. 2005. Mapping and modeling the biogeochemical cycling of turfgrasses in the United States. *Environmental Management* 36(3):426-438.

5. Morris, K. N., and A. M. Hossain. 2000. As the demand for turfgrass grows, so must turfgrass germplasm collection and evaluation. *Diversity* 16(1&2):15-17.

KEVIN N. MORRIS *is president of the National Turfgrass Federation, Inc., Beltsville, Md.*