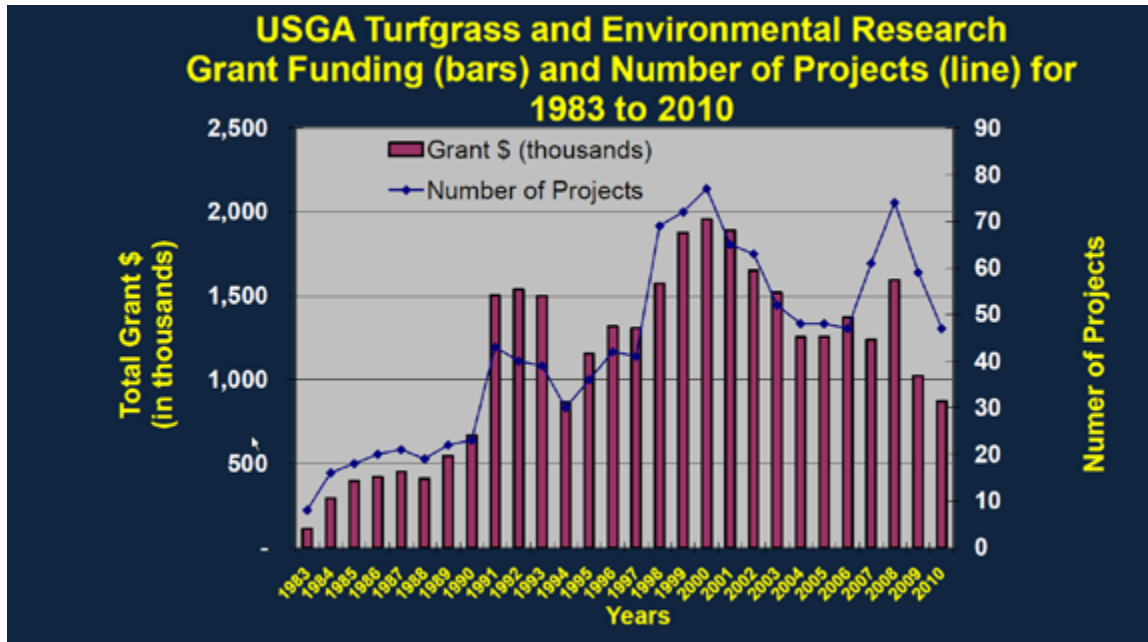


Science to Benefit Golf

Science relies on a systematic approach of challenging what we already accept as knowledge and discovering what we need to know.

BY DR. JEFF NUS

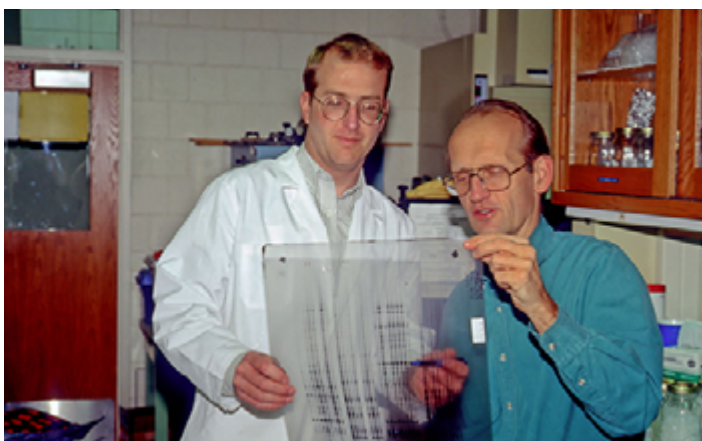


Graph showing USGA research funding and number of projects by year from 1983 through 2010.

Managing golf courses demands a broad range of knowledge. Superintendents need to have considerable skills, not only in the financial, communication, and other business management aspects of the position, but they must also have an in-depth agronomic understanding of

managing turfgrasses. This requires a knowledge of soils, irrigation technology, fertility requirements, species and cultivar performance, turfgrass diseases, weeds, insects . . . the list is a long one. In addition, because more information is generated each year, the tide keeps rising.

Research is defined as “the careful, systematic, patient study and investigation in some field of knowledge undertaken to establish facts or principles”. The work challenges what we currently accept as fact, discovers what we need to investigate, and develops the expertise that allows us



(Above left) Improvement of turfgrass cultivars is depending more and more on the use of molecular genetics. (Above right) Besides funding for improvement in the major turfgrasses like Kentucky bluegrass, bentgrass, perennial ryegrass, zoysiagrass, and bermudagrass, USGA has provided funding to develop other grasses, including buffalograss, seashore paspalum, and inland saltgrass, among others.



(Above left) Dr. Bob Shearman and his colleagues at the University of Nebraska have developed improved cultivars of buffalograss that exhibit much greater drought tolerance and lower water use rates than grasses currently used on golf courses. (Above right) Over the past two decades, USGA has funded several projects to quantify the tendency for both pesticides and fertilizer nutrients to reach surface and groundwater supplies.

to adapt to changing times. In other words, research and the science it creates allow us to navigate in this sea of information.

The United States Golf Association has a long history of supporting turfgrass research dating back to the days of Piper and Oakley in the 1920s. The USGA continues to recognize the essential need for research today in its support of the USGA Turfgrass and Environmental Research Program. Since 1983, the USGA has provided more than \$31 million in support of more than 450 projects at research institutions across the nation. Each year, the USGA Turfgrass and Environmental Research Program invites scientists to submit research proposals over a wide range of topics. If successful, researchers are awarded grants ranging from \$3,000 up to \$25,000 per year for projects typically lasting two to three years. Longer-term projects, such as the development of new turfgrass cultivars, are typically renewed for multiple funding cycles.

It is vital that the projects accepted for USGA funding meet the informational needs of the industry. That responsibility lies on the collective shoulders of the 18-member USGA Turfgrass and Environmental Research Committee. Historically, proposals have fallen into various categories, including integrated turfgrass management, course construction, turfgrass breeding and selection, physiology, environmental impact, and even wildlife research on golf courses (funded through the National Fish and Wildlife

Federation). Results of all funded projects are published in annual [research summaries](#), full-length articles in [USGA Turfgrass and Environmental Research Online](#), and the [USGA Green Section Record](#).

Members of the USGA Turfgrass and Environmental Research Committee select proposals based on their scientific merit and whether the proposals meet the goals of the program, which may change over time. For instance, over the past two decades, significant funding has been provided to projects quantifying pesticide and nutrient fate in efforts to establish best management practices (BMPs) to protect the environment. Significant funding has also been used to investigate how turfgrasses resist environmental stresses (e.g., freezing, saline irrigation and soil conditions, high temperatures, drought, etc.) and eventually use that information to develop grasses with improved stress tolerance and reduced input requirements (e.g., fertilizer, irrigation, pesticide use).

It is no accident that a significant portion of USGA research funding is used for understanding metabolic processes and genetic improvement of turfgrasses. Over the past ten years, USGA research funding has been directed to projects in the category of breeding, genetics, and physiology.

Dr. Michael Kenna, Research Director for the Green Section, explains, "Turfgrass physiology, genetics, and breeding programs were languishing in the late 1970s in the midst of droughts in the Southwest and turfgrass winterkill

in the transition zone. The USGA invigorated several university programs in 1983 with the opportunity for long-term research support to improve existing turfs used on golf courses (e.g., bentgrass and bermudagrass), as well as to introduce and develop new turf species, such as buffalograss or seashore paspalum."

For research to be pertinent to specific regions of the country, it is important to have firsthand knowledge of the challenges facing each region. The USGA's Green Section has agronomists in each of eight regions that cover the U.S., and they visit hundreds of golf courses annually. The USGA Grant-in-Aid Program provides funding for regional projects at the request of USGA agronomists for issues that are pertinent for their regions. These regional research projects are most often applied and yield results that help local golf course managers overcome disease, insect, or other local management challenges.

Like all areas of science, turfgrass science is built, layer by layer, from research that uses previous research as its foundation. Only by conducting research can we even know what to ask to advance the science further. Through the Turfgrass and Environmental Research Program, the USGA continues to play a central role in building the science and training the scientists important for the future of the golf course industry.

JEFF NUS, *manager, Green Section Research*.

Turfgrass	University	Cultivars or Varieties
Creeping Bentgrass	Texas A&M University	CRENSHAW (Syn3-88) CATO (Syn4-88) MARINER (Syn1-88) CENTURY (Syn92-1) IMPERIAL (Syn92-5) BACKSPIN (Syn92-2)
	University of Rhode Island	PROVIDENCE
	Pennsylvania State University	PENNLINKS
	Rutgers University	Heat-tolerant and dollar-spot-resistant parental lines
Colonial Bentgrass	University of Rhode Island DSIR-New Zealand	BR-1518
Annual Bluegrass	University of Minnesota	DW-184 (MN#184)
Bermudagrass	New Mexico State University	NuMex SAHARA SONESTA PRIMAVERA PRINCESS
	Oklahoma State University	YUKON (OKS 91-11) RIVIERA (OKS 95-1) PATRIOT Latitude 36 Northbridge
	University of Georgia	TIFTON 10 TIFTON 94 (MI-40) TIFEAGLE (TW-72)
Zoysiagrass	Texas A&M University	DIAMOND (DALZ8502) CAVALIER (DALZ8507) CROWNE (DALZ8512) PALISADES (DALZ8514)
Seashore Paspalum	University of Georgia	SEASLE 2000 (AP 10) SEASLE I (PI 509018-1) SEASLE Supreme SEASPRAY
Alkaligrass	Colorado State University	Ten improved families were developed
Buffalograss	University of Nebraska	LEGACY PRESTIGE (NE 91-118) 609, 315, and 378 CODY, TATANKA, BOWIE
Blue Grama	Colorado State University	ELITE and NARROW populations
Fairway Crested Wheatgrass	Colorado State University	Narrow leafed and rhizomatous populations
Curly Mesquite	University of Arizona	FINE and ROADSIDE populations
Inland Saltgrass	Colorado State University	A-49, A-50 and A-138
	University of Arizona	Seeded varieties are being developed

The table showing universities receiving funding, species, and cultivars resulting from USGA funding. The goal is to develop turfgrasses and golf course management systems that are tolerant of stressful climatic conditions, conserve water, and use less fertilizer and pesticides. (Table constructed by Dr. Mike Kenna, Research Director, Green Section)