USGA continues major turf, env'l research

By MIKE KENNA

The United States Golf Association will fund nearly $1.4 million in 1996 for its turfgrass and environmental research programs. Of this total, $798,584 will go toward turfgrass research projects and $592,258 will be spent on environmental research which includes grants of $100,000 each to the Audubon Cooperative Sanctuary Program and the Wildlife Links project conducted in cooperation with the National Fish and Wildlife Foundation.

OFF THE RECORD

The USGA is still emphasizing plant-breeding projects to improve turfgrasses used for golf courses. Crenshaw (Lofts Seed) and Cato (Pickseed West) creeping bentgrasses resulted from a USGA project at Texas A&M University in cooperation with Bentgrass Research, Inc., a nonprofit group in Dallas/Fort Worth committed to providing better bentgrasses for the Southwest. Syn 1-88, a reselection from Seaside, was released to Pickseed West for low-maintenance areas using poor-quality irrigation water.

In 1995, Syn 92-1 and Syn 92-2, selected for improved heat tolerance and rooting, were released to Burlingham & Sons.

These new bentgrasses are welcome additions to varieties which were partially sponsored by the USGA in years past. Penncross and Pennlinks (Tee-2-Green), developed at Pennsylvania State University, received small USGA grants to help produce these grasses.

Small USGA grants also helped develop Providence (Seed Research of Oregon) at the University of Rhode Island and even some of the early work on SR-1020 at the University of Arizona.

The U.S. transition zone has always had problems with winter damage to warm-season turfgrass species such as Bermudagrass and zoysiagrass.

At Oklahoma State University, OKS 91-11 has demonstrated superior cold tolerance among the seeded Bermudagrasses and will be released in early this year. Several of the vegetatively propagated zoysiagrasses developed by Texas A&M University have performed well and also will be released in early this year.

USGA-sponsored breeding projects have routinely entered promising varieties into the National Turfgrass Evaluation Trials. In general, OKS 91-11 Bermudagrass and some of the new DALZ lines have performed well in the transition zone.

MI-40, a mutant of vegetatively propagated Midiron Bermudagrass, was released by Dr. Wayne Hanna from the USDA-ARS at Tifton, Ga., for use on golf course fairways. TW-72, a mutant of Tifway, is under consideration for release. These new vegetatively propagated Bermudagrasses will join a long list of successful Bermudagrasses developed by Dr. Glenn Burton. The Bermudagrass breeding program at Tifton has made tremendous contributions with cultivars such as Tifgreen, Tifway and Tifdwarf.

Several promising creeping bluegrasses (*Poa annua var reptans*) were released to Peterson Seed by the University of Minnesota. After trying for the last 75 years to eradicate annual bluegrass, the breeding program at Minnesota has attempted to improve the perennial forms of annual bluegrass. The philosophy is simple: When you're served lemons, make lemonade!

Cody and Tatanka seeded buffalograsses were released by the University of Nebraska to the Native Turf Group. A small amount of seed was available in 1995 and larger quantities will become available in 1996. Both of these new seeded buffalograsses are significant improvements over the older forage types such as Texoka. The vegetative buffalograss varieties 609, 315 and 378 all continue to perform well on golf course roughs.

The University of Nebraska has initiated a selection program for fairway-type buffalograsses. Early indications suggest that buffalograss may be improved for low-maintenance fairway situations where water is a limiting factor.

Results from University of Nevada indicate that buffalograss can provide adequate turf for roughs with deficit irrigation of 50 to 60 percent of evapotranspiration).

The USGA has initiated several projects using molecular genetics techniques. These biotech projects will eventually tie into the plant breeding programs to develop turfgrasses which require fewer cultural inputs.

At Rutgers University, creeping bentgrass resistant to glufosinate ammonium herbicide were produced using genetic engineering technology.

Michigan State, Virginia Tech and Rutgers University are all employing biological technology

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USGA continuing research

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to produce disease-resistant bentgrasses by introducing genes which produce the chitinase protein.

At Mississippi State University, bentgrasses resistant to brown patch (Rhizoctonia solani) were successfully selected using a tissue culture technique called the Host Plant Interaction System.

Several bacteria are under evaluation for their suppressive characteristics on common diseases of creeping bentgrass. At Rutgers University, more than 1,000 bacterial isolates were evaluated for their plastic capabilities to summer patch (*Magnaporthe poae*). Based on laboratory and greenhouse tests, the scientists have narrowed the field of bacteria down to promising strains of *Xanthomonas* and *Serratia*. Bacterial control of Pythium-incited diseases of creeping bentgrass is under investigation at Cornell University.

Promising strains of *Enterobacter cloacae* have been successful in reducing the number of Pythium ultimum sporangium that germinate in lab tests.

The results at both universities have been promising in the laboratory and greenhouse. However, they are a long way away from successful implementation of a biocontrol on turfgrass diseases in the field. Results at the University of Kentucky suggest that the number of grubs required to cause noticeable injury was much higher than prevailing rule-of-thumb estimates used by the turf industry.

An application of aluminum sulfate just before the beetle flights reduced subsequent grub densities by as much as 77 percent.

Scientists at University of Kentucky also believe black cutworm infestation on putting greens results due to the migration of large larvae from collars and surrounds. At the University of Florida, a new species of bacteria, Pasteuria sp., which parasitizes the sting nematode (Belonolaimus longicaudatus) is under evaluation. Early monitoring of six field sites where the bacteria naturally exist indicates that locations that started with low levels of spores had higher numbers of sting nematodes than areas that started with high spore levels.

In 1996, the USGA will sponsor new projects on the construction and maintenance of putting greens.

Research on the physical properties of the root-zone mix, grow-in issues, and maintenance programs for new greens will be addressed.

The projects will be conducted at land grant universities and the results of the effort will be published in peer-reviewed scientific journals.

ENVIRONMENTAL IMPACT

In 1995, the USGA began a second three-year research project to evaluate the environmental impact of golf courses. Nine studies will focus on the fate of pesticides applied to golf course turf.

Emphasis on the volatilization, runoff and leaching of pesticides and best-management practices to avoid problems are underway. The USGA is continuing its support of the Audubon Cooperative Sanctuary Program conducted by Audubon International.

In 1995, the USGA successfully initiated the Wildlife Links Program in cooperation with the National Fish and Wildlife Foundation (NFWF).

A committee of wildlife experts, formed by the NFWF, is evaluating research proposals which will develop resource information useful to golf courses. The projects will begin early this year.

A tremendous amount of positive turfgrass and environmental research is being conducted across the United States due to the financial commitment of the USGA.

The universities who openly share their faculty and facilities are greatly appreciated.

All of those who support the game of golf and the USGA should be proud of the positive contributions these programs have made toward improving the way we build and maintain golf courses.

A summary of USGA research

Project Area	Sub-project	University/Investigator
Green Construction	10 to 12 Projects with GCSAA	TBA
Turfgrass Breeding	Bentgrass	Texas A&M U./Engelke
	Bermudagrass	USDA/Burton and Hanna
	Bermudagrass	Okla. State U./Talifaferro
	Buffalograss	U. of Nebraska/Riordan
	Colonial Bentgrass	U. of R.I./Ruemmele
	Cool Season	Rutgers U./Funk
	Poa annua	U. of Minnesota/White
	Seashore Paspalum	U. of Georgia/Duncan
	Zoysiagrass	Texas A&M U./Engelke
Alternative Pest Management	Mole Cricket	N.C. State U./Brandenburg
	Sting Nematode Control	U. of Fla./Giblin-Davis
	Allelopathy	U. of Arkansas/King
	White Grubs	U. of Kentucky/Potter
	Disease Suppression	Cornell U./Nelson
	Summer Patch	Rutgers U./Kobayashi
Resistance	Rhizoctonia solani	Mississippi State U./Krans
	Disease	Michigan State U./Vargas
	Disease	Virginia Poly Technic U./Ha.
	Herbicides and Disease	Rutgers U./Day
Cultural Practices	Effluent Water	U. of Arizona/Brown
	Buffalograss Water Use	U. of Nevada/Bowman
	Seeded Bermudagrasses	U. of Georgia/Carrow
	Low Temperature and Drought	Clemson U./Barid
	Drought Stress	Texas A&M U./White
	Putting Green Bermudagrass	Auburn U./Dickens
Pesticide and Nutrient Fate	Leaching	Michigan St. U./Branham
	Leaching/Volitalization	U. of Ca. Riverside/Yates
	Pesticide Leaching	U. of Fla./Snyder
	Pesticide Leaching/Runoff	U. of Ga./Smith
	Pesticide Volitalization	U. of Mass./Clark
	Pesticide Degradation Rates	Purdue U./Turco
	Runoff Management	Oklahoma State U./Baird
	Transport Modeling	U. of Maryland/Carroll
	Pesticide Fate Modeling	Stuart Cohen & Bud Smart
Golf Benefits	USGA Sanctuary Project	Golf House/Snow
	Cooperative Sanctuary Project	NY Audubon/Dodson
	Wildlife Links	National Fish and Wildlife Foundation/Stangel