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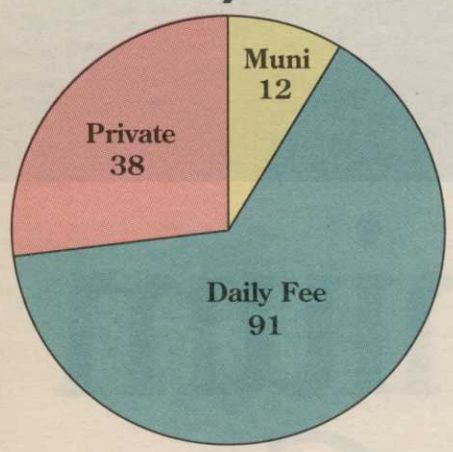
SEED AND SOD
A special look at research and the marketplace

INSIDE

University Courses



Types of university-affiliated golf courses in the United States. Total = 141
Source: NGF

See related story on page 33.

USGA promises another $4.1M

Executive Committee promises continued support through 1997

By Mark Leslie

The U.S. Golf Association Executive Committee has approved another $4.15 million in funding for research projects.

Revealing the decision made on June 10, USGA Green Section National Director Jim Snow said he was excited at the committee's high level of support for the research program.

The committee this winter allotted $3.8 million to 18 research projects through 1992. That will complete the 10-year program that began in 1983.

This new infusion of funds will carry research from 1993 to 1997, Snow said.

Accomplishments so far have consisted mostly of findings that set the foundation for further studies, Snow said. He cited the Turfgrass Information File at Michigan State University, which "is a tremendous resource for the entire industry and is just now catching on"; development of NuMex Sahara bentgrass and 609 buffalograss; and investigation of breeding improvements such as screening for salt."

"These are things you can't visually see, but that were important research," he said. "We're at the point now where

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The University of Wisconsin has joined the growing ranks of universities with affiliated golf courses. This is a view of its new Robert Trent Jones Jr.-designed course, which officially opens in July. See a story on university courses on page 33.

Winter whacks Washington courses with winter kill

By Bob Spiwak

Yoyo-like winter temperatures caused winter kill that devastated greens on northern Washington State courses, costing tens of thousands of dollars in repair bills and lost revenues.

The Spokane area, which boasts some of the nation's best municipal courses, was hit the hardest. Indian Canyon, perennially listed among the top U.S. venues, counted at least half its greens this spring as "browns." And it was not alone.

In fact, courses that fared best had newly planted bentgrass, or were blanketed with snow throughout the winter. Most severely damaged were courses with incursions of poa annua (annual bluegrass) and little or no snow

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Mass. enacts new pesticide mandates

By Vern Putney

The Massachusetts Department of Food and Agriculture will require all private and commercial pesticide applicators to file an annual report listing specific pesticide use information based on previous year records beginning in 1992.

The records will be made available to the 351 cities and towns in the Bay

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Seed scientists making great strides

By Mark Leslie

See related stories p. 20-26.

While plant breeders are making extraordinary advances in turfgrasses, scientists are probing and developing other improvements using nature's endophytes and nematodes and new techniques like seed priming and coating.

"A lot of very bright and talented young people are going into turfgrass research," said Dr. Reed Funk of Rutgers University, an expert in cool-season grasses. "They will do a lot of things that haven't been done.

"Priming," he added, "could be developed to be a delivery system for micro-

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University and industry seed breeders take aim

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organisms that can (improve turfgrass seed) right now in a petri dish. Putting it to work in the field may be a long way off. But who knows? Researchers now have tools that weren't available in the past."

Kevin Morris, national director of the U.S. Department of Agriculture's National Turfgrass Evaluation Program, said golf course superintendents and others have "many more grasses to pick from than in past years.

"We have made a lot of progress in grass breeding in the past 10, 15 years. I think a lot of that is due to the Plant Variety Protection law being implemented in the early 1970s. It gave people the protection to develop something new and market it without having to worry about it being stolen. Partly responsible, also, is that the NTEP's testing program has gotten information out for people to see."

Morris pointed to tremendous progress in perennial ryegrasses. "If you look at the best ryegrass in tests four years ago and compare it to the latest varieties, there is no comparison. There are 20, 30 or 40 that are better... Not that that one is bad, but the other ones have made that much headway in plant breeding."

ENDOPHYTES

While plant breeders nationwide are improving grasses, U.S. Golf Association Green Section National Director Jim Snow said the USGA is concentrating the next three years on environmental research. It is donating more than $3 million to 18 research projects at universities around the country.

Central to hopes of scientific breakthroughs are endophytes. An endophyte is a fungus that lives within plants and gives them natural resistance to certain chewing and sucking insects. Different endophytes live in different species of grass. If one can be found for a certain type, it can be inoculated into grass of that same type.

Since the discovery of endophytes, scientists worldwide have searched for more.

Dr. Richard Hurley of Lofts Seed, Inc. said endophyte is a good "insurance policy" and researchers "have gone a long way in a very short time finding them" for various varieties.

Morris said: "Endophytes have worked well in perennial ryegrasses. Several tall fescues also have endophytes in them now. With tall fescue it won't be as much of a benefit as with ryegrass. Endophytes do two things. They give resistance to certain insects... and give the plant better tolerance to stress and drought. The survivability is better with the endophyte, although we don't know why.

"With ryegrasses, that's critical because it's difficult for them to make it through the summer in some places and they have problems with insects, too. Tall fescues don't have very many insect problems, so I don't see the endophyte being a plus or minus with them. They might enhance their stress resistance, but we won't know that for three or four years."

He said endophytes have been found for some fine-leaf fescues, "which we desperately need because they have a lot of insect problems."

Snow said endophytes for bentgrasses would be most beneficial for Northern golf courses.

"They have found endophytes in other bentgrasses so we're hopeful they can find one in either creeping or Colonial bentgrass," Snow said.

Funk and his Rutgers associates, among others, are looking for endophytes in bentgrasses and bluegrasses. One biologist is even going to Great Britain to search for a bluegrass endophyte for a few weeks this summer.

He said Dr. James White of England, one of the leading endophyte authorities in the world, is at Rutgers this summer working in conjunction with the Sports Turf Research Institute to find endophytes for bluegrass as part of a USGA-funded program.

Funk reported endophytes have been found for several bluegrass types, but not the poa annua or poa trivialis found on golf courses.

Once an endophyte is found, Funk said, "We need to: first, transfer it; and then get it to establish a long-term symbiotic relationship that's transferred through the seed. It must have useful properties to enhance the turf performance, like increasing its insect resistance or stress tolerance."

Hurley, Lofts' vice president and director of research and agronomy, warned that while endophyte retains its viability in cold storage, it loses it dramatically when stored in warm conditions.

Citing the "significant breakthroughs in grasses being developed with genetic resistance to stress tolerance and pest resistance," Funk added: "These are little incremental increases ... But they are building blocks that make a huge difference over the years."

SEED PRIMING

He also pointed to "considerable research" on seed priming. Prim-

on even more improvements in turf varieties

ing is a way to control hydration of seed to a level that allows pre-germination activity, but prevents "radical emergence," or sprouting. The result is faster germination and green-up.

But, Funk said: "It could be much more important than just speeding up germination. The ultimate reason some people are working on primed seed is that ... intrinsic with the ability to put moisture in the seed is the hope that they can put in certain favorable micro-organisms that will be present when the turf is established and that could suppress disease problems.

"Perhaps it can fix atmospheric nitrogen to reduce fertility costs. And perhaps it stimulates seedling vigor by producing growth hormones."

Priming, Funk added, could be developed to be "a delivery system for micro-organisms that can do these things right now in a petri dish."

One firm emphasizing priming is The Genesis Group, a Salt Lake City, Utah, firm that owns seven seed companies.

Genesis and scientist John Easton of Kamterter Products of Lincoln, Neb., have cooperated on a new type of priming called solid matrix priming (SMP). Genesis has exclusive rights to market this type of primed turfgrass.

Genesis Product Manager Gregg Finlay said SMP puts seed in clay, adds water and oxygen, and controls the temperature over a certain period of time. "You trick the seed into believing it is in the soil," he said, "and just before it sprouts, you shut it off, dry it down and package it."

Unlike other primed seed which has a very short shelf life, SMP seed can be stored up to 18 months, perhaps longer on bluegrass, Finlay said. "We're also doing accelerated shelf-life studies on bentgrasses and others," he said.

"We have primed rye and get germination in as little as 24 hours. That's exciting ... especially in areas where there is flooding and the golf course gets wiped out. The superintendent will have an option. He can get primed seed and have grass in a couple of days."

All species can be primed, but some show better results. Marked advantages with Kentucky bluegrass, and with fescue when sown in marginal areas, has been reported.

Dr. Joe Duich at Pennsylvania State University has been testing the method for two years and is extremely pleased with the results, Finlay said.

Finlay said Genesis is in the first of two phases.

"Once we launch the priming process, we're looking down the road a year or two to phase two. Phase two will actually include microbial inoculation during the priming process. In a microbial inoculation you will have a measure of nitrogen fixation in the plant much in the same manner as in legumes," he said.

"What it means for the golf course is you can get by using less fertilizer. And this bacteria forms a sheath around the root, which will allow the plant to take up more nitrogen available in the soil and thereby better use the nutrients in the soil."

Chief Executive Officer Gary Beil said Genesis is in the early stages of marketing. But it is available through the company's seven firms — Seaboard Seed Co. in Bristol, Ill.; Grassland West in Clarkston, Wash.; Curtis & Curtis, Inc. in Clovis, N.M.; Green Seed Co. in Gallatin, Tenn.; Garrison Seed Co. in Hereford, Texas; Turf Merchants, Inc. in Tangent, Ore.; and Stanford Seed Co., in Buffalo, N.Y.

Lofts' John DeMatteo seed priming "fits a niche" in the industry, helping superintendents, for instance, when they are under time constraints to get seed down and grass up.

"But the cost is very high. That's always going to be the prohibiting factor," he said.

OTHER RESEARCH

Seed coating is also done by seed companies.

Generally, it adds about 50 percent weight to the seed, but the coating can include fertilizer, fungicides, growth hormones, insect repellents, or whatever else researchers decide.

DeMatteo said coating coating causes "an invigorated plant, one that's more aggressive, that comes up faster."

He said its sheer weight will help when seeding the lightweight bentgrass. Bentgrass with coating, he said, is easier to spread. Wind can't blow it away."

The USGA's Snow said in many areas of research, turf specialists traditionally use techniques first developed by the major crop industry, which spends "tens of millions of dollars trying to do the same things with crops" as we want to do with turf.

There is a great future in biotechnology, Snow said

He said the USGA is particularly keen on:

• Dr. Eric Nelson's work at Cornell University. Nelson has found that certain compost materi-

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Musser supports student researching genetic engineering

KNOXVILLE, Tenn. — James E. Bond may not be in pursuit of sinister spies, but the Great Britain native is searching the mysteries of genetic engineering that will help turfgrass professionals for generations.

Developing techniques to transfer desirable traits from one plant to another has earned a $4,000 scholarship for the 26-year-old doctoral candidate at the University of Tennessee.

Bond was awarded the 1991 Musser International Turfgrass Foundation's graduate scholarship to complete studies "of tremendous benefit to turfgrasses," according to Dr. Lloyd M. Callahan, UT professor in charge of a DNA research program in the department of Ornamental Horticulture and Landscape Design.

As a direct result of Bond's work, "highly desired traits such as cold-hardiness, herbicide resistance, disease resistance, among others, can be introduced into desired turfgrasses that do not possess this trait," wrote Callahan in nominating Bond for the scholarship.

"This technology is essential for genetic engineering of plants and the related improvement of crop species," echoed Dr. Peter M. Gresshof, who holds the Racheff Chair of Excellence in plant molecular genetics at the university. "Bond's progress has been excellent despite the intellectual and scientific challenge of the research."

The Musser Foundation was formed by graduates of the turfgrass programs at Penn State University to fund basic turfgrass research through fellowships to outstanding graduate students completing their doctoral work in turfgrass science. It honors the late Dr. H. Burton Musser, turfgrass researcher and educator at Penn State for four decades who developed Penncross creeping bentgrass.

The foundation is funded primarily by contributions from Penn State alumni and grants from companies in the turfgrass industry. This year, it sought donations from golf course superintendent associations. The Midwest, West Virginia and Florida responded.

Frank Dobie, superintendent at The Sharon (Ohio) Club, was re-elected president at the organization's annual meeting. Dr. Joseph Duich, head of Penn State's tufgrass program, is first vice president.

Other officers are Tom Burrows, a turfgrass consultant based in Stuart, Fla., second vice president; John Spodnik, superintendent at Westfield, Ohio, CC, treasurer; and Dudley Smith, superintendent at Silver Lake CC, Orlando Park, Ill., secretary.

Seed research—

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als suppress diseases.

"Some materials are being tested on courses in New York and are suppressing diseases very well," Snow said. "The trouble is that we don't know which organisms are causing the suppression. He is trying to identify which organisms are having this effect on diseases. If you can identify the organisms, you can incorporate them into top-dressing materials or sprayable materials ... so that when you top dress greens you can be putting down organisms that suppress disease, and therefore reduce use of pesticides."

- Dr. Nick Christians' research at Iowa State, where he is in the patenting stage for a biological control of certain types of weeds.
- Studies on using nematodes for grub control at Ohio State, the University of Kentucky, Rutgers and University of California-Davis.
- Turf entomologist Mike Villanit's work on alternative methods of controlling grubs at Cornell's Geneva Experimental Station.
- Dr. Dan Potter's research on biological-type controls at the University of Kentucky.
- University of Florida studies on control of take-all patch.
- Research on placement of insecticides in the turf, being done by Dr. Harry Niemczyk at Ohio State and Dr. Pat Vittum at the University of Massachusetts.
- Attempts to develop an "improved" cold-tolerant seeded-type Bermudagrass at Oklahoma State, and a seeded buffalograss at the University of Nebraska.

In recent years, Snow said: "We've made a lot of gains in context of the environment, but not in controlling pests. Trying to develop chemicals that are more specific to certain pest, is better than putting out a product that controls just about everything and thus kills a lot of beneficial organisms. From that standpoint, chemicals have improved a lot.

"There are chemicals we have lost that were much better for some things than anything we've got today — particularly insecticides... But they were environmentally poo, so, justifiably, they were eliminated. So what we have now is a breed of chemicals that is, for the most part, short-lived, breaks down quickly, and has a lot less potential for contamination of ground water and surface waters than before."