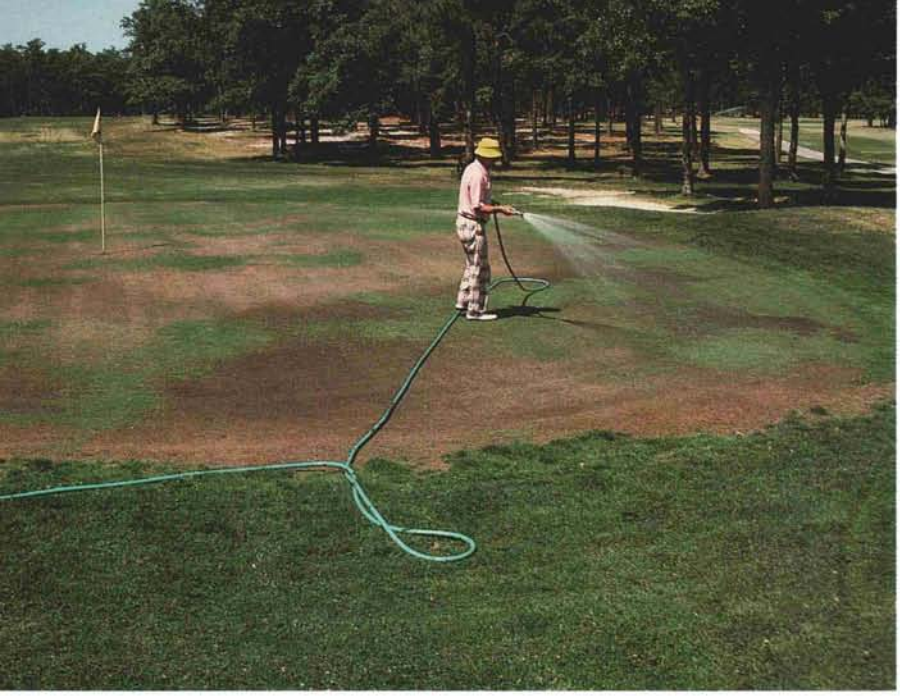
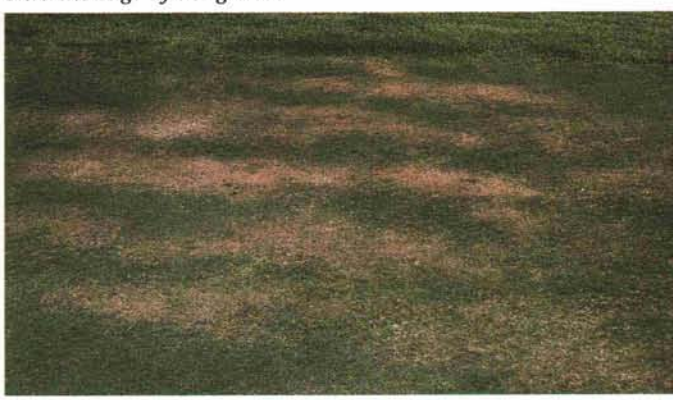


(Left) This scene could have been avoided if the applicator had taken a closer look at the herbicide label.

(Below) Experienced help usually avoids problems like this, caused by the overlap of a herbicide application onto the edge of the green.



The USGA/GCSAA Research Program: Receiving and Disbursing Research Funds

by J. R. WATSON
Vice President/Agronomist, The Toro Company, Minneapolis, Minnesota

THE 10-YEAR USGA/GCSAA Research Program has reached its halfway point, and much has been accomplished. New grasses, new information systems, and new cultural maintenance programs are in use, and the program has great potential for ever more significant gains in the next five years. Administratively, much has gone on behind the scenes to get us where we are.

Funds that support the USGA/GCSAA Turfgrass Research Program are authorized and supplied by the USGA Executive Committee. For the most part, these funds were raised in conjunction with the USGA Capital Campaign. Individuals, corporations, clubs, golf and golf-related organizations designated or directed their contributions be used for this purpose. Contributions are still needed, and they are still being received.

Specifically, the Research Committee agrees on projects to be supported, establishes priorities, and allocates funds according to specific guidelines. A budget is prepared and submitted to the Chairman of the USGA's Green Section Committee (F. Morgan Taylor, Jr.), who in turn submits the budget to the USGA Executive Committee for approval or revision.

J. R. Watson

From 1983 through 1988, approximately $2.25 million was granted and invested in turfgrass research projects at 28 universities. In addition, the Turfgrass Information File, at Michigan State University, has been established and is on line.

Historical

A brief discussion of the program and how it was developed may help to clarify how the funds are disbursed.

In 1982 the USGA Research Committee was formed and charged to seek ways to counter the anticipated reduction in availability of natural resources, especially water and energy, and at the same time find methods that would reduce the increasing costs of golf course maintenance. The committee was given 10 years.

Following several meetings, the committee identified specific objectives and defined the programs needed to accomplish them. The committee

recognized at the outset there would likely never be enough money or time to accomplish everything of value in turfgrass research, and that it would have to adhere strictly to the stated objectives in its decision to allocate money. Furthermore, any research proposals given serious consideration would have to be specifically directed toward the stated objectives.

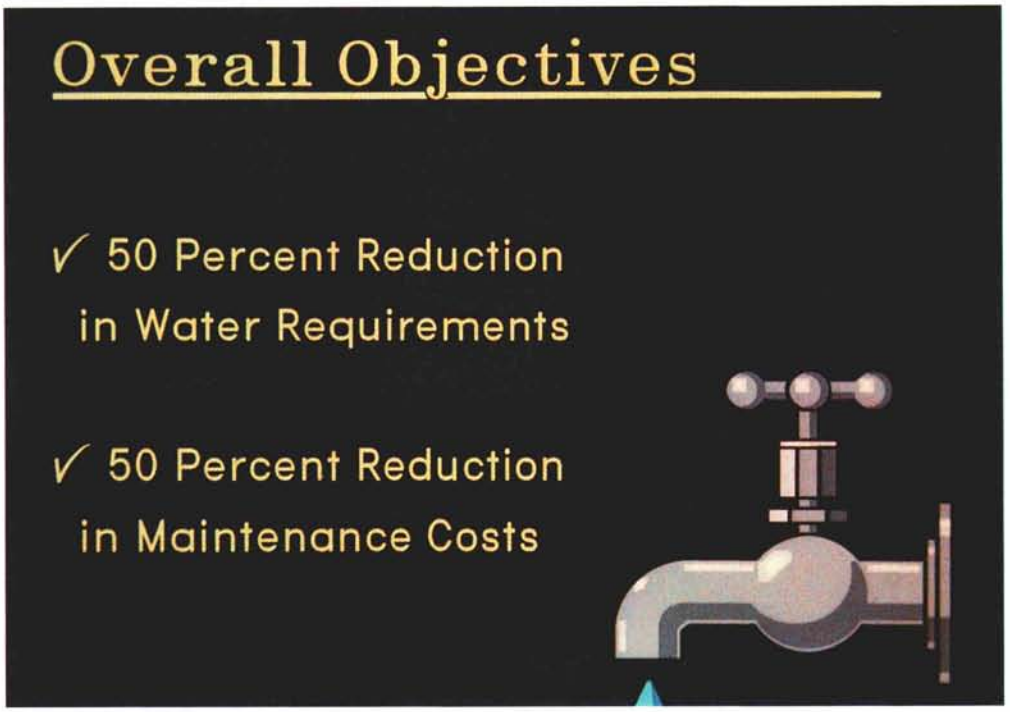
To accomplish the mission, two simple yet challenging objectives were established. Simply put, they were:

1. To reduce water use on golf courses by 50 percent.
2. To reduce golf course maintenance costs by 50 percent.

It was clearly recognized that to accomplish these objectives, cooperation and coordination in three areas would be necessary:

1. Development of new grasses.
2. Introduction of new technologies.
3. Establishment of educational resources to provide turfgrass professionals the information needed to adapt the grasses and technologies to their own use.

The USGA program would contribute, but it could not be expected to solve these problems alone.



The USGA/GCSAA Research Program.

Disbursing Funds

To support the objectives, funds have been allocated to five major categories. They are plant stress mechanisms, turfgrass breeding, cultural practices, computerized turfgrass information file, and administration.

As the committee wrestled with the techniques and procedures needed to accomplish its mission, it became quite clear that a multi-discipline research project would have to be directed toward development of new species and varieties of turfgrasses. With no criticism of past plant breeding and selection efforts intended, it was apparent that most of these had been directed toward grass species exhibiting a broad germplasm base, and developed under highly favorable growth conditions, usually with high moisture and high fertility regimes.

The USGA was looking for grasses with lower fertility requirements, good drought and salinity tolerance, and tolerance to high and low temperatures. At the same time, the new grass would have to be of high quality for golf.

Stress Mechanisms

To begin with, scientists understood few of the mechanisms by which turfgrass plants tolerate stress, making it difficult for them to use modern technology to hasten breeding new cultivars. New information about plant stress mechanisms was required to develop an elite breeding pool based on rapid and easy selection procedures.

Dr. James B. Beard submitted a detailed research proposal and laid out a road map dealing with plant stress mechanisms. It was accepted. Now in its final stages, the program has substantially enhanced this area of turfgrass knowledge. A few items on the original plan are yet to be accomplished.

Through 1989, the committee has disbursed in excess of $528,000 for this study.

Grass Breeding and Selection

Grass breeding projects were deemed to be the most time consuming, but they were also the most essential segment of the entire program. The approach would embody at least three areas:

1. Evaluating stress tolerance cultivars selected from currently used species.
2. Making selections from native species currently surviving and growing in adverse conditions and in environments hostile to normally used turfgrass species.
3. Developing new cultivars through conventional and emerging bio-engineering technology.

Previously funded, long-term programs under the direction of Drs. Glenn Burton, of the University of Georgia; Joe Duich, of Penn State University; Reed Funk, of Rutgers; and Dick Skogley, of the University of Rhode Island, have continued to receive funding. Added to the list were the programs of Drs. Arden Baltensperger, of New Mexico State; Robin Cuany, of Colorado State; Milt Engelke, of Texas A&M; Charles Mancino, of the University of Arizona; Terry Riordan, of the University of Nebraska; William Rumball, of New Zealand DSIR; Charles Taliaferro, of Oklahoma State; and Don White, of the University of Minnesota. In addition, Dr. Jeff Krans, of Mississippi State, has received limited support.

Disbursements to these projects to date has totalled $434,000, and by the end of 1989 it will reach $703,000.

Cultural Practices

From the outset it was recognized that new and old cultivars would have to be evaluated for future turfgrass usage in terms of their minimal main-

Dr. Charles Taliaferro (third from right) and Dr. Mike Kenna (right) at Oklahoma State University, receive a grant check from William Bengeyfield (left), Chairman of the USGA Research Committee, and Dr. James Watson, Research Committee member. Work at OSU is dedicated to producing a cold-tolerant, seeded type of fine-leaf bermudagrass.

The development of new, stress-tolerant grasses is a major goal of the Research Program.

tenance characteristics and their cultural and maintenance costs.

Some 14 projects have been selected to support this effort. They include studies by Drs. Branham, Michigan State — management; Brauen, Washington State — management; Carrow, University of Georgia — management; Colbaugh, Texas A&M — pathology; Danneberger, Ohio State — heat stress physiology; Horst, Texas A&M — techniques to determine salinity tolerance and to qualify salinity tolerance levels; Krans, Mississippi State — plant morphology; Lucas, North Carolina State — pathology (note: this project was funded by Hall Thompson); Petrovic, Cornell — mycohrizza symbiosis; Shane and Nameth, Ohio State — pathology; Shaw, UC Riverside — kikuyu grass selection (note: this project is a cooperative effort with the Northern and Southern California Golf Associations); Sherman, University of Nebraska — cultural practice interactions; Smiley, Cornell — pathology; and Vargas, Michigan State — pathology.

Through 1988, $357,000 has been disbursed in support of these efforts; through 1989 the total will exceed $462,000.

Turfgrass Information File

The Turfgrass Information File is a bibliographic computer database designed and developed under the direction of Dr. Roy Chapin and Peter Cookingham, at Michigan State University. It is unique. It covers turfgrass literature of all kinds, including works on turf culture as far back as 1906. The database provides access to approximately 14,000 records, with an additional 2,000 new references added each year. The records include a wide range of technical and popular literature concerning turfgrass research and cultural and maintenance topics.

Access to the collection is provided through computer by the USGA-TGIF. With an IBM PC, or a compatible system, and communications software, the database is accessible 18 hours a day to those who subscribe for an annual fee. To those without access to a PC, staff personnel are available to assist with search strategies and to send the searched materials. Response to most requests is made within 48 hours.

Through 1989, expenditures for this project will exceed $414,000. Funding of this project is expected to decline as new subscribers are added and the use of this resource increases.

Administration

Administrative costs for the Research Committee are minimal. Members receive no compensation for their contributions of time and effort. Expenses are for the usual legal counsel, printing costs, and committee meetings, including an annual meeting with research leaders in one or more of the research categories. Legal expenses are incurred in the negotiation of contracts and agreements.

Administrative costs are also incurred as a result of monitoring visits. Committee members are assigned to visit project leaders, review and monitor progress against the project objectives, and mutually agree upon future direction. Monitoring visits include discussion with project leaders, department heads, deans, graduate students, and technicians. Visits and subsequent reports and studies generated by the chairman of the monitoring visit are shared with those who are concerned, and are highly beneficial to both parties. Additionally, committee members become acquainted with project supporting personnel, the techniques, and the graduate students, who are tomorrow's leaders.

Funds Disbursed Through the USGA Research Committee

Category	1983-88 Expended	1989 Projected	1983-89 Total
Stress Mechanisms	$ 460,500	$ 67,800	$ 528,300
Turfgrass Breeding	894,285	337,000	1,231,285
Cultural Practices*	365,123	105,500	470,623
Turfgrass Research Library	354,326	60,000	414,326
Administration	144,285	70,000	214,285
Total	$2,218,519	$660,300	$2,878,819

*includes biotechnology category

Administrative funds disbursed through 1988 were $144,000 and will reach $214,000 by the end of 1989.

Disbursement Summary

For the first five years (1983-88), total funds disbursed have amounted to approximately $2,200,500. Through 1989, the sixth year of the 10-year program, disbursements will approach $2,800,000. We thank all who have contributed, participated, cooperated, and supported this effort, and those who will continue to do so.

Six Grasses — One Golf Course

by TOMMY WITT, CGCS
Austin Country Club, Austin, Texas

PETE DYE designed and built an extremely challenging, very aesthetic golf course for the Country Club of Austin, in Austin, Texas, in 1984, at its new location in the hills west of Austin, along the Colorado River. In addition to creating a spectacular design, Dye established a combination of different grasses, several of which had never been used in central Texas.

Dye chose to establish Penncross bentgrass on the greens, 419 bermudagrass on the fairways, 328 bermudagrass on the tees, centipede in the roughs, St. Augustinegrass on the aprons, and a mixture of blue grama, buffalograss, lovegrass, and bluestem in many of the waste areas. Because of its poor playing qualities, though, much of the St. Augustinegrass has been replaced with 328 bermudagrass.

As you can imagine, dealing with six different grasses on one golf course presents quite a challenge, requiring a number of turfgrass management considerations.

The Penncross greens were established on a 100 percent sand base, with the severe undulations and contours so typical of much of Pete Dye's designs. The seedbed varies in depth from 8 to 30 inches, making irrigation management extremely difficult.

Tommy Witt

To make matters worse, the course is located in very hilly terrain, and several of the greens suffer during hot weather from poor air circulation. The combination of consistently high relative humidity, very high summer temperatures, and over 43,000 rounds of golf each year makes this course as much a challenge as any golf course superintendent would want.

The bermudagrasses are well adapted to the area, and they present no maintenance or playability problems to speak of. The St. Augustine, on the other hand, has been poorly received by the golfers, and has caused many problems as collars bordering our bentgrass greens. Not only can the golfers not easily negotiate chip shots from the St. Augustine, but the water requirements and management practices needed for bentgrass and St. Augustine are so dramatically different, keeping them both in good condition is nearly impossible. Brown patch and leafspot are the major disease problems we encounter with St. Augustine, and the encroachment of this grass into the aprons, tees, and fairways is an important concern.

Because of heavy play, the centipede grass in the roughs is rarely given the opportunity to reach an optimum or quality condition. This grass species simply cannot tolerate the traffic, and as a result, the leaf blades turn a reddish color and become thin and worn. Normally preferring a lower soil pH, the centipede does not prosper in the 8.5 pH soils native to the area. Although several sulfur applications are made each year to reduce the effects of the high pH of the soil and irrigation water, results from these efforts have been minimal.

The grass species used in the waste areas, such as grama, love, bluestem, and buffalograss do very well. These