

YEAR-END REPORT - USGA RESEARCH
November 1, 2000

1. **Title**

On-site Testing of Bentgrass and Bermudagrass Cultivars for Putting Greens

2. **Investigator/Cooperator**

Mr. Kevin Morris, Executive Director, National Turfgrass Evaluation Program
Director of Research, GCSAA
Dr. Michael Kenna, Director of Research, USGA Green Section

3. **Purpose**

To evaluate commercially available cultivars of bentgrass and bermudagrass for their usefulness on USGA specification putting and/or chipping greens.

4. **Location of Project**

Sixteen golf courses across the United States. Eight of the courses have bentgrass only, five have both bentgrass and bermudagrass and three courses have bermudagrass only.

5. **Introduction**

Many new bentgrass and bermudagrass cultivars have been commercialized in the last few years, however, there is a lack of research data on their performance under intensively managed putting green conditions. Therefore, this research evaluates these grasses on golf course putting or chipping greens built to USGA specifications. This research differs from evaluations conducted at university research stations because the greens are used by golfers for practice putting and/or chipping.

Information from this project is valuable to the golfing industry because it will determine the adaptation of grasses for golf course use. The information obtained from on-site testing will be of particular value to plant breeders, researchers, extension educators, USGA agronomists, golf course architects, and superintendents who need to select the best adapted cultivars of bentgrass or bermudagrass for a particular regional climate or management level.

6. **Methods**

The evaluation trials are jointly sponsored by the Golf Course Superintendents Association of America (GCSAA), the United States Golf Association (USGA) Green Section and the National Turfgrass Evaluation Program (NTEP). Trial sites are located on golf courses near a land grant university with a turfgrass research program or in a major metropolitan area which is readily accessible to a university turfgrass scientist. Sixteen evaluation trial sites have been established. Trials are positioned strategically in significant areas for bentgrass and bermudagrass performance. NTEP functions as the

coordinating agent for this five-year cultivar trial. All bentgrass test locations except the Snoqualmie Ridge site, were seeded in fall 1997. Due to unforeseen circumstances, the Snoqualmie Ridge site was not selected until Spring 1998 and seeded in June 1998. Bermudagrass trials were planted in June 1998. Trials are conducted under the leadership of a university turfgrass research scientist, who has a faculty appointment. This person has signed a research agreement and is responsible for establishment of the trial, coordination of the maintenance regime, collection and submission of the data to NTEP.

Trials are located on newly constructed USGA specification greens where golfers practice putting or chipping. Plot size is 5' x 10', replicated three times. Host clubs provide daily maintenance of each green. However, an advisory committee consisting of representatives from GCSAA, USGA, NTEP, universities and the turfgrass seed industry provides recommended establishment and maintenance procedures. The superintendents chosen have excellent skills and a strong record of supporting GCSAA and the USGA. Each superintendent also has a good relationship with the university scientist, who has ultimate responsibility for the trial.

NTEP administers the program and its funding, sets the advisory committee and gathers their input and recommendations for the trial. NTEP organized and distributed the seed which constitutes the entries for each trial location. Also, NTEP provides maintenance and data collection protocols to each site, collects, analyzes and disseminates the performance data in annual and final reports, and conducts an annual site visit of each trial site.

The research cooperator is responsible for data collection. Data collected includes monthly turfgrass quality ratings, genetic color, stimpmeter readings and ratings of any any disease, insect or other stress that may occur. The research cooperator is responsible for submission of data to NTEP by February 1 of each year. Annual funding is based on receipt of a complete set of data by the February 1 deadline.

VII. Results and Discussion

The latest progress reports containing 1999 data and management information on this project were compiled and distributed in June 2000. The two reports plus last year's reports (1998 data) can be found on the NTEP web site at <http://www.ntep.org/onsite/ost.htm>. Following is a summary of the results from 1999.

Bentgrass

Again, this year, data was reported from each location separately and not summarized over all thirteen locations, as in standard NTEP reports. Detailed management information was also reported for each site including establishment (date and any problems), mowing (height, frequency, mower type, rollers and groomers used), cultivation (dates and type of aerification, verticutting and topdressing), pesticide and fertilizer regime used (dates, rates and products used) and factors of play (opening and closing date for play, types of spikes allowed, uses of green).

Data on leaf texture, genetic color and greenup were reported by most locations. Density ratings were collected at several locations while fall color and winter color was rated at a

few locations. Diseases were reported by two locations. Turfgrass quality ratings were collected during each month of the growing season at each site.

Stimpmeter readings were not collected at all locations due to the sloped nature of some trials. Also, the on-site advisory committee changed the stimpmeter requirements to only a maximum of three ratings per year, when the green is at its maximum speed, medium speed and slow speed.

The entry "Penn A-4" was again the most consistent top-performer having the highest or second (or tied for) highest mean turfgrass quality rating at twelve of the thirteen sites in 1999. "Penn A-1" was also a consistently good performer finishing number one or two (or tied) for mean turfgrass quality at eight locations. "Century" continued its good performance with quality ratings in the top statistical group at seven sites but this was less than the twelve sites in 1998. We attribute this to a broader separation of the varieties' performance, in general. This is a fairly normal occurrence in cultivar testing as varieties age. In addition, the management level imposed at each site may be having a greater effect on performance than during year one.

Differences in color and density seemed to contribute considerably to quality performance. Again, this is consistent to what we observe in our official NTEP trials conducted at universities. Stimpmeter readings again showed little or no statistical differences among the cultivars.

The site at Murrieta, CA (SCGA Members Club) has a significant infestation of annual bluegrass (*Poa annua*). Since the level of invasion is so severe in some plots, this will be the last year for turfgrass quality evaluations of the bentgrasses at that site.

Bermudagrass

1999 was the first year that good consistent turfgrass quality data could be collected on the bermudagrasses, due to 1998 being the establishment year for this test. The ultra-dwarf bermudagrasses (Mini-Verde, TifEagle, Champion, MS-Supreme and Floradwarf) have shown they can produce a very dense, tight turf with excellent putting quality.

At all seven remaining locations (one location - St. Charles, MO, suffered severe winter kill), "Mini-Verde" performed in the top statistical group for mean turfgrass quality. "Champion" was in the top statistical group at five locations, "TifEagle" - four locations, "MS-Supreme" and "Floradwarf" - two locations each. Mini-Verde has been the most consistent top-performer to date with Champion and TifEagle following closely. Genetic color, density, leaf texture, spring greenup and stimpmeter ratings were collected at several locations. In addition, one location collected data on overseeding quality and another collected thatch measurements. This information will be important as these varieties age and are more affected by management and cultural practices.

In June 2000, turfgrass performance of the bermudagrasses declined significantly at the Mobile, AL (Mobile Country Club) site. After careful evaluation by the researcher and the superintendent, the decline was attributed to high nematode populations. "Tifgreen" had an average root knot nematode (*Meloidogyne spp.*) population (from several samples collected over four replications) of over 120 per 100 cm³ of soil. All other cultivars,

except "Floradwarf", had average root-knot numbers of 55-90 per 100 cm³ of soil. "Floradwarf", however, was the only cultivar to have high numbers of lance (*Hoplolaimus spp.*) nematodes (over 100/100 cm³ of soil). No other cultivar had a sample contain more than 10 lance nematodes per 100 cm³ of soil. Although the data has not yet been statistically analyzed, there appears to be considerable cultivar differences for nematode infestation and susceptibility.

EXECUTIVE SUMMARY

On-Site Testing of Bentgrass and Bermudagrass Cultivars for Putting Greens

Kevin N. Morris
National Turfgrass Evaluation Program

Many new bentgrass and bermudagrass cultivars have been commercialized in the last few years, however, there is a lack of research data on their performance under intensively managed putting green conditions. This project evaluates these grasses on golf course putting or chipping greens built to USGA specifications. This research differs from evaluations conducted at university research stations because the greens are used by golfers for practice putting and/or chipping. The evaluation trials are jointly sponsored by the Golf Course Superintendents Association of America (GCSAA), the United States Golf Association (USGA) Green Section and the National Turfgrass Evaluation Program (NTEP). Trial sites are located on golf courses near a land grant university with a turfgrass research program or in a major metropolitan area which is readily accessible to a university turfgrass scientist. Sixteen evaluation trial sites have been established. Bentgrass trials were all seeded in fall 1997, with one exception. Bermudagrass trials were planted using vegetatively propagated material in June 1998.

The second progress reports containing 1999 data and management information on this project were compiled and distributed in June 2000. The two reports can be found on the NTEP web site at <http://www.ntep.org/onsite/ost.htm>. The on-site advisory committee decided again to report data from each location separately and not summarized over all locations, as in standard NTEP reports. Detailed management information was also reported for each site including establishment (date and any problems), mowing (height, frequency, mower type, rollers and groomers used), cultivation (dates and type of aerification, verticutting and topdressing), pesticide and fertilizer regime used (dates, rates and products used) and factors of play (opening and closing date for play, types of spikes allowed, uses of green).

The bentgrass entry "Penn A-4" was again the most consistent top-performer having the highest or second highest mean quality rating at twelve sites in 1999. "Century" continued its good performance with quality ratings in the top statistical group at seven sites although this was down from twelve sites in 1998. "Penn A-1" also performed well having the highest mean turfgrass quality ratings at five sites. Stimpmeter readings again showed little or no statistical differences among the cultivars. The site at Murrieta, CA (SCGA Members Club) will most likely be abandoned after this year due to high *poa annua* populations.

The bermudagrasses had their first full growing season in 1999 and several entries performed well. "Mini-Verde" was the most consistent performer by finishing in the top statistical group for mean turfgrass quality at all seven locations. "Champion" and "TifEagle" were close behind finishing in the top statistical group at five and four locations, respectively. Data collected on genetic color, density, leaf texture, spring greenup, overseeding quality and thatch showed considerable cultivar variability. Also, at one location (Mobile CC), high nematode populations were found to have a significant affect on turfgrass performance.