

## NTEP Statistical Analysis Grants

### National Turfgrass Evaluation Program

Kevin Morris

Start Date: 1999

Number of Years: 1

Total Funding: \$23,000

#### Objectives:

1. *Evaluation of ANOVA diagnostics and the validity of assumptions about turf quality ratings.*
2. *Assessment of spatial variation.*
3. *Evaluation of factors affecting the success or failure of varietal separation.*
4. *Quantification of the value of test locations - varietal separation and uniqueness of ranking.*
5. *Assessment of plot size and experimental design efficiency.*

In an interest to improve the acquisition and analysis of National Turfgrass Evaluation Program variety trial data, the Policy Committee discussed the current trial setup, experimental design, and statistical analysis procedures. Five one-year statistical analysis projects were selected for funding in 1999. NTEP data available for evaluation includes the Bentgrass Putting Green and Fairway Trial, Kentucky Bluegrass Trial, and Perennial Ryegrass Trial. Research proposals were considered for the following five areas.

**Evaluation of ANOVA diagnostics and the validity of assumptions about turf quality ratings.** Is the current 1-to-9 rating system the best system for accurately assessing quality. The rating scale assumes a quantitative measurement when in reality it is qualitative in nature. Much of the rating scale is not used by some (or many) cooperators, therefore a normal distribution (bell-shaped curve) is not produced. If cooperators used more of the rating scale would better data be produced?

**Assessment of spatial variation.** How effective are cooperators at establishing uniform sites and collecting uniform data? For instance, disease data is often not very significant statistically. Is this because the disease did not develop uniformly throughout the plot area? What procedures might we use to determine if plots are uniform?

**Evaluation of factors affecting the success or failure of varietal separation.** Why do some locations achieve more varietal separation than other locations? When using more of the rating scale do we see more varietal separation or less?

**Quantification of the value of test locations - varietal separation and uniqueness of ranking.** Can the use of cluster analysis and correlation among locations, years and seasons within years be used to group or separate locations? Research in this area could lead to logical geographic groupings of locations and specific regional analysis.

**Assessment of plot size and experimental design efficiency.** Are there any changes that can be made to the way tests are designed (the efficiency of the randomized complete

block design), proper plot size, number of replications, etc. that can make for better tests and data?

Short summaries of the five funded projects will be discussed in next year's annual summary. I

## On-Site Fairway Overseeding Trials

### National Turfgrass Evaluation Program

Kevin Morris

Start Date: 1999

Number of Years: 2

Total Funding: \$ 20,674

#### Objectives:

*Evaluate new cultivars on bermudagrass fairways at golf courses in the Southern and Western United States that will provide scientific information of a more applied nature about cultivars for overseeding.*

With the initiation of on-site testing of bentgrass and bermudagrass on putting greens, interest is now increasing for the evaluation of other grasses used on golf courses. Grasses are needed that provide exceptional playing surfaces with less pesticides, fertilizer and water. Therefore, grasses that have superior drought, cold, heat, disease and insect resistance need to be identified.

Overseeding bermudagrass fairways is a common practice throughout the southern half of the United States. Millions of pounds of seed are bought and sown each autumn on golf courses in this region. Golf course owners, managers and superintendents seek grasses that establish quickly, exhibit exceptional playability, are aesthetically pleasing and require less input. This project will evaluate new cultivars on bermudagrass fairways at golf courses in the Southern and Western United States. This on-site testing program will provide scientific information of a more applied nature about cultivars for overseeding.

Information from this project will be valuable to the golfing industry because it will determine the adaptation of grasses for golf course use. 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 for overseeding in a particular regional climate.

**Location and Number of Trial Sites.** The evaluation trials will be 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 will be located on golf courses near a land grant university with a turfgrass research program or in a major metropolitan area that is readily accessible to a university turfgrass scientist. Ten evaluation trial sites are proposed. Trials will be positioned strategically in the following areas: southern California, Arizona, south Texas

(Houston), Gulf Coast (LA, MS, FL), central or south Florida, Myrtle Beach, SC, North Carolina/Virginia, Georgia/Alabama, Oklahoma/southern Kansas.

Trials will be located on active play sites where golfers hit fairway golf shots and/or drive golf carts. Host clubs will provide daily maintenance of the fairway site. It is preferred that host clubs have a history of supporting the USGA and receiving visits from USGA agronomists. The superintendent should have excellent skills and a strong record of supporting GCSAA and the USGA. The superintendent should have good relationships with the university scientist, who will have ultimate responsibility for the trial.

The Executive Director and Special Projects Coordinator of NTEP, USGA Construction Education Coordinator and Green Section Director of Research and the GCSAA Research Director will determine the location of trial sites.

**Trial Specifics.** The NTEP will function as the coordinating agent for this two-year cultivar trial. Because overseeded grasses provide a temporary playing surface mainly in fall and winter and are reseeded each year, cultivars will be seeded in two consecutive years. Trials will be conducted under mutually agreed upon guidelines, procedures and funding outlined in a research agreement to be drafted and signed by appropriate representatives of GCSAA, USGA and NTEP. Trials will be conducted under the leadership of a university turfgrass research scientist (i.e., research cooperator), who has a faculty appointment. This person will sign a research agreement and will be responsible for establishment of the trial, coordination of the maintenance regime, collection and submission of the data to NTEP.

The NTEP will solicit entries for the trial from sponsoring companies. Trials will be conducted with named cultivars and commercially available blends or mixtures. Various species used in overseeding, such as perennial ryegrass and *Poa trivialis* will be allowed. Experimental lines that will be released in the immediate future (i.e. before the end of the testing cycle) may also be included in this trial at the sponsor's discretion.

Trials will be maintained according to agreed upon procedures. Establishment and maintenance procedures will be based on recommendations set by an advisory committee consisting of representatives from GCSAA, USGA, NTEP, universities and the turfgrass seed industry. Daily maintenance will be conducted by the golf course superintendent at the expense of the host club.

The NTEP will administer the program and its funding, set the advisory committee and gather their input and recommendations for the trial. The NTEP will organize and distribute the seed that will constitute entries for each trial location. The NTEP will provide maintenance and data collection protocols to each site, collect, analyze and disseminate the performance data in annual and final reports, and conduct an annual site visit of each trial site.

**Data Collection.** The research cooperator will be responsible for data collection. The following data will be collected from each trial:

1. Establishment rate, seedling vigor, percent ground cover (4-6 weeks after seeding).
2. Turfgrass quality (monthly).
3. Plot color (twice - late fall/early winter and spring).
4. Texture (once per season).
5. Rate or speed of transition from overseeded grass to bermudagrass.
6. Environmental stress, traffic and divoting damage, disease and insect damage and other data deemed appropriate and feasible by the research cooperator.

The research cooperator will be responsible for submission of data to NTEP by August 1 of each year. †

## Special Report on Turfgrass Diversity

Diversity, GRCS, Inc

Deborah Strauss

Start Date: 1998

Number of Years: 2

Total Funding: \$36,000

Objectives:

1. *The results and analysis of the USGA turfgrass study, and overviews of the relevant USGA research grants.*
2. *A history of major turfgrass germplasm collections and their evaluation for use in developing golf courses.*
3. *A report on the National Turfgrass Evaluation Program (NTEP).*
4. *Articles from experts within both the golfing industry and the larger research and breeding community on innovative turfgrass breeding research including how biotechnology is or could be used in turfgrass breeding regimes.*
5. *A perspective on how US turfgrass breeding and use relates to international efforts.*
6. *Interviews with key leaders in forage and turfgrass research and breeding, including the chairs of the US Forage and Turfgrass Crop Germplasm Committee (CFC), and the Guelph Turfgrass Institute, NTED, and others.*
7. *Interviews with representative industry (seed and golf) leaders.*

The rapidly developing interest in golf around the world has put increasing demands on the golfing industry to develop and maintain improved and more environmentally sound golf courses. These demands come not just from the leisure and sporting community, but also from the communities in which the growing number of golf courses are located and where they fill significant needs for green belts and park spaces, particularly in the drier areas of the world.

These circumstances underscore the need for the dissemination of scientific information and expert views about the often-overlooked agricultural commodity of turfgrass. Golf courses require the genetic materials that will keep them