



SUBJECT: 2022 USGA/NTEP Cool-Season Fairway Water Use and Drought Trial

TO: Seed Companies and Breeders

FROM: Kevin N. Morris, Executive Director

DATE: June 17, 2022 **UPDATED July 11, 2022**

Plans have been finalized for the upcoming national cool-season fairway water use and drought test sponsored by the National Turfgrass Evaluation Program (NTEP) and the United States Golf Association (USGA). **Please know that the USGA committed significant funding for this project, to build facilities in 2016 and provide some of the funding required for plot maintenance and evaluation of this trial.**

The evaluations are conducted using digital imaging as well as subjective ratings, therefore, data collection is involved and intense. **As a result, NTEP will utilize additional staff to monitor site performance and data collection accuracy.** Therefore, even with the additional support, funding from entry fees is essential to properly conduct this trial.

The following gives the details concerning this test. Please complete the enclosed Test Entry Application Form and Sponsorship Agreement for each entry you wish to submit. The first payment for testing is due when the seed is shipped to us. Please make checks payable to the "National Turfgrass Evaluation Program" in \$US only.

Following is important information for this trial:

- 1. The entries for this trial will be \$8,500.00 total payable in four annual installments of \$2,125.00 each.**
- 2. This trial will run for three years of data collection, with four entry fee payments being required.**
- 3. Six locations will be established (see attached list), with three sites using rainout shelters (Approach 1) and three sites using in-ground irrigation with three different ET levels (see attached document).**
- 4. Since space within each trial location is limited, we are prioritizing this trial to include the following species: 1st priority – bentgrass and fineleaf fescue, 2nd priority – perennial ryegrass, then other cool-season species.**
- 5. Our deadline for receipt of seed is August 29th.**

Additionally, we are seeking third party certification for water use efficient/drought tolerance turfgrasses. Currently, we are aligning with other industry groups to discuss potential qualification standards and possible Water Sense® turfgrass certification with EPA Water Sense® staff.

2022 USGA/NTEP National Cool-Season Fairway Water Use and Drought Trial (page two)

For a list of the chosen trial locations and details on the trial parameters, please see the attached documents.

Test locations will be maintained similar to a golf course fairway. Mowing height will be 0.4 - 0.6" and fertilization rate will be 0.25 – 0.5 lbs. of N/1000 sq. ft./growing month. Plot size will be 1 meter x 1 meter replicated three times (in the rainout shelter, Approach 1 locations) and replicated three times within each ET zone (Approach 2 locations). The seeding rate will be 0.5 grams per sq. ft. for bentgrass (1.1 lbs./1000 sq. ft.), 2 grams per sq. ft. for fineleaf fescue (4.4 lbs./1000 sq. ft.) and 2.72 grams per sq. ft. for perennial ryegrass. Therefore, we will need **250 grams (0.55 lbs.)** of seed of each bentgrass entry, **1,100 grams (2.4 lbs.)** of seed of each fineleaf fescue entry and **1,400 grams (3 lbs.)** of each perennial ryegrass entry.

Since trial initiation and data collection will be unfamiliar for some of our cooperators, NTEP will conduct training sessions in advance to ensure proper trial setup, management and image accuracy. As stated above, a portion of the trial funding is designated for additional NTEP staffing dedicated to this project.

The following is the entry fee structure and schedule:

\$2,125.00 each entry - when seed is sent to us
\$2,125.00 each entry - on or before June 1, 2023
\$2,125.00 each entry - on or before June 1, 2024
\$2,125.00 each entry - on or before June 1, 2025

\$8,500.00 total

The following are guidelines for sending seed for this test:

- a. **250 grams of seed of each bentgrass entry, 1,100 grams of each fineleaf fescue, or 1,400 grams of seed of each perennial ryegrass entry must be received at Beltsville, MD by August 29, 2022.**
- b. Seed received after August 29, 2022 but by September 4, 2022 can be included in this test but a **double (2x)** entry fee will be charged.
- c. Seed received after September 4, 2022 will **not** be included in this test.
- d. The entire requested amount of seed is needed for an entry to be included in this test. Entries that are received with less than the requested amount of seed will **not** be included in this test.

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We encourage good planning in preparing and shipping entries on or before the August 29th deadline. In addition, it would be helpful to send seed earlier than the August 29th deadline if possible. Please do not send seed treated with a pesticide. Treated seed will **not** be accepted by the NTEP. Also, please make sure seed is prepaid for shipping charges to Beltsville, MD. The NTEP will **not** pay any additional shipping fees to forward seed to Beltsville.

Please forward all seed, completed application forms and payments to:

Kevin Morris, Executive Director
National Turfgrass Evaluation Program
Beltsville Agricultural Research Center-West
Building 005, Room 307
Beltsville, Maryland 20705 USA

If any of the above information is unclear, or if you have a question about any aspect of this test, feel free to contact me by phone (301-504-5125), fax (301-504-5167), mobile (301-873-6545) or via email (kmorris@ntep.org). Thanks for your continued cooperation with NTEP.

Enclosures

2022 USGA/NTEP NATIONAL COOL-SEASON
FAIRWAY WATER USE/DROUGHT TOLERANCE TRIAL

TEST ENTRY APPLICATION FORM

(Please complete one for each entry)

Required Information:

1. Variety name or experimental designation _____

2. Genus and species name

3. All previous name(s) or experimental designation(s) this entry has been tested under (for *Previously Tested* entries, please indicate name(s) or experimental designations in past NTEP trials)

4. Genetic structure, i.e. single plant selection, number of parental clones, composite cross, open pollinated, etc.

5. Is this variety in commercial production? _____ If not, what are the prospects of it being made available in the United States in two or three years?

6. Has seed been treated with a pesticide or a coating? _____ Treated and/or coated seed will not be accepted.

TEST ENTRY APPLICATION FORM - 2022 NATIONAL FAIRWAY COOL-SEASON WATER USE TRIAL

8. Name and address of organization sponsoring this entry and contact person

Suggested Information:

1. What is the origin of the entry?

2. Seed Quality:

a. Seed lot number _____

b. Year of production _____

c. Location of production _____

d. Purity _____

e. Germination percent _____ Test date _____

f. Noxious and objectionable weed or other crop present _____

3. Description of entry (merits or limitations)

NTEP reserves the right to reject any entry submitted for testing based on:

- a. Completeness of information supplied
- b. Seed quality, quantity, or presence of pesticide/coating treatment
- c. Failure to pay entry fee(s)

2022 USGA/NTEP NATIONAL COOL-SEASON
FAIRWAY WATER USE/DROUGHT TOLERANCE TRIAL

SPONSORSHIP AGREEMENT

(Please complete one for each entry)

We _____ agree to pay the entry fee as indicated
Sponsor

below for _____ to be included in the 2022
entry name or code

USGA/NTEP National Cool-Season Fairway Water Use/Drought Tolerance Trial. By signing this agreement, we also agree to the payment terms set forth below.

Payment will be made to the National Turfgrass Evaluation Program in \$US.

ENTRY FEE PAYMENT SCHEDULE

When the seed is sent to NTEP	\$2,125.00
On or before June 1, 2023	\$2,125.00
On or before June 1, 2024	\$2,125.00
On or before June 1, 2025	<u>\$2,125.00</u>
Total	\$8,500.00

Name and address of sponsor:

Authorized Signature

Date

USGA/NTEP Cool-Season Fairway Water Use/Drought Tolerance Trial Details and Protocols

June 10, 2022 version

MATERIALS AND METHODS

1. Cool-season grass trials will be established in six (6) locations for each species in fall 2022/spring 2023 (as indicated on the following map). The locations have been chosen as the most appropriate for the species tested in this trial.
2. Data will be collected for three growing seasons: 2023, 2024 and 2025 (2024-2026 if any locations cannot start treatments in 2023).
3. Two approaches will be used: Approach 1 – individual plot watering (rainout shelter) and Approach 2 – zone level (deficit ET_0) irrigation (see the following pages for a description of each approach).
4. An equal number of rainout shelters and zone level irrigation plots will be established from previous trial locations (see attached map and locations list for 2016 and 2022 trial). The rainout shelters will be utilized where summer rainfall is possible (and needs to be restricted).
5. Since plot space will be limited, the first priority for entries will include only bentgrass (creeping or colonial) and fineleaf fescues (various species). Perennial ryegrass will be included if space is available. If space is not filled with those three species, other species may be included in the trial. **Entries will be grouped and planted by species for ease of evaluation and management.** Standard entries identified by the advisory committee will be included.
6. Trial locations will be managed using a proposed mowing height of 0.4-0.6” and fertilization of 0.25 – 0.5 lbs. of N/1000 sq. ft./growing month. *These parameters will be reviewed and adjusted based on species by the advisory committee.*
7. Digital image technology will be used to measure percent green cover on plots. Training will be provided to cooperators so that images are collected properly.
8. An advisory committee consisting of USGA, university and entry sponsor companies will be utilized to develop and refine management regimes by species, as well as data collection and procedures outlined below.
9. Since the plot areas are limited, and require considerable labor to manage, the trial will be limited to 30 total paid entries (plus 3 standards), 3 reps of each for a total of 100 plots at each test site.
10. USGA and NTEP will pursue certification/qualification and/or branding of drought tolerant or low-water using cultivars. Therefore, we anticipate that at the end of the trial period, the system will be in place to apply this certification (or brand) to those entries that qualify (qualification requirements will be in place before entry submission).



Rainout shelters are already installed at three locations (see map)

Research Methodology

These approaches are based on similar protocols reported by Kansas State University, University of Arkansas and others (see selected references below):

- 1) **Approach 1- Individual Plot Level Irrigation:** The amount of seed per entry will be sufficient to establish to a final area of approximately 32.28 sq. ft per entry per site. (10.76 sq. ft./plot x 3 reps)
 - a. Year 1- Plots are fully established under full irrigation levels (plot size is 1 meter x 1 meter or 10.76 sq. ft.)
 - b. Years 2, 3, 4, etc.- Following uniform irrigation of all plots to initiate the study, full scale, automated irrigation is terminated, and individual plots are thereafter monitored on a regular basis (could be daily, bi-weekly, or weekly to correspond to particular watering frequencies allotted by the region or budget provided the cooperators) during the morning hours of the dry-down 'season'.
 - c. When quality attributes (wilt/firing/% green cover, etc.) of a specific plot or plots are noted to have fallen below a defined threshold (i.e. 75% green cover or another prescribed level as determined by the advisory committee), it is hand-irrigated with an amount of water necessary to recharge the root zone to field capacity (between ½" to 1"). Irrigation events are recorded on a per plot basis, so that total irrigation applied over the season can be calculated on a plot basis and statistics applied.
 - d. A dry-down 'season' will last around 80-100 days (the period length will be determined by the advisory committee), then plots will be fully irrigated to assess recovery. Turf quality ratings will be collected as well during dry down and recovery.
 - e. A rainout shelter will be employed for this approach. Data produced through the work would document 1) 'water quantity required (inches) per entry' for each location, 2) turfgrass quality before and during dry-down, during and after recovery, and a 3) ranking of the entries used.

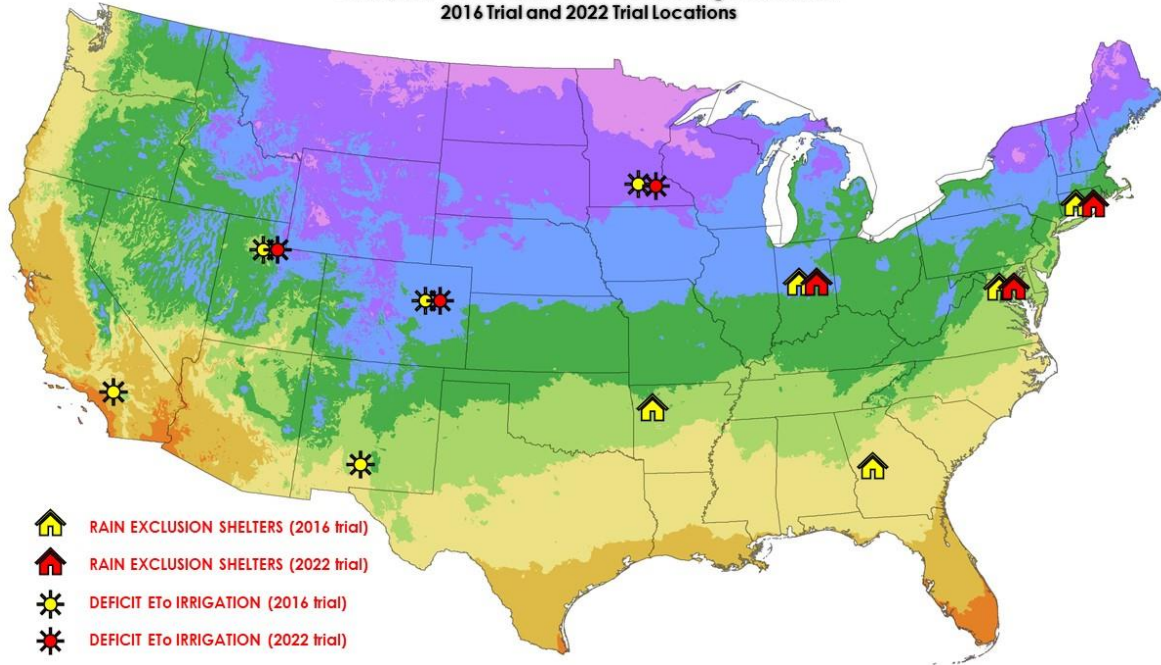
Selected References:

- Lewis, J.D. et al. 2012. Wilt-Based Irrigation in Kentucky Bluegrass: Effects on Visual Quality and Irrigation Amounts Among Cultivars. *Crop Sci.* 52:1881–1890. doi: 10.2135/cropsci2012.01.0033
- Richardson, M. D. et al. 2009. Drought Tolerance of Kentucky Bluegrass and Hybrid Bluegrass Cultivars. Online. *Applied Turfgrass Science*. doi:10.1094/ATS-2009-0112-01-RS.
- Richardson, M.D. et al. 2012. Irrigation Requirements of Tall Fescue and Kentucky Bluegrass Cultivars Selected Under Acute Drought Stress. Online. *Applied Turfgrass Science* doi:10.1094/ATS-2012-0514-01-RS.
- Steinke, K. et al. 2010. Drought Response and Recovery Characteristics of St. Augustinegrass Cultivars. *Crop Sci.* 50:2076-2083. doi:10.2135/cropsci2009.10.0635. Published online 16 June 2010.
- USGA Turfgrass and Environmental Research Online. Vol. 11, No. 6, June 1, 2012, p. 1-12. <http://www.lib.msu.edu/cgi-bin/flink.pl/?recno=205406>



Plots are individually watered after they reach the desired drought stress threshold.

USGA/NTEP Cool-Season Water Use & Drought Tolerance:
2016 Trial and 2022 Trial Locations



USGA/NTEP Cool-Season Fairway
Water Use & Drought Resistance Trial

Approach 1
(restrict water
for 100 days)



Amherst, Massachusetts
W. Lafayette, Indiana
College Park, Maryland

Approach 2
(reduced
ETo levels)



St. Paul, Minnesota
Logan, Utah
Ft. Collins, Colorado