Stop #2: USGA/NTEP Cool-Season Water Use Trial

Marco Schiavon, Antonio Verzotto, Magdalena Poleska and Jim Baird
Department of Botany and Plant Sciences
University of California, Riverside, CA 92521

Objectives:

The National Turfgrass Evaluation Program (NTEP) is designed to develop and coordinate uniform evaluation trials of turfgrass varieties and promising selections in the United States and Canada. Test results can be used by national companies and plant breeders to determine the broad picture of the adaptation of a cultivar. Results can also be used to determine if a cultivar is well adapted to a local area or level of turf maintenance. For more information, please visit ntep.org. The objectives of the 2016 National Cool-Season Water Use and Drought Resistance Test is to identify Kentucky bluegrass, tall fescue and perennial ryegrass cultivars that are best adapted to deficit irrigation and drought conditions.

Materials and Methods:

The study was seeded on 1 November 2016 and established during the winter and spring with non-limiting water. Entry list for the NTEP trial can be found on Table 1. Deficit irrigation, consisting of three irrigation regimes (80%, 60% and 40% ET_o replacements), started on 27 June 2017, and will last until October 25. Plots are mowed at 2.5 inches and fertilized with 0.33 lb N/month. Visual quality (1-9, 9 = best) and percent green cover (digital image analysis) were taken weekly during deficit irrigation and recovery.

Results:

No cultivar was able to withstand two months of 40%ET_o replacement irrigation with the highest % green cover recorded at 28% and 22% for tall fescue and Kentucky bluegrass, respectively (Tables 2 and 3). All of the tall fescue cultivars struggled at 60% ET_o replacements as well, having lost at least half of green cover by the end of August. Kentucky bluegrass performed slightly better than tall fescue at 60% ET_o replacements (Table 3). The best cultivar at 80% ET_o so far is LTP-SYN-A3 for tall fescue with 88% green cover (Table 2), and PST-K13-141 for Kentucky bluegrass with 89% green cover (Table 3).

Table 1. Entry list and plot plan for the 2016 National Cool-Season Water Use and Drought Resistance Test.

Entry Number	Species	Name
1	Kentucky Bluegrass	BAR PP 110358
2	Kentucky Bluegrass	Barrari
3	Kentucky Bluegrass	Everest
4	Kentucky Bluegrass	Blue Note
5	Kentucky Bluegrass	Babe
6	Kentucky Bluegrass	NAI-13-132
7	Kentucky Bluegrass	NAI-13-14
8	Kentucky Bluegrass	Blue Devil
9	Kentucky Bluegrass	Dauntless
10	Kentucky Bluegrass	PST-K13-137
11	Kentucky Bluegrass	PST-K13-143
12	Kentucky Bluegrass	PST-K15-169
13	Kentucky Bluegrass	PST-K11-118
14	Kentucky Bluegrass	PST-K13-141
15	Kentucky Bluegrass	Midnight
16	Perennial Ryegrass	SR 4650
17	Tall Fescue	BarRobusto
18	Tall Fescue	BAR FA 121095
19	Tall Fescue	DLFPS 321/3677
20	Tall Fescue	DLFPS 321/3679
21	Tall Fescue	DLFPS 321/3678
22	Tall Fescue	Nonet
23	Tall Fescue	GO-AOMK
24	Tall Fescue	Supersonic
25	Tall Fescue	Titanium 2LS
26	Tall Fescue	Thor
27	Tall Fescue	Thunderstruck
28	Tall Fescue	RS4
29	Tall Fescue	Kingdom
30	Tall Fescue	MRSL TF15
31	Tall Fescue	Catalyst
32	Tall Fescue	Stetson II
33	Tall Fescue	PST-5SDS
34	Tall Fescue	PST-R511
35	Tall Fescue	LTP-SYN-A3
36	x	x

Plot plan of for the 2016 National Cool-Season Water Use and Drought Resistance Test
North ➔

80% ET_o

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
X	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
5	9	7	1	11	15	13	2	12	3	14	6	10	8	4	X	16	32
17	24	20	29	34	21	18	26	19	22	28	33	35	31	27	30	25	23
6	4	8	12	10	3	15	11	13	7	2	14	1	5	9	16	X	28
25	22	30	23	19	17	24	21	33	31	18	29	20	26	32	35	27	34

40% ET_o

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
X	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
5	9	7	1	11	15	13	2	12	3	14	6	10	8	4	X	16	32
17	24	20	29	34	21	18	26	19	22	28	33	35	31	27	30	25	23
6	4	8	12	10	3	15	11	13	7	2	14	1	5	9	16	X	28
25	22	30	23	19	17	24	21	33	31	18	29	20	26	32	35	27	34

60% ET_o

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
X	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
5	9	7	1	11	15	13	2	12	3	14	6	10	8	4	X	16	32
17	24	20	29	34	21	18	26	19	22	28	33	35	31	27	30	25	23
6	4	8	12	10	3	15	11	13	7	2	14	1	5	9	16	X	28
25	22	30	23	19	17	24	21	33	31	18	29	20	26	32	35	27	34

Table 2. Green cover of tall fescue plots irrigated at 40%, 60% or 80% ET_o replacements on 8/29/2017.

Cultivar	ET_o	Cover (%)	MSGroup
BAR FA 121095	0.4	27	NOPQRSTU
BAR FA 121095	0.6	54	GHIJKL
BAR FA 121095	0.8	59	DEFGHIJ
BarRobusto	0.4	28	NOPQRSTU
BarRobusto	0.6	45	HIJKLMN
BarRobusto	0.8	57	FGHIJK
Catalyst	0.4	22	PQRSTU
Catalyst	0.6	37	KLMNOPQRS
Catalyst	0.8	64	BCDEFGH
DLFPS 321/3677	0.4	21	QRSTU
DLFPS 321/3677	0.6	35	LMNOPQRST
DLFPS 321/3677	0.8	79	ABCD
DLFPS 321/3678	0.4	25	NOPQRSTU
DLFPS 321/3678	0.6	43	IJKLMNOP
DLFPS 321/3678	0.8	79	ABCD
DLFPS 321/3679	0.4	25	NOPQRSTU
DLFPS 321/3679	0.6	40	JKLMNOPQ
DLFPS 321/3679	0.8	73	ABCDEFG
GO-AOMK	0.4	21	QRSTU
GO-AOMK	0.6	28	NOPQRSTU
GO-AOMK	0.8	76	ABCDEF
Kingdom	0.4	20	QRSTU
Kingdom	0.6	49	HIJKLM
Kingdom	0.8	64	BCDEFGH
LTP-SYN-A3	0.4	25	NOPQRSTU
LTP-SYN-A3	0.6	44	HIJKLMNO
LTP-SYN-A3	0.8	88	A
MRSL TF15	0.4	20	QRSTU
MRSL TF15	0.6	50	HIJKLM
MRSL TF15	0.8	75	ABCDEF
Nonet	0.4	17	STU
Nonet	0.6	24	OPQRSTU
Nonet	0.8	72	ABCDEFG
PST-5SDS	0.4	20	QRSTU
PST-5SDS	0.6	32	MNOPQRSTU
PST-5SDS	0.8	82	ABC
PST-R511	0.4	12	U
PST-R511	0.6	44	HIJKLMNO
PST-R511	0.8	78	ABCDE
RS4	0.4	23	OPQRSTU

RS4	0.6	62	CDEFGHI
RS4	0.8	90	A
Stetson II	0.4	19	RSTU
Stetson II	0.6	40	JKLMNOPQR
Stetson II	0.8	61	CDEFGHI
Supersonic	0.4	19	QRSTU
Supersonic	0.6	39	JKLMNOPQR
Supersonic	0.8	80	ABC
Thor	0.4	17	STU
Thor	0.6	44	HIJKLMNO
Thor	0.8	82	ABC
Thunderstruck	0.4	18	STU
Thunderstruck	0.6	44	HIJKLMNO
Thunderstruck	0.8	83	AB
Titanium 2LS	0.4	15	TU
Titanium 2LS	0.6	39	JKLMNOPQR
Titanium 2LS	0.8	58	EFGHIJ

Means followed by the same letter in a column are not significantly different (P=0.05).

Table 3. Green cover of Kentucky bluegrass plots irrigated at 40%, 60% or 80% ET_o replacements on 8/29/2017.

Cultivar	ET_o	Cover (%)	MSGroup
BAR PP 110358	0.4	15	K
BAR PP 110358	0.6	45	GHI
BAR PP 110358	0.8	71	ABCDE
Babe	0.4	14	K
Babe	0.6	38	IJ
Babe	0.8	69	ABCDE
Barrari	0.4	16	K
Barrari	0.6	63	DEFGH
Barrari	0.8	85	ABC
Blue Devil	0.4	15	K
Blue Devil	0.6	56	EFGHI
Blue Devil	0.8	86	ABC
Blue Note	0.4	15	K
Blue Note	0.6	43	HI
Blue Note	0.8	85	ABC
Dauntless	0.4	17	K
Dauntless	0.6	51	EFGHI
Dauntless	0.8	80	ABCD
Everest	0.4	15	K
Everest	0.6	46	FGHI

Everest	0.8	84	ABC
Midnight	0.4	22	JK
Midnight	0.6	65	CDEFG
Midnight	0.8	79	ABCD
NAI-13-132	0.4	13	K
NAI-13-132	0.6	44	HI
NAI-13-132	0.8	68	BCDE
NAI-13-14	0.4	20	JK
NAI-13-14	0.6	55	EFGHI
NAI-13-14	0.8	82	ABCD
PST-K11-118	0.4	20	JK
PST-K11-118	0.6	66	CDEF
PST-K11-118	0.8	88	AB
PST-K13-137	0.4	17	K
PST-K13-137	0.6	50	EFGHI
PST-K13-137	0.8	86	ABC
PST-K13-141	0.4	17	K
PST-K13-141	0.6	57	EFGHI
PST-K13-141	0.8	89	A
PST-K13-143	0.4	16	K
PST-K13-143	0.6	44	HI
PST-K13-143	0.8	85	ABC
PST-K15-169	0.4	18	K
PST-K15-169	0.6	52	EFGHI
PST-K15-169	0.8	79	ABCD

Means followed by the same letter in a column are not significantly different (P=0.05).