

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

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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 November 1, 2016 and let establish during the winter and the spring with abundant water. The entry list for the NTEP trial can be found in Table 1. Plots were irrigated using deficit irrigation, consisting of three irrigation regimes (80%, 60% and 40% ET_{os} replacements) for 3 months (from June 27 to October 21) in 2017, and subsequently watered at 100% ET replacement until May 31 2018. Deficit irrigation in 2018 was resumed on June 1 and will last until September 30. Plots are mowed at 2.5 inch 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

As observed in 2017, no cultivar was able to withstand three months of 40% ET_{os} replacement irrigation with the highest % green cover recorded at 28% and 24% for tall fescue and Kentucky bluegrass, respectively (Tables 2 and 3). Cultivars watered at 60% ET_{os} performed slightly better than 2017, with only one cultivar of tall fescue ('BarRobusto') and four of Kentucky bluegrass ('Babe', 'BAR PP 110358', 'NAI-13-132', and 'PST-K15-169') losing more than 50% ground cover. The best cultivar at 80% ET_{os} was 'Catalyst' for tall fescue with 71% ground cover (Table 2), and 'PST-K13-141' for Kentucky bluegrass with 77% ground cover (Table 3). No statistical differences were detected in the majority of tall fescue and Kentucky bluegrass cultivars between 40% and 60% ET_{os} replacements.

Table 1. Entry list 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

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

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

ET 60%

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. Cover of tall fescue plots irrigated at either 40%, 60% or 80% ET replacements on 8/29/2018.

Cultivar	ET _{os}	Cover (%)	MSGGroup	Cultivar	ET _{os}	Cover (%)	MSGGroup
BAR FA 121095	0.4	19	klmn	Nonet	0.4	24	klm
BAR FA 121095	0.6	61	abcdefghi	Nonet	0.6	53	fghij
BAR FA 121095	0.8	67	abcd	Nonet	0.8	66	abcd
BarRobusto	0.4	20	klmn	PST-5SDS	0.4	24	klm
BarRobusto	0.6	49	j	PST-5SDS	0.6	62	abcdefgh
BarRobusto	0.8	61	abcdefghi	PST-5SDS	0.8	69	ab
Catalyst	0.4	19	klmn	PST-R511	0.4	17	klmn
Catalyst	0.6	61	abcdefghi	PST-R511	0.6	57	defghij
Catalyst	0.8	71	a	PST-R511	0.8	65	abcde
DLFPS 321/3677	0.4	16	lmn	RS4	0.4	13	mn
DLFPS 321/3677	0.6	55	efghij	RS4	0.6	65	abcde
DLFPS 321/3677	0.8	64	abcdef	RS4	0.8	67	abcd
DLFPS 321/3678	0.4	24	kl	Stetson II	0.4	19	klmn
DLFPS 321/3678	0.6	57	defghij	Stetson II	0.6	57	cdefghij
DLFPS 321/3678	0.8	64	abcdefg	Stetson II	0.8	68	abc
DLFPS 321/3679	0.4	23	klmn	Supersonic	0.4	28	k
DLFPS 321/3679	0.6	51	ij	Supersonic	0.6	59	bcdefghij
DLFPS 321/3679	0.8	64	abcdef	Supersonic	0.8	62	abcdefghi
GO-AOMK	0.4	25	kl	Thor	0.4	16	lmn
GO-AOMK	0.6	53	hij	Thor	0.6	63	abcdefgh
GO-AOMK	0.8	62	abcdefgh	Thor	0.8	67	abcd
Kingdom	0.4	22	klmn	Thunderstruck	0.4	16	lmn
Kingdom	0.6	63	abcdefgh	Thunderstruck	0.6	53	fghij
Kingdom	0.8	67	abcd	Thunderstruck	0.8	62	abcdefghi
LTP-SYN-A3	0.4	23	klmn	Titanium 2LS	0.4	13	n
LTP-SYN-A3	0.6	58	bcdefghij	Titanium 2LS	0.6	53	hij
LTP-SYN-A3	0.8	67	abcd	Titanium 2LS	0.8	67	abcd
MRSL TF15	0.4	22	klmn				
MRSL TF15	0.6	53	ghij				
MRSL TF15	0.8	59	bcdefghij				

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

Table 3. Cover of Kentucky bluegrass plots irrigated at either 40%, 60% or 80% ET replacements on 8/29/2018.

Cultivar	ET _{os}	Cover (%)	MSGGroup
BAR PP 110358	0.4	18	f
BAR PP 110358	0.6	48	cde
BAR PP 110358	0.8	61	abcde
Babe	0.4	14	f
Babe	0.6	48	cde
Babe	0.8	56	bcde
Barrari	0.4	17	f
Barrari	0.6	65	abc
Barrari	0.8	68	ab
Blue Devil	0.4	24	f
Blue Devil	0.6	56	bcde
Blue Devil	0.8	67	ab
Blue Note	0.4	19	f
Blue Note	0.6	58	bcde
Blue Note	0.8	69	ab
Dauntless	0.4	24	f
Dauntless	0.6	57	bcde
Dauntless	0.8	69	ab
Everest	0.4	21	f
Everest	0.6	57	bcde
Everest	0.8	64	abc
Midnight	0.4	22	f
Midnight	0.6	55	bcde
Midnight	0.8	66	ab
NAI-13-132	0.4	17	f
NAI-13-132	0.6	44	e
NAI-13-132	0.8	61	abcde
NAI-13-14	0.4	21	f
NAI-13-14	0.6	64	abc
NAI-13-14	0.8	67	ab
PST-K11-118	0.4	18	f
PST-K11-118	0.6	58	abcde
PST-K11-118	0.8	70	ab
PST-K13-137	0.4	20	f
PST-K13-137	0.6	61	abcd
PST-K13-137	0.8	65	ab
PST-K13-141	0.4	20	f
PST-K13-141	0.6	67	ab
PST-K13-141	0.8	75	a
PST-K13-143	0.4	14	f
PST-K13-143	0.6	61	abcde
PST-K13-143	0.8	67	ab
PST-K15-169	0.4	17	f
PST-K15-169	0.6	46	de
PST-K15-169	0.8	63	abcd

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