

## The evaluation of novel hybrid bluegrass in northwest Oklahoma as low-input turf

### Objectives:

Seed producing hybrids and checks were seeded in the fall and spring of 2014-15. The objectives were to evaluate the performance of the entries in a small scale National Turfgrass Evaluation Program (NTEP) trial for low and medium maintenance turf quality.

The fall medium- and low-trials were seeded on September 24 & 25, 2014. Entries varied for germination/%cover when rated on Nov 20<sup>th</sup>. Germination was slightly better in the medium trial for unknown reasons (Table 1 & 2). The checks (Kentucky and commercial hybrids) generally germinated well. Six hybrids in the low trial were detected that germinated well ( $\geq 5$  score) (Table 1). After establishment, the low input trial was not watered, which eventually indicated which entries contained possible heat/drought tolerance, based on turf-quality ratings (Table 1; Figure 1 & 2). Between the 6/2 and 8/25 rating in the low maintenance trial, conditions were harsh on Kentucky checks, Bandera and some experimental hybrids moving them from the near top to near bottom of the rating scale (Table 1). This was also the time when pure Texas bluegrass and some experimental hybrids that were ranked lower in quality started to move up the quality scale. With the addition of irrigation in the medium maintenance trial, the Kentucky checks did not exhibit the level of stress seen in the low maintenance trial (Table 2). By the last rating date (11/24) in the low maintenance trial, there were several hybrids and Texas bluegrass that contained a turf quality rating similar to Solar Green (5.0), although they varied for % coverage. By the last rating on the medium maintenance trial (11/24), some of the hybrids that ranked high in the low maintenance trial also ranked high in the medium (Table 2). Similar to the Kentucky checks, some of the hybrids that did not perform well in the low maintenance trial did not exhibit the stress in the medium trial and ranked higher on the quality scale (Table 2; Figure 2). A spring seeding trial seeded on 4-15-15 did not result in successful establishment for most of the entries. Although most of the entries initially germinated and were watered throughout the summer, only the entries listed in Table 1 with an '\*' in the germination column had plants remaining by the fall. On Oct 24, 2015 an additional fall seeding trial was seeded. The trial including new hybrid selections in addition to some of the better performing entries currently identified.

On the basis of first year performance data, several hybrid entries appear to contain greater heat/drought tolerance than the Kentucky checks; but, similar to the cultivars Solar Green and Thermal Blue. Due to low seed production, some of the entries only contained one or two replications. The experimental hybrids with heat tolerance varied for color, texture, density, and first year percentage ground cover (Figure 2). Although the pure Texas bluegrass population 'D4' performed well as conditions became more extreme, it currently requires prototype equipment to process the seed to a commercial grade. Further evaluation of the current hybrids, newly selected hybrids, and efforts to increase seed production are in progress.

Summary:

>A low and medium NTEP turf trial containing novel experimental hybrids derived from crosses between Texas and Kentucky bluegrass was seeded in the fall of 2014 in Woodward, Oklahoma.

>Several hybrids were identified that appeared to contain greater heat and drought tolerance than the Kentucky bluegrass checks; but, similar to the cultivars Solar Green and Thermal Blue.

>The hybrids with heat tolerance varied for texture, color, density, first year ground coverage and seed production.

>Further evaluation of the current hybrids, newly selected hybrids, and efforts to increase seed production are in progress.

Table 1. Characteristics and performance of hybrids and checks managed under low-input conditions

Low-Input				Seeded 9-25-14																			
N	Germ	Texture	Color	Turf Quality																% Living Cover (2015)			
				11/20/14	4/29/15	10/9/15	2/13/15		4/29/15		6/2/15		8/25/15		9/17/15		10/23/15		11/24/15		3/12	7/30	10/9
3	8.7*	6.0	4.3	#125 Tkiso	8.7	Absolute	7.0	Absolute	6.0	#28:20 Tki	5.0	TK24 SPS	5.0	Texas D4-i	5.2	#35:24 TK	5.5	3.0	5.0	5.0	5.5		
3	8.0	4.7	5.0	Absolute	8.3	Thermal B	7.0	Bandera	6.0	TK24 SPS	4.7	#28:20 Tki	5.0	#35:24 TK	5.0	(TK43XTre	5.3	4.0	4.7	4.7	6.0		
3	7.7*	3.0	3.3	Solar Green	7.7	Bandera	6.7	Thermal B	6.0	#67 TK24X	4.0	#35:24 TK	5.0	(TK43XTre	4.7	Texas D4-i	5.2	4.8	3.8	5.2	5.3		
3	7.7	4.3	6.7	#67 TK24XHuntsville	7.3	Solar Gree	6.7	Solar Gree	5.7	#71 FS	4.0	(TK43XTre	4.3	TK24 SPS	4.0	#67 TK24X	5.0	6.0	4.7	3.3	4.7		
3	6.3*	7.3	5.0	#21 D4-10XPoland	7.3	#67 TK24X	6.3	#57 TK43X	5.7	#35:24 TK	4.0	Texas D4-i	4.3	Thermal B	4.0	Solar Gree	5.0	7.0	6.0	5.5	5.0		
3	8.7*	3.7	5.0	Thermal Blue	7.0	Midnight	6.3	#67 TK24X	5.3	(TK43XTre	3.7	#71 FS	4.0	#71 FS	4.0	#71 FS	5.0	1.0	3.0	3.0	3.0		
2	5.5	3.0	5.0	#56 WL63XRussian FS	6.5	#57 TK43X	6.0	Midnight	5.3	Solar Gree	3.3	#67 TK24X	3.7	#28:20 Tki	4.0	TK24 SPS	4.7	2.7	3.7	3.3	3.7		
3	7.3*	3.7	4.3	Bandera	6.3	#125 Tkisc	5.7	#17 TK43X	5.0	Texas D4-i	3.2	Texas WL-	3.7	Solar Gree	3.7	Thermal B	4.7	7.0	5.7	5.6	5.7		
3	6.7	3.7	4.7	#50 TK43XTrenton	6.3	(TK43XTre	5.0	#21 D4-10	4.3	Thermal B	3.0	Solar Gree	3.3	Texas WL-	3.7	Texas WL-	4.0	2.3	3.7	3.7	4.7		
2	5.5*	3.5	6.0	#71 TK24XHuntsville	6.0	#17 TK43X	5.0	(TK43XTre	4.0	Texas WL-	2.7	Thermal B	3.0	#67 TK24X	3.3	#71 TK24X	4.0	4.5	4.0	2.5	2.5		
3	5.0*	4.0	5.7	(TK43XTrenton)XRus	5.0	#21 FS	4.7	#21 FS	4.0	#87 (WL63	2.0	#71 TK24X	2.5	#71 TK24X	2.5	#28:20 Tki	4.0	2.0	4.0	4.0	4.0		
3	7.0*	5.3	3.3	Midnight	5.0	#21 D4-10	4.7	TK24 SPS	4.0	#71 TK24X	2.0	#21 FS	2.3	#125 Tkisc	2.3	#21 FS	3.3	4.0	3.3	3.0	2.3		
1	4.0	4.0	4.0	#17 TK43XTrenton	5.0	#71 TK24X	4.5	#56 WL63	4.0	#125 Tkisc	1.7	#125 Tkisc	2.0	#21 FS	1.7	#125 Tkisc	3.0	6.7	4.0	2.3	3.0		
3	3.7	5.0	4.0	#57 TK43XTrenton	4.7	TK24 SPS	4.3	#28:20 Tki	4.0	#21 FS	1.7	Absolute	2.0	#87 (WL63	1.5	Absolute	2.3	7.3	4.7	4.9	2.0		
6	3.2*	3.8	5.2	Texas D4-iso	4.5	#28:20 Tki	4.0	#125 Tkisc	3.7	#56 WL63	1.5	#56 WL63	2.0	Absolute	1.3	#56 WL63	2.0	4.0	3.0	2.0	2.5		
3	3.0	6.7	6.0	#21 FS	3.7	Texas D4-i	3.5	#50 TK43X	3.7	#21 D4-10	1.3	#87 (WL63	2.0	Bandera	1.0	#87 (WL63	2.0	2.0	2.5	3.2	2.0		
2	2.0	4.0	6.0	#35:24 TK43XTrenton	3.0	#56 WL63	3.5	#71 TK24X	3.5	Midnight	1.3	Bandera	1.0	#21 D4-10	1.0	#21 D4-10	1.7	6.0	3.7	1.7	2.0		
2	2.0	3.5	4.5	#87 WL63XRussian FS	2.5	#35:24 TK	3.5	#35:24 TK	3.5	Absolute	1.0	#21 D4-10	1.0	#50 TK43X	1.0	Bandera	1.3	6.0	4.0	4.5	1.0		
3	2.0	2.7	4.0	Texas WL-iso	2.3	#50 TK43X	3.0	Texas D4-i	3.0	Bandera	1.0	Midnight	1.0	#57 TK43X	1.0	Midnight	1.3	5.7	4.0	4.1	1.3		
3	1.7	2.3	6.3	TK24 SPS	2.0	#87 (WL63	3.0	#87 (WL63	3.0	#50 TK43X	1.0	#50 TK43X	1.0	#56 WL63	1.0	#50 TK43X	1.3	5.3	3.3	1.0	1.3		
1	2.0	3.0	6.0	#28:20 Tkiso	2.0	#71 FS	3.0	#71 FS	3.0	#57 TK43X	1.0	#57 TK43X	1.0	#17 TK43X	1.0	#57 TK43X	1.3	5.3	4.3	1.3	1.7		
1	1.0	4.0	6.0	#71 FS	1.0	Texas WL-	2.3	Texas WL-	2.3	#17 TK43X	1.0	#17 TK43X	1.0	Midnight	0.7	#17 TK43X	1.0	4.0	4.0	1.0	1.0		

Low-input = 3.5" mowing height; 0.75 lb N/1000 ft<sup>2</sup>/ Spring & Fall; no irrigation after establishment

Absolute, Midnight = Commercial *Poa pratensis* (Kentucky bluegrass); Solar Green, Thermal Blue, Bandera = Commercial Texas x Kentucky hybrids; Texas D4 & WL = *Poa arachnifera* (Texas bluegrass) experimental populations. Others = experimental hybrids. FS = fully shucked seed in which pure caryopsis were seeded.

N = # of plots

Germ = germination/%coverage (1 low -9 high), entries with an "\*" also germinated when seeded in the spring

Texture = (1 coarse – 9 fine); Color = (1 light – 9 dark); Turf Quality (1 low – 9 high); % Living Cover (1 low – 9 high)

Table 2. Characteristics and performance of hybrids and checks managed under medium-input conditions.

Medium-Input				Seeded 9-24-14				Turf Quality												% Living Cover (2015)								
N	Germ	Texture	Color	2/13/15			4/29/15			6/2/15			8/25/15			9/17/15			10/23/15			11/24/15			3/12	7/30	10/9	11/24
1	7.0	4.0	5.0	#17 TK43XTrenton	8.0	Solar Gree	6.7	Midnight	6.3	Bandera	6.0	Solar Gree	5.3	Midnight	5.7	Solar Gree	6.3	Midnight	6.7	#71 FS	7.0	7.0	1.0	3.0	3.0	3.0		
3	7.0	6.0	5.3	#125 Tkiso	7.3	Midnight	6.3	Bandera	6.0	Solar Gree	5.3	Midnight	5.7	Midnight	6.7	TK24 SPS	7.0	2.7	3.7	3.3	3.7	2.7	3.7	3.3	3.7			
3	6.0	2.0	5.0	Solar Green	6.7	Thermal B	6.3	#57 TK43X	6.0	TK24 SPS	5.0	#35:24 TK	5.5	Thermal B	6.7	Solar Gree	7.0	5.0	7.0	6.6	7.0	5.0	7.0	6.6	7.0			
3	5.3	6.0	4.7	#21 D4-10XPoland	6.3	#57 TK43X	6.3	#17 TK43X	6.0	#17 TK43X	5.0	Thermal B	5.3	#35:24 TK	6.5	Midnight	6.7	5.7	5.7	6.7	5.0	5.7	5.7	6.7	5.0			
3	4.7	4.0	4.7	Bandera	5.7	Bandera	6.0	Absolute	5.7	Midnight	4.7	#71 FS	5.0	#57 TK43X	6.0	#35:24 TK	6.5	3.0	5.0	5.0	5.5	3.0	5.0	5.0	5.5			
3	6.3	5.3	6.7	Midnight	5.7	#17 TK43X	6.0	Thermal B	5.7	#35:24 TK	4.5	#57 TK43X	5.0	#17 TK43X	6.0	Thermal B	6.3	5.0	6.7	6.0	7.0	5.0	6.7	6.0	7.0			
3	6.3	2.7	5.0	Thermal Blue	5.7	Absolute	5.7	Solar Gree	5.3	Absolute	4.3	#17 TK43X	5.0	Texas D4-i	5.8	Absolute	6.0	2.7	5.0	5.7	4.3	2.7	5.0	5.7	4.3			
2	4.0	4.0	6.5	#71 TK24XHuntsville	4.5	#125 Tkisc	5.0	#67 TK24X	5.0	(TK43XTre	4.0	(TK43XTre	4.7	Absolute	5.7	Texas D4-i	6.0	2.8	5.2	4.9	6.0	2.8	5.2	4.9	6.0			
3	3.0	3.3	6.7	#67 TK24XHuntsville	4.0	#67 TK24X	5.0	#87 (WL63	4.5	Thermal B	4.0	Absolute	4.3	#125 Tkisc	5.3	#17 TK43X	6.0	3.0	5.0	6.0	5.0	3.0	5.0	6.0	5.0			
3	4.3	5.3	6.7	Absolute	3.7	#21 D4-10	5.0	#125 Tkisc	4.0	#87 (WL63	3.5	Texas D4-i	4.2	(TK43XTre	5.3	#125 Tkisc	5.7	6.0	5.7	5.2	5.7	6.0	5.7	5.2	5.7			
3	4.3	3.3	3.7	#50 TK43XTrenton	3.7	#21 FS	4.3	(TK43XTre	4.0	#67 TK24X	3.3	#125 Tkisc	4.0	#71 FS	5.0	#57 TK43X	5.7	5.3	4.3	1.3	1.7	5.3	4.3	1.3	1.7			
6	2.5	3.7	3.8	Texas D4-iso	3.3	#35:24 TK	4.0	#21 FS	4.0	#21 FS	3.3	#87 (WL63	4.0	#71 TK24X	4.5	#87 (WL63	5.5	2.0	2.5	3.2	2.0	2.0	2.5	3.2	2.0			
2	2.5	3.0	5.0	#35:24 TK43XTrenton	3.0	#50 TK43X	3.3	#21 D4-10	4.0	#57 TK43X	3.3	TK24 SPS	4.0	#87 (WL63	4.5	(TK43XTre	5.3	4.0	4.7	4.7	6.0	4.0	4.7	4.7	6.0			
3	2.7	3.7	6.0	(TK43XTrenton)XRus	2.7	#71 TK24X	3.0	#35:24 TK	4.0	Texas D4-i	3.3	#71 TK24X	3.5	TK24 SPS	4.5	#71 TK24X	5.0	3.0	4.0	3.5	3.0	3.0	4.0	3.5	3.0			
3	1.3	5.3	5.3	#21 FS	2.3	#71 FS	3.0	#50 TK43X	3.7	#125 Tkisc	3.0	#67 TK24X	3.3	#21 FS	4.3	#67 TK24X	4.3	2.7	4.7	4.7	3.3	2.7	4.7	4.7	3.3			
2	1.5	3.5	6.0	#87 (WL63XRussian) F	2.0	(TK43XTre	3.0	TK24 SPS	3.5	#71 TK24X	2.5	#21 FS	3.3	Texas WL-	4.0	Texas WL-	4.3	2.3	3.7	3.7	4.7	2.3	3.7	3.7	4.7			
2	1.0	2.5	4.0	TK24 SPS FS	2.0	#87 (WL63	3.0	#71 TK24X	3.0	Bandera	2.0	Bandera	3.0	#28:20 Tki	4.0	#28:20 Tki	4.0	2.0	4.0	4.0	4.0	2.0	4.0	4.0	4.0			
3	2.3	4.3	4.7	#57 TK43XTrenton	2.0	Texas D4-i	3.0	#71 FS	3.0	#28:20 Tki	2.0	#28:20 Tki	3.0	#67 TK24X	3.7	Bandera	3.7	4.3	5.3	4.9	3.7	4.3	5.3	4.9	3.7			
3	2.0	3.0	5.0	#56 WL63XRussian FS	2.0	TK24 SPS	3.0	#28:20 Tki	3.0	Texas WL-	1.7	Texas WL-	2.7	Bandera	3.3	#21 FS	3.7	4.0	3.3	3.0	2.3	4.0	3.3	3.0	2.3			
3	1.0	3.3	4.0	Texas WL-iso	1.3	#28:20 Tki	3.0	Texas D4-i	2.8	#50 TK43X	1.3	#50 TK43X	2.0	#21 D4-10	2.7	#21 D4-10	2.7	5.3	3.7	4.0	3.0	5.3	3.7	4.0	3.0			
1	1.0	4.0	7.0	#71 FS	1.0	#56 WL63	1.7	#56 WL63	2.7	#21 D4-10	1.0	#21 D4-10	1.3	#50 TK43X	2.7	#50 TK43X	2.7	3.3	4.0	3.4	2.3	3.3	4.0	3.4	2.3			
1	1.0	2.0	5.0	#28:20 Tkiso	1.0	Texas WL-	1.7	Texas WL-	2.0	#56 WL63	1.0	#56 WL63	1.0	#56 WL63	1.0	#56 WL63	1.3	4.0	3.0	2.0	2.5	4.0	3.0	2.0	2.5			

Medium-input = 2.5" mowing height; 2 lb N/1000 ft<sup>2</sup> Spring and Fall; irrigation to prevent stress or dormancy

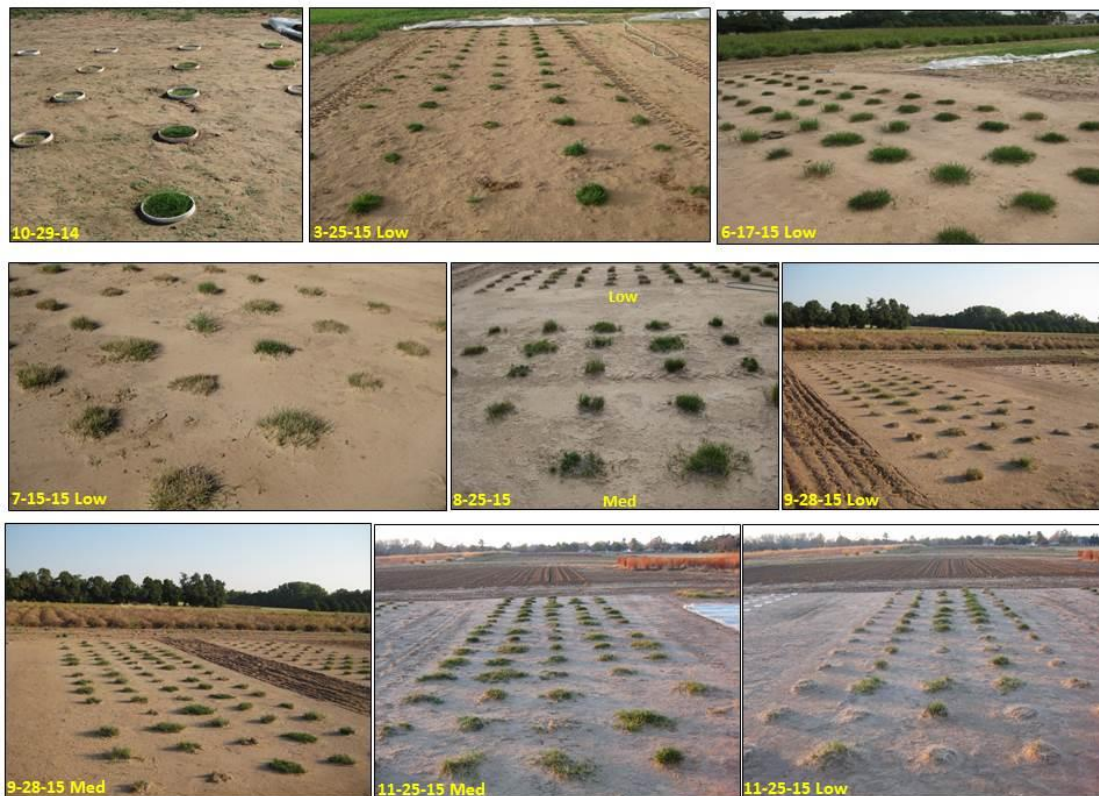


Figure 1. Photographs of the low and medium input seeded turf trial starting from approximately five weeks after seeding (10-29-14) to late November the following year.



Figure 2



Figure 2. All photos were taken on December 3, 2015. Names in the top left corner correspond to the entries in Table 1. The best plot, when there was a visible difference, within the low and medium trials was photographed for the figure.