

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

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Objectives:

1. Determine the level of apomixis, seed production, and turf potential of novel hybrid bluegrass selections derived from crosses between Texas and Kentucky bluegrass.
2. Evaluate selections that produce enough seed in a small National Turfgrass Evaluation Program (NTEP) like low and medium maintenance seeded turf trial.

Hybrid bluegrass, produced from crosses between Texas bluegrass and Kentucky bluegrass can produce turf that combines the heat and drought tolerant traits from Texas bluegrass with the turf quality and seed production of Kentucky bluegrass. A hybrid bluegrass breeding program initiated in 2003 in Woodward, Oklahoma has recently begun identifying seed producing hybrids derived from Texas × Kentucky and (Texas × Kentucky) × Kentucky controlled crosses made in the greenhouse. The selected hybrids were derived from hand-harvested seed from F₁ and later generations and are not considered first generation (F₁) hybrids (Table 1). These hybrids may be suitable as low-input turf, requiring less irrigation for water and other purchased inputs, compared to pure Kentucky bluegrass.

In July 2013, seeds from the hybrids were seeded into 4" pots in the greenhouse for a small scale germination and turf potential trial. Individual seedlings were also started in the greenhouse and used to establish outdoor plots to determine uniformity and turf potential and seed production. Germination rate and turf quality ratings were good for some of the hybrids (Figure 1 Top). The hybrid selections varied for many turf traits including those listed in Table 1 and is shown in Figure 1 (bottom), 2 and 3. Seed production was generally low this first year. Seed harvested this year and remnant seed from the entries listed in Table 1 in addition to seed from recently selected hybrids not listed in Table 1, were used to seed a small scale low and medium maintenance NTEP like turf trial in late September 2014 (Figure 4). Plots were seeded at 10

Table 1. A portion of the hybrids being evaluated for low-input turf. Genome size was determined by flow cytometry and ratings were based on spaced plants (Sept. 2014).

Greenhouse Cross*	2012 Seed ID	Hybrid Genome Size	Uniformity 9 = all identical	Genetic Color	Leaf Texture
D4-10 × Poland	7,21,85	8.86 pg	8	7	8
TK24 × Huntsville	71	14.53 pg	9	7	3
WL63 × Russian	87	13.20 pg	8	7	6
TK43 × Trenton	57	12.06 pg	8	4	5
TK24 × Huntsville	67	15.66 pg	7	7	4
WL63 × Russian	56	14.27 pg	3	5	4-6
TK43 × Trenton	50	12.74 pg	5	7	4

*D4-10, WL63 = *Poa arachnifera* (Texas bluegrass); Poland (PI 274645), Huntsville (PI 531526), Russian (PI 539061), Trenton (PI 527693) = *Poa pratensis* (Kentucky bluegrass); TK24, TK43 = Texas × Kentucky F₁ hybrid.



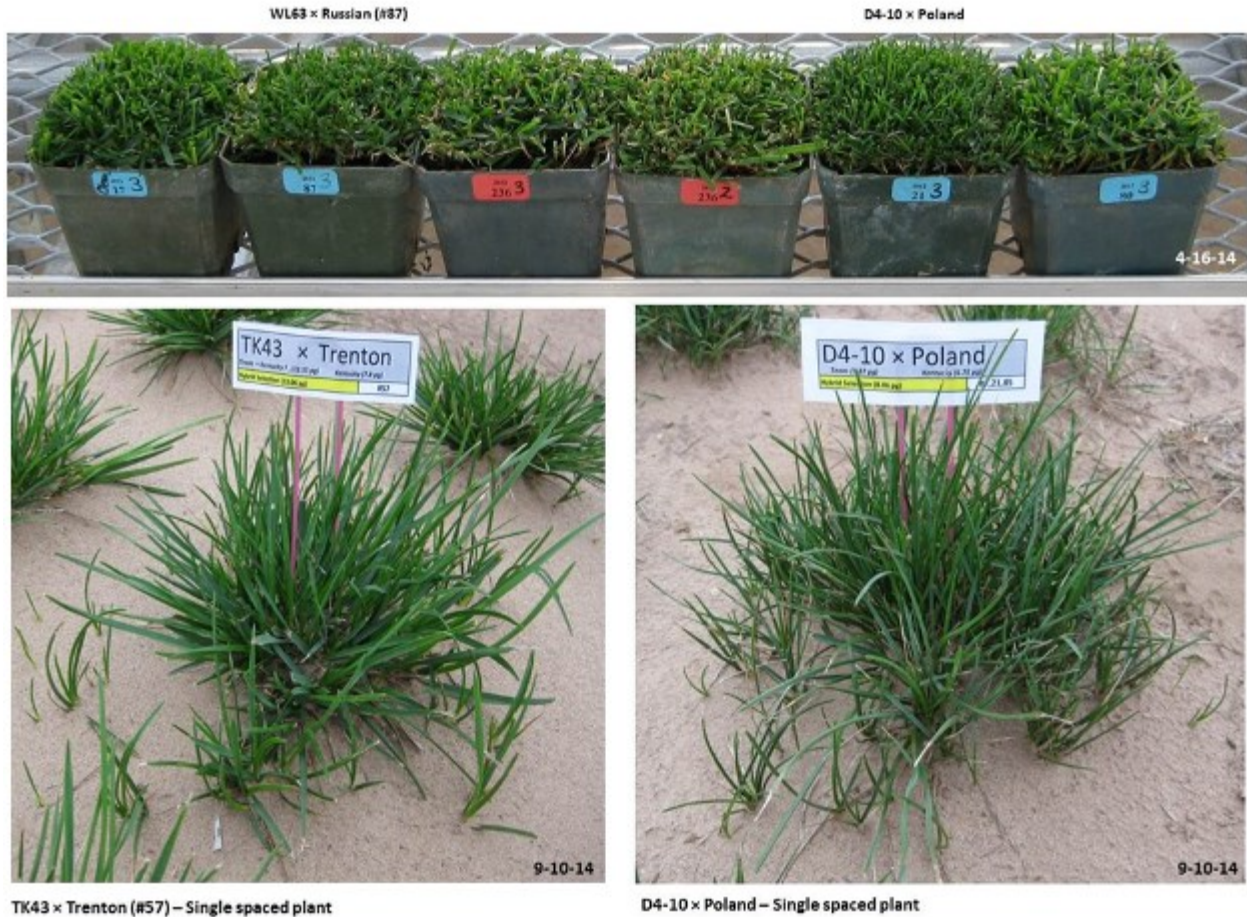


Figure 1. Top- A portion of the small scale greenhouse seeding trial including two hybrid entries listed in Table 1. Bottom - Single spaced plants from two hybrids listed in Table 1.

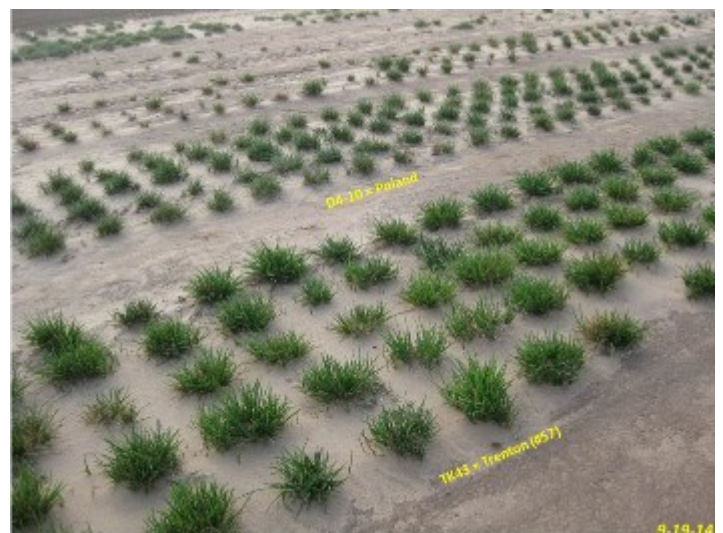


Figure 2. Evaluation nursery containing small plots derived from hybrid bluegrass listed in Table 1 and additional selections.

Figure 3. Portion of the nursery shown in Figure 2 containing a section of D4-10 x Poland and TK43 x Trenton (#57) listed in Table 1.

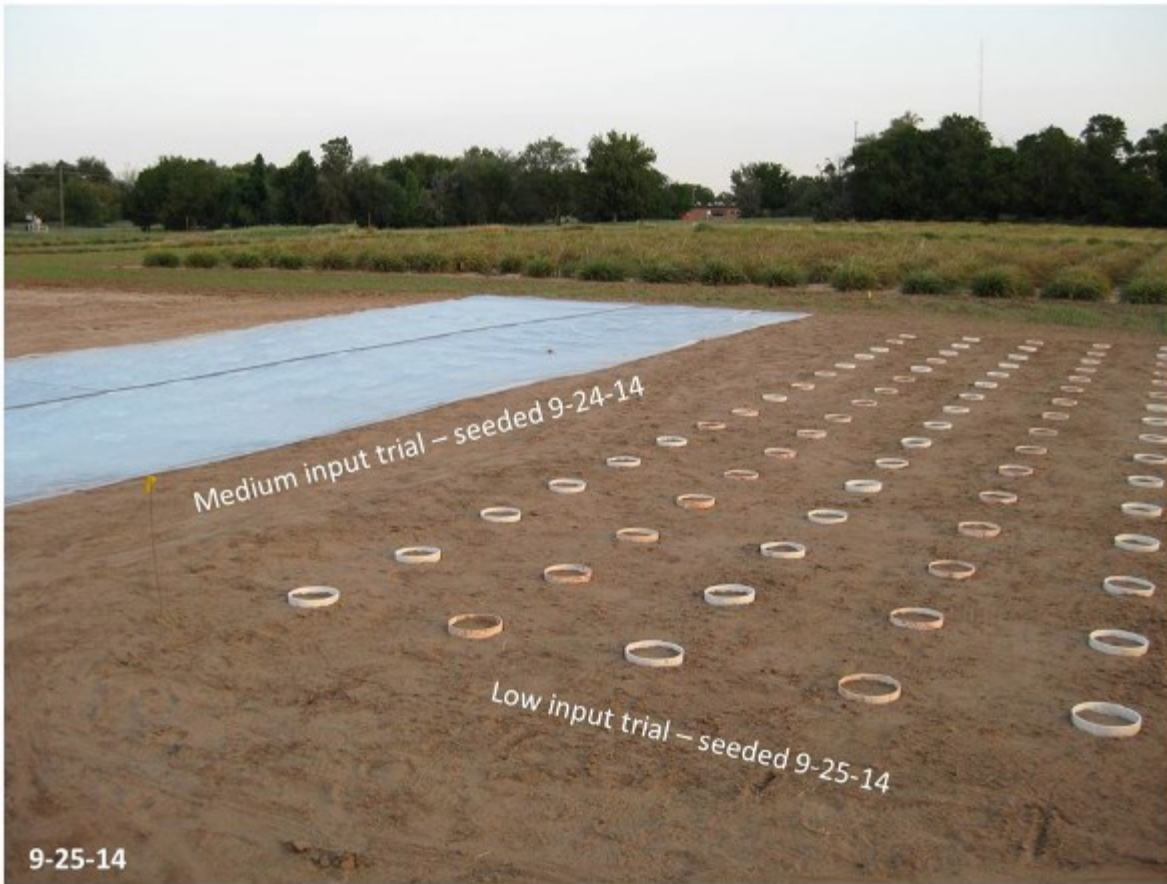


Figure 4. Small scale NTEP like trial seeded in late September at USDA-ARS in Woodward, Oklahoma.

g / m² and some of the checks included were two pure Texas bluegrass seed sources, Solar Green, Midnight, Thermal Blue, Bandera and Absolute.

Summary

- Seed producing hybrids derived from crosses between Texas and Kentucky bluegrass have been selected for evaluation as low-input turf.
- Based on small scale (4" pot) greenhouse seeding trials and spaced plant evaluation in the field, some of the selections appear highly apomictic with good turf quality. Seed production was low from first year field grown plants.
- A fall seeding, low and medium maintenance NTEP like small scale outdoor trial was seeded in late September 2014. The trial included the hybrid entries listed in Table 1, additional hybrid selections, pure Texas bluegrass, Solar Green, Midnight, Thermal Blue, Bandera and Absolute.