

Performance and Persistence Over Two Years of Hybrid Bluegrass Planted in Northwest Oklahoma

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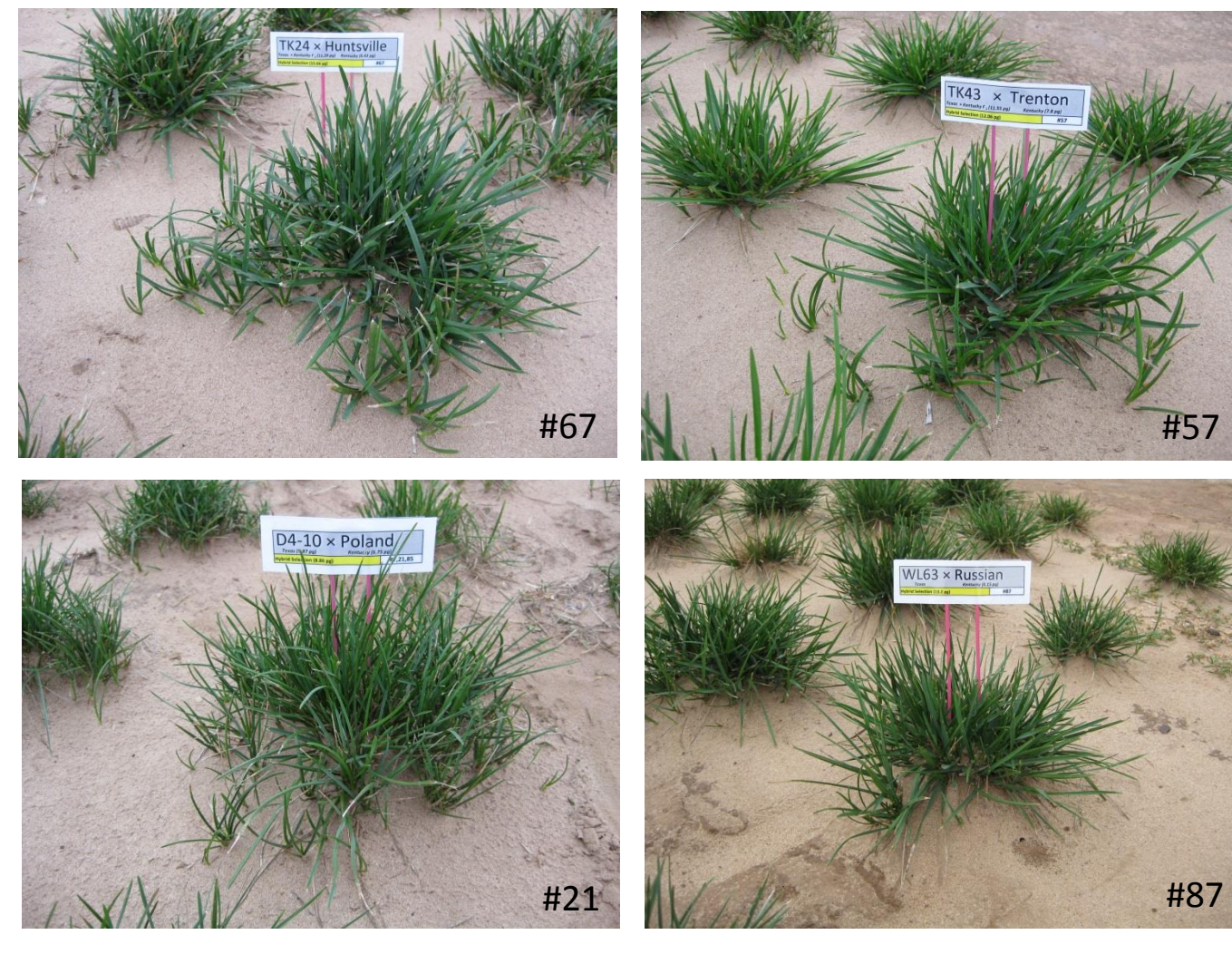


Introduction

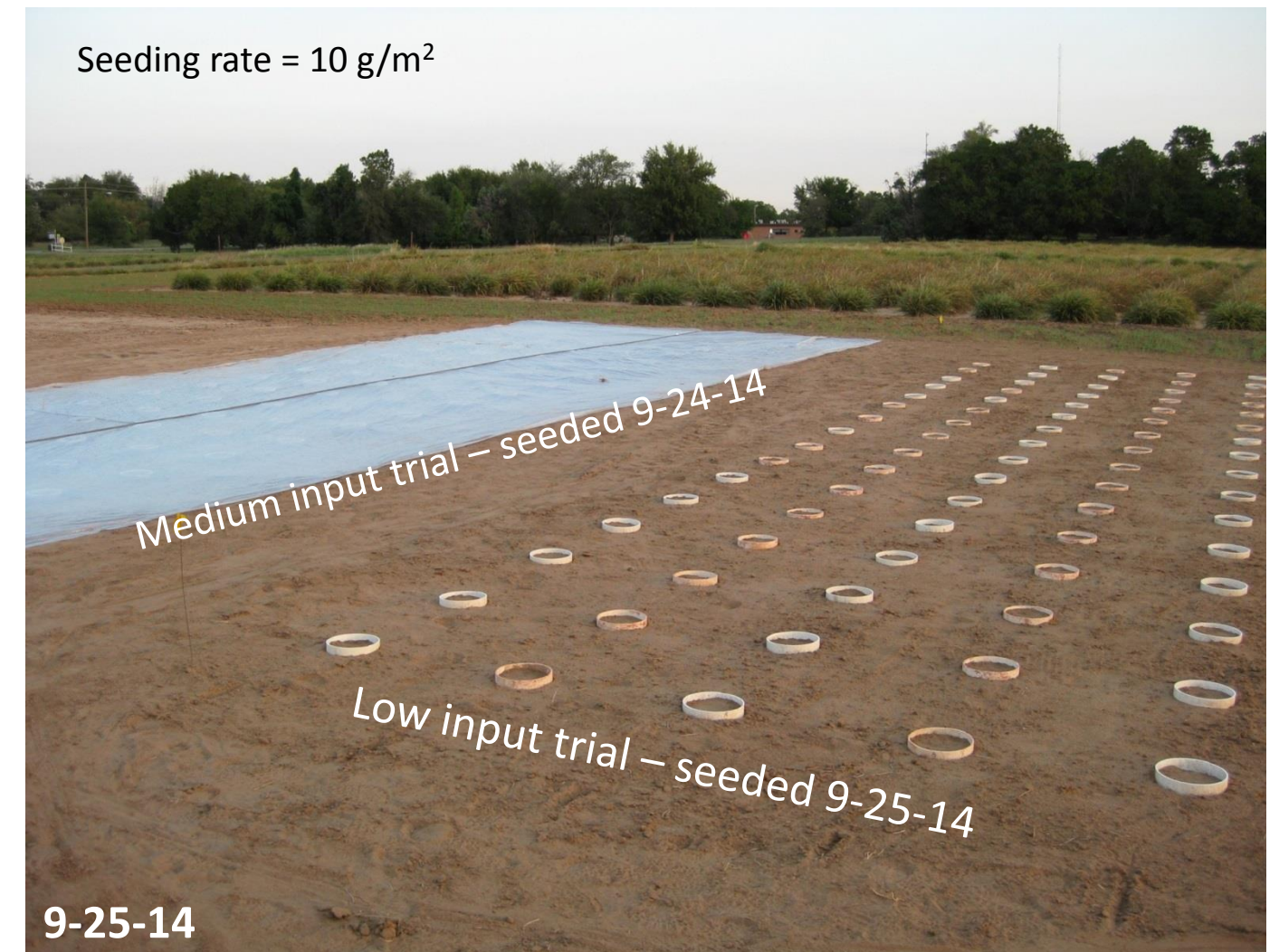
As water use restrictions continue to increase, there is a need for turf-grass with improved performance under hot and dry conditions. Seed producing hybrids derived from crosses between Texas and Kentucky bluegrass were selected in an effort to develop low-input turf with these traits. Eleven experimental hybrids, a pure Texas bluegrass, and commercial hybrids and Kentucky bluegrass checks were seeded in late September 2014 at Woodward, OK and evaluated over a two year period.

Methods & Results

2011-12 Replicated small plot trial transplanted from seedlings



Greenhouse Cross*	2012 Seed ID	Hybrid Genome Size	Uniformity 9 = all identical	Genetic Color	Leaf Texture
D4-10 x Poland	7,21,85	8.86 pg	8	7	8
TK24 x Huntsville	71 (1.6:4.7)	14.53 pg	9	7	3
WL63 x Russian	87	13.2 pg	8	7	6
TK63 x Trenton	57	12.06 pg	8	4	5
TK24 x Huntsville	67	15.66 pg	7	7	4
WL63 x Russian	56	14.27 pg	3	5	4-6
TK43 x Trenton	50	12.74 pg	5	7	4



The initial crosses TK43xTrenton, TK24xHuntsville, D4-10xPoland, and WL63xRussian were made in the greenhouse in 2009-10 and seed was harvested from single plants in a spaced plant evaluation nursery.

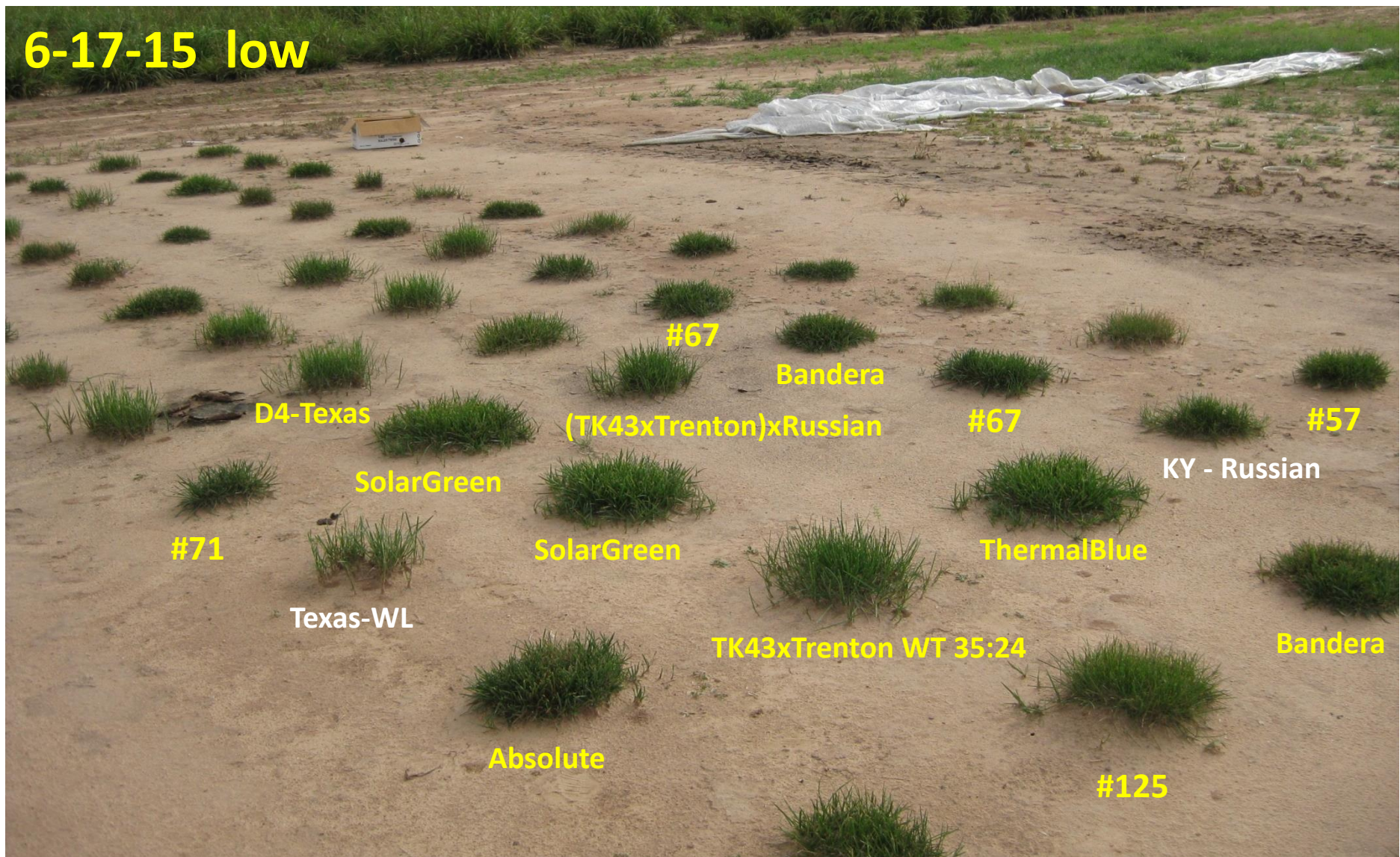
Seeds harvested from individual plants were evaluated in small plots to test for apomixis, turf quality, and seed production. Only D4-10xPoland was identified as fertile and apomictic at this stage. The other hybrids originated from single plant selections within plots.

Seedlings from the single plant selections were evaluated in a spaced plant nursery (2012) and seed was harvested and bulked from hybrids that bred true. A portion of this seed was used to start a larger seed production evaluation nursery (bottom right). A smaller portion was used to initiate a seeded low and medium input turf trial.

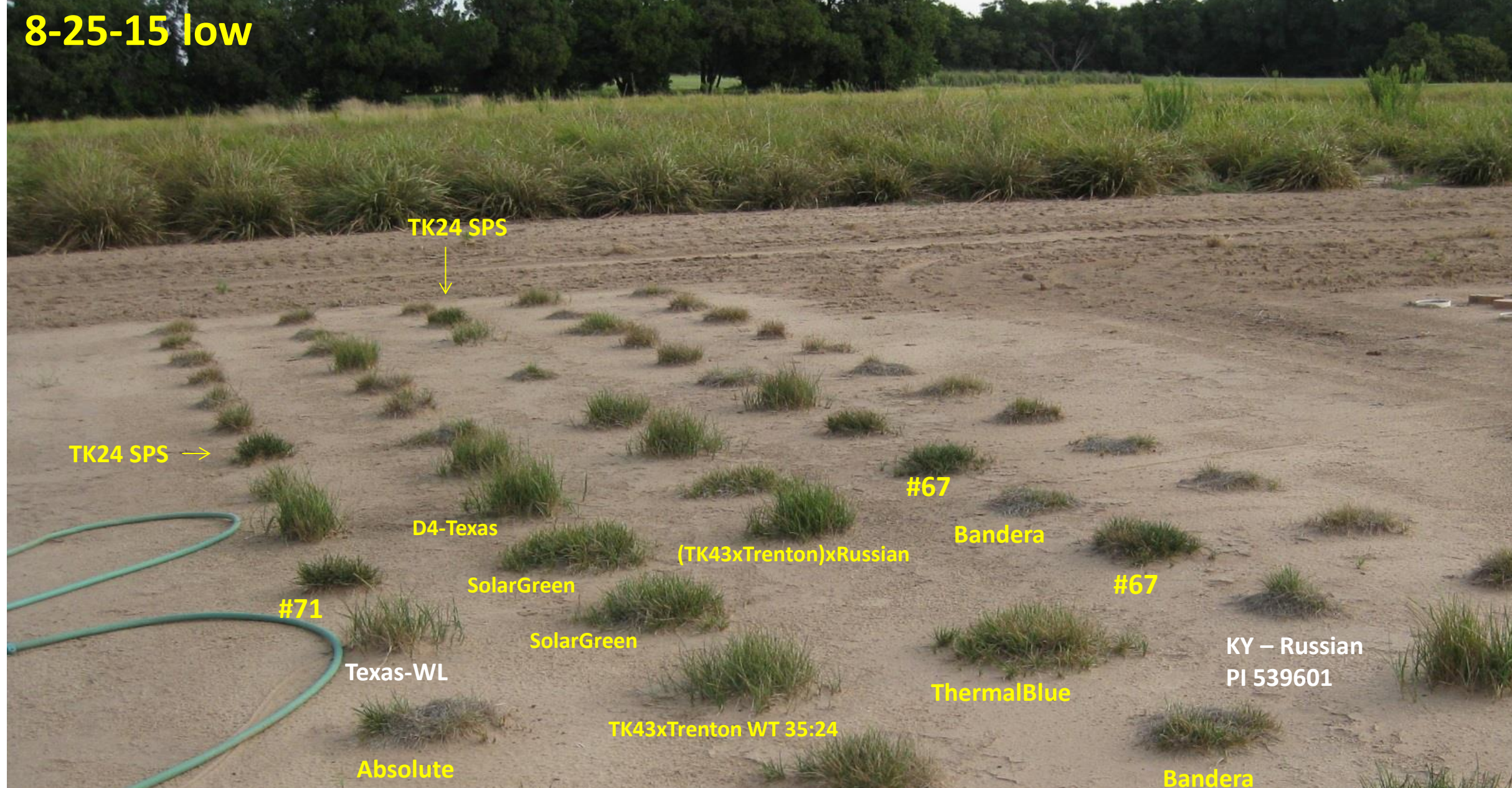
Low: 3+ inch mowing height
0 to 2 lbs of N/1,000 ft²/yr
no irrigation after establishment

Medium:
1.5-2.5 inch mowing height
3 to 4 lbs of N/1,000 ft²/yr
irrigation to prevent stress or dormancy

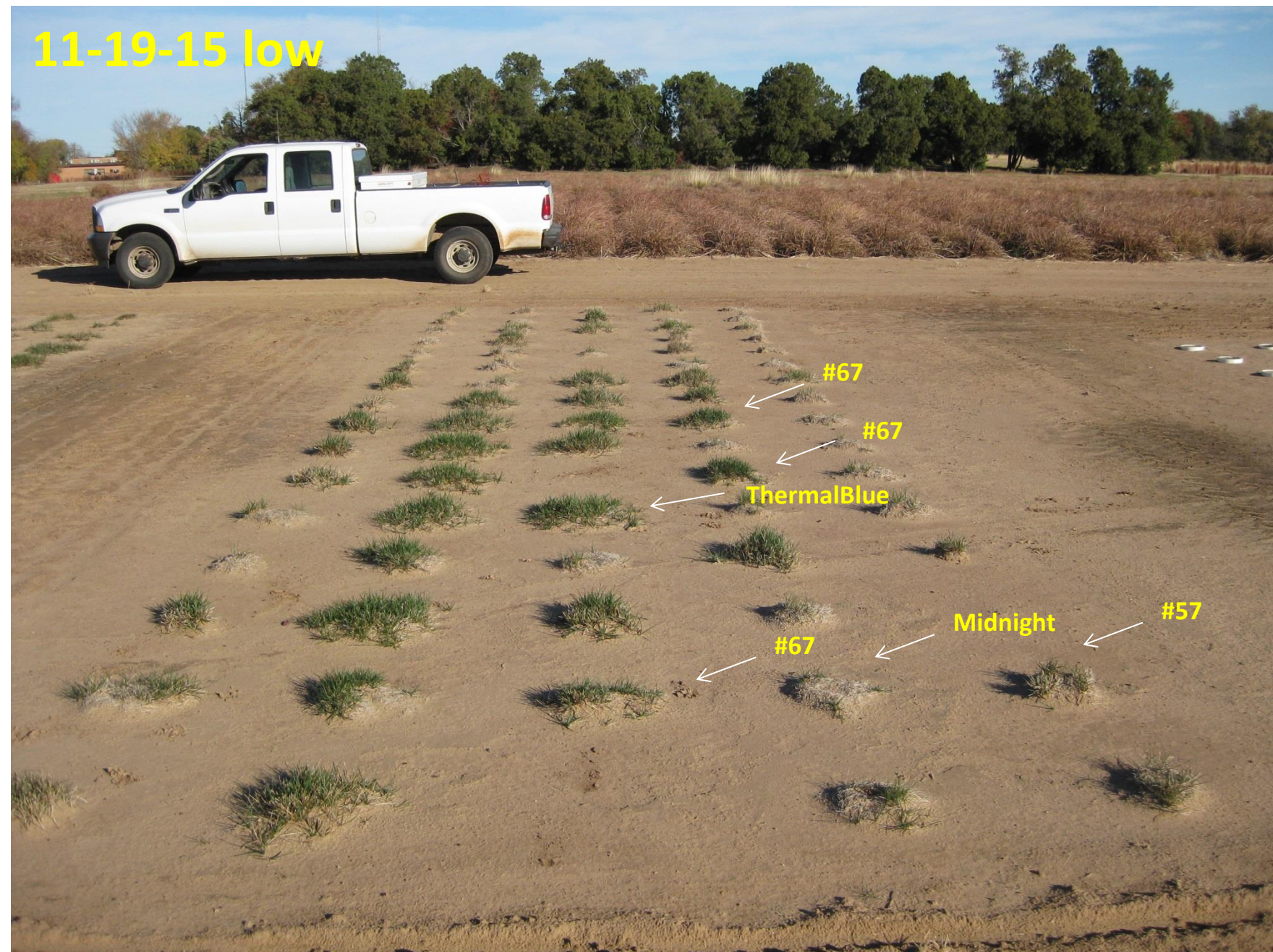
For unknown reasons the low input trial, seeded one day after the medium trial resulted in better germination and establishment when scored on 10-20-14 (see Table). Based on only the low trial, the Kentucky and hybrid checks all germinated well, receiving a rating ranging from 7-0-8.7. Experimental hybrids #21, 50, 56, 67, 71 ranged from 5.5-7.7 and hybrid #125 had the best germination.



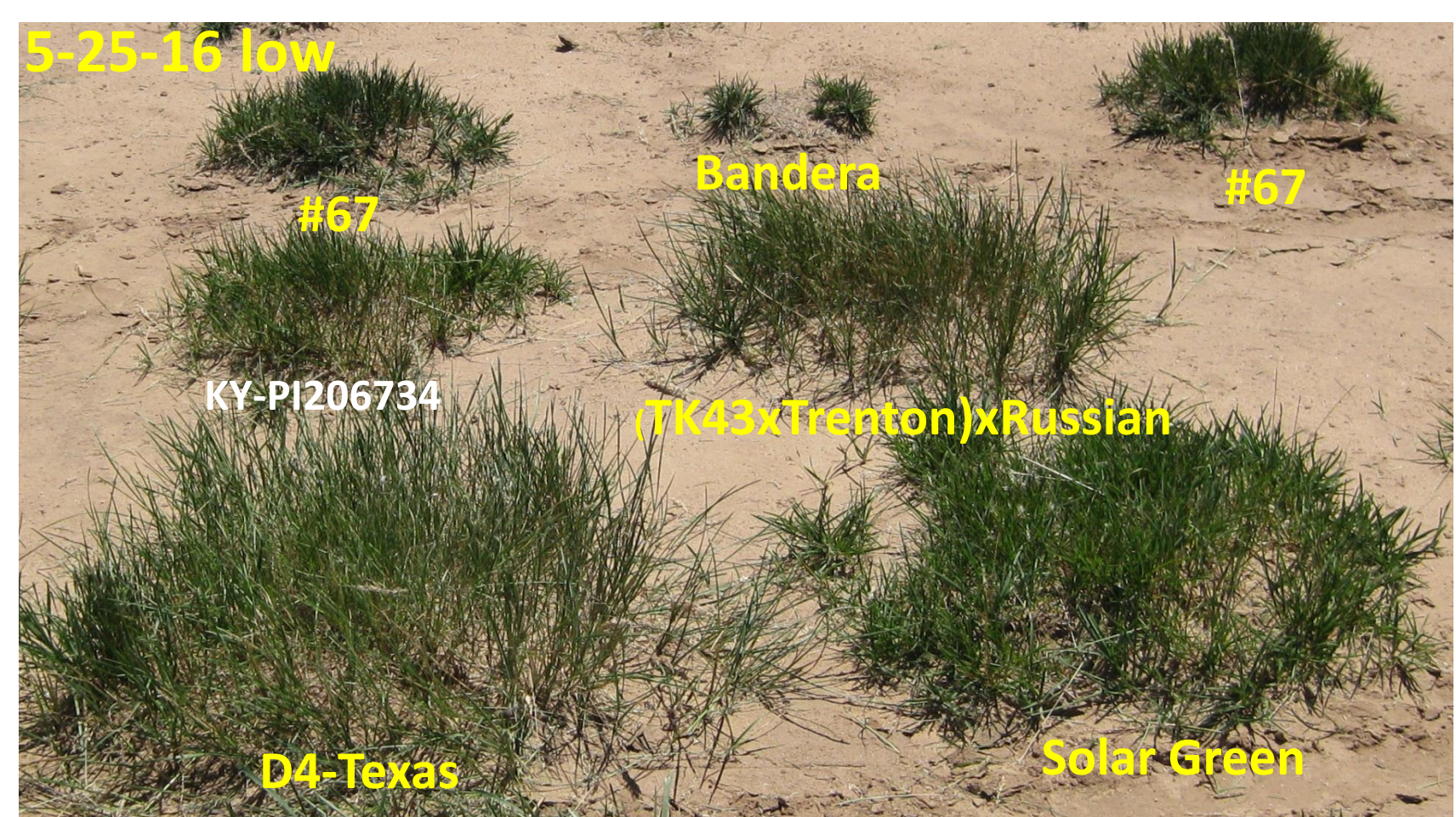
After establishment, turf quality ratings in the low input trial on 6-17-15 (see table) indicated hybrids #57 and #67 contained turf quality ratings 6.3 and 6.0 respectively and were not significantly different from the Kentucky or hybrid checks. Entries labeled in white were not included in the analysis.



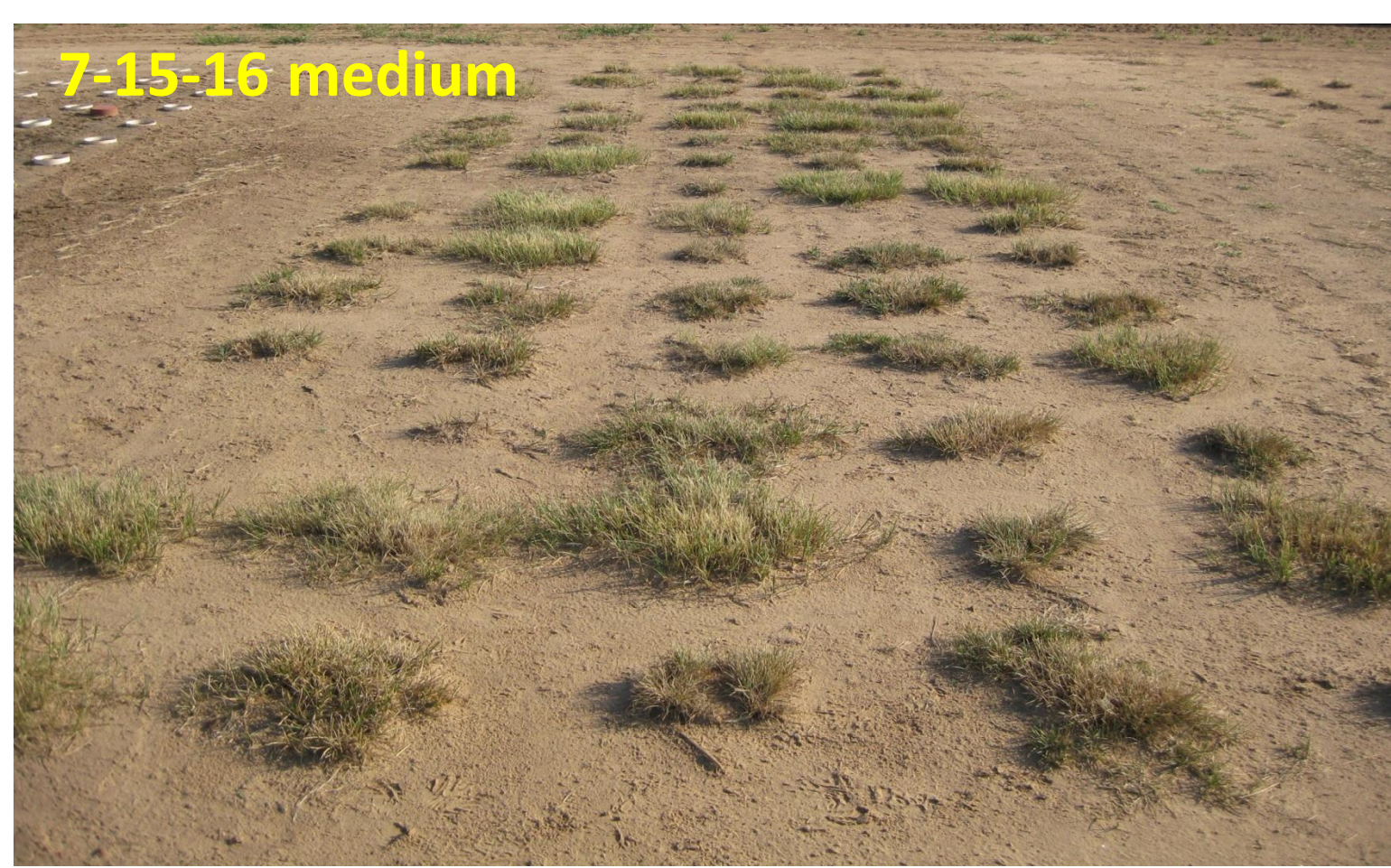
From 6-17-15 to 8-25-15 weather conditions became much hotter, drier, and windier. Three consecutive days in early August (8-6 to 8-8) were particularly stressful with daily highs ranging from 100 - 104°, constant wind speeds 20 - 30 mph, and no rain. Hybrids #67, TK24 SPS, and TK43xTrenton-35:24 were not significantly different from SolarGreen (see table) (rating = 4.5). Most of the other hybrids or checks either entered dormancy or started to die during this period.



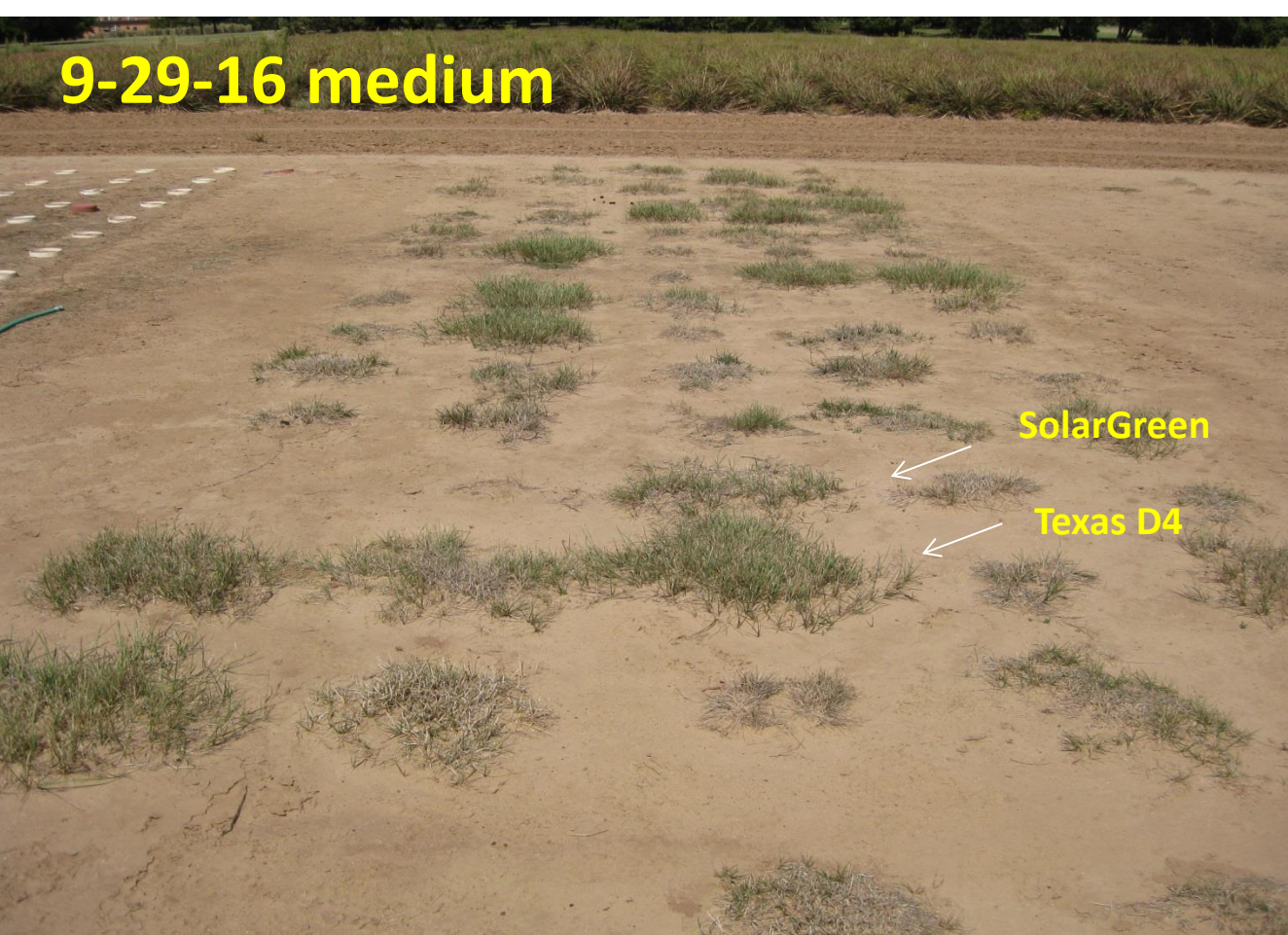
By mid November 2015, in the low input trial, many of the hybrids and Kentucky checks did not persist through the summer. Hybrid #67 continued to appear to contain greater heat/drought tolerance than most of the other hybrids and Kentucky checks. The gusty sandblasting conditions created erosion that made mowing difficult. In the medium input trial, the addition of irrigation enabled many of the Kentucky checks and hybrids to persist through the summer as seen with the difference between Kentucky check Midnight in the low and medium trial.



By late May 2016, hybrid #67 contained the highest turf quality rating of all the experimental hybrids. In the second year as conditions became hotter and drier, pure Texas bluegrass D4 began to display the ability to remain green and productive longer than many of the other entries.



In late June the ability to irrigate the medium trial was lost due to a technical problem. The hot, dry and windy conditions gradually caused the majority of the entries in both the low and medium input trials to turn brown and eventually die. The highest turf quality ratings on 10-24-16, based on the best plant in an entry were as follows:



Date: 10-24-16	Low	Medium
TK43xTrenton WT35:24	2	3
Texas D4	3	5
SolarGreen	2	2
#125	-	3
(TK43xTrenton)xRussian	-	4
ThermalBlue	-	3



	Seed Yield (g)
#57	500
#67	120
#71	163
#21	45
#87	200
#50	382



Seed yield varied for harvests in 2015 and 2016. Some of the entries including #57 severely declined from 2015 to 2016 resulting in a reduced seed yield. Seeds from 2015/16 harvests and additional hybrids are currently being evaluated at Woodward. Top right contains 2x2 plots that were seeded on 10-19-16. Ten hybrids that germinated fair to good in two weeks are scheduled to be tested in larger plots in Stillwater OK (OSU).

Summary

After two years of evaluation a limited number of the hybrids appeared to have greater heat tolerance than the Kentucky checks.

Seed production varied by hybrid and harvest year

Based on seed production, six hybrids in the current trial and four recently identified hybrids are in the process or scheduled for further evaluation at Woodward ARS and at Stillwater (OSU).

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