2015 Annual Report on USGA Grant

Grant Title: Evaluation, Selection and Production of Turf-Type Bahiagrass

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Grant Objectives:
1) Continue to evaluate the bahiagrass genotypes at three locations in Florida for their phenotypic value [turfgrass performance].
2) Evaluate the mutagenic genotypes for their mode of reproduction and seed production characteristics.
3) Evaluate the potential to establish bahiagrass by sprigs.

Research Progress (500 word summary):

Phenotypic Value Evaluations – In addition to the 10 superior lines identified in 2014 and propagated as described for further testing, in summer 2015 we identified 10 additional lines based on maintenance of color and lack of wilting during a drought event. These lines will be propagated in fall-winter 2015-16 and an additional larger plot evaluation experiment will be planted. The original UF experimental turf-type bahiagrass experiment has now been terminated.

Selection & Testing of Superior Lines – The ten superior lines identified in 2014 were vegetatively propagated along with the two parental lines and planted at two locations: Experiment 1 PSREU, Citra FL, planted September 2014 (10 x 10 ft. plot), and Experiment 2 Jay, FL planted April 2015 (10 x 10 ft. plots). Data collected on these plots includes rate of grow-in and cover, turf quality, and other phenotypic value attributes (Table 1a, 1b). We are currently developing plans to harvest sod from the PSREU site and use it for a field sprigging experiment on a sod grower cooperator farm in summer 2016 (this will be the third location projected in our proposal) as well as to evaluate sod lifting quality and sod installation success of the lifted sod.

The same 10 lines were planted Experiment 2 in 4 x 4 ft. plots in a shade house under 60% shade cloth at PSREU, Citra, FL. These shade plots have been evaluated for rate of cover and turf quality (Table 2).

In addition to these plots, 36 ramets of each of the selected lines were shipped to Albany, OR, under a materials transfer agreement to obtain seed production data on these lines under a long day, low humidity growing environment in the Willamette Valley seed production area of Oregon. Data on flowering and seed production of these lines is presented in Table 3.

Evaluation of M2 Progeny – Between 20 and 44 M2 progeny from 7 of the 10 selected lines plus the Argentine and Wilmington parents were transplanted to the field at PSREU on 3 September 2014 to evaluate uniformity/ segregation (apomictic reproduction vs any possible sexual progeny) under field conditions in 2015. No off-type plants were observed in any progeny indicating a high level of apomictic reproduction in these selections.

Digging and Planting Sprigs – A repeat of the preliminary greenhouse sprigging experiment described in our 2014 report was conducted in 2015. Sod pieces were dug from the original field experiment, chopped apart into 1 to 2 inch stolon pieces and planted in flats in USGA-spec sand. Results from 2015 varied from the first experiment with some of the better lines in 2014 being among those with lowest emergence in 2015 (Table 4). We are hopeful that attempts at sprigging in the field will resolve these genotype x year interactions found in the greenhouse experiment.

Summary Points

1. A group of 10 superior selections of turf type bahiagrass was identified, vegetatively propagated and planted in larger plots to fully characterize these genotypes for turf potential. A second group of 10 lines were identified in late spring 2015 based on improved drought stress response.
2. The 10 initial genotypes have been evaluated for their ability to regenerate from stolon sprig pieces in two greenhouse experiments. Results from two studies have not been consistent. Follow-up field “sprigging” experiments are planned for 2016.
3. The 10 initial genotypes were planted in Oregon and preliminary flowering data was obtained in summer/fall 2015 with more complete results expected in 2016.
4. The field experiment of larger plots of the 10 initial selections was featured as a tour stop at the 2015 North Florida Turfgrass Field Day (October 7) and were viewed by approximately 175 attendees with signage indicating USGA grant support of this research.
5. The performance of the 10 lines under 60% shade after one year is not acceptable. Only two or three of the lines show any potential for minimal cover under 60% shade.

Table 1a. Percentage Cover, Turf Quality, and Turf Color of Selected Turf Type Bahiagrass Lines Grown in Full Sun at PSREU, Near Gainesville, FL								
	24-Mar-15		25-Jun-15	25-Aug-15		22-Sep-15	14-Oct-15	1-Dec-15
Entry	% cover	Spring Color	% cover	% cover	Turf Quality	Turf Quality	Turf Quality	Turf Quality
M27	65	5.5	80	85	5.5	5.5	5.0	6.5
3 Fpen 8	70	7.0	90	93	6.0	6.0	6.0	8.0
M36	40	5.0	45	55	5.0	5.0	4.0	4.5
W Con 1	45	8.0	70	85	6.5	5.5	5.5	5.5
3 Fpen 7	55	3.5	75	85	6.0	6.5	6.5	7.0
WXR02	45	7.5	75	88	7.0	7.0	6.0	7.0
WEMS 18	55	7.5	70	78	6.0	6.0	5.0	5.5
Fldw5-1	55	4.0	65	80	6.0	6.0	6.0	6.5
M98Alt	65	6.0	80	88	5.5	5.5	6.0	7.0
Argentine	40	6.0	60	73	5.0	4.5	4.5	5.0
WEMS12	35	7.5	50	73	6.5	6.0	5.0	5.0
MidRoad3	50	9.0	70	88	6.5	6.0	5.5	7.0

Table 1b. Percentage Cover and Turf Color of Selected Turf Type Bahiagrass Lines Grown in Full Sun at WFREC, Jay FL							
Entry	Cover 25 Aug 15	Cover 30 Sep 15	Cover 30 Oct 15		Color 25 Aug 15	Color 30 Sep 15	Color 30 Oct 15
M98 ALT	85	95	100		6.5	6.5	5.5
Argentine	75	85	95		6.0	7.0	6.5
3FPEN7	75	90	100		7.5	8.0	7.5
3FPEN8	85	95	100		8.0	8.0	7.5
FLDW5-1	80	90	90		6.5	6.5	6.5
M36	80	85	90		8.0	8.0	7.0
WEMS12	65	80	85		9.0	9.0	8.5
MR3	65	75	80		8.0	8.0	8.5
WEMS18	75	85	80		8.5	8.0	8.0
M27	90	95	95		7.0	7.0	6.5
WXR02	70	90	95		8.5	8.0	7.5
WCON1	80	90	95		8.5	8.5	8.0

Table 2. Percentage Cover and Turf Color of Selected Turf Type Bahiagrasses Grown Under 60% Shade at PSREU near Gainesville, FL					
Entry	Cover 24 Mar 15	Cover 25 Jun 15	Cover 10 Oct 15	Cover 1 Dec 15	Color 24 Mar 15
3FPen7	20	40	70	65	8.5
3FPen8	40	60	35	30	8.5
Fldw5-1	15	25	30	25	8.5
M27	45	55	30	45	9.0
M36	30	55	30	40	5.0
M98Alt	40	60	60	60	9.0
WEMS12	30	30	10	5	9.0
WEMS18	25	35	15	25	8.5
WXR02	30	40	30	40	9.0
MR3	25	45	15	20	9.0
Argentine	30	45	40	35	6.0
WCon1	30	50	20	25	9.0

Table 3. Flowering of Selected Turf Type Bahiagrasses in Oregon, Summer 2015	
Entry	% Flowering
M27	90
3FPen8	100
M36	40
WCon1	87
3FPen7	97
WXR02	90
WEMS18	87
Fldw5-1	97
M98Alt	7
Argentine	0
WEMS12	10
MR3	90

Table 4. Number of shoots produced from stolon sprig pieces of selected turf type bahiagrasses in two GH experiments		
Entry	No. shoots Exp 1	No. shoots Exp 2
FLDW5-1	15.8	3.3
3FPen8	15.3	2.0
M27	15.0	3.0
M36	13.5	5.5
WCon1	12.	5.8
M98Alt	9.8	2.8
Argentine	9.8	1.8
MR3	9.3	3.8
3FPen7	9.0	8.8
WXR02	8.8	5.3
WEMS18	5.3	10.0
WEMS12	3.3	5.3