Performance of Dwarf Bahiagrass Germplasm Growing Under Low Maintenance Conditions.

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INTRODUCTION

Selection and use of low maintenance grasses vary depending on the region of interest. In Florida, bahiagrass (*Paspalum notatum* Flügge) predominates in low maintenance landscapes. 'Pensacola' and 'Argentine' cultivars dominate the bahiagrass market and are generally used as forage. However, their use as turf is limited due to its poor color, prolific production of tall (> 60 cm) unattractive seed heads and open-growth habit. Moreover, seed establishment makes bahiagrass more cost-effective than vegetatively propagated grasses. Novel dwarf bahiagrass genotypes show promise as potential improved turf types.

Figure 1. a) Low maintenance dwarf bahiagrass planted in 2009 at the NFREC, Quincy, FL. b) Dark green dwarf bahiagrass with dense canopy. c) Novel dwarf bahiagrass genotypes produce shorter foliage and seed heads than Argentine and Pensacola.

MATERIALS AND METHODS

Twelve dwarf tetraploid genotypes, in addition to Argentine and Pensacola, were evaluated for growth habit and seed production in the field during 2010 and 2011 at the North Florida Research and Education Center, Quincy, FL (Figure 1a). The plots (3 × 1.8 m) were planted in April 2009 using plugs in a randomized complete block design (RCBD) with three replications. Sward management included mowing to 7.5 cm every 8 weeks and mechanical weed control. Visual ratings were taken for percentage plot cover and flowering (1= no seed heads, 2= few seed heads, 3= several seed heads). Foliage and seed head height were measured using a ruler, and number of seed heads were counted within a 0.25 m^2 quadrant placed in the center of each plot. For germination tests, seed heads were harvested in mid summer of 2010 and 2011, and seeds were scarified using concentrated sulfuric acid for 6 minutes, rinsed and sown over moist filter paper in petri dishes. Three replicates of 30 seeds were allocated per petri dish for seed germination count. Petri dishes were arranged in a RCBD in a climate controlled incubator. Germination was determined when radicle and coleoptile emergence occurred. Seedlings were counted once per week for four weeks. A turf performance index (TPI) was used to assess how genotypes compared to each other across several traits. The TPI was determined by counting the number of times a genotype placed in the top statistical category across all traits.

RESULTS

- All dwarf genotypes had significantly shorter foliage and seed head height than Argentine and Pensacola. Variability was observed among dwarf genotypes for foliage and seed head height (Figure 1c, Graph 1 and Table 1).
- The dwarf genotypes had a lower rate of spread and plot cover than both standard cultivars (Table 1).
- Significant variability was observed among dwarf lines for seed head production (Graph 2) and seed viability (Graph 3). Dwarf genotypes generally concentrated seed head production in mid-summer (Graph 2 and Table 1).
- All dwarf genotypes produced viable seed, with some having greater germination percentages than either commercial cultivar.
- The TPI varied from 2-10 (Maximum value = 12).

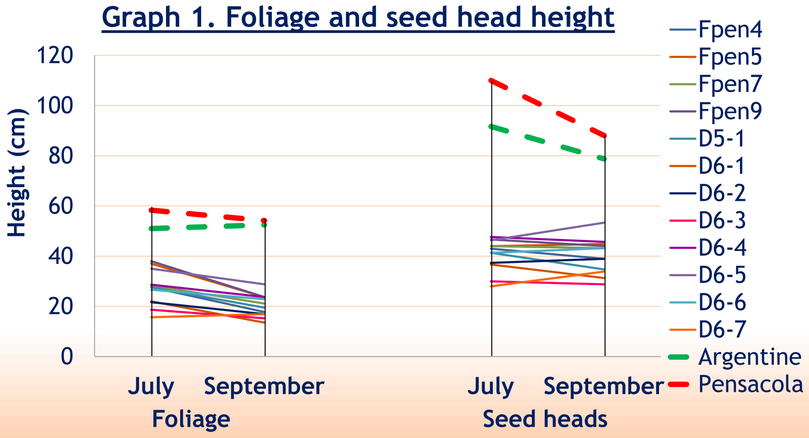
Table 1. Means for growth habit and seed production of twelve dwarf bahiagrass genotypes compared to Pensacola and Argentine cultivars.

Genotype	Foliage height			Seed Head height		% Plot cover		Number of seed		Flowering†	Germination (%)		TPI
	July '10	Sept '10	July '11	July '10	Sept '10	July '10	Sept '10	July '10	Sept '10	March '12	2010	2011	
Fpen4	27.67 cd¶	17.78 abcd	18.63 a	43.00 bc	38.95 abc	53.33 bcd	88.00 d	130 bc	19.00 bc	2.67 c	66.67 ab	24.44 d	4
Fpen5	37.00 ef	23.71 ef	23.71 abc	44.00 c	44.87 cd	56.00 bcd	98.67 ab	228 f	28.67 ef	3.00 c	46.67 bc	24.44 d	2
Fpen7	28.33 cde	21.17 cde	22.87 abc	44.00 c	43.18 bcd	68.00 b	96.00 abc	240 f	22.00 cde	3.00 c	64.44 ab	27.78 cd	3
Fpen9	38.00 f	23.71 ef	26.25 bc	46.67 c	44.03 cd	45.33 d	98.67 ab	185 e	19.67 bc	2.33 bc	73.33 ab	38.89 bcd	2
D5-1	27.67 cd	19.47 bcde	23.71 abc	41.33 abc	34.71 abc	65.33 b	100.0 a	250 f	24.67 cde	3.00 c	73.33 ab	48.89 b	5
D6-1	22.00 abc	13.55 a	17.78 a	36.67 abc	31.33 ab	64.00 bc	96.00 abc	110 ab	4.67 a	1.67 ab	57.78 ab	26.67 cd	10
D6-2	21.67 abc	16.93 abc	18.63 a	37.33 abc	38.95 abc	46.67 cd	90.67 cd	160 cde	14.00 b	1.67 ab	25.56 c	25.56 d	6
D6-3	18.67 ab	15.24 ab	19.47 ab	30.00 ab	28.79 a	44.00 d	86.67 d	150 cd	3.00 a	1.00 a	70.00 ab	36.67 bcd	8
D6-4	28.67 cde	23.71 ef	19.47 ab	47.67 c	45.72 cd	46.67 cd	93.33 abcd	190 e	27.00 def	3.00 c	85.56 a	25.56 d	3
D6-5	35.00 def	28.79 f	27.94 c	46.33 c	53.34 d	58.67 bcd	98.67 ab	180 de	24.00 cde	3.00 c	65.56 ab	34.44 bcd	2
D6-6	26.67 bcd	22.86 de	27.10 c	41.33 abc	43.18 bcd	50.67 bcd	97.33 abc	180 de	21.33 cd	1.67 ab	50.00 bc	23.33 d	3
D6-7	15.67 a	16.93 abc	23.71 abc	28.00 a	33.87 abc	44.00 d	92.00 bcd	190 e	6.00 a	3.00 c	22.22 c	43.33 bc	6
Argentine	51.00 g	52.49 g	50.80 d	91.67 d	78.74 e	96.00 a	100.0 a	85 a	33.67 f	1.00 a	57.78 ab	46.67 b	5
Pensacola	58.33 g	54.19 g	49.11 d	110.0 e	88.05 e	100.0 a	100.0 a	185 e	58.00 g	3.00 c	61.11 ab	78.89 a	4

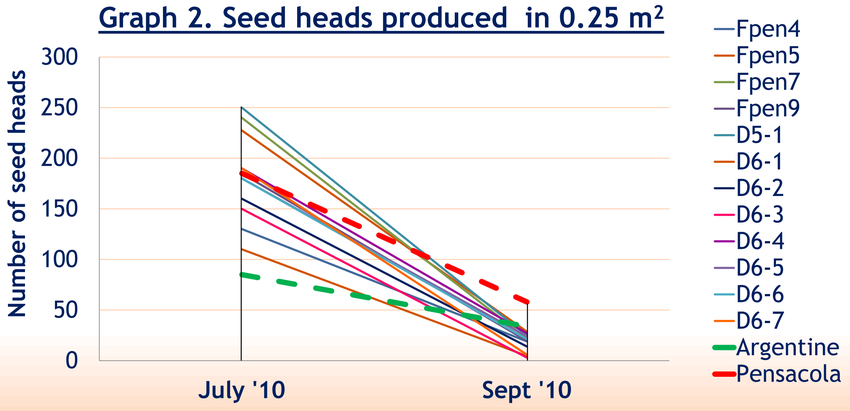
† Flowering, visually rated using a 1 – 3 scale, where 1 = no seed heads and 3 = several seed heads produced.

¶ Means followed by the same letter are not significantly different, P ≤ 0.05

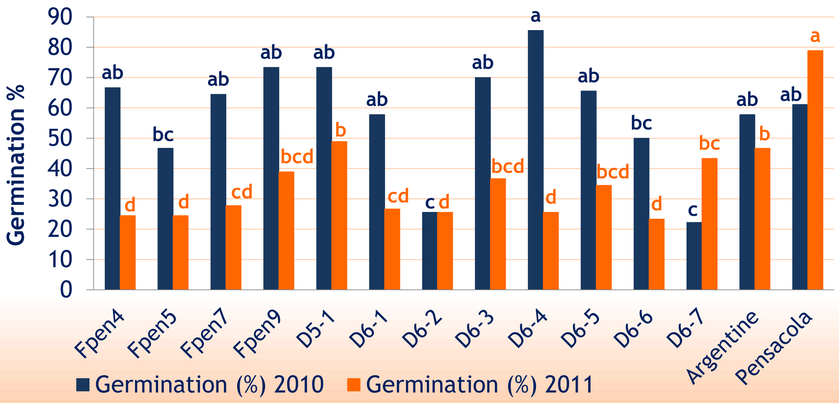
Graph 1. Foliage and seed head height



Graph 2. Seed heads produced in 0.25 m^2



Graph 3. Germination % reached at 4 weeks



CONCLUSIONS

- The dwarf genotypes have potential for low maintenance turf applications due to their short foliage and seed head height, and narrow flowering period.
- The slow rate of spread seen in dwarf genotypes could be compensated by increased seeding rates.
- All dwarf bahiagrass lines produced viable seed that can be used to establish new pastures. However, due to extreme drought conditions seed set and seed viability were lower in 2011.

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