Sod Handling Quality and Tensile Strength of Seashore Paspalum

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Introduction

- Seashore paspalum (*Paspalum vaginatum* O. Swartz) is a perennial, warm-season turfgrass.
- It has potential to be used as a turfgrass in the high saline/sodic soil areas of Oklahoma.
- No research previously found on the sod tensile strength and handling quality of seashore paspalum thus far (P.L. Raymer, personal communication, 2016).

Objectives

- To assess the sod handling quality (SHQ) and sod tensile strength (STS) of 10 entries of seashore paspalum grown at two mowing heights (2.5 cm and 7.6 cm) and two harvest dates.

Goals

- To determine SHQ and STS of experimental and standard entries of seashore paspalum so that variety developers can make informed decisions concerning cultivar commercialization.
- To improve agronomic production practices of seashore paspalum sod with respect to the mowing height and age of seashore paspalum sod product.

Materials and Methods

- Research Location: The Botanic Garden at Oklahoma State University, located 1.6 km west of Stillwater, OK (Figures 1 & 2).
- Ten entries in the 2016 NTEP Seashore Paspalum Trial planted in July 2016.
- Sod harvest: walk-behind sod cutter (Model 544844C, Textron, Racine, WI) at 12 and 14 months after planting (MAP).
- Sod pad dimensions: 38 cm x 30.5 cm x 1.5 cm (length x width x height).
- SHQ assessed on a 1 to 5 visual scale where 1= very poor, 2=fair (transportable to the STS device), 3= suggested minimum acceptable rating for industry handling, 4= suggested minimum rating for cultivar commercialization and 5=excellent SHQ, Han (2009) and Gopinath (2015).
- STS (in kg dm^{-2}) recorded as the peak force required to cause sod pad tearing using a hand winch and force transducer /recorder system (Model DFIS, John Chatillon & Sons, Inc., Greensboro, NC) [Figures 3].
- Experimental field design: randomized complete block with split block arrangement of mowing heights.
- Analytical design: split-block split in time with entries as main plots, mowing height as sub-plots and sod harvest dates as sub-sub plots.
- ANOVA using General Linear Models (Proc GLM) and Fisher's Protected LSD test at $p = \leq 0.05$ in SAS version 9.4.

Figure 1: 2016 NTEP Seashore Paspalum Trial at The Botanic Garden at Oklahoma State University.

Figure 2: 'Sea Isle 1' seashore paspalum.

Figure 3: Sod tensile strength measurement device with force transducer/recorder system.

Fig 4: Measuring depth of sod pad during field work.

Results and Discussion

Sod Handling Quality (SHQ)

- Entry, block, date effects significant.
- Mean SHQ at 12 MAP (4.3) > at 14 MAP (3.5).
- Six entries had SHQ mean ≥4 (Table 1).
- Entry 'UGA Sr 14-1E' had SHQ mean < 3. (Table 1).

Sod Tensile Strength (STS)

- Entry, block, date, entry*date effects significant.
- Mean STS at 12 MAP (95.6) > at 14 MAP (66.4).
- All entries except 'UGP 73' had numerically lower STS values at 14 MAP than at 12 MAP (LSD not shown) (Table 2).

Table 1. Mean sod handling quality (SHQ) of ten seashore paspalum entries.

Entry	Mean SHQ
Salam	4.2a
Sea Isle 1	4.3a
Sea Star	4.2ab
UGA Hyb2	3.5c
UGA 1743	4.3a
UGA Sr 15-14	4abc
UGA Sr 14-1E	2.3d
UGP 73	4.2a
UGP 94	3.6bc
UGA Sr 15-15	3.8abc
LSD (0.05)	0.6

Table 2. Mean sod tensile strength (STS) of ten seashore paspalum entries.

Entry	Mean STS	
	12 MAP	14 MAP
Salam	115.9ab	70.9b
Sea Isle 1	106.6abc	68.3b
Sea Star	104.3bc	69.8b
UGA Hyb2	77.1cd	53.1bc
UGA 1743	137.3a	73.1b
UGA Sr 15-14	99.1bc	66.1b
UGA Sr 14-1E	55.3d	36.1c
UGP 73	89.6bc	105.1a
UGP 94	78.6cd	70.2b
UGA Sr 15-15	92.3bc	51.8bc
LSD (0.05)	31.1	29.2

Conclusions

- All entries could be harvested to produce transportable small sod pads suitable for commercial install at 12 and 14 months of age and at both mowing heights.
- There were significant differences among entries in handling quality and tensile strength. No experimental lines offered consistently great SHQ or STS than commercial standards.
- Average SHQ and STS of seashore paspalum were lower in 14 vs 12 month-old sod pads except for entry 'UGP 73 ' that had numerically greater STS at 14 MAP. The reason for reduced handling quality and tensile strength of the older product is not known but needs further investigation.
- Mowing at 2.5 vs 7.6 cm did not produce a difference in either small pad sod handling quality or sod tensile strength. Additional sod production mowing heights should be investigated.
- The experiment should be repeated across both geographic locations and time to determine the stability of our findings.

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References

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