Establishment Rate of Commercially Available and Experimental St. Augustinegrass Cultivars

David Moseley[1], Aaron Patton[2], and Jon Trappe[2]

Additional index words: coverage, stolon growth rate, Arkansas

Moseley, D., A. Patton, and J. Trappe. 2010. Establishment rate of commercially available and experimental St. Augustinegrass cultivars. Arkansas Turfgrass Report 2009, Ark. Ag. Exp. Stn. Res. Ser. 579:95-98.

Photo by Aaron Patton

St. Augustinegrass cultivars establish at different rates.

Summary. Saint Augustinegrass is currently used in central and southern Arkansas. It is mainly used for shaded lawns, as it is among the most shade tolerant warm-season turfgrass. Many new cultivars are being developed and are being considered for use in Arkansas but prior to their adoption more data is needed on their growth and establishment rates. This experiment sought to determine the stolon growth rate and establishment rate of several commercially available cultivars and genotypes of St. Augustinegrass. Twenty commercially available cultivars and ten experimental genotypes were first grown as plugs in the greenhouse and then planted in research plots in Fayetteville, Ark. Plant materials were provided by University of Florida, Texas A&M University, Mississippi State University, North Carolina State University, and Double Springs Grass Farm in Searcy, Ark. Many of the new cultivars tested in this study have desirable attributes such as improved winter hardiness, enhanced turf color, and faster establishment rates, which may make them desirable for future use among Arkansas turf producers. On 13 September, 'Floratam', 'Texas Common', 'Sapphire', 'Floraverde', and WS had the most overall coverage. Results from this study are intended to help residents of Arkansas make informed decisions when selecting turfgrass cultivars.

Abbreviations: DIA, digital image analysis; SGR, stolon growth rate

[1] University of Arkansas, Cooperative Extension Service, County Extension Agent, Agriculture, Booneville, Ark. 72927
[2] University of Arkansas, Cooperative Extension Service, Department of Horticulture, Fayetteville, Ark. 72701

Saint Augustinegrass (*Stenotaphrum secundatum*) is a common lawn turf in Florida and Texas that has wide leaf blades (0.2 to 0.4 inch) and spreads by stolons. Saint Augustinegrass can make a quality lawn grass, but is undesirable for sports turf and golf due to its inability to tolerate low mowing heights and its poor traffic resistance and recovery. The favored climate for this turf species is warm, subtropical, and tropical climate regions and it is well-adapted to irrigated areas. Currently, St. Augustinegrass is grown in central and southern Arkansas primarily in lawns that are shaded and not suited for bermudagrass. Several cultivars are known to be more winter hardy, disease resistant and chinch bug resistant than others (Busey, 2003). The objective of this study was to evaluate St. Augustinegrasses in Fayetteville, Ark. to better understand their establishment rate and stolon growth rate as part of a larger study to identify winter hardy cultivars that might be well-suited for use in Arkansas.

Materials and Methods

Twenty commercially available cultivars and ten experimental cultivars were established on 30 June 2009. The 3 by 3 inch plugs were grown in the greenhouse from plant material provided by University of Florida, Texas A&M University, Mississippi State University, North Carolina State University, and Double Springs Grass Farm in Searcy, Ark. Raleigh St. Augustinegrass was obtained both from the University of Florida and North Carolina State University and will be referred to as either Raleigh (NC) or Raleigh (FL) throughout the paper. The experimental plots were 4 ft by 4 ft arranged in a randomized complete block design with four replications. One plug was planted in the center of each plot. Plots were irrigated as needed to prevent wilting and were fertilized with 1 lb N/1000 ft^2. The plots were not mown so as not to disturb stolon growth, and weeds were manually removed during establishment. Coverage was determined using digital images of each plot taken by a digital camera mounted on a monopod to ensure a consistent height from the lens to the soil surface. Digital image analysis (DIA) was used to determine plot cover (Richardson et al., 2001). Images were taken of a calibration disk with a known area and data were converted from selected green pixels to coverage. Stolon growth rate (SGR) was measured using a 6-inch digital caliper. Stolon growth rate was measured over a 4 day interval by marking the growing tip of three stolons in each plot with toothpicks on day 0 (20 August, 2009) and measuring stolon elongation with a caliper 4 days later (24 August, 2009). Stolon growth rate (mm/day) was then calculated.

Results and Discussion

There were differences in the stolon growth rate (SGR) of the St. Augustinegrass cultivars. Floratam, Sapphire, WS, Floralawn, and Texas Common had the highest SGR when measured in August 2009, whereas Sunclipse, Delmar, 106G3, GF, 106T3, SV27, Amerishade, Raleigh (FL), 904AT2 and Jade had the lowest SGR (Table 1).

In addition to differences in SGR, the establishment of the St. Augustinegrass also varied throughout the summer (Table 1). Those cultivars with the highest coverage on 23 July included Floratam, 106G3, and Delmar. On 12 and 26 August, Sapphire, Raleigh (NC), Floralawn, Floraverde, and Deltashade had the highest overall coverage, and on 13 September, Floratam, Texas Common, Sapphire, Floraverde, and WS had the highest overall coverage.

Cultivars with the lowest coverage included 106T3, Jade, Captiva, Raleigh (FL), MSA2-3-9, Majestic, Seville, WS, GF, TAES5714, Deltashade, Sapphire, Palmetto, Mercedes, Sunclipse, Bitterblue, Amerishade, 904AT2, Raleigh (NC), FX-10, and SV27 on 23 July. On 12 August, Seville, Bitter Blue, Sunclipse, DALSA0406, FX-10, Floratine, 106G3, 904AT2, 106T3, Jade, Amerishade, and SV27 had the lowest overall coverage. On 26 August, Raleigh (FL), Seville, Palmetto, Majestic, Captiva, Delmar, Sunclipse, DALSA0406, FX-10, Floratine, 106G3, 106T3, Jade, SV27, 904AT2, and Amerishade had the least overall coverage. On 13 September, Jade, DALSA0406, 106T3, SV27, Sunclipse, Raleigh, 106G3, Deltashade, Amerishade, and 904AT2 had the lowest overall coverage. Many of the cultivars with low coverage could be considered dwarf types due to

their short internodes, smaller leaves, and a denser canopy (Moseley et al., 2010). Although slow establishment and low SGR may not seem like a desirable characteristic among turf producers (sod farmers), low SGR also translates to less frequent edging around landscape beds, which may be a desirable characteristic among homeowners. This data on growth and establishment rates will provide turf producers with needed information on selecting cultivars for future use.

Raleigh St. Augustinegrass is a cultivar known for its excellent cold tolerance (Philley et al., 1996). Raleigh was collected from a home lawn in Raleigh, N.C., developed by Dr. W.B. Gilbert at North Carolina State University, and released in the early 1980s (Milla-Lewis et al., 2009). The Raleigh St. Augustinegrass used in this study was obtained both from the University of Florida and North Carolina State University. Although both should be genetically identical, recent research has indicated that not all plant material sold as Raleigh St. Augustinegrass is genetically similar (Milla-Lewis et al., 2009). In our study, these two collections of Raleigh St. Augustinegrass did not appear to have similar stolon growth or establishment rate, which is additional evidence that not all Raleigh St. Augustinegrass has the same genetic make-up as the original Raleigh St. Augustinegrass released by North Carolina State University.

Raleigh St. Augustinegrass is available at four sod farms in Arkansas (Patton et al., 2008). It is unclear whether the Raleigh St. Augustinegrass being sold in Arkansas is genetically similar to that released by North Carolina State University, but it is very likely considering that it has performed well during cold winters in Little Rock. Palmetto, Majestic and Texas Common St. Augustinegrass are also grown in Arkansas (Patton et al., 2008). Many of the new cultivars tested in this study have desirable attributes such as enhanced winter hardiness, dark green color, and fast establishment rates, which may make them desirable for future use among Arkansas turf producers. Results from this study are intended to help residents of Arkansas make informed decisions when selecting turfgrass cultivars. Planting well-adapted cultivars will improve turfgrass quality, and reduce reestablishment cost from winterkill and ultimately increase sustainability. The winter survival of these cultivars will be assessed in spring 2010.

Literature Cited

Busey, P. 2003. St. Augustinegrass. *In* M.D. Casler and R.R. Duncan (eds.) Turfgrass biology, genetics, and breeding. John Wiley and Sons, Inc. Hoboken, N.J.

Milla-Lewis, S, X. Lin, M. Martin, C. Zuleta, A. Chandra, and K. Kenworthy. 2009. Assessment of molecular variability within St. Augustinegrass cultivar 'Raleigh' using AFLP and SRAP markers. In Annual meetings abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, Wis.

Moseley, D., A. Patton, and J. Trappe. 2010. Leaf and stolon characteristics of commercially available and experimental St. Augustinegrass cultivars. Arkansas Turfgrass Report 2009, Ark. Ag. Exp. Stn. Res. Ser. 579:64-68.

Patton, A.J., J.M. Trappe, and J. Boyd. 2008. 2008 Arkansas turfgrass sod source directory. Univ. of Arkansas Cooperative Extension Publication FSA-6136.

Philley, H.W. C.E. Watson, Jr., V.L. Maddox, J.V. Krans, J.M Goatley, Jr., and M. Tomaso-Peterson. 1996. Turf Performance of St. Augustinegrass Cultivars in North Mississippi. Bulletin 1043. Mississippi State University.

Richardson, M.D., D.E. Karcher, and L.C. Purcell. 2001. Quantifying turfgrass cover using digital image analysis. Crop Sci. 41:1884-1888.

Table 1. Stolon growth rate and coverage of St. Augustinegrass cultivars planted 30 June 2009 in Fayetteville, Ark.

		Coverage			
Cultivar	Stolon growth rate	23 July	12 August	26 August	13 September
	mm/d	----------cm^2----------			
106G3	5.9 ijk[x]	292 ab	552 i-m	1074 ghi	2369 ghi
106T3	5.3 ijk	235 b-e	430 j-m	860 hi	2952 e-i
904AT2	4.9 k	176 cde	447 j-m	824 hi	1495 i
Amerishade[z]	5.1 jk	180 cde	388 lm	617 i	1784 hi
Bitterblue[z]	8.5 e-h	190 cde	695 d-m	1767 d-h	3343 d-h
Captiva[z]	7.5 ghi	232 b-e	761 c-l	1510 d-i	3740 c-g
Classic[z]	9.0 d-g	261 bcd	798 c-k	1800 d-h	4679 b-e
DALSA 0406	8.7 d-h	244 bcd	612 f-m	1272 e-i	2986 e-i
Delmar[z]	6.7 h-k	266 abc	857 c-i	1502 d-i	4631 b-e
Deltashade[z]	8.5 e-h	210 b-e	1054 a-e	2443 a-d	2359 ghi
FX-10	8.8 d-g	170 de	597 g-m	1270 e-i	3835 b-g
Floralawn[z]	10.8 a-d	247 bcd	1135 abc	3159 ab	3888 b-g
Floratam[z]	12.4 a	357 a	797 c-k	2181 b-f	6633 a
Floratine[z]	7.1 g-j	260 bcd	595 h-m	1213 f-i	3892 b-g
Floraverde[z]	8.2 fgh	246 bcd	1087 a-d	2446 a-d	5055 a-d
GF	5.6 ijk	220 b-e	866 c-i	1807 d-h	3275 e-h
Jade[z]	4.9 k	235 b-e	427 klm	847 hi	3026 e-i
MSA 2-3-98	9.1 d-g	227 b-e	821 c-j	1805 d-h	4198 b-f
Majestic[z y]	8.2 fgh	225 b-e	754 c-l	1536 d-i	4010 b-g
Mercedes[z]	10.1 b-f	198 cde	801 c-k	1802 d-h	3793 c-g
Palmetto[z y]	9.1 d-g	206 b-e	803 c-k	1569 d-i	4260 b-f
Raleigh[z y] (NC)	9.6 c-f	172 ed	1278 ab	2951 abc	2369 ghi
Raleigh[z y] (FL)	5.1 jk	232 b-e	821 c-j	1640 d-i	3949 b-g
SV27	5.3 ijk	146 e	360 m	842 hi	2875 f-i
Sapphire[z]	11.8 ab	206 b-e	1411 a	3360 a	5186 abc
Seville[z]	8.1 fgh	221 b-e	716 d-m	1627 d-i	3412 d-h
Sunclipse[z]	6.7 h-k	196 cde	676 e-m	1307 e-i	2844 f-i
TAES 5714	9.0 d-g	216 b-e	958 b-h	1816 d-h	3557 c-g
Texas Common[z y]	10.5 a-e	256 bcd	988 b-g	2095 c-g	5528 ab
WS	11.3 abc	221 b-e	996 b-f	2246 b-e	5052 a-d
Average	8.1	225	783	1706	3699

[z] Commercially available in 2009.
[y] Commercially available in Arkansas in 2009.
[x] Within column, values followed by the same letter are similar (α=0.05).