

Leaf and Stolon Characteristics of Commercially Available and Experimental St. Augustinegrass Cultivars

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Photo by Aaron Patton

Leaf and stolon characteristics vary for St. Augustinegrass cultivars.

Summary. Saint Augustinegrass is used on shaded lawns, as it is among the most shade tolerant warm season turfgrasses. 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. The objective of this experiment was to quantify differences in growth characteristics among several commercially available cultivars as well as several experimental cultivars. Twenty commercially available cultivars and ten experimental genotypes were first grown as plugs in a greenhouse and then planted

in research plots in Fayetteville, Ark. Leaf and stolon characteristics as well as color varied among cultivars. 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. Results from this study are intended to help residents of Arkansas make informed decisions when selecting turfgrass cultivars.

Abbreviations: DIA, digital image analysis

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Saint Augustinegrass (*Stenotaphrum secundatum*) is a common lawn turf in Florida and Texas that has wide leaf blades 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, 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 several commercially available and experimental cultivars of St. Augustinegrass in Fayetteville, Ark. to better understand their overall quality. This objective is part of a larger objective 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 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 ft². The plots were not mown so not to disturb stolon growth and weeds were manually removed during establishment. Leaf blade width, and length, and internode length and diameter were measured on the third oldest leaf (on three different tillers in each plot) with a 6-inch digital caliper on 24 August 2009, two

months after planting. Digital images were taken using a portable light box to provide a consistent light source for collecting images. Turfgrass color from the images was determined by quantifying the dark green color index (DGCI) as described by Karcher and Richardson (2003). The blue hue levels for the color of each cultivar were analyzed to help differentiate cultivars as some cultivars appear to have a blue-green color whereas others typically have a yellow-green color.

Results and Discussion

Stolon internode length and diameter varied among cultivars (Table 1). Jade, 904AT2, Sunclipse, 106T3, and SV27 had the shortest stolon internodes, while Floratam, FX-10, and Mercedes had the longest stolon internodes. Captiva and Sunclipse had the smallest stolon diameter, while Bitterblue, Floralawn, and Floratam had the largest stolon diameter.

Leaf characteristics also varied among cultivars (Table 1). Seville, Sunclipse, 904AT2, Captiva, Deltashade, Palmetto, 106G3, SV27, DAL-SA0406, Jade, Majestic, Amerishade, and 106T3 had the shortest leaves, and Floratam had the longest leaves. Majestic, Raleigh (FL), Jade, 106G3, Sunclipse, Floraverde, Amerishade, 106T3, and Captiva were among the group with the narrowest leaves (finest texture). Delmar, Floralawn, Floratam, TAES5714, Bitterblue, FX-10, and Raleigh (NC) were among a group with the widest leaves (coarsest texture). Cultivars with short internode lengths and short leaves are typically grouped as dwarf types and are more popular among some homeowners because they usually tolerate lower mowing heights.

FX-10 had the darkest green color, while Texas Common, Deltashade, Sapphire, Raleigh (FL), GF, Raleigh (NC), TAES5714, Palmetto, and Mercedes were among the group with the lightest green color (Table 1). FX-10, SV27, Jade, Floratam, and 904AT2 were significantly similar with the highest blue color levels (Table 1). Texas Common, Classic, GF, TAES5714, Captiva, Raleigh (FL), MSA2-3-98, Raleigh (NC), Deltashade, Sapphire, Delmar, Mercedes, and Floraverde had the lowest blue color levels. A lighter

blue color (higher blue levels) are evident in turf with a blue-green color rather than a yellow-green color. To help visualize these differences in color among St. Augustinegrass, the blue color levels of FX-10 and Floraverde as well as images of these cultivars are provided (Fig. 1). These represent the cultivars with the lowest and highest mean value for blue color levels.

Raleigh St. Augustinegrass is a cultivar known for its excellent cold tolerance (Philly 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 have similar stolon diameter or internode length, but they did have similar leaf width and length as well as leaf color.

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 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 improved

winter hardiness, dark green color, and faster 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.

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Table 1. Stolon diameter, internode length, leaf width, length and color of St. Augustinegrass cultivars planted 30 June 2009 in Fayetteville, Ark.

Cultivar	Stolon diameter	Stolon	Leaf width	Leaf length	Dark green color index	Blue color levels
		internode length				
						0 to 255
106G3	3.0 j-m ^x	29.5 k-n	7.1f-j	45.5 e-j	0.720 b	62.2 b-e
106T3	3.4 efg	22.0 q	6.5ij	35.0 j	0.710 bcd	62.5 b-e
904AT2	2.9 klm	22.9 pq	7.4c-i	48.4 d-j	0.709 b-e	63.2 a-e
Amerishade ^z	2.9 lm	34.3 g-j	6.8hij	37.0 ij	0.702 b-h	61.7 b-f
Bitterblue ^z	4.3 a	37.9 e-h	8.2abc	70.9 b	0.715 bc	58.5 c-h
Captiva ^z	2.8 mn	27.4 mno	6.4j	48.1 d-j	0.704 b-g	53.9 g-k
Classic ^z	3.1 i-l	32.0 i-l	7.7b-g	57.9 b-g	0.683 e-j	54.6 f-k
DALSA 0406	2.9 klm	42.6 bcd	7.5c-h	41.6 g-j	0.688 c-j	58.6 c-h
Delmar ^z	3.8 cd	33.8 h-k	8.9a	66.0 bc	0.684 d-j	48.5 jk
Deltashade ^z	3.2 f-j	33.8 h-k	7.5c-h	46.1 d-j	0.675 h-k	51.5 ijk
FX-10	3.9 bc	46.2 ab	8.1a-d	57.9 b-g	0.759 a	70.1 a
Floralawn ^z	4.2 a	40.9 cde	8.4ab	69.4 bc	0.701 b-i	59.0 c-g
Floratam ^z	4.1 ab	48.3 a	8.4ab	87.5 a	0.692 c-j	63.6 a-d
Floratine ^z	3.3 f-j	31.2 j-n	7.7b-g	59.2 b-g	0.683 d-j	57.2 d-i
Floraverde ^z	2.9 klm	31.6 i-m	6.8g-j	54.5 c-h	0.690 c-j	48.0 k
GF	3.3 f-j	26.8 nop	7.5c-h	57.9 b-g	0.672 jk	54.4 g-k
Jade ^z	2.9 klm	23.5 opq	7.1f-j	40.6 hij	0.708 b-f	65.4 abc
MSA 2-3-98	3.3 f-i	32.1 i-l	7.4c-i	57.2 b-g	0.681 f-j	52.0 g-k
Majestic ^{z,y}	3.1 h-k	32.5 ijk	7.2d-j	40.3 hij	0.689 c-j	59.0 c-g
Mercedes ^z	2.9 klm	44.0 abc	7.4c-i	53.0 c-i	0.653 k	48.1 jk
Palmetto ^{z,y}	3.2 f-j	32.4 i-l	7.4c-h	45.8 d-j	0.667 jk	56.4 e-i
Raleigh ^{z,y} (NC)	3.6 de	38.2 d-h	8.1a-e	62.1 bcd	0.670 jk	52.0 h-k
Raleigh ^{z,y} (FL)	3.2 g-k	27.9 l-o	7.2e-j	61.4 b-e	0.672 jk	53.3 g-k
SV27	3.3 f-j	22.0 q	8.0b-e	42.5 f-j	0.701 b-i	68.6 ab
Sapphire ^z	3.3 f-j	43.6 bc	7.9b-f	63.7 bc	0.674 ijk	50.4 ijk
Seville ^z	3.3 f-j	34.5 g-j	7.6b-h	49.4 d-j	0.681 f-j	56.7 d-i
Sunclipse ^z	2.6 n	22.8 pq	7.0f-j	48.8 d-j	0.687 c-j	55.1 f-j
TAES 5714	3.4 ef	38.6 d-g	8.2abc	53.5 c-h	0.668 jk	54.1 g-k
Texas Common ^{z,y}	3.6 de	36.1 f-i	7.7b-h	57.5 b-f	0.681 g-k	54.9 f-k
WS	3.4 e-h	39.7 c-f	7.8b-f	54.3 c-h	0.688 c-j	56.2 e-i
Average	3.3	33.6	7.6	53.8	0.690	57.0

^z Commercially available in 2009.^y Commercially available in Arkansas in 2009.^x Within column, values followed by the same letter are similar ($\alpha=0.05$).

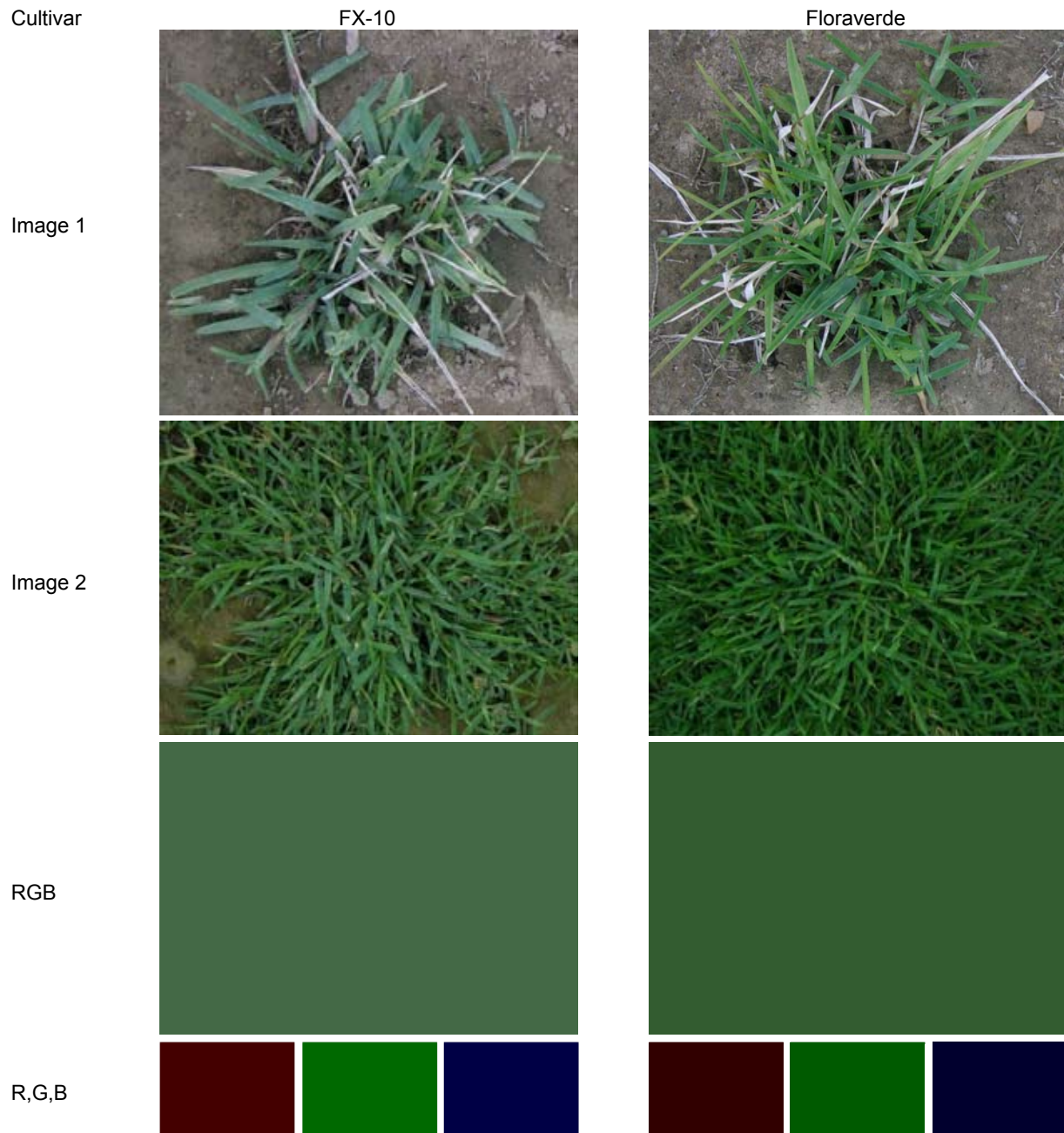


Fig. 1. Color of FX-10 compared to Floraverde St. Augustinegrass. Color is shown using plot images, the red, green, blue (RGB) index as well as showing the blue (B) color levels. Images are representative of one replication on one sampling date, whereas RGB and B values are means of four replications across three dates. A lighter blue color (higher B levels) are evident in turf with a blue-green color rather than a yellowgreen color.