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ENH 967

UF UNIVERSITY of FLORIDA
IFAS Extension

St. Augustinegrass - Made for the Florida Shade?[1]

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Introduction

Landscapes generally contain areas where turfgrass is under some degree of shade for some part of the day. Under conditions of heavy shade, turf will often decline over time. Turf in shaded areas is expected to perform comparably to grass growing in full sunlight, and is generally maintained under the same fertility and cultural regimes as grass in full sunlight. While St. Augustinegrass (*Stenotaphrum secundatum* [Walt.] Kuntze) cultivars are typically recognized as having better shade tolerance than other turf species used in Florida, cultivars vary considerably in their shade tolerance. Typically, they possess relatively good tolerance to shade; however, there is significant variation within the St. Augustinegrass species for shade tolerance. Although reduced light levels are one problem encountered in shaded environments, there are other factors that negatively influence turf growth. These include:

- Altered light quality under tree shade due to use of "photosynthetically active radiation" by the tree. The tree absorbs the light needed for photosynthesis before it can ever reach the grass. This changes the way the grass grows in response to the light it receives.
- Competition with tree roots for soil, air, water, nutrients, and space.
- Reduced air movement, which can encourage disease.
- Potential for increased transplant shock for grasses just being established in shade– these grasses were undoubtedly grown in a sunny sod field and now have to acclimate to different environmental conditions following harvest and transplant.

Cultivar Trial

Due to a lack of qualitative information regarding how much shade St. Augustinegrass can actually tolerate before turf quality and vigor declines and about how new cultivars may compare with older cultivars for shade tolerance, a 14-month glasshouse trial was conducted to evaluate shade tolerance of St. Augustinegrass cultivars.

Five St. Augustinegrass cultivars (Bitterblue, Floratam, Palmetto, Seville, and Floraverde) were subjected to 4 different light regimes (0, 30, 50, and 70% shade). Grasses were grown in 6-inch pots placed under PVC-frame shade structures fitted with shade cloth to provide 30, 50, or 70% shade (Figure 1). Evaluations were made over two 7-month periods

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for physiological and morphological responses to light levels. Measured responses included visual quality, color, and density of grasses, shoot and root growth, leaf chlorophyll concentration, leaf morphology (length and width of leaf blades), leaf area index, concentration of stored carbohydrates, and photosynthetic activity.

Figure 1. Experimental units in the Envirotron greenhouse. Foreground are full sun treatments, left rear is 30% shade treatment. Right rear is 70% shade treatment.

Results

Quality scores differed significantly between cultivars at different shade levels when averaged over the trial period (Figure 2). At 30% and 50% shade, Seville and Floraverde both ranked in the highest statistical category for quality. At 70% shade, all cultivars had significantly reduced quality, with lowest quality in Floratam. Using a ranking of 6 as minimally acceptable turf quality, Floratam quality fell below acceptable levels at 52% shade, Palmetto and 1997-6 at 64 and 65%, respectively, while Seville and Bitterblue maintained quality at acceptable levels up to 70% shade.

Maximum quality levels were reached at slightly different shade levels, ranging from 16% shade for Palmetto to 22% shade for Floratam. Quality ratings then declined as shade increased from these levels. Most turfgrasses are well adapted to low levels of shade, which is logical when you consider that the plant is subjected to less heat and drought stress than if it were growing in full sunlight.

Color scores also differed between grasses at all shade levels except for 50% (Figure 3). Seville

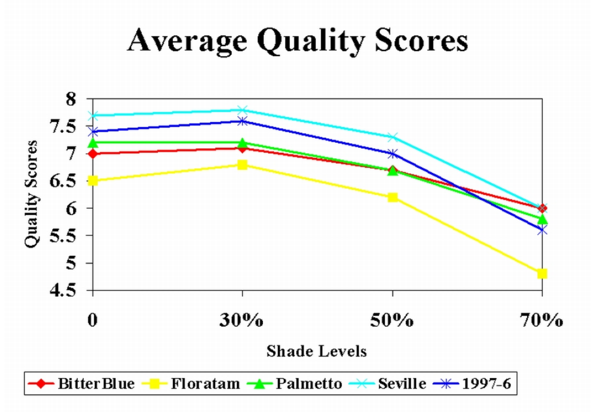

Figure 2. Average quality scores of different St. Augustinegrass cultivars at increasing shade levels. A score of 6 is considered minimally acceptable.

ranked in the highest group at each light level, while Bitterblue was in the highest group at 70% shade only. All cultivars maintained acceptable color rankings through 70% shade. This is not surprising if you consider that concentration of chlorophyll increases as shade levels increase. Chlorophyll is the pigment that reflects green light in leaf blades, and its presence contributes significantly to determine how green a leaf blade appears. We would therefore expect to see dark green leaf blades at the higher shade levels, as long as the plant was able to continue photosynthesizing.

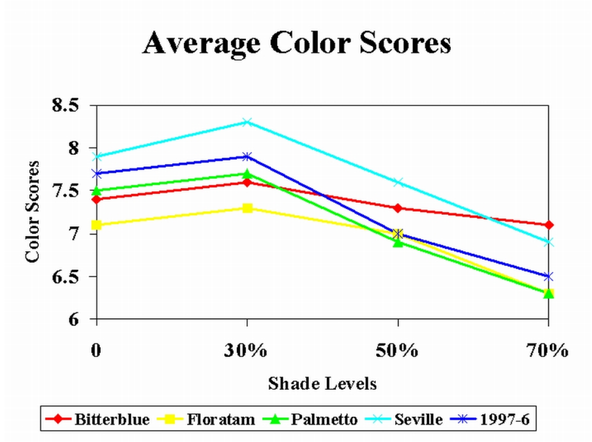

Figure 3. Average color scores of different St. Augustinegrass cultivars at increasing shade levels. A score of 6 is considered minimally acceptable.

Density scores differed between grasses as well (Figure 4). Seville was consistently in the highest ranking and Floratam in the lowest. At 70% shade, Palmetto and Bitterblue were also in the highest ranked group. Unacceptable density occurred at 58% shade for Floratam and 69% shade for Floraverde,

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while the other cultivars maintained acceptable levels through 70% shade.

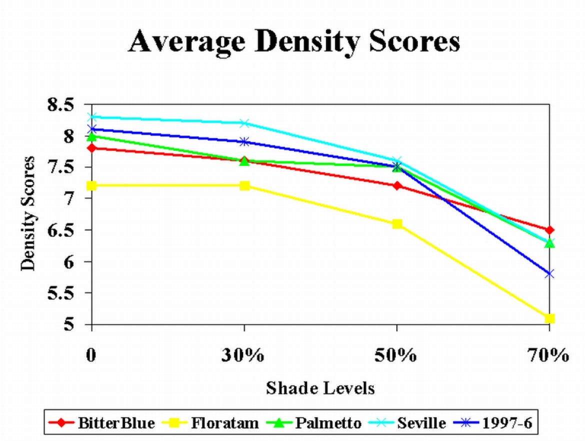

Figure 4. Average density scores of different St. Augustinegrass cultivars at increasing shade levels. A score of 6 is considered minimally acceptable.

Maximum density scores were generally reached at low shade levels, ranging from 5% for Bitterblue to 19% for Floratam. You would expect that density ratings would decrease more as shade increases, which is what is seen in shoot count and growth data at the higher shade levels.

A final harvest after seven months of shade treatments revealed many differences between grasses. Under 70% shade, Seville and 1997-6 produced the highest number of shoots per pot (Figure 5).

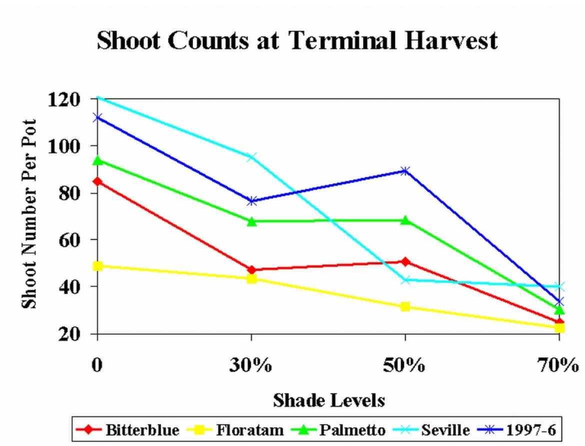

Figure 5. Number of shoots per pot after 7 months of shade treatments.

Actual weight of shoot growth per pot at 70% shade was greatest in Seville, Bitterblue, and Floratam (Figure 6). This measurement is affected by leaf width and leaf length of the cultivars, with Floratam and Bitterblue having wider leaves than many other cultivars.

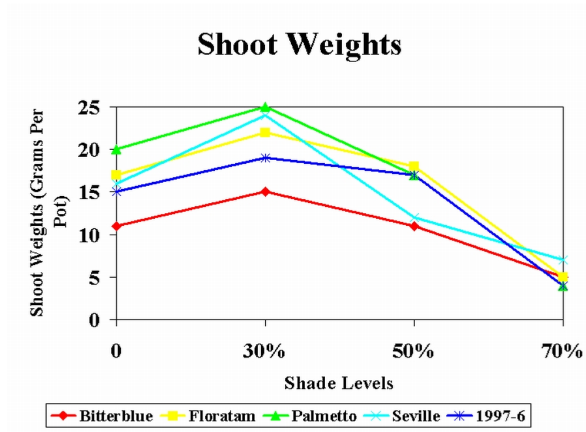

Figure 6. Shoot weights per pot after 6 months of treatments.

Leaves grow significantly longer under shade (Figure 7), which contributes to higher leaf weights. It is interesting that at 70% shade, Seville, which is considered a dwarf cultivar with shorter, thinner leaf blades, produced as much shoot tissue as the larger cultivars. This directly relates to the ability of Seville to maintain good density under heavy shade. The ability to produce ample shoot growth means the grass has the ability to maintain shoot density and therefore the ability to maximize photosynthesis under reduced light.

Figure 7. Grasses after 3 months of treatments. From left to right: 0, 30, 50, 70% shade.

These data, indicate that Seville and Floraverde have better overall shade tolerance at up to 50% shade. This is typical of dwarf St. Augustinegrass cultivars, which are generally characterized as having greater shade tolerance. At higher shade levels, all of the cultivars have reduced quality levels, with Floratam ranking significantly lower in quality than the other cultivars. All of the cultivars were able to handle shade of approximately 50% based on results

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of this study, although Floratam would experience substantial thinning over time at this level of shade.