

### Acknowledgments

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### References

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hours 63 percent shade; 5) 0 hours full sun + 12 hours 30 percent shade; and (6) 0 hours full sun + 12 hours 63 percent shade.

Responses of the two cultivars were not significantly different, supporting earlier data obtained from the glasshouse studies. However, as limited as the evidence is, some results suggest FloraDwarf did respond to shaded conditions better than Tifdwarf. Results suggest that FloraDwarf has a greater ability to assimilate carbon reserves at lower levels of light, indicating greater shade tolerance. A year of weekly observations of a tree-shaded FloraDwarf green at the University of Florida Golf Course in Gainesville also indicated that FloraDwarf could endure 25 weeks at partial shade without a loss in quality. The data suggest that a combination of light intensity and duration affected overall turf quality.

### Conclusions

Golf course superintendents are often faced with major challenges caused by tree shade on turfgrasses, particularly on putting greens. These studies looked at the effects of light and shade on turf health. Results indicate that TifEagle and Champion bermudagrasses are capable of sustaining quality better than other dwarf bermudagrass cultivars when grown under reduced-light conditions. FloraDwarf also responded slightly better to shaded conditions than Tifdwarf. None of the tested grasses performed well under dense shade or long periods of shade.

# Some Species Tolerate Shade With Proper Management

By L.E. Trenholm

Turfgrass requires a minimum amount of light for growth. Both intensity (brightness) and duration of light are important factors affecting turfgrass growth. In many landscape settings, grass will receive a minimum amount of light during enough of the day for adequate growth, even if the area is

shaded for other portions of the day. However, in some situations, a grassed area may be shaded for most or all of the day, making it difficult for the grass to obtain either adequate intensity or duration of light for growth. Under shaded conditions, grasses will have elongated leaf blades and stems as they attempt to obtain sunlight by outgrowing their neighbors.

This tissue elongation depletes carbohydrates, causes shoot tissue to be weakened, and reduces the overall health and vigor of the turfgrass plant. Turf groundcover is also reduced and the bare ground resulting from this is conducive to weed growth. It is not advisable to grow turfgrass under conditions of heavy shade. Other groundcover sources or mulch should be used on these sites. For areas receiving moderate amounts of shade, however, there are certain species and cultivars that are able to maintain suitable growth. There are also specific management practices that will encourage better turfgrass health under shaded conditions.

### Species Suitable for Use in Shade

Some species are particularly well-suited for use in shaded areas. Within these species, certain cultivars sometimes maintain considerable advantages when grown in a shaded environment. Included in these species:

**St. Augustinegrass:** This species is among the best overall for growth in shade, although it will also perform well in full sunlight. St. Augustinegrass cultivars that exhibit best shade tolerance include cultivars Seville and Delmar. Floratam, Floratine, and Floralawn exhibit moderate shade tolerance.

**Zoysiagrass:** This is another good choice for shaded areas. Like St. Augustinegrass, it will also do well in full sunlight. Generally, any cultivar of zoysiagrass will perform well in shade.

**Bahiagrass** is not recommended for use in shaded conditions, but **centipedegrass** will tolerate moderate shade.

**Seashore paspalum** and **bermudagrass** do not do well in shaded conditions.

### Management Practices for Growing Turfgrass in the Shade

Because the turfgrass is already suffering from effects of a stress (lack of sufficient light), it is important to follow specific management practices for turf growth in the shade. Included in these practices are the following:

**1. Increase the mowing height** for grasses growing in the shade. For instance, if you normally cut St. Augustinegrass at a 3-inch height, increase the cutting height to 4 inches. The increased mowing height allows for more leaf area, thus intercepting as much available light as possible. In addition, leaf blades will be longer and narrower in the shade, and a lower cutting

height will cause an excessive reduction in leaf length, which is not good for the grass. Higher mowing heights will also promote deeper rooting, which is one of the key mechanisms of stress tolerance for turfgrasses.

**2. Reduce fertilizer applications** to turf growing in shade. The grass grows more slowly in a shaded environment, which reduces fertility needs. Too much nitrogen fertilizer depletes carbohydrates and produces a weaker turf system. If you normally apply 4 pounds of nitrogen per 1000 square feet yearly, apply 2.5 to 3 pounds to turf growing in the shade. Limit any single fertility application to no more than 1/2 pound of nitrogen per 1000 square feet at any one time.

**3. Irrigation.** Water usage is reduced under shaded conditions, so irrigate only on an "as-needed" basis. This would be when the leaves begin to roll up lengthwise, take on a blue-gray color, or when impressions from foot or vehicular traffic remain on the grass. If the irrigation system covers an area that is partially shaded and partially in sun, consider removing the sprinkler heads from the shaded areas and irrigating by hand instead.

**4. Avoid effects of traffic.** The grass will be more easily injured by traffic if growing in shade and may not be able to recover adequately. Also, if trees cause shade, traffic may damage tree roots, resulting in decline or death of the tree.

**5. Monitor for weed pressure.** Weeds are able to outcompete turf in certain situations, and will seek out those opportunities. In a shaded environment, lateral turfgrass growth and groundcover may be sparse, leaving bare ground suitable for certain weeds. Treatment with a pre- or postemergence herbicide may be necessary. Use caution, however, when applying any chemical treatment to a shaded lawn, as there is a greater chance of phytotoxicity when a grass is under stress. Additionally, many herbicides are potentially damaging to landscape trees and shrubs.

**6. Monitor for disease pressure.** In many shaded environments, there will be less air movement and more humidity, which may increase the possibility of disease. Again, use caution if applying pesticides to a turf that is already under environmental stress.

### Watch for Competition from Trees

Grasses growing under trees are subjected to further stresses in addition to reduced light. These include competition with tree roots for soil space, water, oxygen, and nutrients. Tree roots may extend far from the canopy line, so these competitive effects may occur at some distance from the tree.

### Consider Alternatives to Grass

Attempting to grow grass in shaded environments may be time-consuming, frustrating, costly, and damaging to the environment. In areas that receive shade all day or for much of the day, an alternative ground cover or mulch may be the best choice. Consult your County Extension office for information on alternative groundcovers for shaded environments.