

# TURFGRASS TRENDS

## SHADE TOLERANCE

### All Zoysias are Not Created Equal

By Ben Wherley, Ph.D.

It seems that I get more and more questions about zoysiagrass these days, both from superintendents and homeowners. The increasingly popular species is starting to make a dent in the St. Augustinegrass and bermudagrass markets here in Texas, largely due to its great curb appeal.

For many snowbirds, zoysiagrass (*Zoysia japonica*) has the look and feel of a Kentucky bluegrass lawn. Add to this the inherent heat, drought, cold and salinity tolerance of the species, and it's easy to see why it has gained popularity in the state. Once established, zoysiagrass requires about half the nitrogen and mowing inputs that bermudagrass does, which speaks to its low-maintenance characteristics.

While use on golf courses has traditionally been limited to transition zone areas, an increasing number of courses are realizing the exceptional playability and benefits the species offers for fairways, tees and even greens. Even Tiger Woods became a believer after last year's PGA Championship at Atlanta Athletic Club.

#### Second chance for zoysiagrass

Superintendents who are experiencing shade issues on their courses are giving zoysiagrass a second look. A few years ago, I walked a few courses in northern Texas with Dr. Milt Engelke of Texas A&M University in the early spring after a brutally cold winter. The course had begun to make the switch to Diamond zoysiagrass on shaded tees and greens. While many of the bermudagrass tees had suffered considerable winterkill at that time, areas that had been converted to zoysiagrass were thriving.

With a growing number of cultivars available to superintendents, and little available information on relative shade performance, scientists at Texas A&M AgriLife Research initiated field shade studies under a nursery of 40-year-old live oak trees. The trees in the area had been planted into 3x8 rows on 20 ft. centers. Prior to conducting shade trials, limbs were all pruned to 10 feet above the ground. The heavily shaded nursery screened ~90 percent of incoming solar radiation, and therefore created an environment of 10 percent of full sunlight.

#### Implementing the project

The project was initiated by randomly planting multiple 4-square-inch plugs representing 10 commercially available zoysiagrass (both *Z. japonica* and *Z. matrella*) cultivars throughout the shade nursery. Cultivars included Shadow Turf, Diamond, Cavalier, Royal, Zorro, Crowne, Palisades, Meyer, Zeon and JaMur. During the initial

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*The heavily shaded nursery, planted with 4-square-inch plugs, created an environment of 10 percent sunlight.*

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year of establishment, grasses were irrigated and fertilized to encourage ideal grow-in conditions. However, for the remainder of the three-year study, inputs were scaled back considerably, with nitrogen fertilizer limited to only a May application of  $\frac{3}{4}$  lb. N/1,000 sq. ft. and irrigation limited to every two weeks, or as wilt became apparent within plots.

Near-average amounts of rainfall were received during the study (~30 inches/yr.). Mowing was also scaled back considerably, with plots mowed to a 3-and-a-half-inch mowing height. While this maintenance regime was not by any means intensive, it was intended to provide a low-input environment in which to evaluate shade tolerance/persistence differences among cultivars.

In theory, the top performers in this study would be capable of maintaining relatively compact, low-growing growth habit, with good rates of lateral growth, dark green color

and density, and good late fall/early spring color. Over the course of the following two years, parameters were evaluated monthly, including turf quality, color, density, lateral spread and vertical canopy height ratings. Winter color, spring green-up and genetic color were also evaluated, according to National Turfgrass Evaluation Program guidelines.

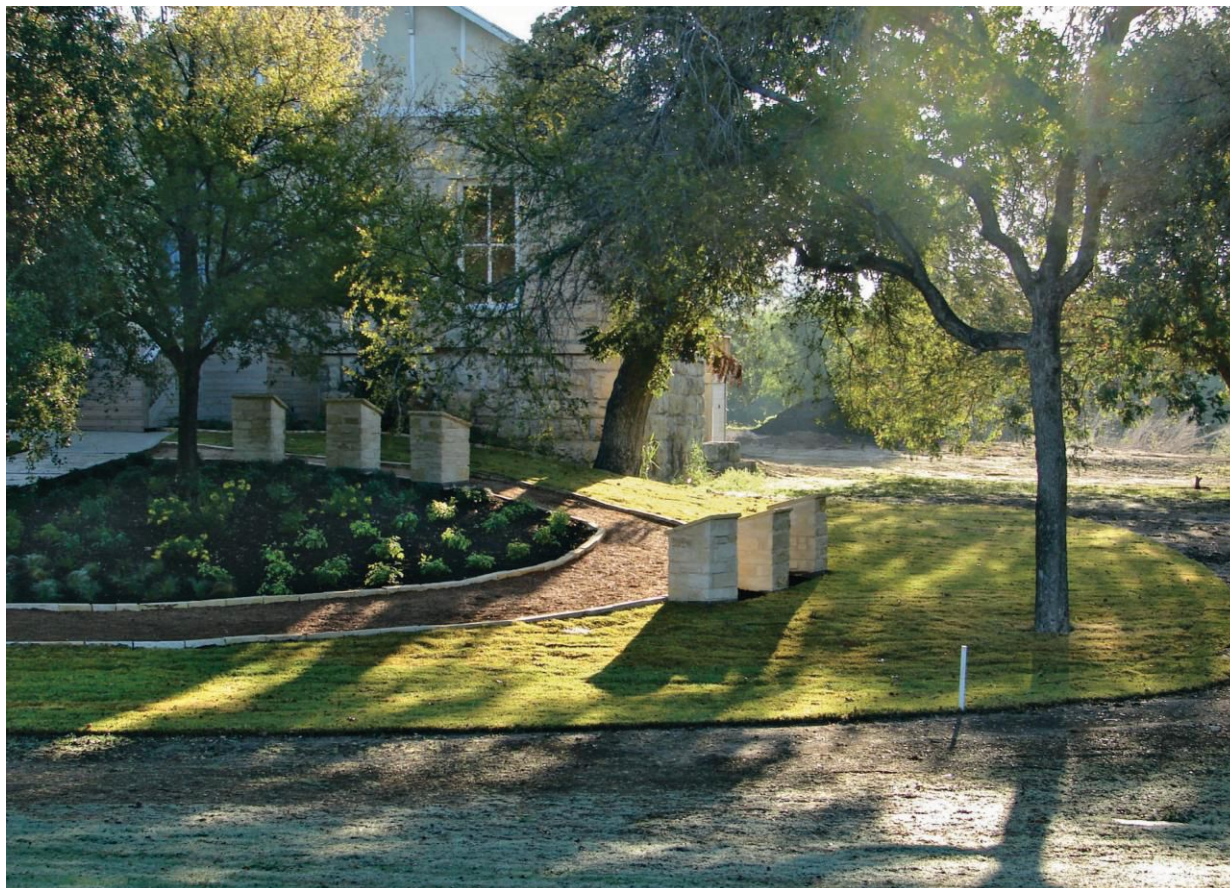
### **Data analysis**

At the conclusion of each season, data were analyzed and statistically compared to determine the winners of each season's evaluations. Following the third year, a turf performance index (TPI) was generated as a means of ranking the cultivars. The TPI represented the number of times a cultivar occurred in the top statistical group, taking into account all parameters and rating dates.

It should be noted that this level of shade was intended for screening germplasm and is

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*Zoysiagrass, with its heat, drought, cold and salinity tolerance, is quickly growing in popularity in Texas.*

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therefore a considerably more stressful shade environment than zoysiagrass would typically be recommended for. It is commonly recommended that a site receive at least 4 hours of direct sunlight for satisfactory zoysiagrass performance.

## Conclusions

By the conclusion of the study, it had become clear that the finer textured zoysiagrass cultivars (*Z. matrellas*) possess much better shade tolerance than their coarser-textured counterparts (*Z. japonicas*). In fact, the top four performers in our study were *Z. matrella*, while four of the bottom six were *Z. japonica* cultivars. Clearly, newer cultivars of zoysia are superior to Meyer in terms of shade tolerance.

Based on previous reports, we were also surprised by the somewhat average performance of Diamond zoysiagrass in this study.

Diamond had shown remarkable shade tolerance in past studies, when managed under much tighter mowing heights and greater management intensity. However, in the confines of this low-input, heavily shaded environment, Royal, Zorro and Shadow Turf demonstrated good lateral growth rates while generally maintaining higher density and color than the coarser-textured cultivars Palisades, Crowne, JaMur and Meyer.

A 3-year shade tolerance summary based on our work resulted in the following cumulative ranking (the number of times cultivar ranked in top statistical group is shown in parenthesis): Royal (51) > Zorro (49) > Shadow Turf (46) > Diamond (39) > Palisades (36) > Crowne (30) > Cavalier (28) > JaMur (27) > Zeon (17) > Meyer (10).

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