Shade Tolerant Turfgrasses

Finding a turf that prospers both in sunlight and shade can be a problem. However, more turf varieties with greater shade tolerance are being developed,making for an easier fight against what could be a major problem in the future.

by Dr. Leah A. Brilman

Trees and shrubs are an essential part of our landscapes, yet they can create problems for the other essential part, our turf areas.

The primary problem created by trees is shade, but contributory factors to poor turf performance are competition for nutrients and water by tree roots, increased humidity due to restricted air flow, which may contribute to increased disease activity, and accumulation of leaves on the turf, causing light exclusion.

Management practices of the turf and/or trees such as raising the cutting height, reducing nitrogen fertilization of the turf, root pruning, trimming lower tree limbs, and infrequent but deep irrigation, can improve turf performance in shaded situations, but proper choice of the species or variety of grass is necessary for long-term survival.

Critical factors to turf survival appear to be the ability to photosynthesize sufficiently under reduced light intensities to provide sufficient carbohydrates for good tillering and root growth, and resistance to diseases, especially powdery mildew and melting out or leaf spot.

Improved shade tolerance

Bluegrass is the preferred turf species in much of the cool-season area of the U.S. Most varieties are best adapted to full sun but certain varieties with improved shade tolerance have been developed.

Selection for improved powdery mildew resistance has been an important part of breeding for shade tolerance. Varieties that have shown improved powdery mildew resistance in various tests include Eclipse, Glade, Ram I, A-34, Bristol, Mystic, Welcome, Nugget, America, Enmundi, Sydsport, Aquilla, Able I, and Harmony.

Some of these varieties appear to possess vertical resistance, determined by one or a few genes, so when different races of the powdery mildew develop, they may become infected.

Certain varieties, such as Aquilla, Mystic, Ram I, and Welcome appear to have horizontal resistance, determined by a complex of genes, and may thus maintain resistance better to different pathogenic races (Furler et al, 1982a).

Other studies have shown that resistance to leaf spot incited by *Bipolaris sorokiniana (Helminthosporium sativum)* and/or melting-out incited by *Drechslera poae (Helminthosporium vagans)* may be important to survival in certain shade situations.

Vargas and Beard (1981) demonstrated the importance of evaluating melting-out resistance in the shade and sun because only two varieties of bluegrass, A-34 and Nugget, out of 18 tested, demonstrated resistance in both shade and sun. Disease resistance in full sun cannot be extrapolated to shade.

A serious problem?

It also appears that necrotic ring spot or Fusarium blight syndrome, caused by *Leptosphaeria korrae*, may be more severe in shade situations.

Screening trials are underway in many areas of the country to determine which varieties of bluegrass have resistance to this disease, which has recently been reported for the first time in many areas of the country and may become a more serious problem in the future.

Karnok and Augustin (1981) demonstrated that Glade exhibited a higher rate of photosynthesis under reduced light than Merion. Glade maintained a more favorable carbon level in the shade, thus allowing for greater shoot growth. This ability to photosynthesize under reduced light levels is critical to long-term shade survival.

Bluegrass varieties that have demonstrated improved shade tolerance in various tests around the country include Eclipse, Glade, Ram I, A-34, Bristol, Nugget, America, and Enmundi.

The blends

A number of newly-released and experimental varieties have also shown improved shade tolerance, an important selection criterion. A shade tolerant variety adapted to your area is an important part of every bluegrass blend.

Red fescues are often added to blends that are intended for shade areas. In general, the fine fescues are

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known for shade tolerance and the ability to tolerate the acidic, infertile soils as well as tree root competition present in many shaded conditions.

The fine leaf fescues vary widely in their resistance to powdery mildew and leaf spot, which can cause damage in the shade.

However, instead of specifying varieties with resistance, common red fescue is usually placed in "shade" blends. Generally it has been found that the strong creeping red fescues have the best powdery mildew resistance, followed bv the slender creeping red fescues, hard fescues, and chewings fescues.

Varieties that have shown improved tolerance to powdery mildew for their respective species include Fortress, Ruby, Commodore, Flyer, Pernille, Robot, Estica, Boreal, and Dawson creeping red fescue; Biljart, Reliant, Scaldis, Waldina, Spartan, and Aurora hard fescue; and Shadow chewings fescues (Furler et al, 1982b and 1984 Progress Report of the 1983 National Fine Fescue Test).

The sheep fescues have also demonstrated shade tolerance but are more suited to low-maintenance turf. Bighorn is a new variety of this species which has shown good shade tolerance. As the National Fine Fescue Test-1983 progresses, additional information on improved shade tolerance should be available.

Poa trivialis, rough bluegrass, is perhaps the species best adapted to moist, shaded sites.

However, in sunny sites it is a weed in other turfgrass species, thin and brown in the summer. It germinates rapidly and flourishes during cool, moist periods but is not compatible in blends with Kentucky bluegrass, fine fescues, and perennial ryegrass for permanent turf.

Sabre is an improved variety with a darker green color and greater density. It is best utilized as a specialty grass for overseeding in the south and for adapted sites in northern areas. It should not be spread into existing turf in other areas.

Perennial ryegrasses

Turf-type perennial ryegrasses have shown improved shade tolerance when compared to the older common types.

Previously useful as a temporary grass from fall to spring in sites shaded by deciduous trees, certain newer varieties have shown the ability to maintain good density and persist in shaded environments.

Tests in a densely shaded site at Everett, Wash., have shown Elka, Palmer, Pennant, Yorktown II, Repell, All*Star, Birdie II, Gator, and Cowboy have the ability to maintain good density and quality in the shade (Brauen et al, 1983, and 1983 and 1984 Progress Reports of the 1982 National Perennial Ryegrass Test). Perennial ryegrasses have better mowing qualities in the shade.

Turf-type tall fescues also have improved shade tolerance when compared to Kentucky 31 and many older varieties.

In the transition zone they may be the turfgrass of choice in many shaded areas where bermudagrass will not survive. In shaded environments, tall fescues have much finer and softer leaves.

Since most of the turf-type tall fescues are new, comparitive shade tolerance is not well established.

The 1984 Progress Report of the National Tall Fescue Test showed Arid, Finelawn I, Trident, Pacer, Mustang, and Apache having better turf quality at four shade sites but this is only the first year of data.

The warm-season grasses

Among the warm-season grasses bermudagrass is almost intolerant of shade while St. Augustinegrass is very shade tolerant, and zoysia grass shows moderate shade tolerance.

Whether in sun or shade, it is important to select a St. Augustinegrass with improved resistance to St. Augustine decline (SAD) and insects if you have a problem in those areas.

Floraturf bermudagrass has been reported to be more shade tolerant and Dr. Arden Baltensperger of New Mexico State University has been screening bermudagrasses for improved shade tolerance.

Shade can also benefit turfgrass. A light shade during the summer may enable the grass to survive heat and drought. However, if high humidity is present, diseases may become worse. It is always best to view your landscape as a total package and manage for the benefit of both trees and turf.

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Tests have shown that *Glade (shown above) exhibits above-average resistance to powdery mildew and a higher rate of photosynthesis under reduced light than some turfgrasses.*

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To request copies of the results of the National Turfgrass Tests write to Kevin N. Morris, technical coordinator, National Turfgrass Evaluation Program (NTEP), USDA-ARS, Beltsville Agriculture Research Center-West, Bldg. 001, Room 328, Beltsville, Md. 20705.