

Turfgrass Species, Cultivars and Management Considerations for Shaded Sites

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Maintaining high quality turf in heavily shaded areas can be a significant challenge even for the most accomplished turfgrass manager. There is no simple solution or single recommendation available that will allow this challenge to be easily conquered.

One primary reason there is not more definitive information available is that the problem itself is very complex. The microclimatic conditions found in a shaded site can vary significantly not only between climatic regions but even within a relatively small geographic area. Therefore, a single recommendation cannot be made for all shaded sites. It's important and necessary for the turfgrass manager to be aware of the many factors, both cultural and environmental which influence turfgrass shade adaptation.

Turfgrass Selection

The single most important aspect of successfully growing turf under shade is the proper selection of shade adaptive turfgrass species. In the cool regions of the country, there are five primary turfgrasses which can be potentially used in shaded sites. They include: Kentucky bluegrass, fine fescues, perennial ryegrasses, tall fescue and roughstalk bluegrass or Poa trivialis. These grasses have been evaluated for shade adaptability at Ohio State University. A brief summary of these findings is presented below.

The study was initiated in the fall of 1979 at the OSU Turfgrass Research Facility in Columbus, Ohio. The incident solar radiation (light) reaching the turf surface was 5% of full sunlight. Following establishment, the plots received 2 lb N/1000 sq. ft./yr. and were maintained at a 3 inch cutting height. Little or no irrigation or pesticides were used during the course of the study.

The rate of establishment varied among the species and cultivars tested (Table 1). The perennial ryegrasses averaged a 60% cover 18 days after seeding. The fine fescues, Kentucky 31 tall fescue, and 'Sabre' Poa trivialis also exhibited fair to good establishment by this date. The Kentucky bluegrasses were very slow to establish (Table 2). The following spring, approximately 8 months after seeding, the ryegrass, fine fescues, and tall fescue had formed an almost complete cover. The overall quality of these species, particularly the perennial ryegrasses was quite high (Table 3). On the other hand, a great deal of variability did occur among the Kentucky bluegrasses in regards to area covered. This is partially reflected in the quality ratings taken on May 22 (Table 4). Among the Kentucky bluegrasses, Birka, Glade, and A-34 exhibited the most rapid establishment rate. Sabre showed a very dense coverage at this time which was comparable to the perennial ryegrasses. The first year of the study the perennial ryegrasses maintained the highest quality early in the season. However, as the season progressed the perennial ryegrasses thinned significantly (Table 5). The fine fescues also showed a dramatic decline in turf quality. After twenty-two months, which included two full growing seasons, 'Loretta' and 'Manhattan' perennial ryegrasses were severely thinned and almost non-existent in the plots they were originally seeded (Table 6). Of the fine fescues tested, 'Biljart' showed the lowest and 'Dawson' the highest quality ratings. Overall, 'Kentucky 31' performed reasonably well. In terms of the Kentucky bluegrasses, 'A-34', 'Bristol' and 'Nugget' showed the highest quality (Table 7). It is believed that

due to the extremely dry summer of 1981, those Kentucky bluegrasses which have performed well in the shade in the past did not fare as well. For example, a previous 4-year study showed 'H-7', 'H-6', 'Nugget', 'Birka', 'Bristol', 'Glade' and 'A-34' all performing fair to good under dense shade. Those cultivars which showed the greatest shade tolerance also tended to have the least incidence of powdery mildew.

The biggest surprise of this latest study was the performance of 'Sabre' Poa trivialis. Throughout the 2 year study it consistently maintained the highest quality. Poa trivialis as a rule is most noted for its lack of heat tolerance, preference for poorly drained soils and apple green color. Sabre performed well even through the droughty summer of 1981. In addition it did not appear to have the characteristic apple-green color associated with typical cultivars of Poa trivialis. Although the use of Sabre in shaded sites looks encouraging, more research is needed in the area of long term shade adaptability. Turf managers should use this cultivar sparingly until more data is obtained.

Management Practices

Since the amount of light reaching the turf surface is greatly reduced, it is important for the turfgrass plant to intercept as much of the available light as possible. This can be achieved by maintaining the turf at 2.5 to 3 or more inches. Higher cutting heights encourage deep and more extensive rooting which allow the turf to better compete with the tree roots for water and nutrients.

Proper nitrogen fertilization is extremely important. High rates of nitrogen will stimulate shoot growth over root growth and accelerate the depletion of stored carbohydrates. Annual rates for most cool season turfgrasses should range from 2 to 3 lbs./1000 sq. ft./yr. Minimum amounts should be applied during the summer months.

Light frequent irrigation should be avoided since it will promote a shallow turfgrass root system as well as encourage shallow feeder roots of trees. Frequent irrigations allows the soil surface and turfgrass leaves to stay wet longer, thus enhancing disease development. Ideally, irrigation should be done in the morning to allow maximum time for evaporation of free water from the turf surface. Sufficient water should be applied to wet the soil to a 6 to 8 inch depth.

If proper species and cultivar selection are made, and recommended cultural practices followed, an acceptable turf cover is possible even under relatively heavy shade. However, the turfgrass manager must realize that turf growing under dense shade will never approach the quality or hardiness of turf growing in full sun. In fact, in some cases it may be impossible to attain a satisfactory cover. Therefore, for nonuse areas, shade tolerant ground covers such as English ivy, goutweed, myrtle, or pachysandra should be used.

Table 1. Perennial Ryegrass, Fine Fescue and Tall Fescue Establishment Under Tree Shade Eighteen Days After Seeding

| Cultiver | % Cover | | % Cover |
|------------------|---------|----------------|---------|
| Loretta (PR) | 67 | Dawson (FF) | 30 |
| Manhattan (PR) | 60 | Jamestown (FF) | 27 |
| Pennfine (PR) | 57 | Pennlawn (FF) | 27 |
| Kentucky 31 (TF) | 50 | Biljart (FF) | 23 |
| | | Dawson (FF) | 10 |

Plots seeded October 1, 1979

Table 2. Bluegrass Establishment Under Tree Shade Eighteen Days After Seeding.

| Cultivar | % Cover | Cultivar | % Cover |
|----------------------------|---------|-----------|---------|
| Sabre (<u>Poa triv.</u>) | 37 | Touchdown | 7 |
| Glade | 13 | Bristol | 7 |
| Ram I | 13 | Victa | 7 |
| Nugget | 10 | Merion | 3 |
| Birka | 10 | A-34 | 0 |
| H-6 | 7 | H-7 | 0 |

Plots seeding October 1, 1979

Table 3. Quality Ratings of Perennial Ryegrass, Fine Fescue and Tall Fescue Maintained Under Tree Shade.

| Cultivar | Quality | Cultivar | Quality |
|----------------|---------|------------------|---------|
| Lorretta (PR) | 7.5 | Biljart (FF) | 6.7 |
| Pennfine (PR) | 7.2 | Jamestown (FF) | 6.2 |
| Manhattan (PR) | 7.2 | Dawson (FF) | 5.0 |
| Banner (FF) | 6.8 | Kentucky 31 (TF) | 4.7 |
| Pennlawn (FF) | 6.7 | | |

Data taken from May 22, 1980

Quality Ratings: 9 = best

Table 4. Quality Ratings of Various Bluegrass Cultivars Maintained Under Tree Shade.

| Cultivar | Quality | Cultivar | Quality |
|-------------------|---------|-----------|---------|
| Sabre (Poa triv.) | 7.8 | Touchdown | 4.7 |
| Birka | 6.3 | H-6 | 4.7 |
| A-34 | 5.7 | Nugget | 4.3 |
| Glade | 5.3 | Bristol | 4.0 |
| Victa | 5.0 | H-7 | 3.0 |
| Ram I | 5.0 | Merion | 3.0 |

Data taken May 22, 1980
 Quality Ratings: 9 = best

Table 5. Quality Ratings of Perennial Ryegrass, Fine Fescue and Tall Fescue Maintained Under Tree Shade.

| Cultivar | Quality | Cultivar | Quality |
|------------------|---------|----------------|---------|
| Dawson (FF) | 4.3 | Lorretta (PR) | 2.8 |
| Kentucky 31 (TF) | 4.2 | Manhattan (PR) | 2.8 |
| Pennfine (PR) | 4.0 | Pennlawn (FF) | 2.5 |
| Banner (FF) | 3.8 | Biljart (FF) | 2.5 |
| Jamestown (FF) | 3.7 | | |

Data taken August 25, 1980
 Quality Ratings: 9 = best

Table 6. Quality Ratings of Perennial Ryegrass, Fine Fescue and Tall Fescue Maintained Under Tree Shade.

| Cultivar | Quality | Cultivar | Quality |
|------------------|---------|----------------|---------|
| Kentucky 31 (TF) | 4.8 | Banner (FF) | 2.8 |
| Dawson (FF) | 4.0 | Manhattan (PR) | 2.7 |
| Jamestown (FF) | 3.5 | Lorretta (PR) | 2.0 |
| Pennfine (PR) | 3.2 | Biljart (FF) | 2.0 |
| Pennlawn (FF) | 2.8 | | |

Data taken August 17, 1981
 Quality Ratings: 9 = best

Table 7. Quality Ratings of Various Bluegrass Cultivars Maintained Under Tree Shade.

| Cultivar | Quality | Cultivar | Quality |
|----------|---------|-----------|---------|
| Sabre | 6.8 | Touchdown | 3.7 |
| H-7 | 5.8 | Birka | 3.5 |
| H-6 | 5.3 | Nugget | 3.0 |
| Bristol | 4.7 | Glade | 3.0 |
| A-34 | 4.0 | Ram I | 2.2 |
| Merion | 3.8 | Victa | 2.2 |

Data taken August 17, 1981
 Quality Ratings: 9 = best