

A PRIMER FOR CHOOSING AND MAINTAINING HEALTHY TURF

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RESearch, as discussed in the article on page 27, is important to fine tune turfgrass recommendations to a specific park or for a particular function. However, much basic information on the attributes of various turfgrass varieties is already available from earlier studies and may be helpful to park managers.

The first step in growing good turfgrass with minimal effort, cost, and disturbance to ecosystems is very basic—choosing the proper grass for the geographical area and intended use. Grasses come in many varieties and flavors, but can be broken down into two categories: cool-season and warm-season. As the name suggests, cool-season grasses grow best in spring, winter, and fall, and prefer the cooler areas of the United States. Extending the Mason-Dixon line west across the country roughly gives the southern border of this region. Logically, warm-season grasses that grow best in warm, summer temperatures, are best south of the Mason-Dixon line, right? Unfortunately, the line is not nearly this clear-cut. Many of the warm-season grasses do not like cold, winter temperatures that prevail from Maryland south to Georgia and even to the mountains of, say, Arizona. Therefore, the grass-type decision process is quite muddled and very confusing at times.

To further complicate the issue is the consideration of the location and use for that grass. Is the area in full sun or shade? Is the soil acidic or alkaline? Will hordes of visitors trample the grass? Many other questions are pertinent, but the point is that choosing the best turfgrass is work! While managers should expect to give attention to the care of turfgrass, choosing the right grass from the start will minimize problems and reduce costs down the road (Table 1).

COOL-SEASON GRASSES

Cool-season grasses have the widest distribution and greatest use in most areas of the United States. The most popular cool-season grasses are Kentucky bluegrass (*Poa pratensis*), perennial

ryegrass (*Lolium perenne*), tall fescue (*Festuca arundinacea*), fineleaf fescue (*Festuca rubra*) and creeping bentgrass (*Agrostis stolonifera*). None of these grasses are native to the United States. Most were brought from Europe when immigrants or sailors crossed the Atlantic with seed or bedding for cattle on board.

Kentucky bluegrass (which did not originate in Kentucky, but grows well there) is widely used because it is attractive, forms a dense sod, and comes in many variants. Some Kentucky bluegrasses are very tolerant of foot traffic, while others tolerate acidic soils, shade, or drought. Unfortunately, no single Kentucky bluegrass has all these characteristics; you must first identify your needs and choose accordingly.

Perennial ryegrass germinates fast, quickly establishes ground cover, and is also fairly tolerant of walking or sports-related wear and tear. Its downfall, in the humid states, is its susceptibility to damage by summer diseases.

Tall fescue is heat and drought tolerant while requiring less fertilizer and water than perennial ryegrass and most Kentucky bluegrasses. The “transition zone,” an area that is too cold in winter for many warm-season grasses and too hot in summer for many cool-season grasses, is the best area for use of tall fescue. It does well in acidic soils, but does not tolerate compacted soils. Therefore, it is not the best choice for most heavy traffic areas.

Fineleaf fescues (a general term for six different grass species) are excellent in shade and also perform well in poor, acidic soils. They require a minimum of fertilizer and water and perform poorly when too much fertilizer is applied. These varieties tolerate compacted soils very poorly and are not suitable for high visitation areas. Very low maintenance areas, such as cemeteries and roadsides, are traditionally where fineleaf fescues have been used, but they are making their way into more turf settings.

Creeping bentgrass is a specialty grass used mainly on golf courses and probably has very little utility in most national parks.

WARM-SEASON GRASSES

Warm-season grasses, such as Bermudagrass (*Cynodon sp.*), zoysiagrass (*Zoysia sp.*), centipedegrass (*Eremochloa ophiuriodes*) and St. Augustinegrass (*Stenotaphrum secundatum*), like their cool-season counterparts, are native to other parts of the world, coming here via settlers or travelers. Buffalograss (*Buchloe dactyloides*), on the other hand, is native to the U.S. Great Plains. These grasses thrive in summer heat and are more tolerant of drought, in general, than the cool-season grasses. Warm-season grasses vary, however, in their ability to tolerate extreme drought, cold winter temperatures, and disease.

Bermuda grass is probably the most widely used of the warm-season grasses. Bermuda grass spreads very fast and forms a dense sod with very good drought and wear tolerance. Hybrid Bermuda grasses form a very dense, fine-textured turf but require higher maintenance than available at most parks. Common Bermuda grass will survive with less care than the hybrids but still requires a higher level of maintenance than some other warm-season grasses.

Zoysiagrass spreads much slower than Bermuda grass but forms a denser sod with lower fertility requirements. Many zoysiagrasses are very cold tolerant and will survive winters in the northern United States.

Centipedegrass is fairly coarse-textured and slow-growing but needs less fertilizer and water than any of the other warm-season grasses. The cold tolerance and wear tolerance is medium to low. St. Augustinegrass has very coarse leaves and forms a sod that feels “spongy.” This grass spreads quickly and has the best shade tolerance of any of the warm-season grasses. However, this grass also has the least tolerance of cold and wear.

GRASS CARE

After choosing and establishing a grass, a manager needs to consider mowing, fertilizing and watering the turf. Since turfgrasses are often not cut or mowed in nature (except where grazed by animals),

Table 1. Advantages and Disadvantages of various grasses

Variety	Pros	Cons
Cool-season grasses	Grow best during cool season and cool regions of U.S.	
Kentucky bluegrass varieties	Tolerant of foot traffic, acidic soils, shade, and drought	No single variety offers all these characteristics
Perennial ryegrass	Germinates and covers quickly; fairly tolerant of soil compaction	Susceptible to summer diseases
Tall fescue	Heat and drought tolerant; uses less fertilizer and water than perennial rye and kentucky bluegrasses; does well in acidic soils	Does not tolerate compacted soils
Fineleaf fescue varieties	Excellent in shade and acidic soils; require little fertilizer and water; good for low maintenance areas like cemeteries and roadsides	Intolerant of compaction
Creeping bentgrass	Specialty grass of golf courses	Large water volume and high maintenance
Warm-season grasses	Thrive in summer heat; tolerant of drought	May not do well in transition zone to cold areas; vary in ability to tolerate extreme drought, colder temps, and disease
Bermuda grass	Spreads fast; dense; drought and wear tolerant	Requires higher maintenance than some other warm-season grasses
Hybrid Bermuda grasses	Spread fast; dense; drought and wear tolerant	Require higher maintenance than Bermuda grass
Zoysiagrass	Forms dense sod with low fertilization requirement	Spreads much slower than Bermuda grass
Centipedegrass	Needs least water and fertilizer of any warm-season grass; forms denser sod, with less fertilization, than Bermuda grass	Spreads more slowly than Bermuda grass; coarse-textured; slow growing; medium to low cold- and wear-tolerance
St. Augustinegrass	Very coarse leaves give a spongy feel; spreads quickly; best shade tolerance of any warm-season grass	Least cold- and wear-tolerance

mowing is the maintenance practice that can most easily damage turfgrass stands. Therefore, proper mowing procedures are essential for healthy grass that is able to withstand weeds, diseases, and insects. A good guideline is to never remove more than one-third of the height of the grass with any one mowing. Grasses need an adequate amount of leaf tissue to perform photosynthesis and produce enough food to survive and thrive. Removing more than one-third of these leaves weakens the grass plant and may force it use stored food to "breathe." In addition, a sharp

mower blade is important to produce a clean cut of the leaf blades and not cause damage to the tip of the grass plant. Finally, cutting height varies depending on the grass and needs to be researched and monitored for each mowing. Mowing shorter than a grass can withstand will severely damage the turf stand and will reduce the density of that stand, creating opportunity for weeds to invade.

Fertilization may or may not be performed in many national park sites, but it is important to understand the most important nutrients required by grasses. Ni-

trogen is the single most important element needed by grasses. Nitrogen causes leaves and roots to grow and improves the green color. Nitrogen can be overused however, therefore care should be taken not to apply more than the grass needs for adequate growth. Since the need for nitrogen varies with the grass type, consult a knowledgeable source for guidance. Phosphorus is the second element that is important for turfgrass survival. Phosphorus applications are most important during establishment of new seed or grass plants. After grasses are well established, phosphorus requirements are much lower than nitrogen requirements. Potassium, the third nutrient of importance, is probably not used enough by turfgrass managers. Potassium increases the heat, cold, drought, and wear tolerance of turfgrasses. Annual application rates of potassium that at least equal the rate of nitrogen used will help grasses to survive stressful periods.

Watering, or irrigation, is the final critical maintenance practice for turfgrass success. In many park situations, irrigation may be unavailable, impractical, or inappropriate. In many areas, such as the desert southwest, grass cannot be grown without supplemental irrigation. Therefore, water may be the limiting factor in growing good turfgrass. In many other areas, turfgrass can be grown successfully without irrigation, providing that the grass has an opportunity to first become well established. Irrigation, like fertilization can be overdone to the point that diseases and weeds become problems. Also, irrigation that promotes excessive grass growth during a stressful period, such as summer, may not allow grasses to "harden-off," or slowly prepare for stress. If irrigation is suddenly stopped, for economic or logistical reasons, the turfgrass will likely suffer more than if it were not irrigated and allowed to shut itself down. Most grasses can withstand at least some heat and drought stress and should, in most cases, be allowed to do so. If the area is needed as an attractive focal point for the park or for the safety of organized sports participants, then irrigation may be essential to ensure consistent turfgrass cover.

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