

Choosing Traffic-Tolerant Turfgrass Varieties



Brinkman Machine used to evaluate wear tolerance of turfgrasses at University California Riverside. Photo courtesy: Stephen Cockerham.

By Roch E. Gaussoin

Outdoor recreation is one of America's favorite pastimes. Whether it is something as active as intramural or recreational soccer, baseball, softball and football leagues, or simply a walk in the park, there are many times when you need turfgrasses that can tolerate intense foot and mechanical traffic. Turf managers are challenged with selecting turfgrass species and cultivars that can tolerate the day-to-day abuse of an active American public.

Before you can make a specific selection of a turfgrass cultivar species to use in a site prone to traffic, you must understand some basic principles about what makes a grass more or less susceptible to the problems associated with heavy traffic.

The first criteria in selecting a turfgrass for a heavily trafficked site is its ability to withstand the wear or abrasion exhibited by sports cleats, foot traffic, and other mechanical traffic devices. Turfgrass species differ greatly in their ability to withstand the abrasion of traffic.

In general, the warm-season grasses, such as buffalograss, bermudagrass and zoysiagrass, are more wear-tolerant or wear-resistant than the cool-season grasses. Grasses that tolerate wear or have a high degree of wearability normally

have tougher leaves and, in general, the leaf blade is wider than those grasses that are ranked or classed as being less wear-tolerant.

A second criteria in selecting a turfgrass with a high degree of traffic tolerance is its recuperative potential. Recuperative potential is the ability of the grass to recover and fill in voids and gaps traffic and other stresses leave. In general, grasses with rhizomes and/or stolons have a greater recuperative potential than grasses that spread by tillering, such as bunch grasses. The recuperative potential of Kentucky bluegrass, which possesses rhizomes, is much greater than that of perennial ryegrass, which spreads by tillering.

The generalization that warm-season grasses are more wear-tolerant than cool-season grasses does not hold true for recuperative potential. Bermudagrass and buffalograss are very aggressive and have the ability to spread rapidly into voids and gaps left by traffic damage. However, zoysiagrass is not very aggressive and its extension or growth into damaged areas is hampered by this slow growth potential. Even though zoysiagrass possesses both rhizomes and stolons, its slow growth rate limits its recuperative potential.

Many grasses that have a high degree of wearability do not have a high recuperative potential. It is not uncommon for grasses with a high

wearability to be blended with those grasses with a high recuperative potential to get the best characteristics of both species. For example, blending ryegrass, which has excellent wearability, with the recuperative potential of Kentucky bluegrass is a very effective means of seeding sports fields and golf course fairways in the northern half of the United States.

Another approach is to use a grass, such as tall fescue, which has a high degree of wearability, and aggressively overseed on an annual or semi-annual basis those areas that are most prone to stand loss.

For example, many soccer fields and recreational installations in the transition zone of the United States use tall fescue. Tall fescue provides an excellent playing surface and is well-adapted to the northern U.S. The problem arises in front of the goal boxes and along sidelines where players congregate and stand, causing turf thinning and loss. By aggressively overseeding these areas in the off part of the season, recovery or recuperative potential is hastened by the new seedlings. Both the blending approach and the overseeding approach have proven to be effective.

Species Selection

Many times, geographic location will dictate your species selection. As a turf manager, you are faced with the decision within a species as to the cultivar that is most appropriate for high-traffic situations. In recent years, turfgrass plant breeders have aggressively developed new cultivars that are adaptable to specific situations.

Selecting a cultivar often can be confusing because of the number that are available and the attributes of each cultivar. The National Turfgrass Evaluation Program (NTEP) is designed to evaluate the suitability and appropriateness of these numerous cultivars within and across geographic regions in the United States. Briefly, this program is sponsored by the NTEP and companies wishing to have cultivars or

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experimental lines evaluated submit seed and a small fee to have these products evaluated in the National Trials.

National turfgrass evaluation programs exist for most species of turfgrasses grown in the U.S. The majority of these evaluations include color and quality ratings, and in some instances, there will be multiple fertilizer and/or mowing heights imposed on the different cultivars. Unfortunately, extensive evaluation region-to-region on traffic tolerance is limited. Excellent programs exist at some institutions for evaluation of traffic tolerance of various cultivars. The University of California at Riverside has an excellent program that is currently evaluating many of the new cultivars for traffic tolerance. Other universities are also evaluating traffic tolerance.

When looking for a traffic-tolerant turfgrass cultivar, you have two options. First, consult with a local seed distributor. Second, obtain a copy of the NTEP reports and make assumptions about the information in these reports and their applicability in a high-traffic situation. Depending upon location, many of the evaluation sites will evaluate not only for quality and color, but also for other attributes that are of interest to people looking for traffic-tolerant turfgrasses. These attributes include rate of spread and establishment rate.

A grass with a high rate of spread would have a high recuperative potential and might be desirable in a given traffic situation. Cultivars that have a quick establishment time also may be applicable where overseeding is anticipated. Use this information to try to ascertain its applicability for the site you will be seeding.

Copies of NTEP reports or other cultivar evaluations are normally available from your state extension turfgrass specialist or from some county extension offices. If there is no such program in your state, check with neighboring states for available information. Pay attention to regional publications and newsletters.

Be active in your local professional organizations. Ask others who have evaluated or used different cultivars in your particular region what their impressions were of the turfgrass cultivars. Use the other experts in your region to critically evaluate grasses for traffic tolerance.

Cultural Modifications

Beyond selecting an appropriate turf-

grass species and cultivar, there are other cultural modifications that you can do to improve the persistence of grasses in hostile, trafficked environments. Turfgrass grown under optimum conditions will be better able to withstand not only traffic stresses, but other stresses as well. This will ultimately result in good stand persistence and high quality.

The following are some cultural practices to examine.

Irrigation. Proper irrigation timing and frequency can facilitate the growth and subsequent traffic tolerance of many turfgrasses. Grasses that are shallow-rooted will not be able to withstand the wear and tear of sports cleats as well as turf that is deeply rooted and knitted. The proliferation of roots to deep depths within the limits of a species is hastened by proper irrigation and management.

Make sure to irrigate so that surface runoff does not occur and that percolation into the subsoil is adequate. The interval between irrigations often is dictated by the use of the particular facility. Modify the irrigation schedule to promote root production, which can greatly enhance the ability of the turfgrass to withstand stress conditions.

Fertility. Fertility also plays a key role in traffic tolerance. Grasses that are adequately fertilized have a greater potential to recuperate and spread into voids and/or damaged areas. Conversely, grasses that have a high degree of wearability that are overfertilized often exhibit lush, succulent growth from high nitrogen fertilization. This causes them to lose some of this wear potential, resulting in stand loss.

A balanced fertilization program is critical for traffic-tolerant turfgrasses. Potassium and phosphorus are also critical for traffic tolerance in turfgrasses. Work by Dr. Bob Shearman at the University of Nebraska has shown that high levels of potassium greatly enhance turfgrass' ability to withstand wear and traffic. Dr. Shearman's work shows that, although soils may not appear to be limited in potassium based on soil tests, the addition of potassium in excess of that dictated by soil tests resulted in grasses that were better able to withstand wear and tear. Consider an increase in your potassium fertilization program to enhance the wearability and stress tolerance of your turfgrass.

The condition of the soil is also critical to acceptable traffic-tolerant turfgrasses. An aggressive aerification program, includ-

ing core aerification and soil modification with top dressing, can greatly facilitate turfgrass traffic tolerance. When the soil is compacted, roots are restricted. When roots are restricted, traffic tolerance also is restricted.

As was evident with adequate fertilization and irrigation, promoting deeper rooting helps the turf withstand traffic stresses. Unfortunately, the optimal time to cultivate or aerify most grasses coincides with peak playtime for most field sports. Scheduling these operations can be a turf manager's nightmare, but it is still critical to find an opportune window to aerify sports turf and highly trafficked sites to enhance their ability to withstand this stress.

The final step is managing traffic. Traffic control is the attempt to minimize the high degree of traffic, either vehicular or foot traffic, in recreational areas. If possible, use portable soccer goal nets or other field accessories that you can move to allow areas under heavy traffic to recuperate. For more permanent fields, this approach is obviously not appropriate. However, try to limit the amount of time spent on the field exclusive to game and/or peak recreation time. Work with your local park board or recreational department to facilitate field rotation and/or saving one or more field for use only for key events.

In park areas or recreational sites, individuals walking to and from events or using the park facilities will create footpaths. If these paths are recurrent from year to year, consider designating these as permanent paths and applying either a permanent covering, such as asphalt or concrete. If your budget is limited, a mulch path will work. Paths encourage people to walk in designated areas instead of across the turf.

If paths are not possible, consider using portable barriers that will route the traffic throughout the turfgrass area, dissipate the injury and allow for adequate recovery time in peak use areas.

The use of turfgrass in heavy traffic areas is a challenge. Selecting a traffic-tolerant turfgrass is just the first step. After the selection, you need to consider the existing management practices and establish methods to control traffic and maintain turfgrass health to retain both the aesthetics and useability of the site. □

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