

SELECTING GRASSES FOR SEEDING HEAVY TRAFFIC AREAS WITH PARTICULAR REFERENCE TO ATHLETIC FIELDS

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CHOOSING ADAPTED SPECIES AND VARIETIES

When selecting turfgrasses for heavily trafficked turf, one must consider adaptation to both environmental and management conditions including:

1. Environment
 - a. temperature extremes
 - b. sunlight
 - c. rainfall
 - d. soils

2. Management
 - a. time for establishment
 - b. intensity of use
 - c. irrigation
 - d. aerification
 - e. overseeding
 - f. cutting height
 - g. fertility
 - h. pest control

The recommended species for Michigan and vicinity are limited to cool season species having good traffic tolerance, shear resistance, and recuperative potential. The species of choice that fit this description are Kentucky bluegrass, perennial ryegrass, and tall fescue.

Many varieties (cultivars) of Kentucky bluegrass, perennial ryegrass, and tall fescue are available on the market today. However, it is important to realize that there are differences between all of

them. The National Turfgrass Evaluation Program (NTEP) and university trials are good sources of information on different grasses. Some character differences are important considerations when selecting grasses for new establishment of overseeding high traffic areas, others are not. Remember that one variety or species may not provide every character desired; therefore, blend two to four varieties or mix two species to broaden adaptation.

Caution should be used when selecting grasses based on ratings of general quality or genetic color. Although eye catching in side by side comparisons, very dark green color will contrast sharply with any weeds (particularly *Poa annua*) or disease blemishes and give the turf an undesirable "freckled" appearance. Lighter medium green cultivars are better able to mask slight imperfections. General quality ratings tend to be highly correlated with dark green color and density yet tell you very little about variety deficiencies.

I do not recommend using "common" varieties of any grasses even though their price may seem attractive. The turf quality of commons even under ideal conditions is poor compared to the improved cultivars. Common bluegrasses such as Kenblue, Cougar, Newport, and Park tend to be susceptible to turf diseases such as the leafspots and rusts and are not able to stand up to lower cutting heights and heavy traffic. Common ryegrasses and 'Linn' tend to be very coarse with low shoot density and poor mowing qualities. Common tall fescues such as KY31, Fawn, Trident, and Alta are also coarse leaved with low shoot density and wear tolerance. Disease resistance is poor among these common pasture type tall fescues.

KENTUCKY BLUEGRASS

Among the cool season grasses adapted to the north-central United States, Kentucky bluegrass is a top choice for athletic fields for several reasons. The most important characteristic of Kentucky bluegrass is that it produces rhizomes (underground creeping stems). These rhizomes produce a tight knit sod that binds the soil and resists shearing forces, protect the crown of the plant so that the plant can recuperate from wear, permit the plant to creep into barren areas caused by scuffs and divots, and help develop a cushioning thatch layer which further protects the crown. Thatch can reduce the potential for soil compaction, which protects the crown and softens the playing surface for player comfort. Thatch should be kept between 1/4 to 1/2" (6 to 13 mm) so that it does not cause pest and water management problems.

Kentucky bluegrass is able to tolerate the cold, severe winters of the north central states better than either ryegrass or tall fescue. Relying on 100% perennial ryegrass or tall fescue for a playing surface could be disastrous in this region for early spring sports such as baseball and softball.

There are improved Kentucky bluegrasses to suit most any management situation including variations in fertility, irrigation, mowing, and pest management. Seasonal performance varies as well and should be matched to the season of use. For example, spring green-up and spring density would be important for traditional spring sports such as baseball and softball.

Top varieties for spring green-up in East Lansing, MI are Parade, Freedom, Mystic, Huntsville, Suffolk, PSTCB1, Aspen, Liberty, Classic, Haga, Trenton and Glade. Since actively growing tissue is able to recuperate from injury these varieties will probably have the best recuperative potential in the early spring while other varieties have not broken dormancy. Top varieties for spring density in Lafayette, IN include America, BA70-139, P-104, Eclipse, HV97, Asset, Trenton, Merion, Sydsport, and Classic.

Winter color is an indicator of which varieties are actively growing late into the fall. This character would be important in traditional fall sports such as football and soccer. Top cultivars for winter color across seven U.S. locations include: Nassau, Trenton, Freedom, K3-178, Classic, P-104, Destiny, PSTCB1, Bristol, and Parade.

Blending varieties that have good spring and winter performance can give long season performance for multipurpose turfs and areas where aesthetics are important. Optimum seeding rates for bluegrasses are 1.5 to 2.5#/1000 ft².

One of the negative characteristics of Kentucky bluegrass is that it is slow to germinate and establish. I like to see a minimum of 180 days for establishment of Kentucky bluegrass from seed

before an intensive use of the turf. If you have between 60 and 120 days available from establishment to intensive use. I recommend bluegrass sod. Sodding will provide you with a highly desirable bluegrass base with sufficient rhizome and root development for wear tolerance and recuperation from wear. A ryegrass overseeding program can begin immediately. Although bluegrass does not perform well for overseeding into established turf, it should be included at up to 50% of the overseeding mix if larger bare areas are present.

Another alternative when time is short at initial establishment is to use a seed mixture of 50-70% Kentucky bluegrass and 30-50% perennial ryegrass. The objective here is to get bluegrass in the original mix and give it a foothold, yet to rely on the perennial ryegrass for early soil stabilization and wear tolerance. As long as the initial use is not too intense and you have at least 90 days of good growing conditions (including optimum water and fertility management) you should get a strong stand of grass. One problem with mixtures of perennial ryegrass and Kentucky bluegrass is that the perennial ryegrass tends to out compete and limit bluegrass development. One way to reduce the competitive ability of the ryegrass during bluegrass establishment is to mow the grass close (1/2-3/4") for the first mowing or two. In effect you will scalp the perennial ryegrass and shock it so that the bluegrass can develop more freely. As you raise the cutting height to about 1" during subsequent mowings there will be a more even mixture of perennial ryegrass and Kentucky bluegrass. Since rhizome and root development is severely restricted at lower cutting heights, Kentucky bluegrass should not be maintained much lower than 1" after establishment. Reduced rhizome development translates into reduced shear resistance and recuperative potential and subsequently increased weed problems.

PERENNIAL RYEGRASS

Given 60 to 90 days for establishment from seed, the only realistic solution is to establish with straight perennial ryegrass and remain on a regular overseeding program. Perennial ryegrass is able to provide turf in the shortest period of time due to its rapid germination and seedling vigor. Additionally, the strong germination energy makes perennial ryegrass the best choice for overseeding worn turf. Most Kentucky bluegrass seedlings lack the competitive ability to establish themselves in actively growing grass stands. Seeding rates for ryegrasses are 4 to 6#/1000 ft² at established and 1 to 2#/1000 ft² twice per year for overseeding.

Other positive characters of perennial ryegrasses for athletic turf include excellent wear tolerance, a tough penetrating root system that resists shearing forces of cleated shoes and tolerates compacted soil conditions and tolerance to cutting heights of 1/2" or less.

Perennial ryegrass has the best wear tolerance and persistence on compacted soils of any of the cool season species except perhaps *Poa annua*. Research conducted at Michigan State University on a football practice field in 1990 and 1991 has shown that there are also differences in wear tolerance among the varieties of perennial ryegrass. This data will be available soon.

Although wear tolerance and recuperation from wear are probably best achieved with quick establishing and vigorous growing grasses, a trend among some grass breeders is toward developing dwarf-type perennial ryegrasses. Early data indicates slower germination and establishment of dwarf-type ryegrasses compared to conventional varieties. Slower germination and establishment of these dwarf ryegrasses will increase the potential of weed encroachment and reduce their effectiveness in overseeding programs. Additionally, the wear tolerance of dwarf varieties will probably suffer.

Some of the negative characteristics of perennial ryegrass include: a reduced recuperative potential due to its non-creeping, bunch-type growth habit, the inability to form thatch, the necessity for high nitrogen fertility levels, and susceptibility to winter damage.

Although winter cold hardiness is still a weakness among perennial ryegrasses, there are varieties which are more hardy than others. Top performing varieties in NTEP trials are Goalie, Delray, Ovation, MomLp763, Regency, PST-259, Prelude, Pennfine, Pennant, and Belle. Research has shown that improved cold tolerance is due in part to a subset of crowns not common to all ryegrasses.

Kentucky bluegrass is an ideal choice to complement perennial ryegrass weaknesses in athletic turf and vice-versa. Kentucky bluegrass will contribute recuperative potential and lateral healing

from rhizomes, a cushioning thatch layer, and will also provide the winter hardiness so important for Michigan turf. On the other hand the ryegrass will provide quick establishment and a viable overseeding program essential for heavily used and intensively managed facilities. Additionally, the ryegrass will provide wear tolerance and persistence as soil becomes compacted under traffic. A Kentucky bluegrass and perennial ryegrass mixture is tough to beat for athletic turf in Michigan.

TALL FESCUE

Tall fescue is a good choice for lightly used athletic fields where irrigation is not available or is very limited (i.e., baseball or softball outfields and other athletic fields limited to one event per week). Tall fescue should have 120 to 180 days of optimum growing conditions before exposure to traffic. If time is short, tall fescue sod is available in a limited but growing supply in this region. Positive characteristics of tall fescue for athletic turf include excellent heat and drought tolerance for summer performance, good germination rates, and good wear tolerance once established.

In order to take advantage of tall fescue heat and drought tolerance the soils must be prepared to permit roots to extend as deeply as possible; and, the cutting height must not be dropped below 1.5 inches but preferably 2". Where heavy use is anticipated or soil conditions cannot be corrected to accommodate the deep roots of tall fescue, one should stick to perennial ryegrass and Kentucky bluegrass.

Tall fescues have been improved considerably since the introduction of KY31 which was originally developed for pasture use. The tall fescues today have improved tillering, darker color, finer texture, better wear tolerance, and slower growth than KY31. Seeding rate recommendations for improved tall fescues are between 6 and 8#/1000 ft². Higher seeding rates will decrease the initial wear tolerance of the stand by keeping the plants in a weak, juvenile stage due to interplant competition. Increased tillering of improved tall fescue will provide the density once provided by higher seeding rate of KY31.

Limiting characteristics of tall fescue for athletic turf include: poor tolerance to cutting heights less than 1.5", poor cold tolerance, a non-creeping bunch-type growth habit, clumpy and nonuniform stands without regular overseeding, and a requirement for moderate fertility to maintain color and density.

Since tall fescue is a bunch type grass it may be desirable to use 5-10% Kentucky bluegrass in your seed mixture to provide for lateral repair of divots and scuffs. Based on our research at Medalist Turf, good low maintenance bluegrasses to include with tall fescue include Aquilla and Trenton. If more than 10% bluegrass is used, uniformity of the stand is reduced. Tall fescue must predominate the turf stand for uniformity; therefore, biannual overseeding with tall fescue at 1 to 2#/1000 ft² is recommended.

Data from the National Turfgrass Evaluation Program illustrates how density and tillering of improved varieties has increased over KY31.

1989 NTEP Data from Five Locations
Summer Density, Tall Fescue
Scale - 1-9 densest

Amigo	6.9	Mesa	6.7
Pick TF9	6.9	Normarc 99	6.7
Arriba	6.8	PE-7	6.6
Rebel II	6.7	Arid	6.5
Bel 86-2	6.7	KY31	4.9

Unfortunately, as with the ryegrasses, some turfgrass breeders have bred dwarf-type tall fescues that are so compact that establishment rates and recuperative potentials are too slow for them

to perform in athletic turf. Recuperation and establishment is especially slow for some dwarf-type tall fescues in the fall when day length is short. Be aware of establishment rates for particular tall fescues.

BUYING QUALITY SEED

The cost of grass seed is a small fraction of the cost of any project when you consider the planning, site preparation, establishment, irrigation, fertilization, and future maintenance. After going to the effort to select the best adapted species and varieties for your project, it is important to insure you are purchasing what you selected by dealing with a reputable company and being aware of labeling laws and certification programs.

Federal law dictates that grass seed must have a label containing the following information:

- Lot number (used to trace the seed)
- Weight of seed in the container, box or bag
- Kind (species) of seed in the bag
- Each variety of the given kind(s)
- Pure seed (% by weight)
- Germination (%)
- Inert Matter (% by weight)
- Weed seeds (% by weight)
- Noxious weeds (kind and number per #)
- Other crop (% by weight of other agricultural seeds)
- Date of seed test
- Origin of the seed (state or country)
- Name and address of the company selling the seed

This information is helpful in telling you something about the quality of the seed in the bag. Pay attention to labels.

The next level of insurance is to buy seed that has been certified by a state agency (blue tag in Oregon). Certification assures that the variety listed on the certification tab is what is in the bag and therefore should give you the performance you expect. Most certification programs dictate minimum purity and germination standards, and maximum weed and other crop content. Standards are generally much higher than for uncertified seed.

Many states also have another level of certification called sod quality (Gold Tag in Oregon) which sets more stringent minimum and maximum standards. The best quality can be obtained by specifying "Crop and Weed Free" or by Specifying particular germination and purity standards.

If the high quality seed you seek is not readily available, then concessions must be made. A check of the laboratory analysis report will show what particular weeds or other crop were found in a given lot. A decision may then be made concerning the severity of the seed problem you may be buying based on selective controls available through management or pesticides.

A point to remember when purchasing seed. Labels are made based on a test of a representative sample of only 1 to 50 grams out of a seed lot which may comprise 50,000 #. These samples are drawn and examined by highly trained people. Even with a perfect test report there may be undesirable contaminants in a very low percentage within the lot that simply go undetected.

CONCLUSIONS

Improved varieties of Kentucky bluegrass, perennial ryegrass and tall fescue are adapted to traffic prone sites in Michigan.

On high to moderate maintenance athletic turf in this region, the top objective is to get a good base of established Kentucky bluegrass and then to begin a regular overseeding program consisting of straight perennial ryegrass or a seed mixture of perennial ryegrass with up to 50% Kentucky

bluegrass. On less trafficked, lower maintenance sites, straight tall fescue with 5 to 10% Kentucky bluegrass can be successful with a biannual overseeding of the same mix.

When establishing areas with high traffic give the grass stand a chance to establish fully before permitting activity. Young plants do not have sufficient strength or tillers developed to withstand and recuperate from traffic.

Choose adapted varieties carefully based on specific characters of consequence to the performance of the turf. Information concerning varietal performance in your region is available through university and National Turfgrass Evaluation Program (NTEP) research reports.

Buy seed from a reputable dealer based on a combination of quality, price, and service. When you purchase seed, be specific with regard to varieties, seed purity and germination you desire.