



# The Best Cool Season Turfgrasses for Your Field

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**T**he best grass type for your field will depend on several factors. These include soil type, type and frequency of play (soccer, baseball, etc.), environmental conditions, level of performance expected, the level of play (professional, high school, elementary) and available inputs. This last may well be the most important. If irrigation is unavailable and a fertilizer budget unlikely then it makes little sense to install a nutrient-demanding, high water use grass. The environmental conditions can also dictate the grass type. For instance, it makes little sense to install a Kentucky bluegrass field in the Pacific Northwest where consistent rainfall and cloudy conditions will result in uncontrollable leafspot and poor turf performance. Perennial ryegrass may die during extreme cold spells during winter months in the northern part of the U.S. and Canada. The characteristics described below will help you determine which grass species are best for your fields.

## Desirable features of a good sports turfgrass

Wear tolerance is the ability of a plant to survive a given amount of traffic. If this were the only desirable attribute then everyone would



Selecting the right grass type will result in excellent turf performance.

use tall fescue. Recuperation is the ability of a plant to recover from damage, i.e. grow new leaves and tillers. Plants with creeping growth habits (stolons and rhizomes) often have better recovery than those with bunch-type growth. Other desirable features include good density, sufficient traction, stress, disease and insect tolerances and overall appearance. Differences in appearance can be caused by differences in leaf texture (leaf width), two or more species in the turf or even different cultivars of the same species which have contrasting shades of light versus dark green.

“Kentucky bluegrass will survive long drought periods during which its leaves die, though irrigation can prevent this type of dormancy. Its water use rate is considered moderate.”



Plants with creeping growth habits often have high rates of recovery.

## The best locations for cool-season turfgrasses

In the eastern U.S. cool-season turfgrasses are usually limited to the area north of the transition zone, an area bordered on the north by the Mason-Dixon line in the east and the Ohio River in the midwest. The exception is in the mountainous areas of the southeast U.S. where cooler temperatures prevail. West of the Mississippi, cool season turfgrasses can be used when adequate irrigation is available, particularly in mountainous areas.

Heat tolerance limits the southern range of cool-season turfgrasses. Cool-season turfgrasses grow best between 60 and 75 Fahrenheit. Most possess good to excellent cold tolerance. Excessive heat, depending on its intensity and duration, can denature proteins and kill susceptible plants. Photorespiration is a less dramatic, but critical heat-related problem. In cool-season turfgrasses, oxygen competes with carbon dioxide during photosynthesis and causes some potential sugar production to be lost, a process termed photorespiration. As temperatures increase, so does photorespiration, sometimes to the point where the turfgrass is using more energy than it is making. This stops



the growth of the grass and can ultimately lead to death.

### Meet the grasses

#### Kentucky bluegrass

Despite its name, Kentucky bluegrass (*Poa pratensis* L.) actually originated in Eurasia and was brought to North America by early settlers. The most commonly used cool-season turfgrass, it prefers moist, well-drained soils and full sunlight. Depending on the cultivar and management level, it can provide a dense turf over a range of mowing heights from 0.75 to 2 or more inches. Kentucky bluegrass will survive long drought periods during which its leaves die, though irrigation can prevent this type of dormancy. Its water use rate is considered moderate.

*Limitations:* Its modest rate of germination (seven to 21 days, depending largely on temperature) and establishment is a major limitation when seeding new fields and overseeding existing fields. When planted by itself (monostand), Kentucky bluegrass is susceptible to necrotic ring spot and summer patch diseases.

Cultivars with some resistance are available. During rainy periods leaf

“Perennial ryegrass (*Lolium perenne* L.) is one of the most widespread turfgrasses on northern athletic fields due to its quick establishment rate.”



Cool season turf grass grows best between 60 and 75 degrees Fahrenheit.

spot disease can cause severe yellowing and thinning of the turf stand, although improvements in disease resistance are making this less of a problem than in the past. Its shade tolerance is rather poor and powdery mildew is often a problem in dim light.

*Advantages:* Its wear tolerance is moderate, and its rhizomes provide good recuperative abilities. These underground lateral stems provide Kentucky bluegrass with a creeping growth habit and allow a single plant to spread further than any bunch-

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type grass could ever develop. The rhizomes provide stability for athletes, particularly in football fields. The root system is perennial which may provide some stress tolerances not present in species where the root systems are all the same age. Its cold tolerance is among the best of the cool-season turfgrasses. A large number of cultivars exist, with leaf texture (width) ranging from fine to medium and color from light to dark green. Since it is primarily the only cool-season turfgrass grown as sod, Kentucky bluegrass sod is used often for construction and quick-fixes in many

“Bermudagrass and zoysiagrass are occasionally tried in cool-season areas because both grasses are noted for their wear tolerance; however both are warm-season grasses and have no place north of the transition zone.”

more disease resistant. Since common types produce abundant seed without irrigation and are non-proprietary, they cost considerably less than improved types. Don't let that fool you into relying on them for your athletic field unless you plan to have a low-use, low maintenance turf with low expectations.

Improved types are further categorized as belonging to one of the following major groups: BVMG, compact, mid-Atlantic, Julia, Bellevue, or aggressive. Aggressive types have a dense, prostrate growth habit and can be ideal for athletic fields, though the other types have desirable characteristics and can be a useful addition to a seed mix or blend. Aggressive cultivars include 'Touchdown', 'Fairfax', 'Award', and 'Limousine'. Not all cultivars have been classified into these sub-groups. Since new cultivars become available every year and production of some older cultivars stops, don't expect your seed dealer to know the sub-group to which the latest cultivar belongs.

#### Perennial ryegrass

Perennial ryegrass (*Lolium perenne* L.) is one of the most widespread turfgrasses on northern athletic fields due to its quick establishment rate. Perennial ryegrass has a bunch type growth habit which limits its spreading ability to the area able to be covered by a single plant through above-ground vertical shoots. It prefers moist, acid to neutral soils. The optimal cutting height is between 0.5 and 2 inches. Its tough fibers give it better wear tolerance than Kentucky bluegrass but also make it more difficult to mow: sharp blades are required to provide a clean cut or else a ragged turf results with shredded, bleached leaf tips. This is less of a problem in the newer varieties though the wear tolerance may be decreased. Like Kentucky bluegrass it can survive dry conditions, staying green longer than Kentucky bluegrass though it's less likely to recover from extended drought periods. Newer cultivars have narrower leaves and much darker color, though a wide color range still exists.

**Limitations:** The bunch type growth habit and sometimes distinct coloration cause irregular patches of turf to be especially noticeable, par-

athletic fields.

The wide variety of Kentucky bluegrass cultivars can make their selection difficult. Kentucky bluegrasses are primarily designated as either common or improved types. Common types are usually older cultivars adapted to low maintenance conditions. They green up early in the spring and have an upright growth habit. Their main downfall is their high susceptibility to leaf spot diseases especially when intensively managed. Improved types are usually proprietary and require medium to high management inputs for best performance. Their growth is more prostrate than common types and they are



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ticularly during spring when Kentucky bluegrass is still coming out of winter dormancy. Its bunch type growth habit limits its spreading ability and a clumpy turf can result unless it is routinely overseeded. Perennial ryegrass has an annual root system, so if conditions aren't favorable to root growth during a given year it may have trouble surviving. It is susceptible to a number of diseases, including Pythium blight, brown patch, red thread, Typhula blight, and crown rust. The seed stalks which form in the spring can persist throughout the summer, their thick brown stems suggesting that a problem exists when in fact all is fine. It is not as cold or heat tolerant as Kentucky bluegrass.

**Advantages:** A fast germination rate of 5 to 7 days makes it the number one choice for overseeding athletic fields. The annual root system may allow it to perform better in compacted soils than Kentucky bluegrass. Its wear tolerance is superior to Kentucky bluegrass. Certain cultivars contain a fungal endophyte which provide resistance to some insects and may enhance turf performance.

#### Tall fescue

Tall fescue (*Festuca arundinacea* Schreb.) is another bunch type grass sometimes used on athletic fields. Its germination rate is four to 12 days. Tall fescue will grow across a range of soil types and does well in sandy soils with low fertility. Its deep root system provides tremendous drought tolerance though its water use rate is actually higher than Kentucky bluegrass or perennial ryegrass. It should not be mowed shorter than 1.5 inches. Its tough fibers provide excellent wear tolerance but require sharp mower blades for a clean cut. Tall fescue is one of the coarsest (wide-bladed) cool-season turfgrasses and for this reason it is not often mixed with finer textured turfgrasses such as Kentucky bluegrass. Coarseness was notably a problem with the older cultivars such as Kentucky 31; new cultivars tend to be finer textured. These turf type tall fescues are not as coarse as the older cultivars and include dwarf and semi-dwarf cultivars which are capable of being mowed at shorter heights. Examples include cultivars like 'Bonsai' and 'Rebel Jr'.

**Limitations:** Like perennial ryegrass, tall fescue requires regular overseeding to maintain a uniform turf. It is particularly susceptible to brown patch disease during summer months and to snow mold in the northern part of its range during the winter. Its cold tolerance is poorer than other cool-season grasses.

**Advantages:** Tall fescue has perhaps the best heat tolerance of any cool-season grass which makes it ideal for areas close to and within the transition zone. Its wear tolerance is superior to other cool-season grasses though its recuperative ability is rather poor. Its shade tolerance is quite good and management requirements are low. Though irrigation is recommended for optimal performance, it can usually survive fairly well without irrigation or much fertility. For low-budget fields with low expectations, this may well be the grass of choice.

#### Supina bluegrass

Long used in Germany for athletic



*A thin plant cover is a sure sign of turf stress.*

fields, supina bluegrass (*Poa supina* Schrad.) is native to the sub-alpine regions of Europe. Although its wear tolerance is only fair, its recuperative potential is better than any other cool-season grass used for athletic fields. The vigorous stoloniferous (above-ground lateral stems) growth habit allow supina bluegrass to quickly regenerate new leaf tissue following damage and to fill in damaged areas. It is often mixed with other species because of its high seed cost and ability to outcompete other turfgrasses under high traffic conditions.

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When properly fertilized and irrigated, a seed mixture containing just 5 to 10 percent supina bluegrass can provide an almost completely supina bluegrass field in two to three years of heavy traffic. The stoloniferous growth habit provides a dense, uniform turf at heights of 0.5 to 1.5 inches. In the colder areas of the cool-season zone, supina bluegrass may be the best turf for soccer. Its use in North America has been climbing steadily during the past few years.

**Limitations:** The seed is expensive and few dealers carry it though it can be readily ordered. Its drought tolerance is poor thus it should not be placed in a non-irrigated site. Its lack of heat tolerance restricts its use to areas north of the transition zone. The light green color does not mix well with dark green cultivars of Kentucky bluegrass or perennial ryegrass, causing the turf to have a mottled appearance until supina bluegrass dominates the turf stand. It is susceptible to summer patch, dollar

“When blending or especially when mixing, make sure to avoid mismatches in color, leaf texture, or other differences which may affect the appearance or performance of the turf.”

spot, and Microdochium patch. Annual cultivation is needed in non-trafficked areas to prevent excessive thatch formation.

**Advantages:** The rapid lateral growth of supina bluegrass make it ideal for high traffic areas. It seems to have few major disease problems; even the ones listed seldom cause excessive damage. Supina bluegrass is quite tolerant of moist shade and will perform well in stadia where shadows are a concern for turf growth. Its leaf texture is similar to improved types of Kentucky bluegrass and perennial ryegrass, allowing it to be readily mixed with these species, particularly when cultivars of similar color are chosen.

#### Grasses to avoid

Sometimes fields fail because they were planted to the wrong grass species. Usually someone thought they were “getting a deal” and could save a few dollars. Above all, avoid buying any seed listed as VNS, or “variety not stated.” There is no telling what is in the bag or how many and what types of weed seeds are present. Another mistake is to use annual ryegrass (*Lolium multiflorum* Lam.): this species does not survive for more than one year and replanting will be necessary. The only use for annual ryegrass is to hold the soil in place while an area is being constructed.

A common mistake is the use of fine fescues (creeping red, Chewings, and hard) in athletic fields. Fine fescues (*F. rubra*, *F. rubra* L. spp. *commutata* Gaud., and *F. longifolia* Thuill.) should never be used on athletic fields even if the seed is free. All have poor traffic tolerance and recuperative capabilities, and many go dormant during the summer. Rough bluegrass (*P. trivialis*) should not be used for the same reasons. Bentgrasses (*Agrostis* spp.) also do not tolerate traffic and require much more intensive management than available on most athletic turfs (the exceptions are bowling greens or croquet courts). Bermudagrass (*Cynodon* spp.) and zoysiagrass (*Zoysia* spp.) are occasionally tried in cool-season areas because both grasses are noted for their wear tolerance. While they do have exceptional wear tolerance, both are warm-season

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grasses and have no place in athletic fields north of the transition zone.

### Mixtures and blends

Mixtures and blends are used to give a turf the best possible combination of pest, disease, and stress tolerance while providing an acceptable playing surface. Mixtures are composed of two or more grass species. An example is an 85 percent Kentucky bluegrass, 15 percent perennial ryegrass mixture.

When two or more cultivars of the same species are together in a seed lot, the result is called a blend. Most fields are planted to a mixture containing blends of two or more cultivars of each species. When blending or especially when mixing, make sure to avoid mismatches in color, leaf texture, or other differences which may affect the appearance or performance of the turf.

A common mistake is to use too much perennial ryegrass in a mixture with Kentucky bluegrass. Because perennial ryegrass has such a quick establishment rate, a 50:50 seed mixture with Kentucky bluegrass will produce a turf which is nearly all perennial ryegrass. A good rule of thumb is to use no more than 15-20% perennial ryegrass in the seed mixture if a turf stand composed more or less equally of both species is desired. One of the benefits of Kentucky bluegrass is the stability it provides to the turf because of its rhizomes. When fields are constantly overseeded with perennial ryegrass, the Kentucky bluegrass component can become insignificant, especially in high traffic areas where stability is especially important. Tall fescue is usually planted as a blend and is seldom mixed with other species due to its coarser leaf texture.

Seeding rates will depend on the ultimate percentage of each in a mixture. Small seeded Poa species are seeded at 1-2 lbs./M while large seeded species such as perennial ryegrass are seeded at 7-9 lbs./M. Ask your seed supplier for the proper seeding rate for a given mixture.

### Further information

Additional information on suitable grass species and cultivars is often available through your local county extension agent or a university turfgrass extension specialist. Reputable

seed dealers and other turf suppliers can also provide good recommendations, but be wary of biased information. The National Turfgrass Evaluation Program (NTEP) is another source of information on cultivar performance for many grass species. Performance data are collected by university specialists across the country and published by NTEP annually.

NTEP data are accessible at <http://www.ntep.org>. The site is free and no passwords are needed.

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