

Choosing the **best time** for seeding mixtures of Kentucky bluegrass and perennial ryegrass

By Dr. John Stier

Combinations of Kentucky bluegrass and perennial ryegrass are commonly used for sports fields in the northern section of the U.S. because they mix well together from an appearance standpoint.

Each species also brings valuable contributions to the pairing. Kentucky bluegrass has an appealing texture (leaf width) and perhaps the best general appearance of any cool-season grass. It produces underground creeping stems (rhizomes) that produce new plants when a gap occurs in the surface turf cover, providing an evenly smooth turf. Kentucky bluegrasses tend to have tremendous genetic uniformity, meaning each grass plant looks and acts like all the others if a single cultivar is planted.

However, its slow rate of establishment is unacceptable in many situations: seed germination can take anywhere from 1-4 weeks depending on temperature. It can take longer to fill in an area as shoot production is slower than some other grasses and many weed species. Furthermore, pure stands of Kentucky bluegrass are subject to the dramatic die-back symptoms caused by necrotic ring spot disease.

Perennial ryegrass can germinate in 5-7 days: its ability to provide a quick turf is the main reason it's usually mixed with Kentucky bluegrass. Seed distributors also like to use perennial ryegrass in mixtures because it is cheaper than Kentucky bluegrass. Pure stands of perennial ryegrass are often not desirable because the species is subject to diseases such as gray leaf spot and crown rust or environmental stresses such as winterkill or drought.

A common goal is to achieve a turf stand that is about 50% each Kentucky bluegrass and perennial ryegrass. Recommendations for the proper amount of perennial ryegrass to use in mixtures with Kentucky bluegrass varies but is generally less than 50% by seed weight. Too much perennial ryegrass in a seed mixture results in a virtually pure stand of perennial ryegrass turf because its fast germination and establishment crowds out and prevents Kentucky bluegrass from getting established.

Most recommendations suggest the amount of perennial ryegrass be limited to between 5-30% of the seed mix weight. A previous study at the University of Wisconsin-Madison showed that common types of Kentucky bluegrass are less competitive with perennial ryegrass than improved Kentucky bluegrass cultivars. Common types include low-cost cultivars such as Park, Kenblue, Alene, Ronde, and South Dakota. Improved types make up the majority of the cultivars sold commercially but often cost more than common types.

Information from our previous study has been increasingly used in contract specifications for sports field construction but is really limited to situations where seeding is done in late summer and the field is given nearly a year or longer to establish. Many sports fields are constructed under tight timelines, though, and such an extended establishment period is often not available.

Dormant seeding

In some cases sports fields are seeded in the spring and need to be played on later that year. However, spring is also a prime time for many weeds to germinate and the heat of summer often reduces cool season grass growth. Sometimes contracts require grass to be seeded the year before play is to begin, but construction delays result in the grass being seeded too late in the fall for germination to occur. This is called dormant seeding: the grass seeds are expected to survive the winter and germinate the following spring. Dormant seeding is often an accepted practice for roadsides, golf course roughs, and some lawns but not much is known about its success rate in areas prone to winters with below freezing temperatures.

One of the goals of the University of Wisconsin-Madison turf program is to provide research-based information that can be used by the sports turf industry. Because of the uncertainty involved with seeding cool-season sports turf mixtures at different times of the year, and the potential difficulties sports field managers may face if a particular mixture is seeded at the wrong time of year, we compared the relative success of seeding various Kentucky bluegrass:perennial ryegrass mixtures in late summer, as a dormant seeding in late autumn, and as an early seeding in spring. Our idea was to use the three seeding times to determine the best time for various seed mixtures to be seeded before football game season that begins in mid to late August.

We seeded plots to mixtures containing 95, 80, 70, or 0% Kentucky bluegrass with the remainder being perennial ryegrass. The varieties used were all high quality, commercially available cultivars. Kentucky bluegrass cultivars were equal proportions of Touchdown, Odyssey, and Fairfax. Perennial ryegrass cultivars were equal proportions of Manhattan 4, SR 4500, and Fiesta 3. The soil type we used was a Batavia silt loam with a pH of 7.4.

Plots were seeded in late summer (about September 1), as a dormant seeding in late November, and in late April about three weeks after winter



Photo courtesy of Turfco Manufacturing

snow melted. We fertilized with a starter fertilizer (13-26-12) at the time of seeding to provide 0.5 lb P per 1,000 square feet. Additional fertilizer was applied in early October (summer-seeded plots only), late May, early September, and early October using 25-2-4 to supply 1 lb N per 1,000 square feet with each application.

Irrigation was applied following summer and spring seedings to encourage germination; dormant seedings were irrigated at the same time as spring seedings. Afterwards, irrigation was applied once each week during the growing season to replace 100% of the estimated evapotranspiration, which was determined with a Toro SitePro irrigation program using data from a Campbell Scientific weather station.

We rated each plot for turf quality every month, weed cover in mid-June before we applied herbicide to control broadleaf weeds, and counted the amount of Kentucky bluegrass and perennial ryegrass plants in a representative area of each plot several times over the year. Beginning in mid-August, we simulated four games of football each week through mid-November using a Brinkman Traffic Simulator. We conducted the first study in 2004/2005 and repeated the study in 2005/2006.

We found that turf quality varied depending on the year and month. In general, turf seeded to 100% perennial ryegrass tended to provide the best quality during May and June, but in one of the 2 years crown rust disease severely reduced turf quality during August and September compared to the mixtures with Kentucky bluegrass. All three mixtures with Kentucky bluegrass gave good turf quality by July of the first study, but had unacceptably low turf quality until September of the second study due to lower spring temperatures, which suppressed growth.

Dormant seedings produced the worst turf quality, though plots seeded

to 100% perennial ryegrass were less affected by seeding time than plots seeded to mixtures of Kentucky bluegrass and perennial ryegrass. Dormant seeded plots had high levels of weeds that required herbicide application (Fig. 1). Turf seeded in late summer, as usually recommended by university extension programs, had few weeds and wouldn't have required herbicide applications.

We also found that seeding time had a profound effect on the amount of Kentucky bluegrass that became established in a turf. Both late summer and dormant seedings produced turf that had 60-75% Kentucky bluegrass when seed mixtures contained at least 70% Kentucky bluegrass seed by weight (Fig. 2). However, turf seeded in the spring needed 95% Kentucky bluegrass in the seed mix to provide more than 50% Kentucky bluegrass in the turf stand.

We also found that perennial ryegrass in lower-lying areas tended to die out during winter but the impact was relatively minor partly because of the short time frame, just over 1 year, for each of the studies. While perennial ryegrass can continue to dominate mixtures with Kentucky bluegrass for years in states such as Missouri and Kentucky, we wouldn't expect the same results in areas prone to severe winters because it lacks the cold temperature tolerance of Kentucky bluegrass.

In a large perennial ryegrass cultivar trial, subsidized by the National Turfgrass Evaluation Program, we've lost an average of about 80% of the perennial ryegrass since the trial was planted in September 2004. Most of these losses have occurred following the winters of 2005/06 and 2007/08. ■

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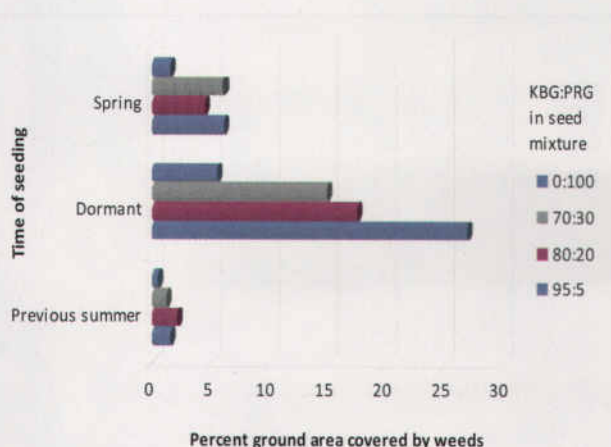


Figure 1. Time of seeding Kentucky bluegrass:perennial ryegrass mixtures affects the amount of weeds in the turf differently depending on the mixture used.

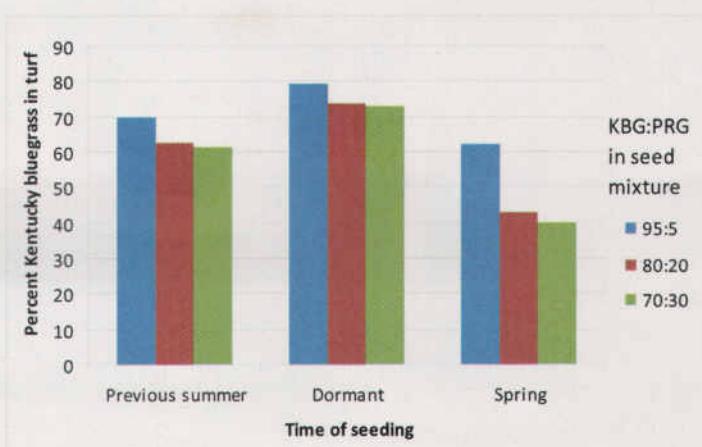


Figure 2. Time of seeding various Kentucky bluegrass:perennial ryegrass mixtures results in different amounts of Kentucky bluegrass in the turf stand.

Study results you can use

Our results suggest that if an area must be seeded in the spring, only pure perennial ryegrass seed or perhaps mixtures containing mostly perennial ryegrass can be relied upon to give acceptable quality turf by the beginning of football season. However, in northern climates where perennial ryegrass is subjected to winterkill, or if crown rust disease is undesirable because of the orange

appearance of the turf and resulting orange powder on clothes/shoes, then seed mixtures containing 70% or more Kentucky bluegrass should be used. Such seed mixtures should be planted the summer or fall the year before the fields are to be used. Dormant seedings should not be relied upon to give acceptable turf quality and are most likely to require herbicide applications.