



Establishing Horse Pastures

Ray Smith, Garry Lacefield, Laura Schwer, and William Witt, Plant and Soil Sciences; Robert Coleman and Laurie Lawrence, Animal and Food Sciences

Kentucky and surrounding states are known for grass pastures and horses. Pastures supply nutrients, provide hoof support for exercise, control erosion, and add to the aesthetic value of horse farms. The ability to establish and manage horse pastures is therefore important to horse owners.

Horses graze closer than cattle and tend to repeatedly graze the same areas of a pasture, so desirable forage plants in a pasture can be reduced or eliminated. Hooves can also damage pastures, even with grasses that form tight sods. Areas around gates, fencelines, waterers, and hay feeders endure the most traffic and are the hardest to maintain.

Good establishment and management principles must be employed to maximize the value of pasture forages, and in a broader sense, the overall value of pastures to the horse. Establishment principles include proper fertilization, species and variety selection, seeding date and rates, seeding method, and control of weed competition, which are discussed in detail in this publication. Management principles include grazing plans or rotations, paddock design and fencing, parasite control, cultural practices, annual fertilization based on soil testing, and weed management (see the “Horse Links” section of the UK Forage website for other publications, www.uky.edu/Ag/Forage).

Basic Establishment Requirements

The following recommendations will increase your chances of success whether you are seeding all or part of a pasture.

Apply any needed lime and fertilizer amendments. A current soil test will indicate the amount of lime, phosphorus, potassium, and other nutrients (except for nitrogen) needed for the species to be seeded. Contact your county extension agent on how to properly take a soil sample or see the UK publication *Soil Sampling and Nutrient Management in Horse Pastures* (AGR-200, www.uky.edu/Ag/Forage under “Publications”).

Use high-quality seed of an improved variety. Many varieties of commonly established grasses, such as Kentucky bluegrass, orchardgrass, tall fescue, and bermudagrass, are available for pasture in Kentucky. It is recommended to seed grass varieties that have been proven to be top performers under Kentucky conditions. University forage yield trials from Kentucky or surrounding states are excellent sources of this agronomic information. The University of Kentucky testing program also evaluates the survival of cool-season grasses under grazing (see “Forage Variety Trials,” www.uky.edu/Ag/Forage).

High-quality seed has high rates of germination and is free of contamination from seed of other crops or weeds. Look for this information on the seed tag and remember that a blue certified seed tag is a guarantee of seed quality and purity.

When buying tall fescue seed for pasture used by pregnant mares, make sure that the tag clearly states that this variety is endophyte-free or low endophyte (usually less than 5 percent). If this information is not clearly stated, assume that the tall fescue seed is infected, and **do not use** in pastures to be grazed by pregnant mares. The new novel endophyte tall fescues contain a non-toxic endophyte which helps the plant survive but does not cause problems in pregnant mares (see *Understanding Endophyte-Infected Tall Fescue and Its Effect on Broodmares*, ID-144, www.uky.edu/Ag/Forage under “Horse Links”). In addition, some varieties of perennial ryegrass contain an endophyte that can be harmful to horses. **Warning:** The turf-type perennial ryegrasses and tall fescues contain very high levels of endophyte and the toxins produced by the endophyte.

Plant enough seed at the right time. Seeding rates are affected most by the forage crop to be sown (Table 1). When sowing a mixture, less seed of each com-

Table 1. Common seeding rates and optimum seeding dates for pasture plant species.

Species	Seeded alone (lb/A)	In mixtures (lb/A)	Optimum seeding dates
E ^a or Novel Tall Fescue	20 - 40	10 - 20	8/15 - 9/15
Orchardgrass	15 - 30	10 - 15	8/15 - 9/15
Kentucky Bluegrass	15 - 30	10 - 15	8/15 - 9/15
E ^a Perennial Ryegrass	20 - 40	5 - 15 ^c	8/15 - 9/15
White Clover	--	1 - 3	Winter ^b , 2/15 - 4/15, 8/15 - 9/15

^a Endophyte-free

^b Winter seeding of clovers, often called frost seeding, can be made on closely grazed or mowed pastures in late January or February.

^c Never seed perennial ryegrass more than 25% of a seeding mixture. Ideally, only 10 to 15% perennial ryegrass is needed to provide quick cover without outcompeting the desirable long-term perennial grasses.



ponent is used than when sown alone. The seeding rates in Table 1 show a range from the minimum amount needed to a higher rate that will provide a better guarantee for a good stand. For a full listing of forage crops and seeding rates and dates, see *Grain and Forage Crop Guide for Kentucky* (AGR-1, www.uky.edu/Ag/Forage under "Publications").

Grasses and clovers can be seeded in either spring or fall. However, cool-season grasses (Kentucky bluegrass, orchardgrass, and tall fescue) are most easily established in the late summer and early fall. Seedings of white clover are usually best in early spring but may also be planted in late summer.

Use the best seeding method available.

In general, planting into a conventionally tilled seedbed is more effective than no-till seedings, especially when a cultipacker or a modified roller is used to firm the seedbed before and after seeding. Brillion® seeders combine packing and seeding into one operation. No-till seeding is preferred on sloping land and when overseeding pastures without disturbing the existing pasture sod. A common, but less accurate, method is to harrow a pasture, broadcast the seed, then harrow or drag the pasture to cover the seed. With this method, a roller or cultipacker is recommended after seeding to achieve good soil-to-seed contact. All three methods can be successful if the seed is placed in firm contact with moist soil at a depth from which the seedling can emerge. The forage crops listed in Table 1 should all be sown at a depth of ¼ to ½ inch.

Frost seeding refers to the practice of broadcasting seed on top of the ground during the winter and relying on the freeze/thaw cycle of late winter to work the seed into the soil. Frost seeding is recommended only for clover seed sown onto very closely grazed or clipped sod during late January or February. Seeding grasses via frost seeding is not recommended, since the success rate for grasses varies greatly depending on environmental conditions.

Control competition. When overseeding into existing pastures, mow or graze close before seeding to reduce existing vegetation. Many seedings fail due to competition from weeds. Herbicides can be used to control weeds when no-till seeding. Always read and follow label directions. For example, most herbicides have a waiting period after spraying before seeding. The University of Kentucky has a publication on grass pasture weed control called *Weed Management in Grass Pastures, Hayfields, and Fencerows* (AGR-172, www.uky.edu/Ag/Forage under "Publications").

Broadleaf weeds can be controlled with herbicides on newly established stands only after the forage seedlings are well established. Otherwise, herbicide damage to the new seedlings is possible. Mowing is effective on erect, upright weeds taller than the seedling grasses, but low growing weeds, such as dandelions and crabgrass, are not controlled effectively by mowing.

Allow the immature seedlings to become established before putting the pasture back into full use. It can take over a year for a grass pasture to develop a strong dense sod. Overgrazing newly seeded areas is a major cause of seeding failures. A few brief grazing sessions can be tolerated. It is best to allow the new grass seedlings to mature and harvest one cutting for hay before gradually returning the field to full pasture use. When it is not possible to keep animals off the pasture while the grass is becoming established, consider splitting the field and seeding half the field at a time to allow proper establishment.

Specific Seeding Situations

Re-establishing grass alone. The best method is to plow or disk the field in late July or early August. Make a fine, firm seedbed and seed in late August or early September. Seed may be planted by a grain drill, no-till drill, Brillion® seeder, or it may be broadcasted and cultipacked. If seedbed firmness is in question, roll with a cultipacker before and after seeding. Make sure that the grass seed is not planted deeper than ¼ to ½ inch deep. A limitation to most no-till seed drills is that they can easily place seed over 1 inch deep unless carefully adjusted. Plant at the recommended rate for horse pastures (Table 1).



If the goal is to kill the existing pasture and replace it with another grass without tillage, use multiple applications of a broad spectrum herbicide containing glyphosate (Roundup® or other glyphosate containing product). For example, you might suppress the existing grass with herbicide in the spring, followed by a second or even third application in the summer/early fall before seeding. Alternatively, a summer annual grass can be grown on the field during the summer as a transition crop, but some millets and sorghums can cause health issues for horses. Teff is a new grass species that provides an excellent transition crop and provides high quality horse hay, but it must be seeded into a well prepared seedbed.

It is often desirable to eliminate Kentucky 31 tall fescue in broodmare pastures. When the tall fescue infestation is less than 50 percent, an option is to selectively remove tall fescue with herbicides. Research at UK has shown good control from imazapic (sold as Panoramic[®] or Plateau[®]) applied at 10 or 12 ounces/acre. Imazapic must be applied with methylated seed oil or a non-ionic surfactant; consult the Panoramic[®] or Plateau[®] label for specifics. Tall fescue was controlled at these rates when applied from May through October. Two consecutive annual applications did not harm Kentucky bluegrass. Weekly mowing of the pasture did not reduce tall fescue control from imazapic. Under very dry conditions, Panoramic[®] and Plateau[®] can persist in the soil and prevent germination and emergence of Kentucky bluegrass and orchardgrass. Consult the Panoramic[®] or Plateau[®] label for specific instructions for application, reseeding of desirable grasses, precautions, and restrictions.

Pastures with greater than 50 percent tall fescue should be killed with glyphosate and seeded to a desirable grass. The optimum time for this approach is to apply glyphosate in mid-July and seed desirable grasses in early September after a second application of glyphosate. It is important to have at least 4 to 6 weeks between the first glyphosate treatment and grass seeding to allow the killed grass to decay and not interfere with seedling emergence. **Do not let tall fescue go to seed in the year of re-establishment.**

Generally, avoid spring seedings of cool-season grasses. These plantings can be successful given adequate moisture and mild temperatures during the growing season, but the failure rate is greater than fall seedings. If seeding in the spring in Kentucky, plant early (early to mid-March) to increase the chance for success.

Good Grass Choices for Horse Pastures in Kentucky and Surrounding States

Pasture grasses differ in their tolerance to close grazing and traffic. Kentucky bluegrass and bermudagrass form tight sods and are the most tolerant of close grazing and traffic. Orchardgrass is the least tolerant, and tall fescue is intermediate between orchardgrass and Kentucky bluegrass or bermudagrass. (Note that Kentucky bluegrass is best adapted for central, eastern, and northern Kentucky.)

Grass Species Options

- Orchardgrass, endophyte-free or novel endophyte tall fescue, or Kentucky bluegrass alone.
- Equal amounts of Kentucky bluegrass with either orchardgrass or endophyte-free or novel endophyte tall fescue.
- Equal amounts of orchardgrass and endophyte-free or novel endophyte tall fescue.
- Perennial ryegrass is a short-lived, cool-season grass that has exceptionally high seedling vigor and can be used for a two-year solution or to thicken up troublesome areas around the farm. Some of the newer varieties have survived for three years in Kentucky. Insist on endophyte-free forage-type perennial ryegrasses. The turf-type perennial ryegrasses are almost always highly infected with the endophyte, while forage types are not.
- Bermudagrass makes an excellent horse pasture due to its grazing tolerance, heat and drought tolerance, and ability to carry high stocking rates during the summer. Bermudagrass requires high levels of nitrogen and potassium to maintain productive stands. In Kentucky, it is essential to plant only varieties that have proven winter survival in our environment. For example, a new seeded variety “Wrangler” has shown superior winter survival in Kentucky compared to other varieties (see *Bermudagrass: A Summer Forage for Kentucky*, AGR-48, and *Lime and Nutrient Requirements*, AGR-1, www.uky.edu/Ag/Forage).
- Timothy, a superior hay plant, is not a good pasture plant when seeded alone.

Establishing grass-clover mixtures.

White clover is more competitive than grasses in the seedling stages because they emerge faster, have a taproot-type root system that penetrates the soil deeper and faster, and develop leaf area more quickly. When seeding a grass-clover mixture, choose the seeding date, rate, and method that gives the maximum advantage to the species that is desired the most. Spring seedings favor clovers, while fall seedings favor grasses. If a good grass base is desired quickly, plant in the fall and consider reducing the amount of clover seed in the mix or seed the grass alone. More clover can be added by frost seeding in January and February or by using a no-till drill in March to early April.

Renovating with clovers. Adding white clover to existing grass pastures increases forage quality, adds nitrogen to the system, and is desirable in horse pastures. Begin by suppressing existing sod by grazing or very close mowing (mower height should be set as low as possible, e.g. 1–2 inches). White clover may be either broadcast in late winter (January and February) or drilled in early spring (March to early April). For broadcast seedings, make sure the sod is short enough for some seed to fall on bare ground. It may be necessary to drag or lightly disk the pasture to open up the sod and expose some bare soil. White clover is preferred over red clover for horse pastures due to its greater grazing tolerance. In addition, red clover can occasionally cause excessive salivation mid- to late summer, often called “the slobbers.” This is caused by a mycotoxin called slaframine, a by-product of the fungus *Rhizoctonia leguminicola*, which can infect red clover. Fortunately, it is not harmful to horses when plenty of drinking water is available.

Renovating high-traffic areas. Improving or re-establishing grass cover in high-traffic areas around fences, gates, and barns is probably the most common pasture problem facing horse owners. On the assumption that it is not possible to keep horses off such areas until vegetative cover is attained, the question becomes how best to get vegetative cover as fast as possible and maintain it as long as possible.

There are two central challenges in this scenario: getting the seed into the ground and selecting a highly vigorous species that will germinate and establish quickly.

To accomplish the first goal, either use a no-till drill or do some light tillage work in the area to be seeded. Unless the soil is somewhat disturbed, broadcasting seed onto such areas will fail.

Several valid forage options exist for these areas. The ryegrasses, perennial and annual, are the most vigorous in establishment and growth followed by orchardgrass, tall fescue, and Kentucky bluegrass, in that order. Annual ryegrass has the fastest emergence and growth but dies out mid-summer. Perennial ryegrass is nearly as fast to emerge as annual ryegrass and will survive for two years under Kentucky conditions with some newer varieties surviving up to three years. Perennial ryegrass can have an endophyte similar to that in tall fescue. Make

sure that any perennial ryegrass used is endophyte-free (see *New Recommendations for Perennial Ryegrass Seedings for Kentucky Horse Farms*, ID-142, www.uky.edu/Ag/Forage under "Horse Links").

Based on the assumption that animals cannot be kept off these areas for substantial lengths of time, the most effective method of establishing grass cover may be drilling perennial ryegrass into these areas every other year or annual ryegrass every year. Mixing orchardgrass, tall fescue, or Kentucky bluegrass seed with ryegrass (either annual or perennial) may give some longer lasting cover in these areas, but it is probably more practical to use ryegrass alone. Perennial ryegrass in a seed mixture should not be more than 25 percent of the mixture due to its competitiveness.

Mulching newly seeded areas with straw and irrigating to keep the soil moist will speed up grass emergence and establishment. This approach is not practical

on large pastures but can easily be used on small areas around gates, fences, waters, and feeding areas.

High traffic area pads can also be constructed in these areas if less management is desired. A properly constructed and managed pad can provide a sturdy surface for horses and significantly reduce mud in these areas. For more information on the construction and cost of high traffic area pads see *High Traffic Area Pads for Horses* (ID-164, www.uky.edu/Ag/Forage under "Horse Links"). Dry lots can be established as an alternative use area during periods when pastures need to be protected due to rain or drought to avoid further damage to high traffic areas in pastures. For more information on use, benefits, construction, cost, and management of dry lots see *Using Dry Lots to Conserve Pastures and Reduce Pollution Potential* (ID-171, www.uky.edu/Ag/Forage under "Horse Links").

Mention or display of a trademark, proprietary product, or firm in text or figures does not constitute an endorsement and does not imply approval to the exclusion of other suitable products or firms.