



Kentucky Bluegrass

Kentucky bluegrass (*Poa pratensis* L.) is a short-to-medium height, cool-season, long-lived, highly palatable, perennial grass that has smooth, soft, green to dark green leaves with boat-shaped tips. It spreads via rhizomes to form a dense sod and grows best during cool, moist weather on well-drained, fertile soils with a pH between 6 and 7 (Table 1). Although Kentucky bluegrass is found throughout the United States, it is most important agriculturally in the north central and northeastern regions and is best adapted to areas where the average daily temperature during July does not exceed 75°F. Warm summer temperatures are the most limiting environmental factor to Kentucky bluegrass production.

Kentucky bluegrass is found in most pastures in the northeastern United States because it tolerates close and frequent grazing better than other cool-season forage grasses. This ability makes Kentucky bluegrass an ideal species for permanent pastures that are continuously grazed. In addition, the dense sod formed by Kentucky bluegrass rhizomes make it ideal for erosion control, particularly in grass waterways.

ADAPTED VARIETIES

Most varieties of Kentucky bluegrass have been developed for use in lawns. Therefore, it is widely considered to be the most important lawn grass in the United States. Only three forage-type Kentucky bluegrass varieties, 'Park', 'Troy', and 'Ginger', have been released in the past 45 years. Turf-type varieties of Kentucky bluegrass need dethatching to remain productive and, in general, also require greater amounts of nitrogen fertilization and more extensive irrigation systems than forage-type varieties.

ESTABLISHMENT

Very few fields in the Northeast are sown with Kentucky bluegrass seed. However, Kentucky bluegrass generally appears in these fields, coming from seed or rhizomes in the soil, particularly if the field was previously a pasture. Kentucky bluegrass should be planted at 10 to 14 pounds per acre in late summer or early fall when temperatures begin to moderate and rains are more frequent. Higher seeding rates ensure quicker ground cover. Kentucky bluegrass is slightly slower to establish than many other cool-season grasses. The slow establishment is primarily a result of slow (approximately 14 days) germination. However, once established it spreads quickly via its

Table 1. Characteristics of perennial cool-season grasses in the Northeast.

Grass	Seedling vigor	Tolerance to soil limitations			Winter survival rate	Tolerance to frequent harvest	Relative maturity ^b
		Dry	Wet	Low pH ^a			
Kentucky bluegrass	M ^c	L	M	M	H	H	Early
Orchardgrass	H	M	M	M	M	H	Early-medium
Perennial ryegrass	H	L	M	M	L	H	Early-medium
Reed canarygrass	L	H	H	H	H	H	Medium-late
Smooth brome grass	H	H	M	M	H	L	Medium-late
Tall fescue	H	M	M	H	M	H	Medium-late
Timothy	M	L	L	M	H	L	Late

^apH of 6.0

^bMaturity characteristic refers to relative time of seed head appearance in the spring, which will depend not only on species but also on variety.

^cL = low, M = moderate, H = high

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extensive rhizome production. Kentucky bluegrass's nitrogen requirements and low summer production make it ideal for seeding with a legume such as white clover at 4 pounds per acre, red clover at 6 pounds per acre, or birdsfoot trefoil at 8 pounds per acre. Pastures composed of Kentucky bluegrass mixed with legumes also have higher nutritional values than pure grass pastures (Table 2). Tall-growing grasses such as orchardgrass, timothy, smooth bromegrass, or tall fescue also may be included in a pasture seeding mixture with Kentucky bluegrass where hay or silage harvests will be made each year before grazing begins. The tall-growing grasses typically thin over time and require reseeding, while the Kentucky bluegrass will persist indefinitely.

Kentucky bluegrass can be "frost seeded" (in early spring when the soil is still honeycombed with frost) into existing pastures to thicken the stand. Successful seeding requires good seed-to-soil contact. This can be accomplished with frost seeding by seeding into a field with a thin stand of existing plants or where the pasture was grazed "into the ground" the previous fall. Greatest success is generally achieved when frost seeding is completed while the soil contains frost. Delaying seeding until mid-morning when the soil has become slippery on the surface will result in poorer stand establishment.

Seeding Kentucky bluegrass alone or in a mixture into a conventionally prepared seedbed or no-till seeding can also be an excellent method of establishment. Do not plant deeper than 1/4 inch when seeding. Press wheels or cultipacking used in conjunction with or after band seeding will improve the seed-soil contact and the chances of obtaining a good stand. To obtain a proper seeding depth, the seedbed should be firm. Therefore, you should cultipack the seedbed before seeding.

HARVEST OR GRAZING MANAGEMENT

Under normal environmental conditions in Pennsylvania, Kentucky bluegrass achieves nearly 70 percent of its annual forage production by early June. Consequently, proper management during the early growing season is essential to maximize production potential. Because Kentucky bluegrass grows to a shorter height than many other cool-season forage grasses, it is ideally suited for grazing.

Kentucky bluegrass pastures often are undergrazed in

Table 2. Affect of percent legume in mixture on pasture quality in Pennsylvania.

Mixture			Pasture quality ^a			
	Legume	Grass	Weeds	CP	ADF	NDF
			%			
83	6	11		23	24	37
74	12	13		24	27	46
54	42	4		16	31	53
26	73	1		12	32	56

^aCP = Crude protein, ADF = Acid detergent fiber, NDF = Neutral detergent fiber

the spring, which results in an accumulation of mature, low-quality forage. Managers should use high stocking densities early in the growing season when Kentucky bluegrass is most productive or should harvest excess growth as hay or silage. Reduce the stocking density later in the grazing season as grass growth slows. In hilly areas, grazing of Kentucky bluegrass should begin on south-facing slopes that warm first and begin growth early in the spring. Maintaining a stubble height of 2 to 4 inches in spring promotes tiller (new shoot) formation, which helps keep a dense sod. Excessive defoliation often leads to shallow rooting, an open sod, and weed invasion. These effects are particularly damaging to Kentucky bluegrass in a dry summer when it is less able to recover. Kentucky bluegrass productivity is increased substantially with proper pasture rotation and rest.

Kentucky bluegrass has a large proportion of its leaves close to the soil surface and below the grazing height in managed pastures. This characteristic makes it more tolerant of overgrazing than most other cool-season grasses. Consequently, tall-growing grasses will thin under abusive management while Kentucky bluegrass volunteers and thickens, providing high-quality forage and protection from soil erosion. However, heavy stocking densities and continuous overgrazing (frequently the case in sheep and horse pastures), especially in midsummer when grass growth has slowed, will weaken Kentucky bluegrass and increase weed invasion.

As growth of Kentucky bluegrass declines in midsummer, livestock production on these pastures also is reduced, particularly during a dry growing season. In addition, grazing days per year and animal gains per acre are generally less on Kentucky bluegrass than on other cool-season, tall-growing grasses. Exceptions to this trend occur at higher elevations and latitudes where temperatures and rainfall are not limiting.

The botanical composition of Kentucky bluegrass pastures changes over and within growing seasons depending on environmental conditions and grazing management. Under conditions of high temperatures, limited rain fall, or low soil fertility, the amount of Kentucky bluegrass in a pasture will decline, allowing undesirable weed species to invade. The ratio of Kentucky bluegrass and white clover in a pasture is strongly influenced by grazing management. As the amount of clover in the pasture declines, the pasture can be grazed more closely so that the grass competes less with the clover. If the amount of white clover in the pasture is too great, then allowing the pasture to reach a height of 8 to 12 inches will encourage the Kentucky bluegrass to compete better with the white clover. In addition, nitrogen fertilizer favors the Kentucky bluegrass component of the pasture and may be used to manipulate the clover to grass ratio.

FERTILITY

The lime and fertilizer needs of Kentucky bluegrass should be determined by soil testing. For best results, the soil pH should be between 6 and 7. If the soil test calls for large

amounts of nutrients, they should be applied prior to seeding and incorporated into the seedbed. Surface application of the recommended nutrients is equally beneficial if the Kentucky bluegrass is already established.

Applying nitrogen to Kentucky bluegrass is not recommended if more than 30 percent of the pasture is a legume. Applying approximately 25 pounds per acre of nitrogen fertilizer to Kentucky bluegrass in early spring before green-up will stimulate growth and generally allow grazing to begin earlier. Additional nitrogen applications to pure Kentucky bluegrass stands should be made in late spring and early fall when the grass is growing rapidly. Remember that nitrogen application will increase the grass's competitiveness at the expense of clover and weeds in the stand. Kentucky bluegrass-white clover pastures can be maintained indefinitely and their forage quality improved by applying lime and fertilizers according to soil test recommendations. In a recent study, when soil pH was adjusted to 6.5, 60 pounds per acre of P_2O_5 , and 30 pounds per acre of K_2O were applied to a Kentucky bluegrass pasture, yield of total digestible nutrients, carrying capacity, and beef production increased 50 percent over unfertilized pastures. An additional application of 120 pounds of nitrogen per acre increased beef production by an additional 39 percent.

PESTS

Kentucky bluegrass is susceptible to many of the same diseases as other cool-season forage grasses. These diseases rarely affect plant persistence, but may reduce yield and quality.

Grubs cause the most serious damage to Kentucky bluegrass pastures. Adult Japanese beetle, May beetle, green June beetle, northern masked chafer, and European chafer lay eggs in thin, overgrazed bluegrass pastures, and the larvae then feed on bluegrass roots and rhizomes. Damage is most severe and recovery slowest during dry years. Controlling insects in Kentucky bluegrass pastures is most easily done through good grazing and fertility practices that maintain a healthy and vigorous grass stand.

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