



Native plants are a beautiful alternative to typical commercial horticultural plants. They bring a bit of the prairie to your overall landscaping. Native plants often thrive with low water and fertilizer inputs, and with little maintenance.

As a bonus, these plants may provide wildlife habitat or flowering dicots (broadleaf plants) for honeybees, birds, and butterflies. Because revegetation is a requirement of land conversion programs such as the Conservation Reserve Program, there is a readily available source of plant materials for all areas in Kansas. This publication focuses on planting small areas rather than seeding large acreages. For establishment on large acreages, refer to K-State Research and Extension publication *Establishing Native Grasses*, MF2291 (www.ksre.k-state.edu/bookstore/pubs/mf2291.pdf).

Plant Materials

Plants genetically adapt to local environments to survive the climate and its inherent variability. Planting a genotype that evolved in an area far removed from a local area often leads to failure. The source of seed should not be more than 250 to 400

miles south or 100 to 150 miles north of the intended planting location.

To avoid these problems, it is best to plant named varieties or cultivars adapted to your area. Planting a species from a southerly location may result in winterkill of perennials. Conversely, planting a species from a more northerly location may result in poor or stunted growth. It is critical that you select locally adapted species. For example, cultivars with an eastern Kansas genetic origin are not likely to survive the lower rainfall of western Kansas.

A list of commonly available cultivars with known areas of adaptation is appended to this guide. Since this guide addresses small-area plantings, gathering seeds locally is an option. One pitfall of gathering local seed is the lack of information regarding germination percent and purity.

Not all seeds will germinate. Seeds of native plant species purchased from seed dealers are tagged with germination and purity information, so the proper amount of seed can be planted.

Purity refers to the amount of bare seeds or the percentage of seed by weight you want to plant. Grasses may have nonseed spikelet parts that add weight but do not contribute to the pure live seed

amount. Other contaminants in a seed lot may be labeled as inert, weed seed, or other crop seed.

Germination percentage multiplied by purity percentage gives pure live seed percentage (PLS). For example, 80 percent germination times 90 percent purity gives 72 percent pure live seed. Age of the seed also affects germination. Native plants usually have an after-ripening dormancy that reduces germination. As the seed ages, after-ripening dormancy declines and germination increases. Typically, 2-year-old grass seed has the highest germination percentage; however, after this point germination declines with seed age.

Seedbed Preparation

A seedbed relatively free of competitive weedy annual grasses and annual herbaceous broadleaf plants is ideal. There should be no live perennial plants in the seedbed. If perennial plants are present, a nonselective herbicide such as glyphosate should be used. If the area to be planted has been tilled or disturbed during construction, the green, annual plant growth should be killed with a nonselective herbicide before plants shed seeds. This reduces competing vegetation and increases seeding success.

Because small areas are not likely to be planted with a grassland drill, clean tillage is required to ensure seed incorporation into the soil. On larger areas, a grassland drill should be used, and no tillage should occur before planting. Disturbing the soil with tillage exposes annual weed seeds to light and increases their germination and establishment rates. These weeds then provide competition for the planted native species.

Till the area and allow weedy species to germinate and grow. Kill those plants before seed set. Then, till small areas and incorporate the seed. If you are planting a large area with no soil tillage before planting, use a grassland drill.

Under no circumstances should you apply fertilizer to the area to be seeded. Weedy annuals are much more competitive than native species and will use the fertilizer to increase growth rates, leading to increased competition and possible stand failure.

Seeding Methods

For small areas, it is impractical to use a grassland drill. Broadcasting seed on a newly tilled surface is the most efficient way to seed those areas. The seeds should then be incorporated into the soil. A garden rake or a harrow pulled behind a garden tractor will bury a high percentage of the seeds. Native plant seeds are small, and it is important that they are not covered

with too deep a soil layer. Ideally, they should be incorporated no more than an inch deep.

A firm seedbed is better for establishment. If practical, roll the area with a compaction roller after seed incorporation to increase seeding success. A light compaction is better than one that severely compresses the soil. Compaction ensures that seed is in contact with moist soil and moisture can move to the surrounding soil through capillary action, much the same as a paper towel wicks water.

On larger areas where a grassland drill is used, the drill provides compaction through spring-loaded press wheels. Seeding success is primarily related to adequate soil moisture for the first 2 months following seed germination and emergence. Perennial grasses establish on a seed root system that lasts for 4 to 6 weeks before dying. The permanent, perennial root system develops from stem tissue at the crown area. For warm-season grasses, which are the dominant grasses in Kansas, the crown area is at the soil surface, and the roots that develop there are called adventitious roots.

Adventitious roots will not develop in dry soil, so it is important for establishment to occur when there is the greatest chance for frequent rainfall. On small areas, irrigation enhances seeding success for that reason. The soil surface may be kept moist by applying a continuous, light mulch of prairie hay or wheat straw. Because small seeds of native plants do not store much energy, avoid leaving litter on the surface, which may prevent plants from emerging before stored energy is depleted.

Seeding Date

As the saying goes, the best time for planting is before a long, wet spell. In Kansas, the chances of that happening are best in April and early May. Seeding date trials have shown that plantings during this time have the greatest chance of success. Germination and emergence are more likely with June plantings, but many of those plants will not survive the winter. Plants require sufficient time to grow and store energy to survive the winter and emerge the next year.

Seeding Rate

Native grasses are notoriously poor in seedling establishment. Unfortunately, that cannot be overcome by sowing more seed. Exceeding the recommended rate will not increase stand establishment. For small areas and broadcast seeding, the total seeding rate should be 9 to 12 pounds pure live seed per acre of the seeding mix. If a grassland drill is used, 6 to 8 pounds pure live seed per acre is adequate. Recommended percentages for the various species are listed on the back page.

Management Following Seeding

Initial Stand Establishment. The general rule for managing a native plant seeding is to do nothing. In the summer following seeding, the area will look like a weed patch. The tendency is to believe the native plant stand is a failure. Controlling the weeds by mowing or using a herbicide will not improve the chances for a successful seeding. Those weed control methods will likely reduce the native plant establishment. After seeding, old growth should be removed each spring in mid-March. Mowing and removing old growth speeds establishment of the native species. Mowing later than mid-March reduces the native forbs in the mixture.

By the end of the third year, the native warm-season grasses will be the dominant plants. Not seeing native grasses does not mean they are not there. They take time to fully establish. Old growth should be removed each spring in mid-March. Do not mow any other time during the first 3 years. In early March of the second year and in following years, fire can be used instead of mowing, obeying any local fire restrictions. It is imperative that the area not be fertilized. Nitrogen fertilization causes an invasion of annual and perennial cool-season grasses as well as annual broadleaf weeds.

Management of an Established Stand. After the first 3 years, the greatest threat to the stand is allowing too much old growth to accumulate. This causes the stand to thin and allows erosion between established plants. Old growth should be removed to allow sunlight to reach the base of the perennial grasses. This stimulates tillering, which thickens the stand and protects against erosion.

Plants grow by using carbon compounds captured by the leaves. If an area is mowed frequently, weedy grasses and herbaceous dicots replace native species. The area can be mowed once before mid-July, but should be allowed to grow during the last half of the summer. Native plants store food reserves in late summer for next year's growth. If the area is mowed in mid-August to mid-September, the reserves will be used to grow new leaves in late summer and fall and native grasses will go into the winter with low reserves. This may kill plants or slow growth the following spring and leave them unable to compete with weeds.

To keep from being invaded by woody plants, spot treat with herbicide while few plants are present. Once woody plants have colonized, they are difficult and expensive to kill. Do not foliarly apply a nonselective herbicide, such as glyphosate, which will kill native grasses and wildflowers. To control individual woody plants, cut them at ground level and treat the stump with an appropriate herbicide. Contact your local K-State Research and Extension agent for herbicide recommendations unless you can identify the invasive plant and know how to deal with it.

Fire is a natural part prairie development. Control of sprouting woody species occurs when they are at the low point in their stored food reserves. That is almost always much later than the early March date when fire should occur to preserve prairie wildflowers. Fire at any time in the dormant season before early March will kill eastern redcedar, a nonsprouting species.

Recommended Native Plant Species

Tallgrass Prairie Plant Species — Eastern and Central Kansas¹

	Pounds of pure live seed per acre	
	Drilled	Broadcast
Kaw Big Bluestem	1.5 – 1.75	2.5 – 3.75
Osage or Cheyenne Indiangrass	1.5 – 1.75	2.5 – 3.75
Aldous or Cimarron Little Bluestem	1.0 – 1.30	1.75 – 2.5
El Reno Sideoats Grama	1.5 – 1.75	2.5 – 3.75
Blackwell Switchgrass	0.5 – 0.65	0.7 – 0.85
Native Forbs ²	0.5 – 0.65	0.7 – 0.85

1. This mixture works well for sandy regions in western Kansas, but sand bluestem is preferred over big bluestem and sand lovegrass added to the mix at 0.5 pound pure live seed per acre. If irrigation can be supplied, this mix will work well throughout Kansas.
2. Forbs are broadleaf plants with an annual top. They vary greatly in seed size, so forb mixes should be based on seed size, with larger seeds having a greater percentage of the weight. Sources for native plant seeds can be found at www.kansasnativeplantsociety.org/plant_seed_sources.php.

Shortgrass Prairie Native Plant Species — Western Kansas^{3,4}

	Pounds of pure live seed per acre	
	Drilled	Broadcast
Lovington or Alma Blue Grama	1.5 – 1.75	2.5 – 3.75
Sharp's Improved or Texoka Buffalograss	1.5 – 1.75	2.5 – 3.75
Barton Western Wheatgrass	1.0 – 1.30	1.75 – 2.5
El Reno Sideoats Grama	1.5 – 1.75	2.5 – 3.75
Cimarron Little Bluestem	0.5 – 0.65	0.7 – 0.85
Native Forbs	0.5 – 0.65	0.7 – 0.85

- 3 This mixture should be planted on fine-textured soils in the absence of supplemental irrigation. On soils that are calcareous to the surface, the Tallgrass Prairie mixture will likely be best.
- 4 Forb seed availability is quite diverse. The goal is to have a mix of both annual forbs and native grasses. Adapted native forbs can be found at the Kansas Native Plant Society (www.kansasnativeplantsociety.org/gallery_plant.php).

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