

Establishment is the most important phase to ensure system longevity when planning the long-term use of a seeded native grass stand. Native species are slow to establish and do not compete well with other plants (weeds). For that reason, native grass pastures can take up to four years to become fully established. Because they have been selected for better establishment and forage production characteristics, use known cultivars. Species and cultivar selection, site preparation, seed quality, seed source, and seeding date must be considered to ensure the successful establishment of a native grass pasture. Planning is the key to achieving a successful stand.

## Before Seeding

Before seeding, it is important to assess resources, including soil type, fertility, and current and past cropping uses, and how these resources affect the establishment of new native pasture. Producers must understand the potential challenges (existing weed problems, seed bank, and potential cropland herbicide carry-over), necessary changes in the farming operation, available equipment, seed sources, the intended use of the seeded area, costs and returns anticipated, and suitability for wildlife habitat. This information contributes to the preparation for seeding.

## Soils

The first step in knowing the potential yield for haying or grazing is to understand more about the soil. First, the texture of the soil needs to be known (sandy, silty, or clay soil). Soil texture can be identified by a lab test or by searching NRCS soil survey maps, available through the Web Soil Survey ([websoilsurvey.nrcs.usda.gov](http://websoilsurvey.nrcs.usda.gov)). Use the Web Soil Survey to determine the soil series and potential production for a given area.

Additionally, soil chemical properties such as pH and soil physical properties such as soil texture for each soil series can be determined. Previous cropping history, particularly herbicide use, is necessary to prevent seedling damage from herbicide carryover. Seedling damage can result from long-residual herbicides, particularly those used for grass control. Short-residual herbicides are less likely to injure seedlings. Herbicides with rotation restrictions for corn or grain sorghum are

an indication of potential seedling damage. Check labels for plant-back intervals and expected suppression.

The species and cultivar selected should be adapted to the field's soil. If several different soils occur in a field, splitting the field should be considered, and changes in seedbed preparation may be required.

## Seedbed Preparation

A firm, weed-free seedbed is recommended. Seedbed preparation depends on climate, soils, and intended use. In most cases, clean-tilled seedbeds are preferred to establish pastures, especially where precipitation is greater than 32 inches per year. The seedbed is tilled as needed to destroy all weeds and leave a firm, friable seedbed. Weed control is a major requirement for a successful stand. The use of a cultipacker or similar equipment before and/or after seeding can greatly improve the stand of grass, especially during seasons of low rainfall. This approach stores soil moisture but requires precipitation after seeding to ensure a successful stand.

A no-till seedbed can be prepared using a cover crop to reduce weed competition and provide a standing stubble to modify the microclimate at the soil surface. It must be managed to prevent the production of viable crops or weed seeds and excessive growth. Excess cover can be removed by mowing, haying, or grazing to leave 12- to 18-inches of stubble. After a crop, such as wheat, a seedbed may be prepared by tillage or chemical destruction of growing vegetation to provide a mulch. The growing crop must be completely killed or it will compete with the establishing seedlings. The surface must be left free of weeds and with a cover. Grain sorghum or forage sorghum stubble provides good standing cover to seed native grasses.

## Seeding Method

Proper seeding depth is important to obtain adequate establishment of native grasses. Most seeds cannot emerge from deeper than ½ to 1 inch. Grass drills will handle the fluffy seed of most native grass species and ensure accurate placement, delivering the seed at a uniform rate. Planting depth is controlled by double disc openers with depth bands. Packer wheels are necessary to cover the seed well, firming the soil around the seed.

If a grass drill is not available, use a cultipacker to roll the seedbed, then broadcast the seed immediately, and roll with the cultipacker again. This alternative method should place the seed at approximately the correct depth, and provide a firm covering. This has been the least effective seeding method unless timely precipitation occurs.

### Origin and Quality of Seed

Companies selling certified seed are required by law to inform buyers of seed quality. This allows buyers to determine the amount of seed to plant. Native grass seed quality is measured on a pure-live-seed (PLS) basis, which is calculated based on germination and purity (PLS in percentage, Equation 1). Tests are also available from state and private laboratories. To determine the amount of seed to be planted, divide the PLS (%) into the seeding rate per acre in PLS pounds (Equation 2).

*Equation 1:*

$$\text{PLS (\%)} = (\text{germination} \times \text{purity}) \div 100$$

*Equation 2:*

$$\text{bulk seeding rate (PLS lbs)} = \frac{\text{seeding rate in PLS pounds}}{\% \text{ PLS}} \times 100$$

*Examples.* A switchgrass seed lot has a test of 92% germination, 5% firm or hard seeds, and a purity of 98%. The PLS for the seed is 95%  $[(92 + 5) \times 98 \div 100]$ . If the switchgrass seeding rate is 3 PLS pounds per acre, the bulk seed to be planted per acre is 3.16 or 3.2 bulk pounds per acre  $(3.0 \div 95 \times 100)$ .

A big bluestem seed lot has a germination of 85% with no hard seed and a purity of 60% with a seeding rate of 6 PLS pounds per acre. The bulk seeding rate would be 11.76 pounds per acre  $[6 \div (85 \times 60 \div 100) \times 100]$ . The results are in Table 1.

### Seeding Rates

Seeding rates vary by soil, precipitation, and intended use of the seeding. For help on seeding rates and mixtures, consult the county Natural Resource Conservation Service Office, local K-State Research and Extension office, wildlife agencies, or seed dealers. An example mixture is given in Table 2.

### Seeding Dates

Recommended planting dates are based on research, but they may be adjusted for your region based on local knowledge. For warm-season grasses, the optimum seeding date is about 2 weeks before the average last frost date and at least 6 weeks before hot, dry summer weather (Figure 1). If it is not possible, 1 month before to 3 weeks after the average last frost date may be an acceptable period for seeding. This allows the seedling 6 to 8 weeks to establish the permanent root system before hot, dry summer weather.

### Fertilizing

In drier climates of Kansas, fertilizer and lime are not normally required for native species at seeding. Lime is suggested if the pH is below 6.0. Taking soil samples contributes to successful seeding. Consult NRCS or local K-State Research and Extension personnel for local needs. Fertilizing may stimulate weed competition during the establishment phase.

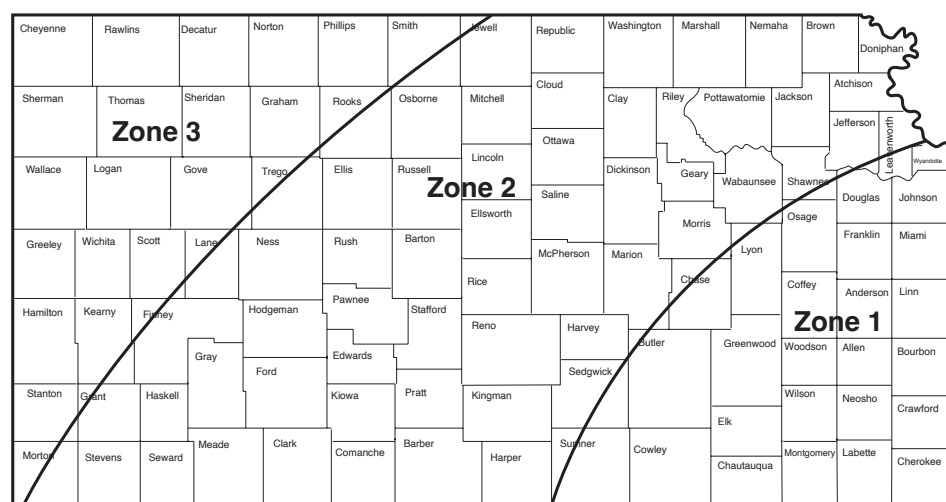
Table 1. Calculating bulk seeding rate in native warm-season grasses.

----- Seed analysis -----						
Seed type	Germination	Hard seed	Purity	% PLS	Seeding rate (PLS lbs)	Bulk pounds
Switchgrass	92	5	98	95.1	3.0	3.16
Big bluestem	85	0	60	51.0	6.0	11.76

Table 2. Typical mixture of native warm-season grasses for loamy soils in central and eastern Kansas.

Species	Pure Live Seed (PLS) lbs/acre	Inclusion % Allowable	Example Mix %	Pounds PLS/acre to plant
Big bluestem	6.0	10-35	30	1.8
Little bluestem	4.0	10-30	25	1.0
Indiangrass	6.0	0-25	20	1.2
Switchgrass	3.0	5-20	15	0.45
Sideoats grama	6.0	0-20	10	0.6
Total				5.05

Figure 1. Optimum and acceptable seeding dates for native grass species.



Zone	Optimum	Acceptable
1	March 25–April 10	Feb. 15–May 1
2	April 1–April 20	March 1–May 15
3	April 10–April 30	March 1–May 15

## Grazing Management During Establishment

Overgrazing and weed control are the two most important management considerations during establishment. Grazing should be avoided during the first and possibly the second growing season depending on stand establishment. Short periods of grazing (flash grazing) for weed control early in the first growing season are encouraged to stimulate tillering in the new seedlings. For example, graze for 1 day with enough animals to harvest the weeds without damaging the grass seedlings.

Haying in the year of seeding may be beneficial if there is enough forage produced, but set the mower to at least 4-inch height to ensure the plants can readily regrow. As a general rule, hay most native species after the first week of July. This will allow time for the plants to develop tiller buds for the following year and to build reserves for early growth.

## Weed Control

Weed control helps reduce competition for moisture, nutrients, and sunlight in new seedlings. When weed control is necessary, the main methods are mowing and herbicides. Dense shade created by annual grasses is the greatest concern, the most commonly encountered are downy brome, Japanese brome, crabgrass, and foxtail. Weed control is most beneficial during May and June with little benefit in August. Pre-plant or preemergence herbicides are labeled for some

species and situations. Consider using an herbicide wipe-on applicator if weeds are 6 inches taller than the desirable grass or spot spray if the weeds are not spread throughout the whole field. Consult *Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland* ([bookstore.ksre.ksu.edu/pubs/CHEM-WEEDGUIDE.pdf](http://bookstore.ksre.ksu.edu/pubs/CHEM-WEEDGUIDE.pdf)) for current herbicide recommendations for products, rates, and timing.

Mow before weedy plants produce seeds. Generally, broadleaf weeds should be mowed before they are 8 inches tall. Annual grasses should be mowed to prevent seed production. Herbicides may be used to reduce annual or perennial broadleaf weeds after the grass plants have become established. Consult the label for application restrictions and instructions.

Chemicals must be federally and state registered. They also must be applied in accordance with authorized registered uses, directions, and cautions on the label and all other federal and state policies and requirements.

## Management After Establishment

After establishment, seeded areas should be managed to promote tillering and to keep the soil covered. A great forage stand reduces erosion and runoff, contributing to minimized soil loss, providing high forage production, and improving wildlife habitat.

New stands must be grazed following appropriate stocking rates, good grazing distribution, and proper

season of use. Proper management of a seeded grass stand is a must with the investment of time, money, and labor involved in establishing it.

Haying should be done in early July to harvest the highest combination of forage accumulation and nutrient value. A minimum cutting height of 4 inches is recommended to ensure plants have adequate opportunity to regrow and build reserves for the following season.

Prescribed burning should be done in late spring, just as the seeded grasses are starting growth (less than 1½ inches). Burning at this stage stimulates tillering, removes the last year's dead forage, and increases forage quality. Prescribed burning can be done as early as one growing season after seeding.

## Related Publications

- Managing Kansas Grazinglands for Multiple Benefits (MF2086)
- Rangeland and Pasture Grasses of Kansas (C567)
- Prescribed Burning: Safety (L565)
- Prescribed Burns: Planning and Conducting (L664)
- Prescribed Burning as a Management Practice (L815)
- Prescribed Burning: Equipment (L876)
- Grazing Distribution (MF515)
- Stocking Rate and Grazing Management (MF1118)

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