

**NATURAL RESOURCES CONSERVATION SERVICE  
MISSOURI AGRONOMY SPECIFICATION**

**VEGETATION ESTABLISHMENT, HERBACEOUS SEEDING**

**CODE 723**

**GENERAL**

This item of work shall consist of providing the species selection, site preparation, timing and manner of seeding, and facilitating practices for the establishment of permanent herbaceous vegetation. This specification is the criteria to be applied for all conservation practice standards with a permanent herbaceous seeding component (327, 342, 386, 390, 393, 512, 645, and 643). This specification does NOT provide criteria for annual plantings such as Cover Crop (340) or for woody plantings such as Tree and Shrub Planting (612).

The current version of the Missouri JS-AGRON-25 form will be used to generate a seeding recommendation and to document the proper completion of the conservation practice. Simple computations will be used to calculate the seeding rate for each species.

**SPECIES SELECTION**

Adapted Species - Species selected must be suited to the site (soils, Pasture Suitability Group, wet soil conditions, drought tolerance, etc.) and expected growing conditions as well as the expected use and management of the vegetation. When erosion control is a primary purpose, the mixture must contain at least 60 percent perennial grasses.

Mixtures are usually desired over monoculture plantings. Where the primary use is for grazing management, legumes shall not exceed 50 percent of the mixture. If the primary planned use is hay production, the mixture shall not exceed 75 percent legumes.

Site Conditions – Plant species and cultivars shall be selected based on:

- 1) climatic conditions such as annual precipitation, seasonal precipitation distribution, length of growing season, humidity levels, temperature extremes, wind, and solar radiation;
- 2) soil condition and position attributes such as pH, available water holding capacity, aspect, drainage class, inherent fertility, salinity or alkalinity, flooding or ponding, and levels of toxic elements that may be present such as selenium or aluminum; and
- 3) resistance to disease and insects common to the site or location.

Use – Select species and cultivars that are desirable for the planned use and address the resource concerns.

Companion Crop – A companion crop may be established prior to or at the same time as a permanent seeding of grass, forbs, and/or legumes. The companion crop will be selected and managed to minimize competition with the permanent seeding. Approved companion crops are:

- 1) Redtop may be planted on erodible sites along with warm season grasses that are slow to establish. A seeding rate not to exceed 1.0 pound per acre pure live seed may be added to the full seeding rate of the planned warm season grasses, forbs, and legumes.
- 2) Spring Oats may be planted at a rate not to exceed 25 pounds per acre of high quality, relatively weed-free seed (feed-grade oats are suitable if they are clean). When the permanent seed is drilled in one operation along with the oats, the planting depth will be ½ -inch or less. Note: Oats seeded in the fall will winter-kill and not mature. Oats seeded earlier in the

year must not be allowed to mature because of competition with the permanent seeding species. Clip, harvest, or flash-graze when the oats are in the milk stage; manage the stand as often as necessary to keep the canopy from becoming competitive.

3) Winter Wheat may be used ONLY for Critical Area Treatment (342) where topsoil has been disturbed and the permanent vegetation is being established on subsoils. Wheat may be planted at a rate not to exceed 25 pounds per acre of high quality, relatively weed-free seed. Clip, harvest, or flash-graze when the wheat is in the milk stage; suppress the wheat cover as often as necessary to keep the canopy from becoming competitive with the permanent species.

## **SEEDING RATES**

1) Base Rate – The base rate for all seedings are listed in Table 1. This is the initial seeding rate prior to any adjustment factors. The seeding rates vary for each separate species due to different seed sizes (seeds per pound) and determined by pure live seed (PLS) needed for selected use.

2) Practice Adjustment Factor – The conservation practices supported by this specification have separate and distinct multipliers. This adjustment based on conservation practice is incorporated to place enough seed on the ground to provide the desired cover.

The CONSERVATION COVER (327) practice standard requires a seeding rate that represents 100 percent of the desired plant cover for erosion control. The base rate will be adequate for erosion control while providing quality habitat for wildlife without a practice adjustment factor. The base rate also applies to seedings for wildlife practice standards (643,645) unless there is an exception for specific mixes in each standard.

The CRITICAL AREA PLANTING (342) practice standard is usually applied on cut and fill construction sites. Herbaceous vegetation cannot be successfully established on these sites with the base rate. The seeding rate for the 342 conservation practice is designed to supply additional seed to the site and allow natural selection to reduce the number of surviving seedlings. The seeding rate is 200 percent of the base rate in Table 1 (Base Rate multiplied by 2). This seeding rate will be used for conservation practice standards 390 and 393.

The FORAGE AND BIOMASS PLANTING (512) practice standard requires a seeding rate for the establishment of a production field either for grazing, hay, or biomass harvest. This 512 rate is the desired seeding rate for establishing adequate ground cover on relatively undisturbed sites and represents 125 percent of the base rate (Base Rate multiplied by 1.25).

These base rates and specific adjustments by conservation practice (practice multiplier) will be used whenever the soil, site conditions, seeding equipment, and management conditions are adequate for the establishment of the desired stand of grass, legumes, and forbs under each of the seeding practices.

3) Method Adjustment Factor – When it is possible to properly place the seed and obtain good seed to soil contact, less seed is needed on the site to establish a full stand. This condition is represented by the base rate in Table 1 multiplied by the practice adjustment factor for each separate practice. The base rate for each conservation practice standard requires a planter or drill that provides accurate seed distribution, planting depth control, and good seed to soil contact.

Broadcast seeding methods only offer a fair chance of adequate stand establishment. Broadcast planting methods do not ensure uniform seed distribution, planting depth control, or provide adequate seed to soil contact. This site condition is represented by the base rate in Table 1 multiplied by a method adjustment factor and any practice adjustment factor. The broadcast rates will be the base rate multiplied by 1.50 (50 percent increase in seed for a broadcast method) multiplied by the practice adjustment factor of 1.0, 1.25, or 2.0 for the specific conservation practice standard that applies. The method adjustment factor applies to all seeding standards covered in this specification (327, 342, 386, 390, 393, 512, 645, and 643).

TABLE 1: BASE SEEDING RATES - POUNDS PURE LIVE SEED PER ACRE

Species	Base Rate (100%)	Erosion Control Rating	Wildlife Habitat Rating	Wet Soil Tolerance Rating	Drought Tolerance Rating
<b>Cool Season Legumes:</b>					
Birdsfoot Trefoil	5.0	Fair	Fair	Low	Medium
Alsike Clover	3.2	Good	Good	High	Low
Ladino Clover	3.0	Good	Fair	Medium	Low
Red Clover	6.1	Fair	Fair	None	Low
Kura Clover	7.0	Fair	Fair	None	Low
Alfalfa	7.5	Fair	Excellent	None	High
<b>Warm Season Legumes:</b>					
Common Lespedeza <sup>1/</sup>	7.5	Poor	Excellent	Low	High
Illinois Bundleflower <sup>2/</sup>	14.5	Fair	Excellent	None	Medium
Partridge Pea <sup>1/2/</sup>	26.8	Fair	Excellent	None	Medium
Purple Prairieclover <sup>2/</sup>	5.8	Poor	Good	None	High
Roundhead Bushclover <sup>2/</sup>	6.3	Poor	Good	None	High
Showy Ticktrefoil <sup>2/</sup>	10.0	Fair	Excellent	None	High
<b>Cool Season Grasses:</b>					
Canada Wildrye <sup>2/</sup>	15.3	Good	Excellent	Low	Medium
Virginia Wildrye <sup>2/</sup>	15.0	Good	Excellent	Medium	Medium
Kentucky Bluegrass	2.2	Good	Good	Low	Low
Orchardgrass	6.2	Fair	Excellent	None	Medium
Perennial Ryegrass	7.3	Poor	Good	None	Low
Redtop	1.7	Good	Good	Medium	Low
Reed Canarygrass	4.8	Excellent	Poor	High	Medium
Smooth Brome	8.0	Excellent	Fair	Low	Medium
Tall Fescue	10.0	Excellent	Poor	Low	High
Timothy	3.1	Good	Excellent	Low	Low
<b>Warm Season Grasses:</b>					
Bermudagrass	2.1	Excellent	Poor	Low Medium	High
Big Bluestem <sup>2/</sup>	8.0	Fair	Good	Medium	High
Oldworld Bluestem	2.5	Good	Poor	None	High
Composite Dropseed <sup>2/</sup>	2.3	Fair	Good	None	High
Eastern Gamagrass <sup>2/</sup>	8.0	Poor	Good	Medium	Medium
Indiangrass <sup>2/</sup>	7.8	Fair	Excellent	Low	Medium
Little Bluestem <sup>2/</sup>	6.4	Good	Excellent	None	High
Sideoats Grama <sup>2/</sup>	7.5	Good	Excellent	None	Medium
Southern Crabgrass <sup>1/</sup>	2.2	Poor	Poor	Low	Low
Switchgrass <sup>2/</sup>	4.7	Good	Good	Medium	Medium
<b>Warm Season Forbs:</b>					
Grayhead Coneflower <sup>2/</sup>	3.6	Fair	Good	None	Medium
Pale Purple Coneflower <sup>2/</sup>	16.4	Poor	Fair	None	Medium
Ox-eye False Sunflower <sup>2/</sup>	11.3	Poor	Fair	None	High
Wild Bergamot <sup>2/</sup>	1.4	Fair	Fair	High	Low
Foxglove Beardtongue	4.4	Fair	Fair	Medium	High

<sup>1/</sup>These species are annual species; plant in the dormant or spring planting periods to allow seedset to occur. Refer to Table 3, page 7 for planting dates. Check to make sure that the use of these species meets the local environmental conditions and any program requirements prior to planning in the seed mixture.

<sup>2/</sup>Acceptable cultivars or locally adapted seed of native species grown in (origin) Missouri or adjacent states (KS, OK, AR, TN, KY, IL, IA, and NE) will be planted. Refer to Table 2 of this specification for a listing of acceptable cultivars.

TABLE 2: NATIVE GRASS SPECIES, CULTIVARS OR SELECTIONS FOR USE IN MISSOURI

Grass Species	Cultivar	Area of Use <sup>1/</sup>	Source of Collection
<b>Native Cool Season Grasses</b>			
Virginia Wildrye	Cuivre River	Statewide	Eastern Missouri
	O'Ma'Ha	North Missouri	East and Northeast Nebraska
<b>Native Warm Season Grasses</b>			
Big Bluestem	Rountree	Statewide	Western Iowa
	OZ-70	Statewide	Southern Missouri, Southern Illinois, Northern Arkansas, and Eastern Oklahoma
	Kaw	Statewide	Eastern Kansas
	Pawnee	North Missouri	North Central Kansas and South Central Nebraska
	Champ	Statewide	North Central Nebraska
Little Bluestem	Aldous	Statewide	Eastern Kansas
	Cimarron	South Missouri, sandy sites only	Southwest Kansas and Oklahoma Panhandle
	Camper	North Missouri	North Central Kansas and South Central Nebraska
	Ozark	Statewide	Missouri and Southern Illinois
Eastern Gamagrass	Pete	Statewide	Kansas and Oklahoma
	PMK-24	Statewide	Kansas and Oklahoma
Sideoats Grama	Butte	North Missouri	North Central Nebraska
	El Reno	Statewide	Central Oklahoma
	Trailway	Statewide	North Central Nebraska
Indiangrass	Rumsey	Statewide	Southern Illinois
	Osage	Statewide	Eastern and Central Kansas and Oklahoma
	Cheyenne	Statewide	Western Oklahoma
	Nebraska 54	North Missouri	Nebraska
Switchgrass	Cave-In-Rock	Statewide	Southern Illinois
	Blackwell	Statewide	North Central Oklahoma
	Alamo	Lowland Sites – South Missouri	South Central Texas
	Kanlow	Lowland Sites - Statewide	East Central Oklahoma
	Pathfinder	North Missouri	North Central and South Central Nebraska
	Trailblazer	North Missouri	Selection from Pathfinder
	Nebraska 28	North Missouri	North Central Nebraska
<b>Native Warm Season Legumes and Forbs</b>			
Illinois Bundleflower	Reno Germplasm	Statewide	Kansas
Partridge Pea	Riley	Statewide	Kansas
	Lark Selection	Statewide	Arkansas
Purple Prairieclover	Kaneb	Statewide	Kansas
Roundhead Bushclover	Kanoka	Statewide	Kansas, Nebraska, Oklahoma
Showy Ticktrefoil	Alexander Germplasm	Statewide	Illinois
Grayhead Coneflower	Sunglow	Statewide	Kansas

<sup>1/</sup> North Missouri is all counties north of Bates, Henry, Benton, Morgan, Moniteau, Cole, Osage, Gasconade, Franklin, and St. Louis Counties. South Missouri is all counties including and south of those listed.

4) **Mixture Adjustment Factor** – The amount of seed needed will vary based on the percentage of each species in the desired mix that is planned and applied to the site. Use the current form JS-AGRON-25 to calculate the amount of seed needed to apply the minimum seed to meet the practice criteria. Each conservation practice requires a different minimum amount of seed due to the different conservation purposes. Declare the desired percentage for each species in the mix for calculating seed needs; mixture percentages will total 100 percent.

An example of the seeding rate calculations for Practice, Method, and Mixture Adjustment Factors follows the formula:

$$\text{Base Rate (Table 1)} \times \text{Practice (\%)} \times \text{Method (\%)} \times \text{Mixture (\%)} = \text{Seeding Rate (PLS)}.$$

For seeding Birdsfoot Trefoil as a Critical Area Planting (342) practice using broadcast planting methods and 20 percent of the mix, the formula would be:

$$5.0 \text{ PLS pounds/acre} \times 200\% \times 150\% \times 20\% = 3.0 \text{ pounds/acre seeding rate (PLS)}$$

5) Interseeding Adjustment into an Existing Stand – The JS-AGRON-25 form allows a planner to calculate the seed needed to complete an interseeding practice. Interseeding is a process to plant a portion of the desired stand without removing or destroying all the established plants currently occupying the site. Some type of site preparation or disturbance to the existing stand is required to make a niche or opening in the existing cover that will allow desired seedling establishment. The interseeding rate is a multiplier of 50% based on one-half of the stand surviving the site preparation disturbance and one-half of the stand being established from proper placement of the seed. Seeding rate calculations will include the base rate from Table 1 multiplied by 50% (interseeding adjustment) and including any multipliers for practice, method, and mixture adjustments.

### **SITE PREPARATION, SEEDBED PREPARATION, SEED PLACEMENT**

Refer to Table 3 for specifications for site preparation, seedbed preparation and seed placement.

Weed Control – Competitive vegetation will be controlled on the site prior to seeding and during establishment of the seeded stand. Mechanical, chemical, or biological means will be employed to remove, control, or retard undesirable vegetation. Herbicides and/or tillage may be used to open a niche in the existing cover in an interseeding operation. Always read and follow the herbicide label directions.

Surface Conditions – On highly erodible soils a no-till establishment procedure should be used, but tillage is allowable if adequate residue is present to control erosion after planting the site.

Surface Conditions for Construction or Critical Areas – Cover fine textured soils (greater than 40% clay) and coarse textured soils (sands, loamy sands) with a minimum of six (6) inches of topsoil after construction is complete. Topsoil shall be the highest quality surface soil available at the site. Topsoil shall be free of brush, rocks, and other large materials to the extent that it is not detrimental to the establishment and maintenance of desired plants. Soil materials from drained ponds or surface material from an erosive area will not be used. If available topsoil material is no better than the material to be covered, do not apply topsoil.

Prepare a seedbed, incorporate lime and fertilizer, and plant or cover seed with mechanical operations on slopes where it is safe to operate equipment. Use appropriate methods to prepare a seedbed, control weeds, incorporate fertilizer, and achieve seed to soil contact of the permanent seeding or temporary cover where slopes are too steep for safe vehicle operation. All slopes must be smooth and free of rills or gullies.

Moisture in Soil Profile – Soil moisture shall be adequate for the germination and establishment of the desired vegetation. Plan seedings to be planted prior to the portion of the year when adequate precipitation is likely to occur. Follow required planting dates in Table 4.

**Table 3: Site preparation, Seedbed Preparation, and Seed Placement**

Seeding Situation	Site Preparation	Seedbed Preparation	Seed Placement
Broadcast seeding legumes and forbs in the dormant seeding period (for more information on establishing forbs, see Native Forb Information Sheet IS-MO643F)	Remove some of the residue/cover prior to planting. This may be accomplished by grazing, baling, or prescribed burning	None	Broadcast without rolling before or after seed placement
No till drilling or planting Complete Renovation	When planting a no till seeding into heavy crop residue, remove some of the residue cover prior to planting. This may be accomplished by herbicides, grazing, baling, shredding, or prescribed burning. If chemical burndown of existing perennial vegetation will be used apply chemicals in split applications at least 1 month apart. Split applications late summer/fall and spring/summer prior to seeding work best. If chemical burndown of annual crops/weeds will be used 1 application may be used.		Plant the seed mixture with a grassland drill, grain drill, or seeder/packer at the proper depth. Drills shall be capable of properly metering and placing the size and kind of seed being planted. Desired seeding depth shall be between 1/8 and 1/4 inch for all species except eastern gamagrass which will be planted to a depth of 1 to 1½ inches. Set the drill or seeder at shallower depths (1/8 inch) for smaller seeds or planting on heavier soils. Plant large seeds at the deeper depth (1/4 inch) or when planting on sandy soil
No-till drilling or planting Interseeding grasses or grasses and legumes into existing vegetation	When no-tilling into existing vegetation to improve diversity or thicken the stand, remove some of the residue/cover prior to planting. This may be accomplished by grazing, baling, shredding, prescribed burning or herbicides. If chemical burndown of existing cover will be used, 1 application will be used to weaken the existing stand and reduce competition.		
Broadcast seeding onto a tilled seedbed	Depending on prior land use, existing cover and active growth herbicides, prescribed burning, grazing, close mowing or some combination of these treatments will be used to weaken the existing stand, control weedy species and/or prevent seed production during the growing season prior to seeding. Timing of herbicide applications shall be based on the growth stage of the target species being controlled. Adequate time for decomposition of root crowns should be provided to insure good seed to soil contact at planting	Prepare a seedbed, incorporate lime and fertilizer. <b>Rolling or packing before broadcasting seed will be required for all broadcast seedings that occur outside of the dormant seeding period. All slopes must be smooth and free of gullies and/or rills.</b>	Spread the seed on the soil surface in any manner that will insure even distribution of seed to the entire area. <b>Rolling or packing after spreading the seed will be required for any broadcast seedings that occur outside of the dormant seeding period.</b>
No-till drilling, planting, sprigging into a tilled seedbed			Plant the seed mixture with a grassland drill, grain drill, seeder/packer, or sprigger at the proper depth. Drills shall be capable of properly metering and placing the size and kind of seed being planted. Desired seeding depth shall be between 1/8 and 1/4 inch for all species except eastern gamagrass which will be planted to a depth of 1 to 1½ inches. Set the drill or seeder at shallower depths (1/8 inch) for smaller seeds or planting on heavier soils. Plant large seeds at the deeper depth (1/4 inch) or when planting on sandy soil
Critical area plantings on steep slopes (4:1 or steeper)	All slopes must be smooth and free of rills and/or gullies	None	Broadcast seed without rolling before or after seed placement

## SOIL FERTILITY

Follow the criteria in the NUTRIENT MANAGEMENT (590) practice standard to apply fertilizer and soil amendments for stand establishment. A current soil test will be required to determine the need for nitrogen (N), phosphorus (P), and potassium (K).

The CRITICAL AREA PLANTING (342) practice standard allows an option to use all-inclusive fertilizer and limestone application rates for stand establishment when a timely soil test is not available.

The following criteria applies to any seeding standard where a soil test will be used to determine the fertility and effective neutralizing material (ENM) needed for establishment of the vegetative stand:

- the application of fertilizer and soil amendments for pH shall be based on a current soil test (less than 4 years old) taken since the last application of liming material or fertilizer.
- the requirement for the application of nitrogen, phosphate, and potash may be waived when the soil test recommendation for each individual nutrient is less than 25 pounds per acre and the total amount of fertilizer material to be applied is less than 50 pounds per acre. On grass and legume plantings where no nitrogen is recommended and only where the vendor cannot provide a fertilizer blend without nitrogen, up to 30 pounds per acre of nitrogen may be applied.
- when liming materials or fertilizer are required for establishment, applications shall be appropriately placed and timed prior to seeding to be effective and beneficial. Lime and fertilizer shall be applied prior to seeding and incorporated during tillage operations. On plantings containing legumes, where lime can be incorporated during seedbed preparation, lime shall be applied at least three months prior to planting. On no-till or broadcast plantings containing legumes where incorporation with tillage cannot be accomplished, lime shall be applied at least 6 months prior to the planting date. This advance time requirement (3 to 6 months prior to seeding) may be waived for seed mixes containing:
  - 1) alfalfa when the pH is equal to or more than 5.7 (salt pH) or 6.2 (water pH);
  - 2) warm season legumes when the pH is equal to or more than 5.2 (salt pH) or 5.7 (water pH); or
  - 3) all other legumes when the pH is equal to or more than 5.5 (salt pH) or 6.0 (water pH).
- the application of liming materials in excess of 4 tons per acre can be applied in split applications with approximately half of the lime requirement being properly placed and timed prior to the seeding and the remainder applied within 2 years following the planting date. Agricultural lime requirements of 600 pounds or less ENM may be waived.

## PLANTING DATES

Specific planting dates are required for successful completion of vegetation establishment. Refer to Table 4 for acceptable and optimal planting dates.

TABLE 4: PLANTING DATES<sup>1/</sup>

Plantings with a dominance of:	Spring Planting Period <sup>2/</sup>	Summer or Fall Planting Period	Dormant Season Planting Period <sup>2/</sup>
Cool Season Grasses and Legumes in Northern Missouri <sup>1/</sup> : Acceptable Dates Optimal Dates	Mar 16 – May 31 Mar 16 – Apr 30	Aug 01 – Oct 15 <sup>3/</sup> Aug 16 – Sep 15	Dec 01 – Mar 15
Cool Season Grasses and Legumes in Southern Missouri <sup>1/</sup> : Acceptable Dates Optimal Dates	Mar 01 – May 15 Mar 01 – Apr 15	Aug 16 – Oct 15 <sup>3/</sup> Sep 01 – Sep 30	Dec 16 – Feb 29
Warm Season Grasses, Legumes, and Forbs in Northern Missouri <sup>1/</sup> : Acceptable Dates Optimal Dates	Mar 16 – Jun 30 Apr 16 – Jun 15		Nov 16 – Mar 15
Warm Season Grasses, Legumes, and Forbs in Southern Missouri <sup>1/</sup> : Acceptable Dates Optimal Dates	Mar 01 – Jun 15 Apr 01 – May 31		Dec 01 – Feb 29

<sup>1/</sup> Planting dates are based on plant suitability zones. Northern Missouri is all counties north of Bates, Henry, Benton, Morgan, Moniteau, Cole, Osage, Gasconade, Franklin, and St. Louis Counties. Southern Missouri is all counties including and south of those listed.

<sup>2/</sup> Mixtures containing annual species (common lespedeza, partridge pea, or southern crabgrass) will be planted only in the dormant or spring planting periods. All herbaceous seedlings under the 643 standard **must** be planted in the dormant period.

<sup>3/</sup> Mixtures containing legume species will be planted by September 15 in Northern Missouri and September 30 in Southern Missouri.

Critical Area Planting Date Exemption - A special exemption on seeding dates may be used with CRITICAL AREA PLANTING (342) practice when mixtures of cool-season grasses are to be planted. These mixtures may be planted from June 1 through July 31 in Northern Missouri or from May 16 through August 15 in Southern Missouri only when all five of the following conditions exist:

- 1) soil moisture on the site is at field capacity at time of seeding;
- 2) planting rates are increased by an additional 50 percent
- 3) an adequate, firm, and weed-free seedbed has been prepared;
- 4) seed is planted at a depth of ¼ inch or less with a grassland drill or similar quality seeding equipment; and
- 5) mulching material is applied following the planting operation according to the MULCHING (484) practice standard.

## SEED QUALITY

Only viable, high quality and adapted seed will be used. All seed shall have a current seed test within 10 months of the planting date that lists germination, purity, and hard seed as a percentage for determining pure live seed and lists the percent of weed seed present that meets State seed quality law standards. Seed must be clean and relatively free of weed seed and other

contaminants. Seed that has become wet, moldy, or otherwise damaged in transit or storage is not acceptable. Certified seed is preferred but not required.

### **INOCULATION OF LEGUMES**

Legume seed shall be inoculated with the proper, viable *Rhizobium* bacteria species prior to planting according to Missouri Agronomy Technical Note MO-36, "Legume Inoculation", <http://www.mo.nrcs.usda.gov/technical/agronomy/technote36.html>. Pre-inoculated seed shall be planted prior to the expiration date on the inoculum tag or be re-inoculated with the appropriate inoculum within 24 hours prior to seeding. Inoculated seed will not be exposed to direct sunlight.

Inoculation of legumes may be waived when a current pasture inventory (JS-AGRON-24 or similar inventory) shows that the legume species to be seeded occupies more than 5 percent of the vegetative cover on the site prior to seeding.

### **SPECIAL PLANTING METHODS**

Sprigging – Planting sprigs, rhizomes, stolons, or cuttings of bermudagrass, prairie cordgrass, giant miscanthus, and reed canarygrass may provide quicker and easier cover than planting seed. The planting rate will be a minimum of 20 bushels of sprigs per acre for bermudagrass and reed canarygrass. The following steps will be required:

- 1) Plant only in a moist, fertile, weed-free seedbed.
- 2) Plant reed canarygrass (only in the spring) and bermudagrass (spring or summer season by June 15) to take advantage of available precipitation and the growing season.
- 3) Plant pure live sprigs as soon as possible after harvesting within the same day if possible or within 24 hours of digging the sprigs.
- 4) Plant sprigs at least 2 inches deep to ensure placement in soil moisture, but leave tips of green leaves above the ground.
- 5) Firm soil around the sprigs to obtain good soil to sprig contact.
- 6) Control weeds with selective herbicides applied immediately after planting.
- 7) Fertilize to hasten good ground coverage as soon as new stolons or rhizomes are evident.
- 8) Plant prairie cordgrass only with dormant rhizomes in early spring or as vegetative rooted plants by May 31. Split one-gallon size containers four ways to create vegetative plugs. Plugs will be planted either by hand or with a mechanical tree planter at a planned spacing.
- 9) Plant giant miscanthus rhizomes at depth of 4 inches and density of 6000/acre (approximately 32 inch by 32 inch spacing). A post-planting roller may be required to ensure solid contact between soil and rhizome.

Sodding for CRITICAL AREA PLANTING (342) – Apply fertilizer and lime according to a current soil test. Incorporate lime and fertilizer to a depth of 2 or 3 inches, and firm the site with a cultipacker, roller, or similar tool. The site must be relatively smooth to apply sod.

Wet the soil surface to a depth of 2 inches or more prior to laying the sod. Only moist, fresh sod shall be used. Lay sod as soon as possible after delivery to the site. Begin laying the sod from the lower end of any slope. On steep slopes the use of ladders will speed up the laying operation and limit damage to the sod.

Sod strips shall be laid at right angles to the flow of water. Stagger the joints between sod pieces. Fill any open joints with topsoil. Tamp and roll laid sod to ensure a solid contact of the sod rootmass with the moist soil surface.

On steep sites or when anticipating overland flow, sod shall be held in place by woven wire, wooden pegs, wire staples, or similar material designed for this use. Pegs or staples will be a minimum of 10 inches long.

Recently laid sod should be irrigated until moisture penetrates the soil layer beneath the sod.

Apply sod during the growing season and no later than October 1.

#### **ESTABLISHMENT PERIOD**

Weed Control – Weeds and companion crops will be controlled by herbicides, mowing, clipping, or controlled grazing prior to becoming competitive with the species planted. Competing species should be controlled depending upon their density, prior to becoming 12 inches tall, but always before viable seed set. Weed control procedures will be performed as often as necessary to ensure that stands are not reduced due to excessive competition.