



Forage and Biomass Planting Fact Sheet

Applicable to conservation practice Forage and Biomass Planting - 512

USDA Natural Resources Conservation Service - North Dakota

April 2011

What is Forage and Biomass Planting?

Forage and Biomass Planting is the establishment of adapted native or introduced forage species on cropland, hayland, and pastureland.

When successfully established, these plantings will serve one or more of the following purposes.

- Improve or maintain livestock nutrition and/or health.
- Provide or increase forage supply during periods of low forage production.
- Reduce soil erosion.
- Improve soil and water quality.
- Produce feedstock for biofuel or energy production



How Forage and Biomass Planting helps:

When properly applied, this practice has the potential to:

- ✓ Provide a higher quantity and/or quality of forage for grazing animals
- ✓ Provide a source of forage which addresses seasonal shortages in the present grazing program. Examples would include:
 - establish cool-season grasses/legumes for early spring or late fall pasture
 - establish warm-season native grasses for mid summer pasture
- ✓ Provide a source of emergency forage during periods of drought
- ✓ Provide perennial cover to reduce soil erosion
- ✓ Provide a perennial source of plant material for biofuel production

To apply this practice:

Establishing a stand of grass requires proper planning and attention to detail. Perennial grasses, forbs, and legumes differ in establishment requirements compared to annual grain crops. Five keys to successful grass establishment are presented in the following narrative. Adhering to these guidelines will greatly improve your chances of a successful Forage and Biomass Planting.

Key #1—Seeding Date

Grasses should be seeded when soil moisture and temperature are optimum for germination. Grasses are designated either “cool” or “warm” season based on their growth cycle. Cool-season grasses can be planted when temperatures are cooler and day lengths shorter. Warm-season grasses need warmer temperatures and longer day lengths to grow. Following are recommended planting dates for cool and warm-season grasses in the Northern Great Plains.



<i>Species type and season of planting</i>	Seeding Dates	
	<i>North</i>	<i>South</i>
<u>Cool-season species</u>		
Spring	Prior to May 20	Prior to May 10
Late Summer	August 10 to Sept 1	August 10 to Sept 15
Late Fall (dormant)	After October 20	After November 1
<u>Warm-season species</u>		
Spring	May 10 to June 25	May 10 to June 25
<u>Warm / Cool-season mix</u>		
Spring	May 1 to June 15	April 20 to June 1

Key #2—Seedbed

A proper seedbed is firm and free of competing vegetation. Correct firmness is when an adult footprint is only slightly visible on the prepared bed prior to the seeding operation. The seedbed can be firmed, if needed, by pulling a commercial or homemade packer or roller. A firm seedbed is essential for proper seeding depth. A loose, fluffy bed will place seeds too deep for proper germination. Seed requiring light for germination will be hindered by a deep planting depth. Seed that germinates but does not have enough nutrient reserve for the shoot to reach the surface is also hindered by a deep planting depth. Most species should be planted at a shallow depth of ¼ to ½ inch. Larger seeds can be planted up to 1 inch deep. Most seedings are too deep if you cannot see a few seeds on the soil surface.

Grasses can be successfully seeded into a tilled or no-tilled seedbed, provided weeds are controlled and residue is managed prior to planting. Weeds compete with seedlings for moisture and light. Optimum control comes with several years of weed management prior to seeding. At seeding time, there should be no actively growing weeds. Weeds can be controlled with tillage and/or herbicides applied before or just after seeding. Like a weed, companion crops can compete with the seeded species for water and light. Unless erosion is a problem, companion crops are NOT recommended in Forage and Biomass Plantings.

Seeding into standing stubble can enhance seedling survival. Residue affects seeding depth and seed soil contact. Tolerable residue amounts are dependent on seeding equipment to be used. Straw and chaff should be spread with a properly adjusted straw/chaff spreader attached to the combine if the seeding is to be performed without tillage. Tillage, fire, and mowing can be used to manage residue prior to seeding.

Key #3—Seed Placement

The seeding equipment should provide for proper seeding depth, uniform seeding rate, and good seed to soil contact. Grass seed can be broadly categorized into three types; fluffy or chaffy, smooth small seed, and smooth large seed. Grass drills are equipped with separate boxes to properly place and meter each of the three seed types. Picker wheels and agitators in the fluffy/chaffy box and oversized feeder tubes keep rough-coated seed flowing evenly. Depth bands on grass drills are essential for planting depth control. Press/packer wheels contribute to close seed/soil contact. Free-flowing grass seed (e.g. wheatgrass) can be successfully planted with a small grain drill if proper, shallow, and consistent seeding depth is maintained.

Drills should be calibrated to monitor seeding rate. Seeding rate can be determined by counting dropped seeds after traveling a given distance on a hard surface, collecting seed from openers after traveling a given distance, or turning the drive wheel on the drill and collecting seed from openers.

Key #4—Seed Quality

All seed must meet the requirement of North Dakota State Seed Laws and Regulations (see Chapter 4-09 of the ND Century Code). The seed should be tested for purity and germination. Purity specifies any weeds and inert matter in the seed lot. Germination is an indication of the percentage of seed that will sprout and grow. Seed is usually purchased and planted on a Pure Live Seed (PLS) basis. This is calculated by multiplying purity by germination (including dormant). A high PLS usually indicates high quality seed. Seed of adapted species and recommended cultivars within the species should be planted. It is best to select cultivars whose origin is closest to the planting site when seeding warm-season grasses. Cool-season species are more broadly adapted.

- Origin of non-varietal ('common') grass seed of both native and introduced species for Forage and Biomass Planting is limited to North Dakota, South Dakota, Nebraska, Montana, Wyoming, Minnesota, Alberta, Saskatchewan, and Manitoba.
- Non-varietal ('common') native forbs and legumes will originate or be grown in North Dakota, South Dakota, Nebraska, Montana, Wyoming, Idaho, Washington, Oregon, Minnesota, Wisconsin, Iowa, Alberta, Saskatchewan or Manitoba.
- Foreign seed, except Canadian, must be of adapted, named varieties.
- Alfalfa should have a fall dormancy rating or Winter Survival Index (WSI) of 3 or less.
- Legume seed should be inoculated with the proper culture just prior to seeding in order to increase the potential for nitrogen fixation by the plant.
- No amount of noxious weed seed is allowed on any seed tags.

Seed with awns or other appendages is called “fluffy” or bearded. Debearded seed has part or all of the appendages removed and is more flowable. Flowability depends on degree of debearding.

Key #5—Weed Control

Weeds compete for moisture and light with young seedlings. Competitive weeds should be controlled mechanically by clipping or with herbicides. Clipping height should be adjusted so that the majority of the seeded species leaf area remains intact. Dense residue clippings should be removed from the area to prevent smothering of seeded species. Weeds should be controlled with herbicides before they reach 4 inches tall.

Other considerations:

Grass and/or legume species may be seeded alone or in mixtures for use as pasture or hayland. When deciding which grasses and/or legumes to include in the seeding mixture, consideration should be given to matching the selected species to the soils within the field. Also, mixing species with similar growth characteristics (i.e. season of growth), recovery after use, and palatability will simplify management.

Maintenance:

Once the stand is established, application of prescribed grazing management for pastures and forage harvest management for hayland will help maintain the long-term productivity of the stand.

Contacts:

For more information or site specific assistance on Forage and Biomass Planting and other technical assistance, please contact your local Natural Resources Conservation Service Field Office, Soil Conservation District Office, or your local NDSU County Extension Service.