October 2005 Rev. 1

Jimmy Carter Plant Materials Center
Americus, Georgia

PLANT SHEET

Switchgrass
(*Panicum virgatum*)

Special Edition: For Farm Bill Implementation

Description: Switchgrass is a native warm season, rhizomatous, perennial grass that ranges in height from 3 to 6 feet. It is a bunch grass with flat leaf blades about ½ inch wide and 30 inches in length. It is a good cover plant for birds and some small game. 'Alamo' is a good forage on sites in coastal plain and Piedmont regions. It can be used for forage, conservation buffers, streambank stabilization, filter strips and wildlife.

Alamo Switchgrass

Grazing Land Study

Conservation Uses:
- Grazing Land
- Wildlife habitat improvement
- Critical area stabilization
- Biofuel/Alternative Fuels
- Streambank Stabilization
- Nutrient Reclamation
- Filter Strip
- Conservation Buffers
- Urban Conservation
- 2002 Farm Bill Implementation

ESTABLISHMENT OF NATIVE WARM SEASON GRASSES

Native warm season grasses need special attention given during purchasing, planting and management of established stands. The following features make native warm-season grass planting different from other traditional plantings:

- Planting rates for warm season grasses are based on pure live seed (PLS) lb/acre and **NOT** bulk lb/acre.
- All warm-season grasses require a firm seedbed for best establishment.
- Traditional seeding equipment works well for switchgrass and eastern gamagrass, but fluffy-seeded species such as big bluestem, little bluestem and indiangrass require special equipment and/or techniques for successful seedings.

Streambank Stabilization (Alamo switchgrass)

Conservation Buffers

Switchgrass Buffer (*Panicum virgatum*)

PURCHASING SEED

It is best to purchase certified seed of varieties adapted to the region of planting. Certified seed is guaranteed to be true to a variety, and use of certified seed may lead to a more reliable planting. It is best to order different species and varieties separately instead of pre-mixed because seeding and management specification will differ between species.

Warm season grass species should be purchased on a pure live seed (PLS) basis. Do not confuse 12 lb PLS/acre with 12 bulk lb/acre. Failure to recognize PLS when purchasing seed and figuring seeding rates may yield unexpected results.

TIME OF SEEDING

Warm season grasses are best established during March through May. Early planting is critical even though warm season grasses do not germinate until soil temperatures are above 50 to 55 degrees F. Avoid planting after June 1 because moisture and weed competition may delay stand establishment.

Early establishment allows seedlings to develop good root systems before summer drought and greatly increases the ability of the grasses to compete with weeds. Irrigation (if available) should be applied when soil conditions are very dry to enhance seed germination and stand establishment.

Seeding into warm soil in late spring can be helpful in controlling weeds. The first flush of weeds is allowed to germinate and then is killed by final tillage or contact herbicide just prior to planting. Ideally, this practice would result in the shortest period of bare ground and would get grass seedlings up as quickly as possible to compete with other weeds.

SEEDBED FERTILITY

Warm season native grasses can be productive on low fertility soils, but fertilization will increase plant vigor. Soil test the field prior to planting or cultivating. The pH should be adjusted to around 6.0 if needed. Incorporate lime in the fall to allow it time to adjust pH before planting in the spring. Fertility should be up to medium levels for phosphorous (P), and potassium (K). Incorporate P and K into the soil at planting time. Do not apply nitrogen (N) at or before planting time. Nitrogen and phosphorous have been shown to increase productivity. However, nitrogen promotes weed growth, as well. Unless weed competition is low, N should be excluded the first year until a stand becomes established. The only exception for N application is planting critical sites, such as log decks, log roads, skid trails and other impoverished soils.

In addition to the above guidelines, follow the fertilizer and lime recommendation in your state. Consult your Field Office Technical Guide (FOTG) for more specific information based on site and soils.

SEEDBED PREPARATION

Native warm season grasses are best established by creating a tilled, firm seedbed. It is best to remove all vegetative cover through the use of approved herbicides or extensive tillage. Seedbeds should be adequately plowed, disked and packed prior to planting. A cultipacker works well for firming the seedbed. If a prepared hard seedbed is rained on before planting, harrow and cultipack again before planting.

EQUIPMENT USED FOR SEEDING

Ideally seed will be drilled into a prepared seedbed. Switchgrass may be planted with a conventional drill because it has a hard, smooth seed coat. Conventional drills equipped to seed alfalfa work well. Eastern gamagrass seed is about the size of corn seed and is best planted with a corn planter. Big and little bluestem and indiangrass seed have appendages with fine hair and will not pass through conventional equipment unless they can be ordered as "debearded" or brushed seed. Debearded seed may pass through a conventional drill, though it may still be best to use a special drill designed for fluffy seed. Seed drills advertised as "native grass drills", such as a Tye or Truax drill, have special boxes equipped with picker wheels and augers which help prevent seed from sticking together and move the seed to the drilling mechanism. Many native seed drills have multiple boxes, which allow for the sowing of both switchgrass and fluffy seeded species at the same time. Switchgrass, indiangrass, and big and little bluestem should be seeded at 1/4 to 1/2 inch deep. In sandy soils be especially careful not to bury seed too deep! Eastern gamagrass is usually seeded at 1 ½ inches deep. Planting native grasses with conservation tillage equipment is not recommended at this time.

If a seed drill is not available, seed may be broadcast over a site. Broadcast fluffy seed (bluestem and indiangrass) with a drop spreader or cyclone spreader and then drag to lightly cover seed. If you are using a cyclone spreader, try mixing seed with inert matter such as kitty litter or sawdust for better spreading. Successful broadcast seeding can be achieved by increasing seeding rate and by rolling or cultipacking before and after seeding. When planting a small area (1/4-acre) in droughty conditions, an optional step to enhance the stand would involve lightly mulching the seeded area.

SEEDING RATES

Warm season grasses species vary in their growth characteristics. This makes it more difficult to manage mixtures for pasture or hay use, so only one species should be seeded per field. In areas planted for wildlife and erosion control the management of mixtures is not as critical. Information is being developed on the use and adaptability on establishing native grasses in mixtures.

Native Grass Field Planting (‘Alamo’ Switchgrass in Barnesville, GA)

Seeding rates for pasture and hay, wildlife, critical area treatment and conservation buffers are found in the tables 1 and 2.

Table 1: Seeding rate for species planted alone

		Pounds of Pure Live Seed (PLS) per Acre			
Species	**Seeds/lb.**	**Forage**	**Wildlife**	**Buffers**	**Critical Area**
Big bluestem	165,000	7-10	3	7	8
Little bluestem	255,000	7-10	3	7	8
Switchgrass	389,000	6-10	2	8	8
Indiangrass	175,000	7-10	3	8	8
Eastern gamagrass	7,800	8-14	7	10	10

Table 2: Seeding rate for mixed species plantings

		Pounds of Pure Live Seed (PLS) per Acre			
Species	**Seeds/lb.**	**Forage**	**Wildlife**	**Buffers**	**Critical Area**
Big bluestem	165,000	4	1.5	4	7
Little bluestem	255,000	3	1.0	3	7
Switchgrass*	389,000	4	.05	3	5
Indiangrass	175,000	4	1.5	3	7
Eastern gamagrass*	7,800	**	**	4	**
Total lbs PLS / Ac.		**15**	**4.5**	**17**	**26**

* Switchgrass and eastern gamagrass should not be pre-mixed with fluffy-seeded species
** Eastern gamagrass is best when used alone for these applications

---

SEED QUALITY

Warm season grasses can be quite variable in germination rate and the purity of seed. Pure Live Seed (PLS) should always be used when purchasing seed and to determine the bulk amount of seed necessary for a planting. It may be necessary to increase your seeding rate to provide the recommended rates of pure live seed.

Recommended Varieties of Switchgrass for Use in Georgia

Switchgrass

'Alamo'	'Alamo' switchgrass is highly recommended throughout the southeast. It has been fully tested for conservation uses and is recommended for forage, buffers, wildlife plantings, critical area treatment, shoreline and streambank stabilization and nutrient reclamation.
'Cave-In-Rock'	'Cave-In-Rock' is recommended in the northern portion of the Southeastern Region. Not as good on critical sites as 'Alamo'. Adapted to lowland and upland sites with good palatability and animal gains. More dormant seed than 'Blackwell' and tends to be slow to establish. It is a good variety for wildlife plantings.
'Blackwell'	Not well adapted in the lower southeastern portion of the Southeastern Region. Can be used in mixed stands for wildlife plantings. Less forage production than 'Cave-In-Rock. Fine stemmed and rust resistant

'Shelter'	Adapted mostly for wildlife plantings. Not recommended for forage and/or erosion control.
Miami Stuart Wabasso	These relatively new pre-varietal releases (source-identified) which are adapted for use in Florida. The conservation uses include forage, wildlife and critical area treatment. These releases are established vegetatively.

NATIVE GRASS DRILLS

Planting with a no-till drill designed for native warm season grass seed is highly recommended. Do not drill seed any deeper than ¼ inch! In fact, as much as 30 percent of the seed should be obvious on top of the planting furrow.

Drilling – For even grass distribution and a continuous, solid stand, native warm season grasses planted for wildlife should be planted with a drill. When planting bluestems or indiangrass, a drill with a specialized seed box containing "picker wheels" is necessary or the fluffy seed of these grasses will lodge in the seed chute. These drills often are available for use through state wildlife agencies, soil conservation districts, the Natural Resources Conservation Service and some local chapters of Quail Unlimited. Switchgrass can be planted with a conventional drill. Any drill, however, must be calibrated before planting. Eastern gamagrass is usually planted with a corn planter in rows 18-24 inches apart, but some producers like to plant rows only 12 inches apart to reduce stool size and make stems more upright so haying is easier. Native grass drills can be used to plant eastern gamagrass.

About this publication

Authors:
USDA Natural Resources Conservation Service
Donald Surrency, Plant Materials Specialist
Jimmy Carter Plant Materials Center, Americus, GA
Charles M. Owsley, Plant Materials Center Manager
Malcome Kirkland, Asst. Plant Materials Center Manager

We would like to thanks the following people for their review of this booklet:
Sam Sanders, Plant Materials Specialist, FL
Clarence Maura, Brooksville PMC, Brooksville, FL
Mike Owsley Jimmy Carter PMC Manager, GA

Photography:
Donald Surrency
Charles M. Owsley
Mary Ann McQuinn, Public Affairs Specialist, GA
Larry Dyck, Clemson University, Clemson, SC

All photos are courtesy of USDA NRCS unless otherwise noted.

WHERE TO GET HELP: For more information about Switchgrass, contact Donald Surrency, Plant Materials Specialist, Thomson, Georgia, 706-595-1339. E-mail don.surrency@ga.usda.gov. Mike Owsley, Jimmy Carter PMC, Americus, Georgia, 229-924-4499. E-mail mike.owsley@ga.usda.gov. For more information about switchgrass click the Jimmy Carter Plant Materials Center homepage. The homepage address is www.ga.nrcs.usda.gov/ga/technical/pmc/pmc.html.

The United States Department of Agriculture (USDA) prohibits discrimination in all its program and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs). Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at 202-720-2600. (voice and TDD).

To file a complaint, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal employment opportunity employer.