

## SWITCHGRASS

### *Panicum virgatum* L.

Plant Symbol = PAVI2



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From the Southern Wetland Flora (1991)  
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#### Uses

**Livestock:** Switchgrass is noted for its heavy growth during late spring and early summer. It provides good warm-season pasture and high quality hay for livestock.

**Erosion Control:** Switchgrass is perhaps our most valuable native grass on a wide range of sites. It is a valuable soil stabilization plant on strip-mine spoils, sand dunes, dikes, and other critical areas. It is also suitable for low windbreak plantings in truck crop fields.

**Wildlife:** Switchgrass provides excellent nesting and fall and winter cover for pheasants, quail, and rabbits. It holds up well in heavy snow (particularly 'Shelter' and 'Kanlow' cultivars) and is useful on shooting preserves. The seeds provide food for pheasants, quail, turkeys, doves, and songbirds.

**Biofuel Source:** Interest in switchgrass as a renewable biofuel resource has been increasing in recent years, primarily in the Southern United States. The Booneville, Arkansas, Plant Materials Center (PMC) and the Plant and Soil Science Department of Oklahoma State University (OSU) are cooperating to evaluate several upland types of switchgrass for use as a biomass energy resource. Selections of upland types of switchgrass have been evaluated by OSU for

several years. The development of hybrid progeny with substantial heterosis for increased biomass yield will ultimately result in improved hybrid cultivars for the Central and Southern United States. The PMC is in the process of assessing several improved lines along with commercially available cultivars for dry-matter potential and environmental adaptation. Results of this study may contribute to producers cashing in on a growing demand for renewable fuels and a decrease on our dependency on fossil fuels.

#### Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

#### Weediness

This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site at plants.usda.gov.

#### Description

*Panicum virgatum* L., switchgrass, is native to all of the United States except California and the Pacific Northwest. It is a perennial sod-forming grass that grows 3 to 5 feet tall and can be distinguished from other warm-season grasses, even when plants are young, by the white patch of hair at the point where the leaf attaches to the stem. The stem is round and usually has a reddish tint. The seed head is an open, spreading panicle.

#### Adaptation and Distributions

On suitable soils, switchgrass is climatically adapted throughout the most of the United States. Moderately deep to deep, somewhat dry to poorly drained, sandy to clay loam soils are best. It does poorly on heavy soils. In the Northeast, it performs well on shallow and droughty soil.

Switchgrass is distributed throughout the majority of the United States, excluding the far west states. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

## **Establishment**

Switchgrass should be seeded in a pure stand when used for pasture or hay because it can be managed better alone than in a mixture. It may be mixed with other native grasses, forbs, or legumes for wildlife and restoration seedings. Its slick, free-flowing seed can be planted with most seed drills or with a broadcast spreader. Sow seed at a rate of approximately 4-6 pounds of pure live seed (PLS) per acre drilled in a pure stand. Broadcast seed at a rate of 8-10 pounds of pure live seed (PLS) per acre for a pure stand. Reduce the rate of switchgrass in mixes. Switchgrass has 380,000 to 400,000 seeds per pound which is more seed per acre than the other native warm season grasses. Seeding rates must be carefully designed to provide the desired balance of species.

Tilled seedbeds in areas that were formerly cropped should be firmed with a roller prior to the drilling or broadcasting of seed. If seeds are planted using the broadcast method, the area should be rolled afterward to help cover the seed. When drilled, seeds should be planted 1/4 inch deep. Seedings in areas that were formerly pastures or hay fields have been successful, where control of sod is accomplished with clipping, grazing, or herbicides.

Switchgrass and all other native warm season grasses require exposure to cold, moist conditions (stratification) before they will germinate in warm temperatures. This is easiest to accomplish by sowing seed before the last frost. The date of the last frost in most of the Appalachian Region is April 15.

Phosphorus and potassium should be applied according to soil tests before or at seeding. Nitrogen, however, should not be used at seeding time because it will stimulate weed growth. Apply nitrogen once the switchgrass is growing and is taller than the weeds in the stand at a rate of 30 to 50 pounds per acre.

## **Management**

To control weeds during establishment, mow switchgrass to a height of 4 inches in May or 6 inches in June or July. Grazing is generally not recommended the first year, but a vigorous stand can be grazed late in the year if grazing periods are short with at least 30 days of rest provided between grazings. Switchgrass is the earliest maturing of the common native warm-season grasses and it is ready to graze in early summer.

Established stands of switchgrass may be fertilized in accordance with soil tests. Phosphorus and potassium may not be needed if the field is grazed

since these elements will be recycled back to the soil by the grazing animal.

Apply nitrogen after switchgrass has begun to produce using a single application in mid-to-late May or a split application in both May and early July. Avoid high rates of nitrogen because carry-over could spur cool-season grass growth and harm young plants the following spring. Switchgrass will utilize 80 to 100 pounds of nitrogen when it is managed well for grazing or hay. Fertilize stands managed for wildlife with 30 to 50 pounds of nitrogen per acre to produce seed.

Switchgrass will benefit from burning of plant residues just prior to initiation of spring growth. Burning fields once every 3 to 5 years decreases weed competition, eliminates excessive residue and stimulates switch grass growth. Switchgrass used for wildlife food and cover should be burned once every 3 to 4 years to reduce mulch accumulations that inhibit movement of hatchlings and attract nest predators.

Under continuous grazing management, begin grazing switchgrass after it has reached a height of 12 to 16 inches, and stop when plants are grazed to within 6 to 8 inches of the ground. A rest before frost is needed to allow plants to store carbohydrates in the stem bases and crown. Plants may be grazed to a height of 6 to 8 inches after frost. The winter stubble is needed to provide insulation. Grazed paddocks need to be rested 30-60 days before being grazed again.

## **Pests and Potential Problems**

Grasshoppers and leafhoppers can be major pests in new seedings. Some stands are impacted by damping off and seedling blight. Leaf rust occasionally affects forage quality.

## **Weed Control**

Establishment and maintenance of stands of switchgrass and all other native warm season grasses is highly dependent on weed control. These grasses are extremely slow to germinate and grow in their first year. Weeds can have a significant impact on stand establishment and persistence.

When establishing stands into areas that were in row crops the year before the seeding, good weed control in those cropped fields during the year prior to the seeding can minimize the impact of weeds on the seeding. Thorough tillage and cultipacking before sowing the seed is necessary to minimize the impact

of annual weeds that germinated over the winter and perennial weeds that escaped weed control measures.

When seeding into areas that were pastures or hay fields the year before the seeding, the pasture or hay crops must be killed. Cool season pasture and hay species can be grazed heavily, mowed very close, or treated with herbicide in the early spring before sowing the seed. Warm season grasses must be killed during the summer of the year prior to seeding.

The herbicide imazapic (products s Plateau and Journey) are labeled for the pre-emergent and post-emergent control of many species of weeds in native warm season grasses, but both herbicides damage switchgrass. There are no labeled pre-emergent herbicides for use on switchgrass.

Annual grass and broadleaf weeds can be controlled by mowing over the top of the switchgrass stands to cut off flowering stalks before they make mature seed. Broadleaf weeds can be controlled with broadleaf herbicides such as 2,4-D, dicamba, picloram, metsulfuron, triclopyr, and clopyralid. Broadleaf weed control can be only effective when the correct herbicide is applied to a susceptible species at the proper rate and at a susceptible stage of growth. Most herbicides must be applied when weeds are young. Cool season weeds can be controlled with a contact herbicide such as glyphosate (product Roundup) in native warm season grasses when the native warm season grasses are dormant.

Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA, NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

### **Cultivars, Improved, and Selected Materials (and area of origin)**

'KY-1625' was released by the Quicksand, Kentucky Plant Materials Center as a germplasm release in 1987. It was collected from Raleigh County, West Virginia and compared to 35 other switchgrass accessions before its release. It is not commercially available, but seed is available for research purposes from the Alderson, West Virginia Plant Materials Center.

There are commercially available cultivars of switchgrass that are adapted to the Appalachian Region. 'Cave-in-Rock' is originally from Illinois and was released by the Elsberry, Missouri Plant Materials Center. 'Cave-in-Rock' is a cultivar released for forage production. 'Shawnee' is a selection from 'Cave-in-Rock' from the Agricultural Research Service in Lincoln, Nebraska. 'Shawnee' was selected for its forage quality.

'Kanlow' is originally from southern Oklahoma and was released by the Manhattan, Kansas Plant Materials Center. 'Kanlow' is a stiff-stemmed, lowland type switchgrass well adapted to poorly drained areas and preferred for wildlife habitat. 'Shelter' is originally from West Virginia and was released by the Big Flats, New York Plant Materials Center. 'Shelter' is also a stiff-stemmed type and is preferred for wildlife habitat.

'Blackwell' is originally from northern Oklahoma and was released by the Manhattan, Kansas Plant Materials Center. 'Blackwell' is a low maintenance cultivar adapted to droughty, infertile sites. Seeds are available from most commercial sources and through large agricultural supply firms.

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For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site <<http://plants.usda.gov>> or the Plant Materials Program Web site <<http://Plant-Materials.nrcs.usda.gov>>

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