

**100 native  
forage grasses  
in 11  
southern  
states**

Horace L. Leithead,  
Lewis L. Yarlett,  
and Thomas N. Shiflet  
*range conservationists*  
Soil Conservation Service



Agriculture Handbook No. 389  
Soil Conservation Service  
U.S. Department of Agriculture  
Washington, D. C.

Issued February 1971

## Introduction

Nature has been at work for thousands of years selecting and developing the native plants most suitable for each kind of soil and climate. Native grasses are the dominant plants in the vast rangeland plant communities and are important in the understory of many forested areas.

Fibrous roots of grasses hold the soil in place and build up soil fertility. Grasses, like all green plants, convert the sun's energy into carbohydrates for their own food and for use by animals and man.

Early American farmers depended on the native grasses for livestock forage. As land clearing progressed, native grasses were sometimes replaced by grasses brought from the Old World. Planted on the right kind of soil, the introduced grasses often were superior but required more intensive care and management, such as fertilization and weed control. Today broad areas are still in native grasses and an understanding of their values and many uses is growing.

Native grasses have many important uses including erosion control, forage production, and for roadside plantings and recreation areas subject to heavy foot traffic. They are important in beautification programs too. In many places adapted native grasses are more successful for these uses than are introduced grasses.

Slightly more than 40 percent of the beef cattle in the United States are produced in 11 Southern States (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, and Tennessee). Many of these animals get most of their forage from the native grasses and others get a significant part. In addition, many sheep, goats, horses, and some dairy cows rely heavily on native grasses for forage.

The 100 native grasses described in this handbook were selected on the basis of their importance as forage for both domestic and wild animals or as indicator plants of range condition.

The species of grasses and their abundance on a range indicate the quality and quantity of forage available to grazing animals and the past and present use and management of the range. Some grasses are more reliable indicators than others. The most palatable decrease under continuous heavy grazing while the less palatable increase. Some grasses invade sites to which they are not native. They are called invaders.

This handbook is designed to give a better understanding of the many values and uses of native grasses. It will assist soil conservationists, farmers, ranchers, land users, and others in identifying the 100 grasses covered and in managing them to improve the grazing resources of the South.

## Contents

	Page
<b>Introduction</b> -----	<b>1</b>
<b>Principal parts of a grass plant</b> -----	<b>2</b>
<b>Roots</b> -----	<b>2</b>
<b>Stems</b> -----	<b>3</b>
<b>Leaves</b> -----	<b>6</b>
<b>Seedhead</b> -----	<b>7</b>
<b>Principles of native grass management</b> _____	<b>8</b>
<b>Description of the grasses</b> -----	<b>11</b>
<b>Reference list</b> -----	<b>210</b>
<b>Glossary</b> -----	<b>211</b>
<b>Index</b> -----	<b>214</b>

Drawings of some characteristic parts of each of the 100 native grasses are included to aid in identification. The parts are not drawn to the same scale because enlargement of some parts is necessary to show detail.

Below the drawings of each grass is an outline map of the 11 Southern States, showing areas of major importance for the grass.

Information about the grasses is based on observations of conservationists and on literature of the area. A list of references is included.

Scientific names and botanical authorities and some of the grass drawings are from Hitchcock's Manual of the Grasses of the United States, U.S. Department of Agriculture Miscellaneous Publication No. 200. The common names are those used in the area.

## Principal Parts of a Grass Plant

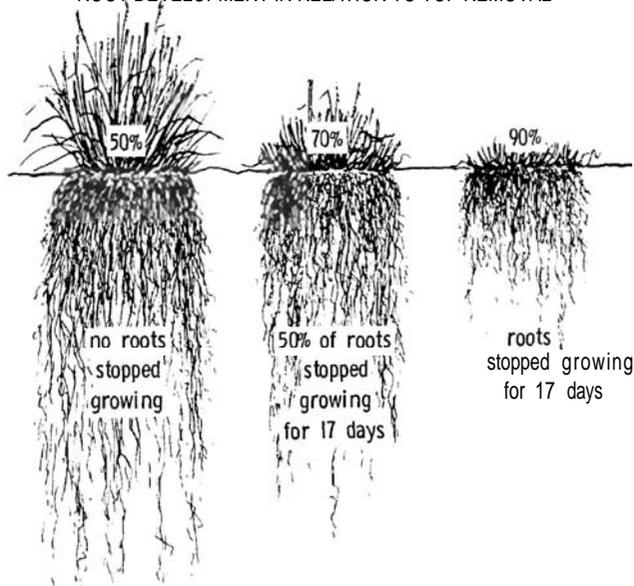
The vegetative parts of a grass plant are roots, stems, and leaves. The flowering (reproductive) part is the seedhead. Brief descriptions and drawings of these parts follow :

### Roots

Grass roots are fibrous. Size of the root system depends on genetic and environmental factors and on management. In general, grasses that are capable of producing the greatest top growth are

also capable of producing the greatest root growth. The ratio of

ROOT DEVELOPMENT IN RELATION TO TOP REMOVAL



roots to tops by weight ranges from about 0.8:1 to 1.5:1 for most native grasses.

Soil factors influencing root growth are moisture, temperature, structure, depth, fertility, and chemical reaction. Soil moisture, generally, has the greatest effect on root depth. In shallow soils, root systems are shallow; in moist, deep, well-developed soils, root systems are deep. Grasses differ widely in their ability to grow in saturated, poorly aerated soil. Excessive wetness inhibits root growth of most grasses except those adapted to marshes.

Soil temperature affects the growth of grass roots. In general, native perennial grasses have active root growth in the fall until frost, very slow growth through winter, and active growth again in spring from about 10 to 15 days before green leaves appear until flowering. After flowering, growth slows down and stops during summer when soil temperatures are high.

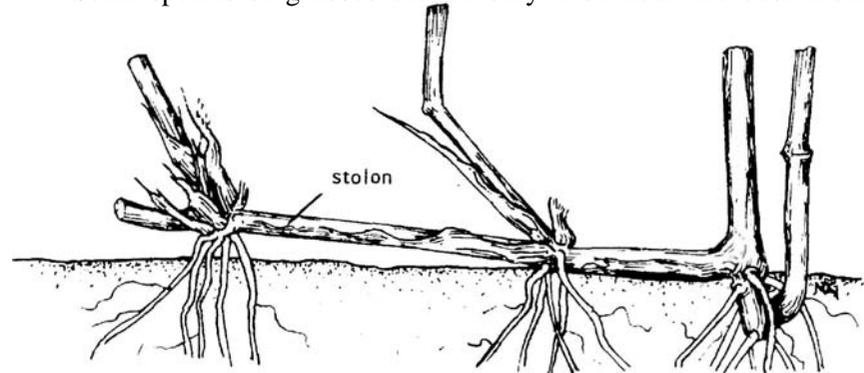
The amount and frequency of top-growth removal by grazing or mowing have a marked influence on root growth. According to research (Crider, 1955), the proportion of roots that stop growing varies according to the proportion of top growth that is removed.

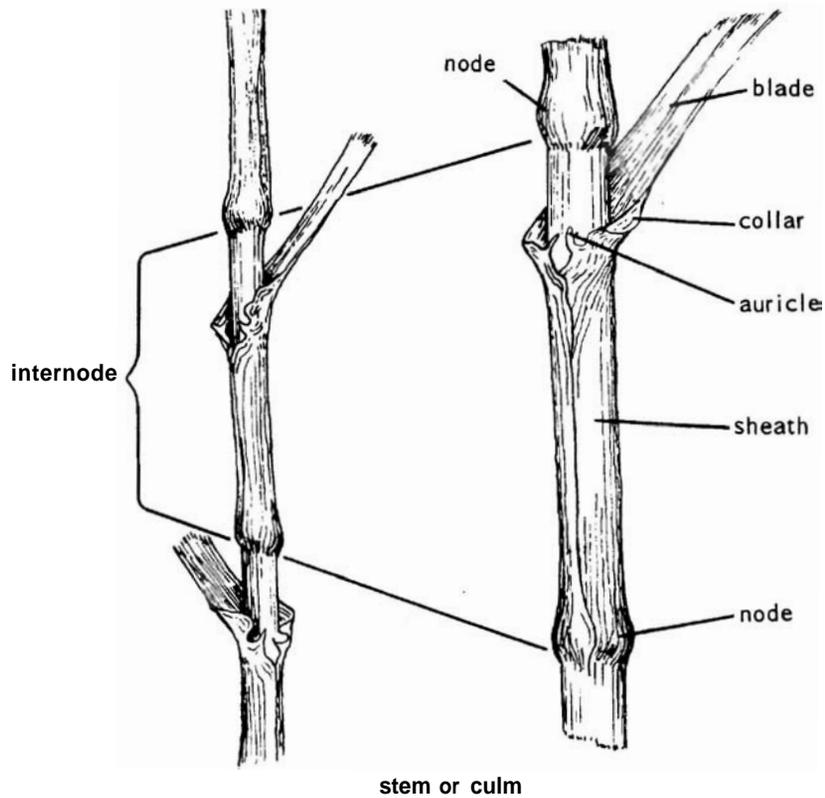
### Stems

The jointed stem (culm) of a grass plant consists of *nodes* and *internodes*. The nodes (joints) are solid and usually larger than the rest of the stem. The internodes, the part of the stem between two nodes, are usually hollow.

Branching at the base of the main stem may produce *erect shoots*; horizontal, above-ground *stolons* (stoloniferous); or horizontal, below-ground *rhizomes* (rhizomatous). Both rhizomes and stolons bear roots at the underside of the nodes.

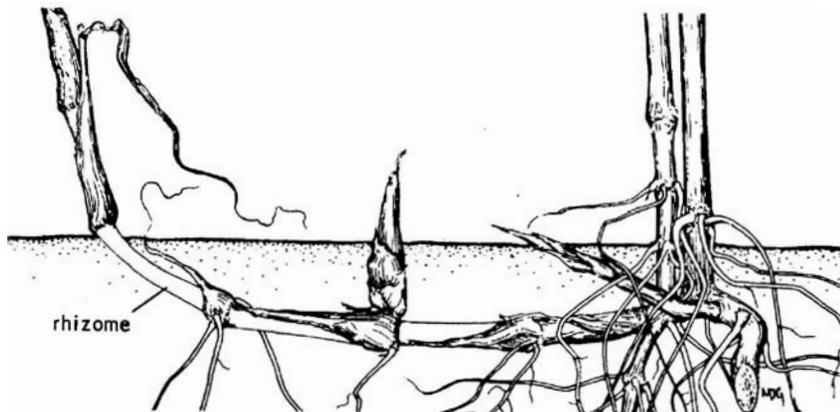
Some species of grasses branch only at or near the base from





axillary buds at the basal nodes. Others branch and rebranch from buds produced at upper nodes, giving the appearance of a dense bouquet.

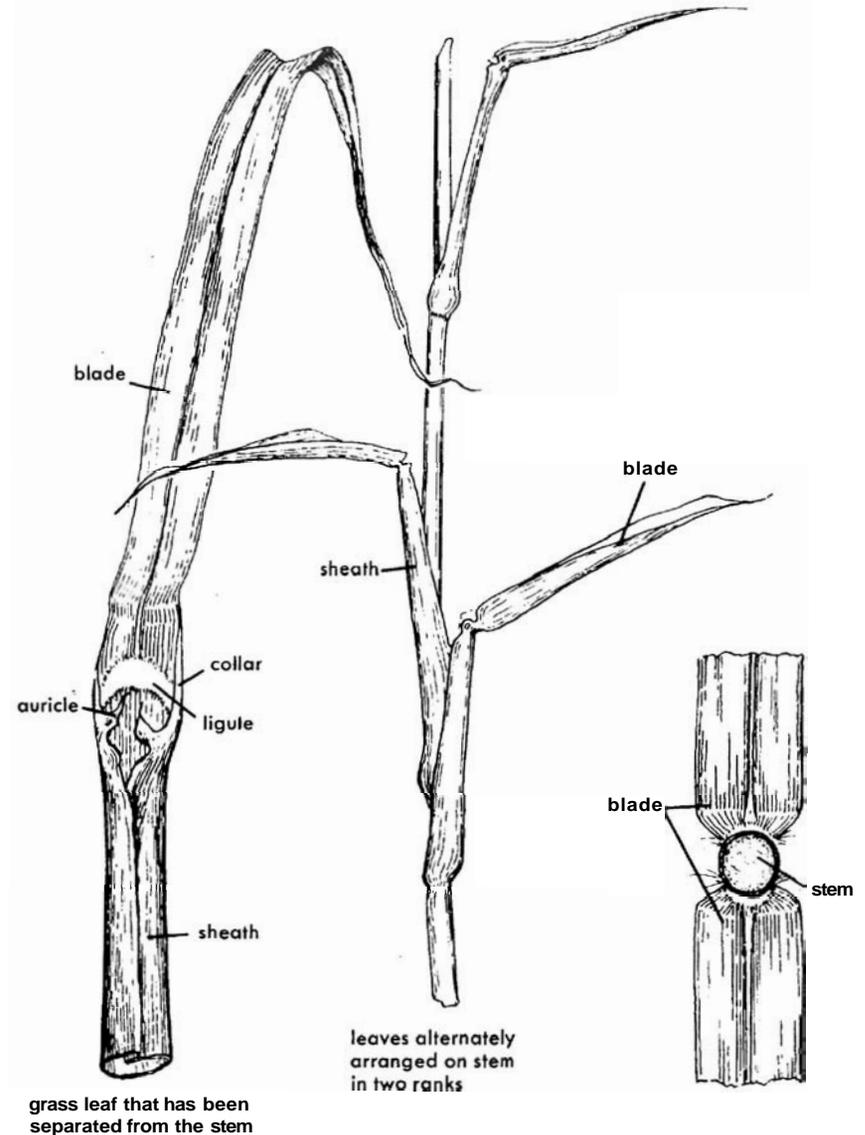
*Stolons* are stems or runners that originate at the base of the main stem and grow along the surface of the ground. They have nodes and scales or well-developed leaves. Roots borne at the

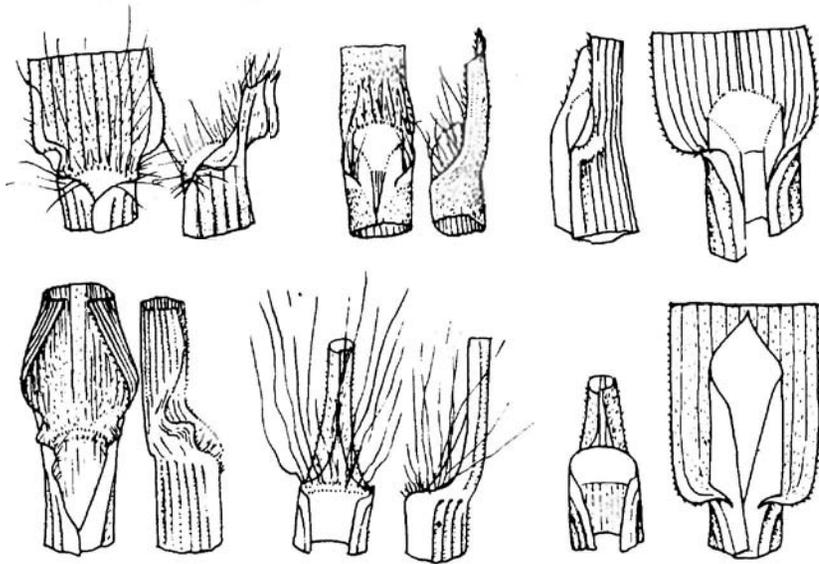


nodes help to establish and spread the plant and to produce new plants if stolons are broken.

*Rhizomes* are stems that originate at the base of the main stem and grow horizontally below the ground surface. They have nodes, internodes, and scalelike leaves. Roots grow from the underside of the nodes; shoots (stems and leaves) grow from the topside.

Stems of most perennial grasses die back to the approximate base of the stem each year. However, in the basal part of the





hairy ligules

papery ligules

stem, there are from several to many basal nodes with axillary buds capable of initiating new growth.

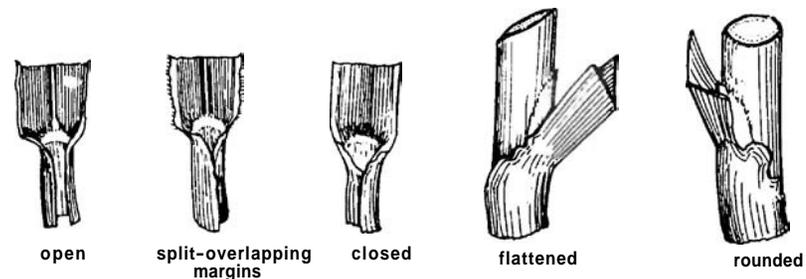
### Leaves

Grass leaves are borne at nodes along the stem in two ranks. The newest leaf is always on the opposite side of the stem from the leaf just below it. Leaves are parallel veined.

The grass leaf consists of three principal parts: *Blade*, *sheath*, and *ligule*. Other parts are *collar* and *auricle*.

The *blade*—the expanded part of the leaf—may be (1) flat, (2) V-shaped or folded, (3) involute (rolled inward), (4) filiform (threadlike), or (5) keeled (boat shaped). But it may grade from one form to another.

The *sheath* is borne at the node and surrounds the stem like a tube. It is characteristically split down one side, making it pos-



sible to separate the sheath from the stem without tearing the sheath. In some grasses, the sheath is open—the margins do not come together; in others, it is closed—the margins overlap. Some sheaths are flattened; others are rounded. Because of their different forms and shapes, they are important in identifying a grass.

The *ligule*, meaning little tongue, usually clasps the stem firmly on the inside of the leaf at the junction of the sheath and blade, preventing dirt and water from getting between them. In the absence of a seedhead, the ligule is often used to identify a grass. Some ligules are membranous or papery; some are only a ring of hair.

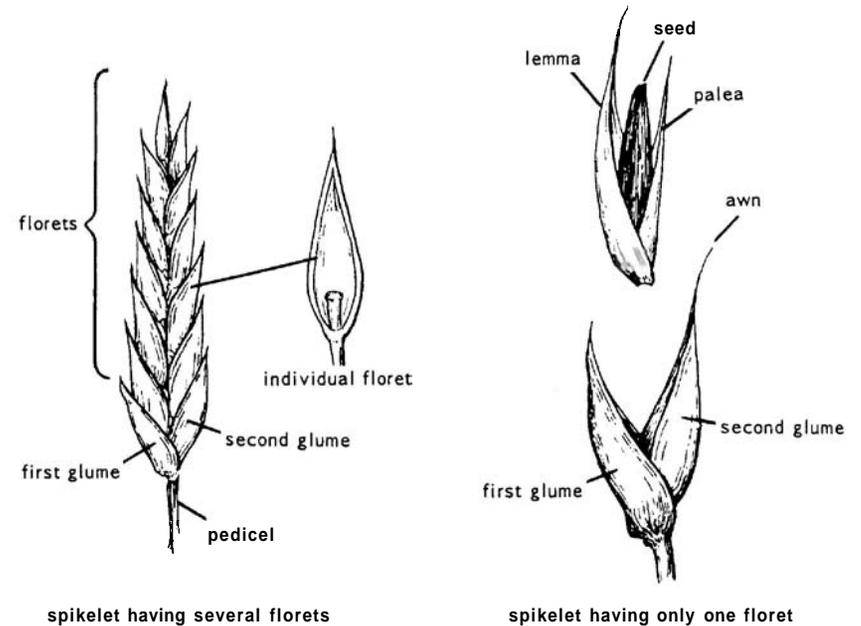
The *collar* is on the outside of the leaf at the junction of sheath and blade.

Some grasses have two earlike lobes or appendages, called *auricles*, which are borne, one on either side, at the base of the blade.

### Seedhead

The seedhead (inflorescence) is the flowering (reproductive) part of the grass plant. Generally, the seedhead has no leaves. On some grasses, a sheathlike bract, called *spathe*, encloses or partly encloses the seedhead.

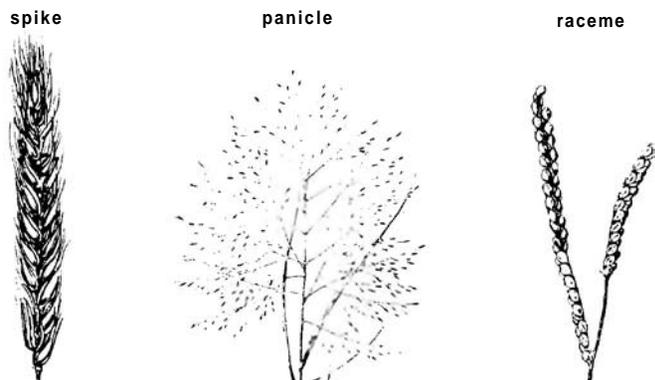
The *spikelet* is the basic unit of the seedhead. It may be pedicel (on a pedicel or footstalk) or sessile (without a pedicel). The spikelet consists of a *rachilla* (jointed stem or axis), one to several *florets*, and two *glumes*. The florets are borne in two



ranks on the rachilla. Below them are the glumes—two bracts without flowers.

Each floret consists of one flower or seed enclosed in two papery membranes called *lemma* and *palea*. The lemma is borne on the rachilla above the pair of glumes and the palea at the base of the flower or seed. Both the glumes and lemma have nerves or veins that run from the base to the tip. If the center nerve is extended, it is called an *awn*. Because awns are of different lengths, shapes, and colors, they are often used to identify a particular grass.

The basic forms of grass seedheads are *spike*, *raceme*, and *panicle*.



*icle* but they may grade from one form to another and may have specialized forms.

*Spike* is a seedhead in which one or more sessile spikelets are borne on the main axis (rachis).

*Raceme* is a seedhead in which the spikelets are borne on individual footstalks (pedicels) growing directly on the main axis (rachis).

*Panicle* is a seedhead with a main axis and subdivided branches. It may be compact and spikelike or open.

## Principles of Native Grass Management

Maximum forage production of native grasses depends on applying certain basic management principles. Some knowledge of the differences in growth characteristics, site adaptation, and uses of the native grasses is important in applying these principles.

Native grasses may be annual or perennial. Annual grasses grow from seed each year. Perennial grasses grow each year from axillary buds at basal nodes and from seed.

Native grasses differ in temperature requirements for growth. Because of this difference, they are placed in two broad groups—cool-season and warm-season grasses.

Cool-season grasses make their active growth in winter, early spring, or late fall. In extremely cold climates, they are forced into dormancy. In the more temperate climates and with adequate moisture, they grow during the cool season and become dormant during summer. The minimum daily temperature for active growth is 40° to 45° F.

Warm-season grasses make their active growth during summer. Growth usually starts when the minimum daily temperature is 60° to 65° F. They are dormant during fall, winter, and early spring.

All grasses are more robust and hardy when they grow close to the center of their climatic zone of adaptation. Grasses that grow on the outer edge are always more sensitive to use and climatic changes.

Animals are selective grazers when they have a choice. They prefer some plants to others during certain seasons. In addition, some parts of plants are preferred to others. For example, animals generally prefer the grass leaves to the seedstalks. Yet when grass seed ripen, cattle and deer select the seed on some plants rather than the leaves and stems.

Since animals prefer different parts of the grass plant, the growing points and the height they reach as the plant grows are significant in grass management. On many grasses, the growing points remain near the ground surface; on others, they are within reach of grazing animals (Branson, 1953 and Rechenhth, 1956). Growth of the stem stops if the growing points are removed. Any new growth must come from axillary buds at basal nodes.

The grasses most preferred by animals during any particular season are grazed closest. If they are grazed closely year after year during their growing period, the grasses become weakened and may die.

Because each range or grazable woodland has different soil, water, plant, and animal resources, proper grazing use and management may be different for each.

Proper grazing means controlling grazing so that enough of the current year's growth by weight of the key management species is left to maintain them. This practice favors good root growth, vigorous plants, and maximum forage production.

Deferred grazing means postponing grazing for a period during any growing season. Its primary purpose is to allow the more desirable species of grasses to regain vigor and produce a seed crop. Deferred grazing from the beginning of the growing season through seed maturity gives maximum results. A full growing season deferment is especially needed during the first growing season following brush-control measures, severe droughts, or overgrazing.

## Description of the Grasses

### *Agropyron smithii* Rydb., western wheatgrass

#### DESCRIPTION

*Cool-season*, rhizomatous perennial.

*Height*: 1 to 3 feet.

*Leaf blade*: 4 to 8 inches long; ribbed; upright; usually flat; curls or rolls inward when plant wilts.

*Leaf sheath*: Hairless; shorter than internodes.

*Stem*: Numerous; covered with bluish or whitish waxy substance; nodes darker than internodes.

*Seedhead*: Terminal spike 2 to 7 inches long, pale blue.

#### GROWTH CHARACTERISTICS

Growth starts in spring when daily temperature is 50° to 56° F. Produces new growth from axillary buds at the basal nodes of stems and at the nodes of rhizomes. Becomes semidormant during hot summer months; greens up in fall if moisture is available. Reproduces from seed and from rhizomes.

#### DISTRIBUTION

Throughout Great Plains north to Canada, as far east as Michigan and Tennessee, and as far west as California.

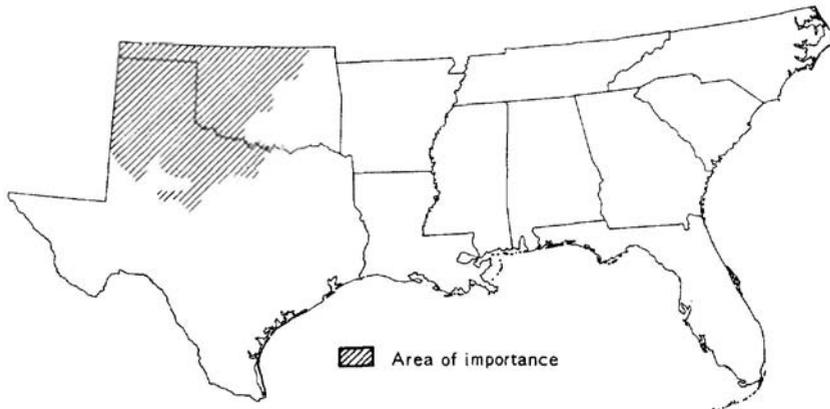
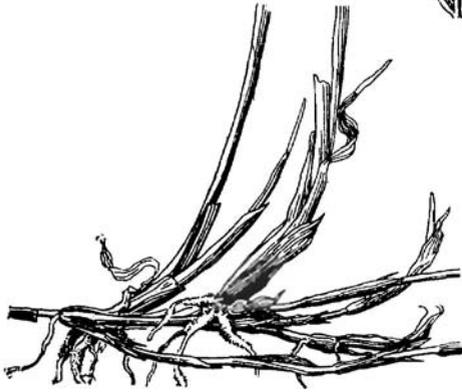
#### SITE ADAPTATION

Adapted to a wide range of soils on uplands. Grows best on clay loams. Also adapted to well-drained bottom-land soils. Tolerates alkaline and saline conditions. This grass is often the dominant grass on salty sites and on adobe (clay) soils.

#### USE AND MANAGEMENT

Western wheatgrass is a valuable forage grass for horses, cattle, sheep, goats, deer, and elk. Sheep relish the seedheads. It cures well on the stem, making it valuable winter forage. It makes excellent hay of high feeding value. This grass grows successfully under cultivation but is not widely accepted as a managed pasture grass. It is used to seed waterways in cultivated fields.

For maximum production on rangeland, defer grazing every few years at least 90 days before seed form. Protect this grass from grazing throughout growing season if it is managed for seed harvest or hay. Graze it moderately during dormant period.



*Amphicarpum muhlenbergianum*, blue maidencane

*Amphicarpum muhlenbergianum* (Schult.) Hitchc.,  
blue maidencane

#### DESCRIPTION

*Warm-season*, rhizomatous perennial.

*Height*: 1 to 3 feet.

*Leaf blade*: 3 to 5 inches long; 1/4 to 1/2 inch wide; flat; firm; whitish margins become whiter as plant matures; leaves evenly distributed along stem.

*Leaf sheath*: Rounded.

*Subterranean spikelets*: 2 to 4 inches under soil surface; fertile.

*Roots*: Fibrous; numerous; weight of roots produced is double that of top growth.

*Seedhead*: Open panicle, 2 to 4 inches long; sterile spikelets.

#### GROWTH CHARACTERISTICS

Growth cycle is 10 to 11 months. In south Florida, new growth starts in late December. By mid-March, plant is 4 to 5 inches high; by June, 14 to 15 inches high. Sterile spikelets form in June. Subterranean spikelets also appear in June. They are in a soft-dough stage by October and mature in mid-November or early December. Reproduces primarily from rhizomes. Tends to grow in pure stands.

#### DISTRIBUTION

Throughout Florida, coastal area of Georgia, and southern South Carolina.

#### SITE ADAPTATION

Adapted to acid to neutral sandy soils that are wet for part of year. Grows in pond areas that are intermittently dry and wet if water level is seldom deeper than 6 to 8 inches. Especially well adapted to sloughs where water is shallow and moves slowly over the surface during rainy seasons. Does not grow in deep or stagnant water. Tolerates shade. Produces 1 to 1-1/2 tons of air-dry forage per acre under a 35- to 40-percent shade.

#### USE AND MANAGEMENT

Blue maidencane is grazed readily by cattle all year and by deer in winter and spring. Hogs graze rhizomes in winter. Livestockmen reserve ranges and grazable woodlands that are largely blue maidencane for winter and spring use.

This grass remains vigorous and produces at maximum if properly grazed and grazing is deferred periodically for at least 120 days. Thin stands respond favorably to disking in winter or early spring.



*Andropogon barbinodis*, cane bluestem



*Andropogon barbinodis* Lag., cane bluestem

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height*: 2 to 4 feet.

*Leaf blade*: Narrow; long; rough.

*Leaf sheath*: Sparsely hairy at throat.

*Stem*: Round; smooth; greenish yellow; often branching at nodes.

*Node*: Enlarged; covered with short, silvery hair; identifies this grass if there is no seedhead.

*Seedhead*: Raceme 3 to 5 inches long; silvery to creamy or silky white when ripe.

**GROWTH CHARACTERISTICS**

Growth starts when daily temperature reaches 65° to 70° F. Growing points stay close to the ground until midsummer when seedheads appear. At that time growing points are 2 to 4 inches above ground. Seed ripen in late summer and early fall. Dominates good sites.

**DISTRIBUTION**

Primarily western Oklahoma and Texas, west to Arizona, and to north-central Mexico.

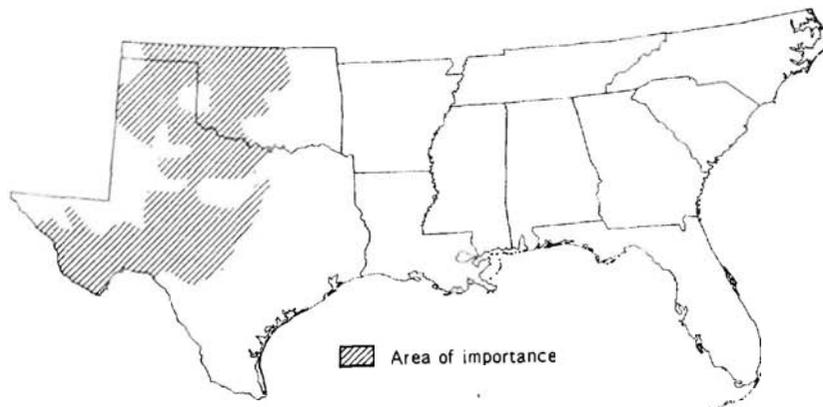
**SITE ADAPTATION**

Well adapted to sandy loam to loamy calcareous soils with a pH of 7.2 to 8.0, which overflow frequently. Grows on gravelly foot slopes that have a good soil-moisture relationship.

**USE AND MANAGEMENT**

Cane bluestem is a choice forage grass. Cattle search it out during early growth. Because stems are not palatable in fall only leaves are eaten, causing livestockmen to misjudge its forage quality. It is used in mixtures for reseeding rangelands in west Texas.

Periodic grazing deferments of 90 to 100 days during growing season are needed for maximum production, plant vigor, and density of stand. No more than 60 percent of current year's growth by weight should be grazed off.



*Andropogon capillipes*, chalky bluestem



*Andropogon capillipes* Nash, chalky bluestem

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height*: 3 to 5 feet.

*Leaf blade*: Folded tightly; keeled at base but flattened toward tip; lower blade 20 to 25 inches long, 1/2 inch wide.

*Leaf sheath*: Keeled; overlapping and crowded at base.

*Ligule*: Membrane 1/16 inch long.

*Seedhead*: Raceme partly enclosed in purplish-brown spathe about 1 inch long.

**GROWTH CHARACTERISTICS**

Growth starts in mid-January in southern Florida and 30 to 45 days later in northern part of range. Vigorous plants produce leaves 8 to 10 inches long in 30 days. Stems, blades, and sheaths are covered with a white chalky coating that rubs off easily. Seedheads appear in September and early October. Seed ripen in October and November. Chalky bluestem is a good seed producer. Basal leaves stay green during winter unless temperature falls below 20° F.

**DISTRIBUTION**

Throughout Florida, southern North Carolina, South Carolina, and Georgia and west to east Texas.

**SITE ADAPTATION**

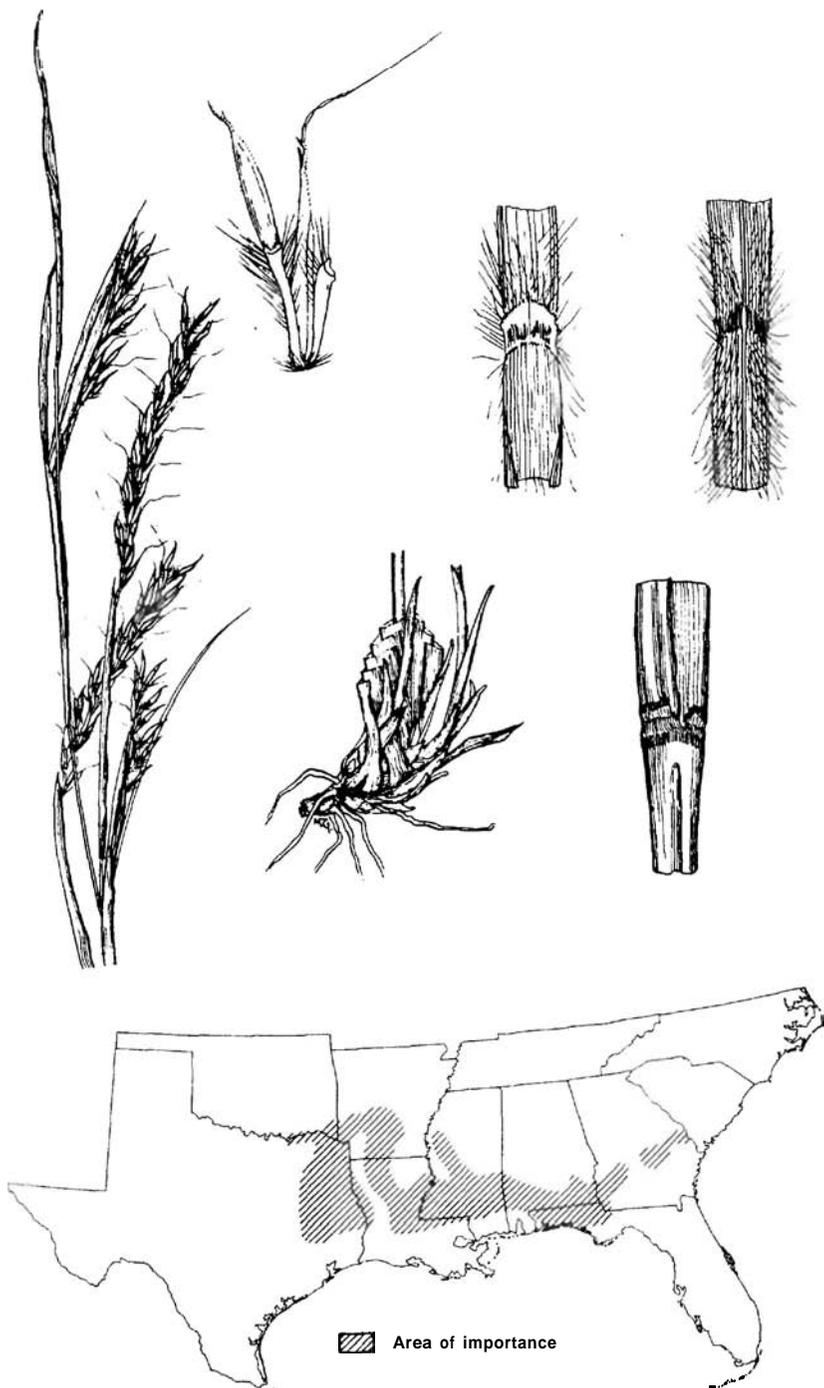
Particularly well adapted to wet acid or neutral sandy soils. Makes maximum growth on seepy slopes.

**USE AND MANAGEMENT**

Chalky bluestem is a palatable grass. It furnishes excellent spring grazing and produces high-quality winter forage. This grass establishes naturally on muckland soils that have been idle for 1 to 2 years, making it a valuable grass for protecting these soils against erosion. It is an indicator of past grazing use.

Since this grass seldom contributes more than 10 to 15 percent of total herbage on any site, it is seldom selected as a key management species. It maintains itself in the plant composition of grazable woodlands if grazing is deferred every summer and proper grazing is practiced during winter. Under good management, it is one of the first grasses to become established on a range that has been overgrazed. Annual burning reduces stand.

*Andropogon divergens*, pinehill bluestem



*Andropogon divergens* (Hack.) Anderss., pinehill bluestem

**DESCRIPTION**

*Warm-season*, rhizomatous perennial.

*Height*: 2 to 3-1/2 feet.

*Leaf blade*: 10 to 24 inches long; hairy on both sides but denser on top.

*Leaf sheath*: Mostly basal; numerous; hairy; flattened; purple when young; slightly twisted.

*Stem*: Branching near top.

*Seedhead*: 6 to 8 stout racemes usually enclosed in a spathe; spikelets borne in pairs — one sterile, the other fertile.

**GROWTH CHARACTERISTICS**

Makes primary growth during late spring and summer. Remains green until late fall if moisture is available. Seedstalks form in September and persist for several months. Growing points are 2 to 4 inches above ground. Old growth is a distinct reddish brown during winter. Reproduces from short, scaly rhizomes.

**DISTRIBUTION**

In pine forests of east Texas, Louisiana, Arkansas, Mississippi, Alabama, and Georgia.

**SITE ADAPTATION**

Best adapted to well-drained medium- and coarse-textured soils. Does not tolerate excessive wetness. Tolerates shade; grows well under 50- to 60-percent shade.

**USE AND MANAGEMENT**

Pinehill bluestem provides high-quality forage when green and is grazed readily by cattle during spring and summer. It is the most important forage plant on longleaf and slash pine woodlands within its range. This grass furnishes good forage in fall and winter but must be supplemented with protein concentrate.

Close grazing for one season reduces production and kills some plants. For maximum production, no more than 50 percent of current growth by weight should be removed during any season. Deferred grazing for at least 90 days before seed ripen improves plant vigor and increases seed production. This grass withstands occasional burning during dormancy if grazing is deferred for at least 60 days to allow plants to regain vigor.

*Andropogon elliottii*, elliott bluestem

*Andropogon elliottii* Chapm., elliott bluestem

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: Usually 2-1/2 to 3 feet.

*Leaf blade*: 6 to 15 inches long; smooth except for cluster of hair just above ligule.

*Leaf sheath*: Basal sheaths keeled, overlapping, relatively narrow; upper sheaths rounded.

*Stem*: Erect; 1 to 6 per plant, branching near top.

*Seedhead*: Raceme partially enclosed in conspicuous enlarged spathe, which turns a rusty color when plant matures.

GROWTH CHARACTERISTICS

New growth starts in early spring but most of growth is made during spring and summer. Seedheads develop during fall, and seedstalks remain for several months. Distinctive seedhead clusters make plants conspicuous after maturity. Grows best in open areas but tolerates some shade.

DISTRIBUTION

States south of a line from New Jersey and Pennsylvania, west to Illinois, and in the 11 Southern States.

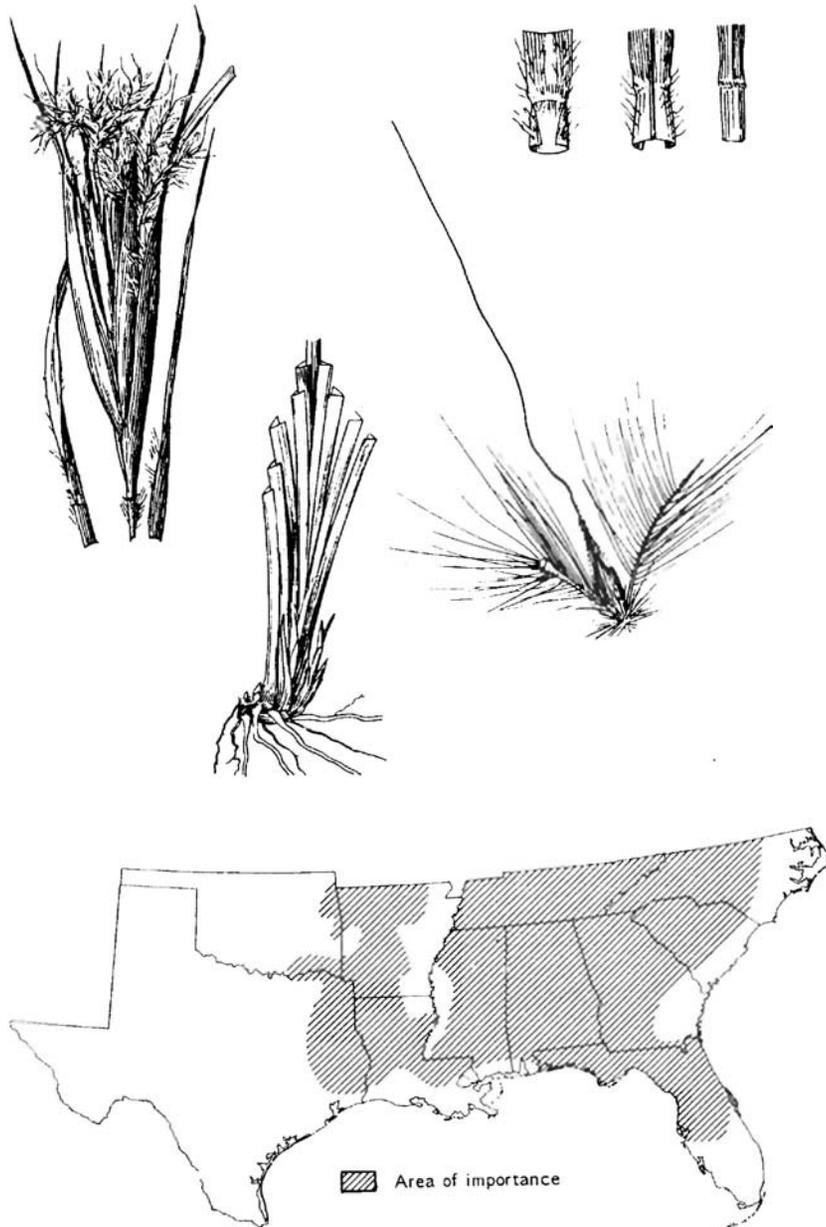
SITE ADAPTATION

Adapted primarily to well-drained soils on uplands. Does not tolerate wet sites.

USE AND MANAGEMENT

Elliott bluestem is grazed readily by cattle during spring and early summer. Forage quality is relatively high when green. Protein concentrate should be provided when grazed during dormant season.

Although of fair grazing value, this grass is seldom if ever abundant enough to be a key management species. It usually makes up no more than 3 to 5 percent of the plant composition. Proper grazing of more plentiful associated grasses maintains proper percentage of this grass in the plant community.



#### DESCRIPTION

*Warm-season, rhizomatous perennial.*

*Height: 4 to 6 feet.*

*Leaf blade: Long; flat; scabrous margins.*

*Stem: Purplish at base; covered with fine hair.*

*Seedhead: 2 to 3 distinct racemes on top of stem, resembling toes of a turkey's foot which suggests another common name, turkeyfootgrass.*

#### GROWTH CHARACTERISTICS

Produces abundant foliage in late spring from axillary buds at basal nodes and from short, scaly rhizomes. Growing points stay close to the ground until late summer when seedheads appear. At that time, growing points are 2 to 4 inches above ground. Growth cycle is 3 to 4 months. Ungrazed leaves and stems form a light straw-colored mat on the ground in winter and decompose rapidly.

#### DISTRIBUTION

All except four of the Far Western States, Canada, and Mexico. (Big bluestem is one of the grasses that characterizes the tall grass prairies of the Great Plains, the grasslands of central United States, and the blackland belt in the South.)

#### SITE ADAPTATION

Best adapted to deep, fertile soils but grows abundantly during wet periods on shallow, gravelly ridges and near limestone ledges. Thrives on the blackland soils, particularly the calcareous soils, from Texas to Georgia.

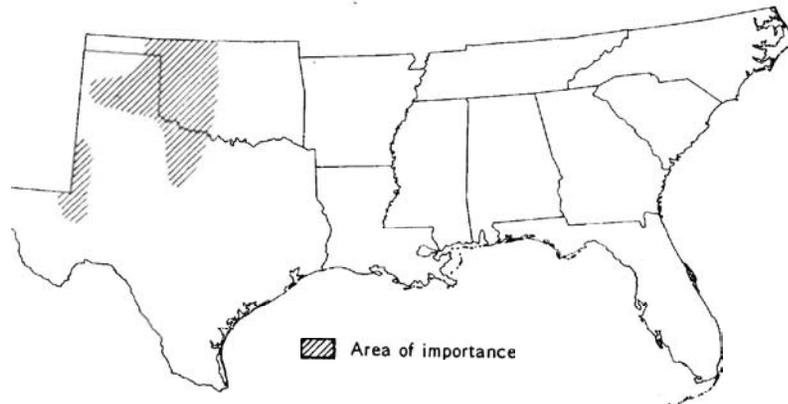
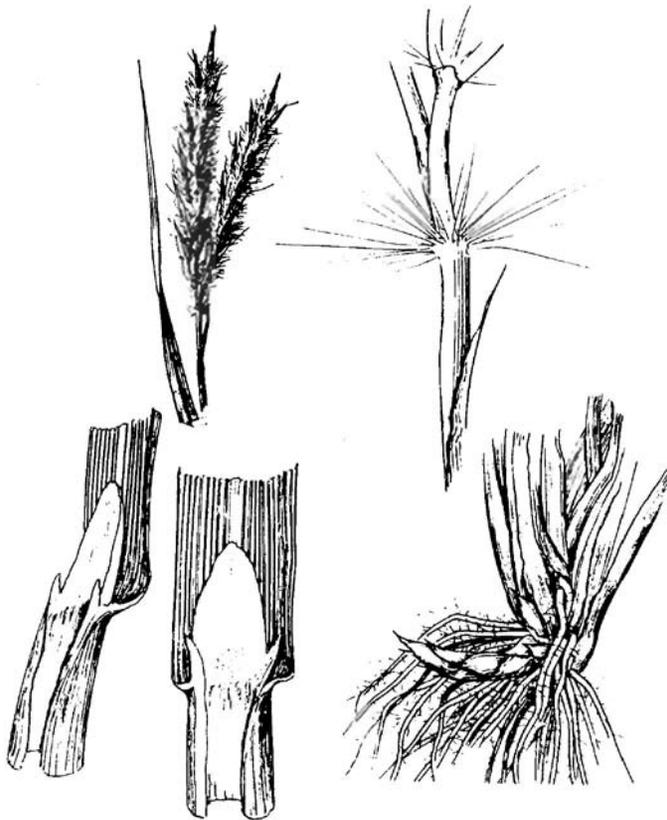
#### USE AND MANAGEMENT

Big bluestem is used primarily for grazing but produces abundant high-quality hay when cut soon after seedheads emerge. Livestock and elk prefer it to most associated grasses during early stages of growth.

Grazing should be deferred every 2 to 3 years for 2 to 4 months before seed ripen. Hay meadows should not be grazed during growing season and only moderately during late fall and winter.



*Andropogon hallii*, sand bluestem



*Andropogon hallii* Hack., sand bluestem

DESCRIPTION

*Warm-season*, rhizomatous perennial.

*Height*: 4 to 6 feet.

*Leaf blade*: Long; flat; strongly ribbed.

*Leaf sheath*: Mostly basal; keeled; overlapping.

*Stem*: Flat at base; pale purplish during early growth.

*Seedhead*: Paired raceme; a distinctive ring of hair at base.

GROWTH CHARACTERISTICS

Growth starts in late spring. Shoots grow from axillary buds at basal nodes and from rhizomes. Reproduces primarily from rhizomes. Grows mostly in colonies of a few plants to an area several feet in diameter. Foliage turns a light straw color in fall and winter. Growing points are 3 to 4 inches above ground when seedheads emerge.

DISTRIBUTION

North Dakota and eastern Montana, south to Texas and in a few locations in Utah, Arizona, and Iowa.

SITE ADAPTATION

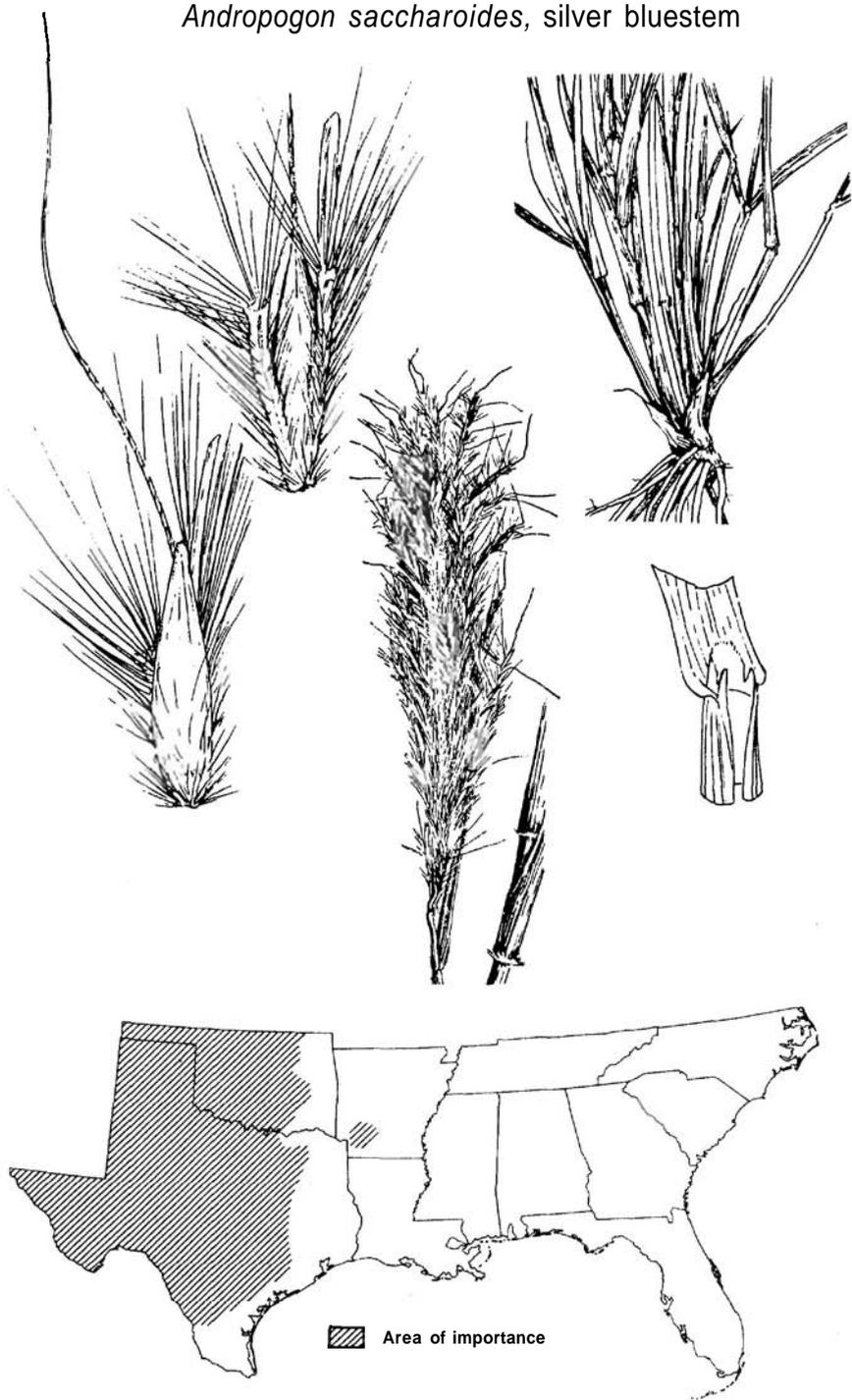
Grows principally in Nebraska sandhills and in the deep, sandy soils of Texas and Oklahoma.

USE AND MANAGEMENT

Sand bluestem is grazed by cattle and horses any season of the year. Deer graze basal leaves early in spring.

For plant vigor and high production, no more than 50 percent of current year's growth by weight should be grazed off. Grazing should be deferred every 3 to 4 years for at least 120 days before seed ripen.

*Andropogon saccharoides*, silver bluestem



*Andropogon saccharoides* Swartz, silver bluestem

#### DESCRIPTION

*Warm-season*, short-lived, perennial bunch grass.

*Height*: 2 to 3 feet.

*Leaf blade*: 2 to 8 inches long.

*Stem*: Rounded at base; sometimes branching at nodes; lower part purplish throughout growing season; usually has a ring of white hair at nodes. Stems turn irregularly at each node.

*Seedhead*: Raceme silky white soon after it emerges from spathe.

#### GROWTH CHARACTERISTICS

Growth starts in spring when daily temperature is 70° to 75° F. Seedheads emerge 3 to 4 weeks later. Seed ripen during a 4- to 6-week period. Silver bluestem is a prolific seed producer.

#### DISTRIBUTION

Most abundant throughout central Texas and Oklahoma, as far north as Colorado and Missouri, east to Alabama and Mississippi, and west to Arizona.

#### SITE ADAPTATION

Grows best on loamy soils underlain by limestone. Grows well on clays and clay loams throughout the blackland resource areas of the South. Further west, grows on rocky slopes and coarser textured soils. Does not grow well on moist sites.

#### USE AND MANAGEMENT

Silver bluestem is used primarily for grazing. Cattle graze it a few weeks in spring but little after seedheads form. It can be grazed some during winter if livestock are fed a protein supplement. It is cut for hay only when associated with other grasses such as little and big bluestem. Goats relish seedheads when seed are in dough stage. This grass is neither seeded nor managed to control erosion on critical areas but establishes itself readily on denuded soils and overgrazed ranges.

This grass increases on ranges that are grazed continuously. It is an invader on ranges in poor condition. On ranges managed to maintain this grass in the plant community, no more than 50 percent of the current year's growth by weight should be grazed off. Grazing should be deferred 45 to 60 days in the spring every 2 to 3 years.

*Andropogon scoparius*, little bluestem



*Andropogon scoparius* Michx., little bluestem

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 2 to 4 feet.

*Leaf blade*: Flat 6 to 10 inches long; 1/8 to 1/4 inch wide.

*Leaf sheath*: Mostly basal; strongly keeled; hairy or smooth.

*Ligule*: Ring of short hair on some plants.

*Stem*: Basal; flat; purplish during early growth.

*Seedhead*: Racemes borne singly, in pairs, or in groups on zigzag rachis; 2 spikelets 1 sterile, 1 fertile.

GROWTH CHARACTERISTICS

Growth starts in late spring and continues throughout summer if moisture is adequate. Reaches maximum height in July. Produces seedheads in fall. Seed ripen in October and November. Withstands prolonged dry periods. Mature plants turn light reddish brown.

DISTRIBUTION

Throughout the United States except Washington, Oregon, and California; in Canada and Mexico; seldom grows above the ponderosa pine belt.

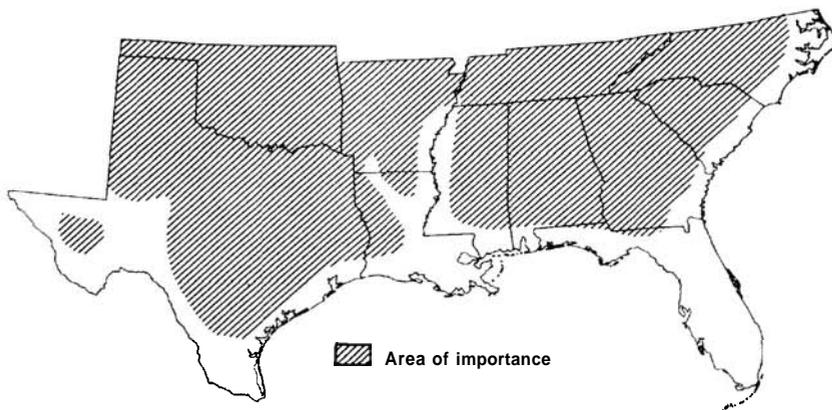
SITE ADAPTATION

Grows on a wide variety of soils but grows best on calcareous soils derived from limestone.

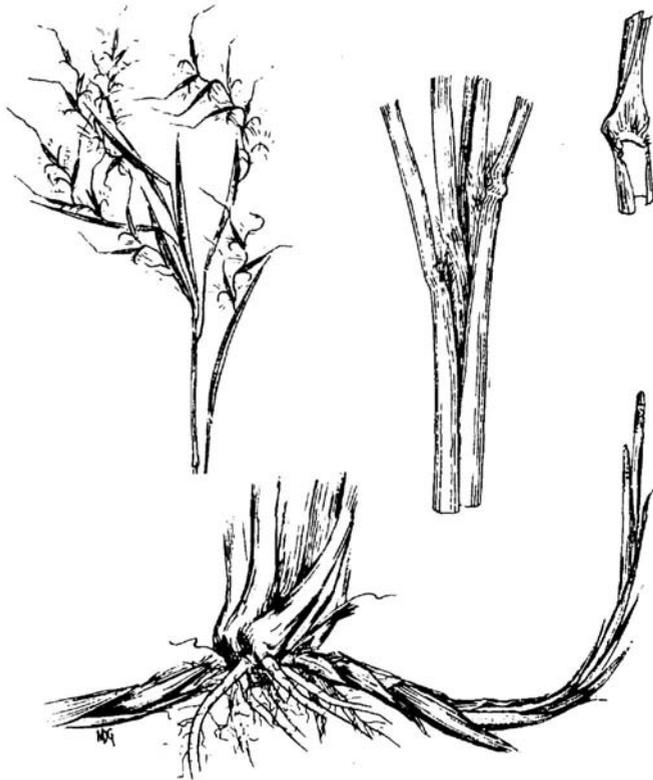
USE AND MANAGEMENT

Little bluestem, an important forage grass, is grazed readily by livestock, deer, and elk. It is cut for hay along eastern edge of Great Plains and in Arkansas. Seed are used extensively for re-seeding depleted ranges.

For plant vigor, no more than 50 percent of current year's growth by weight should be grazed off. Grazing should be deferred for 90 days every 2 to 3 years before seed maturity. When cut for hay, leave about a 4-inch stubble. Graze hay meadows moderately during dormant season.



*Andropogon stolonifer*, creeping bluestem



*Andropogon stolonifer* (Nash) Hitchc., creeping bluestem

DESCRIPTION

*Warm-season*, rhizomatous perennial.

*Height*: 2 to 6 feet.

*Leaf blade*: 1/4 to 3/8 inch wide; often 2 feet long; V-shaped or flat; abruptly tapered at tip.

*Leaf sheath*: Strongly flattened; often light purplish at base; upper part of sheath, collar, and lower part of blade very hairy.

*Stem*: Solitary or few.

*Seedhead*: Several racemes, each 1 to 1-1/2 inches long, droop slightly at maturity; seedhead commonly 1 to 2 feet long.

GROWTH CHARACTERISTICS

Rhizomes grow actively in December and January, 12 to 14 inches in a single season. New leaf growth starts in January and February. Leaves stay green as long as 17 months. Basal leaves are usually only 4 inches long in 4 to 5 weeks. Forms dense colonies. Grows best in open areas but tolerates 25- to 30-percent shade. Pure stands yield about 2 tons of air-dry forage per acre. Seed production is uncertain and erratic.

DISTRIBUTION

Throughout Florida and southern Georgia.

SITE ADAPTATION

Grows on a wide variety of soils in the sandhills and sweet and acid flatwoods.

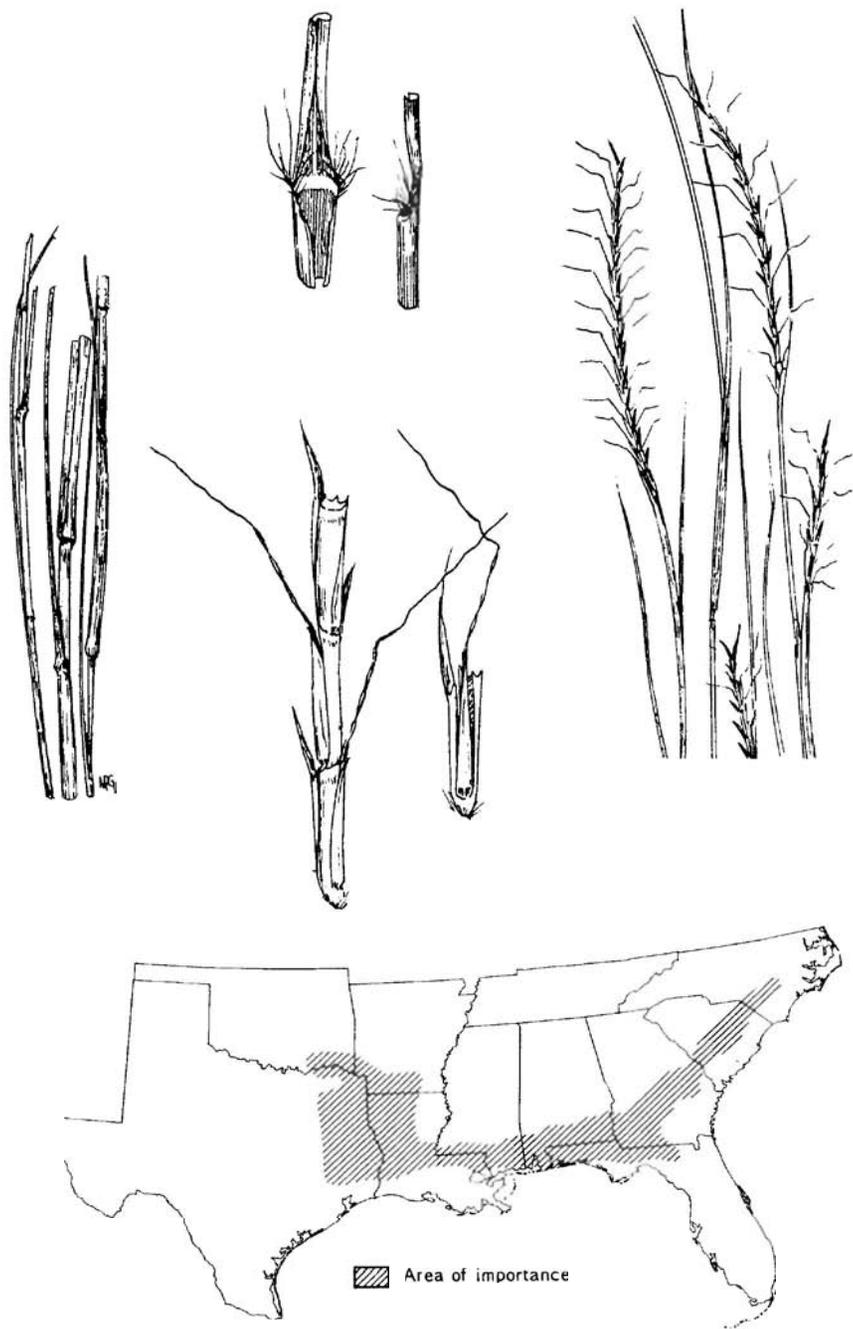
USE AND MANAGEMENT

Creeping bluestem is readily grazed by livestock every month of the year. It retains its nutritive value and stays green during winter.

Where saw palmetto has been controlled by double chopping with heavy rolling cutters, creeping bluestem is one of the first plants to become reestablished if grazing is deferred 6 to 8 months following treatment. Plants are weakened if more than 50 to 60 percent of current year's growth by weight is grazed off.



*Andropogon tener*, slender bluestem



*Andropogon tener* (Nees) Kunth, slender bluestem

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 1 to 3 feet; often found reclining or lying flat on ground.

*Leaf blade*: Narrow; 2 to 8 inches long; 1/16 inch wide or less; wiry.

*Leaf sheath*: Rounded; smooth; mostly basal.

*Ligule*: Hairy.

*Stem*: A bend at each node gives zigzag appearance; often branches at nodes.

*Seedhead*: Single straight spikelike raceme on each seed-stalk; seed shatter soon after maturity, leaving a tiny hollow tip on each stalk.

GROWTH CHARACTERISTICS

Growth starts in early spring and continues into summer. Seed-heads generally form by mid-July. In fall and winter, foliage tangles, mats together, and turns a faded straw color. Grows in colonies. Slender bluestem is not as shade tolerant as many associated grasses.

DISTRIBUTION

Dry, pine woodlands and open lands of southern Coastal Plain from east Texas to Florida, Georgia, South Carolina, and North Carolina and in southeastern Oklahoma.

SITE ADAPTATION

Best adapted to open or sparsely wooded, poorly drained soils. Also found on sandy well-drained soils.

USE AND MANAGEMENT

Although slender bluestem is not one of the preferred forage grasses, cattle graze it when it is young and tender. New growth following a burn is the most palatable. As seedstalks form, palatability declines rapidly. It is an indicator of excessive grazing.

Grazing practices should favor the broader leaved, more palatable grasses rather than slender bluestem. Heavy grazing for a short period after spring growth starts followed by a 6-month grazing deferment and light use make it possible for later maturing grasses such as pinehill bluestem to shade out slender bluestem and dominate the site. Slender bluestem increases if burned annually and grazed continuously.

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 2 to 4 feet.

*Leaf blade*: 1/8 to 1/4 inch wide; 10 to 16 inches long; usually hairy; curls at maturity.

*Leaf sheath*: Covered with hair; upper part rounded; lower part slightly flattened and keeled; purplish, especially during early plant growth.

*Stem*: Slender; erect; upper two-thirds branching.

*Seedhead*: Each stalk tipped by paired racemes about 2 inches long with small tuft of hair at base; spikelets long and hairy. After seed disseminate a tuft of silver hair remains which suggests another common name, paintbrush bluestem. Seedstalks persist several months after seed ripen.

GROWTH CHARACTERISTICS

Growth starts about April. Forms bunches 2 to 8 inches in diameter. Basal leaves remain green until late fall; some leaves in center of large bunches stay green all winter. Seedheads form in late August and September. Splitbeard bluestem is a fair seed producer. It is moderately shade tolerant. Since it is not an aggressive plant, it seldom dominates a site.

DISTRIBUTION

Eastern part of Texas, Oklahoma, and Kansas to Atlantic coast and north to Delaware.

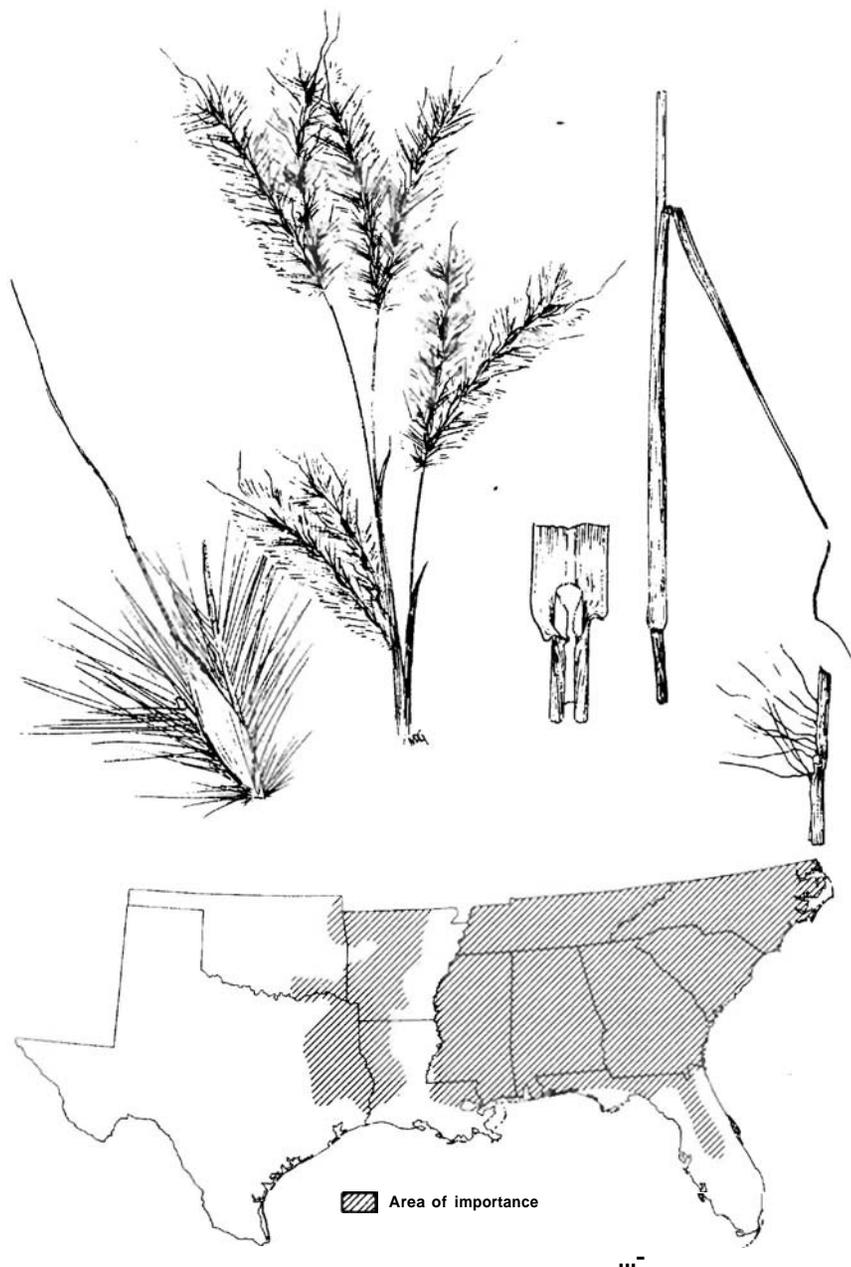
SITE ADAPTATION

Grows best on well-drained coarse- to medium-textured soils on ridges and knolls.

USE AND MANAGEMENT

Splitbeard bluestem is grazed readily by cattle in spring shortly after growth starts. If used as winter forage, cattle should be fed a protein supplement.

This grass does not occur in sufficient quantity to be a key management species. Proper use of associated desirable grasses, such as pinehill bluestem (*A. divergens*) and little bluestem (*A. scoparius*) results in proper to light use of this plant. This grass withstands periodic controlled burning. Annual burning followed by grazing tends to eliminate it.





#### DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height:* 2 to 4 feet.

*Leaf blade:* Flat to partly folded; 1/8 to 1/4 inch wide; a few scattered hairs at base on upper side.

*Leaf sheath:* Strongly flattened; keeled; crowded; overlapping at base; pale yellowish green; papery at maturity.

*Ligule:* Fringed; 1/16 inch long.

*Stem:* Flattened at base; smooth.

*Seedhead:* Racemes partly enclosed in large straw-colored spathe as long as or longer than raceme.

#### GROWTH CHARACTERISTICS

New growth starts in spring when average daytime temperature is 60° to 65° F. Seed mature in 6 weeks to 2 months. Broomsedge bluestem is a prolific seed producer. New seedlings are easily established. Does not tolerate shade. Grows well on sites low in fertility—especially on eroded, wornout fields.

#### DISTRIBUTION

Throughout South from the 25-inch rainfall belt eastward.

#### SITE ADAPTATION

Grows on a wide variety of soils, especially soils in old fields and other disturbed areas.

#### USE AND MANAGEMENT

Broomsedge bluestem furnishes considerable grazing during spring and early summer. During late summer, fall, and winter, forage value is low.

This grass is an increaser on deteriorating ranges and open woodlands. On ranges in poor to fair condition, it frequently contributes as much as 60 to 90 percent of total herbage. Improved pastures are frequently invaded by broomsedge if not properly managed. To reduce the percentage of broomsedge in a plant community, graze it heavily early in spring when plants are most palatable. Then defer grazing 60 to 90 days and do not overgraze associated grasses the rest of the year.

*Anthraenantia villosa*, green silkyscale



*Anthraenantia villosa* (Michx.) Beauv., green silkyscale

**DESCRIPTION**

*Warm-season*, rhizomatous perennial.

*Height*: 2 to 4 feet.

*Leafblade*: 4 to 12 inches long; light green; distinct fringe of silky hair along edge; twists and curls particularly when young.

*Leafsheath*: Chiefly basal; rounded; obscure collar.

*Ligule*: Ridgelike membrane with dense ring of short hair.

*Stem*: Round; slender.

*Seedhead*: Panicle slender, pale green; oval spikelets covered with short, stiff hair.

**GROWTH CHARACTERISTICS**

Growth starts slowly in spring and becomes more prominent during summer. Forms loose colonies. Becomes dormant in fall and winter. Seedheads form in fall; seedstalks break off and disappear in winter.

**DISTRIBUTION**

Throughout South from 30-inch rainfall belt eastward.

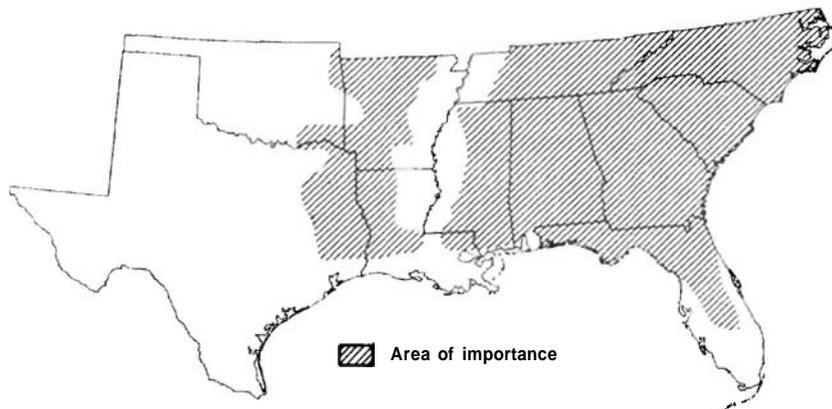
**SITE ADAPTATION**

Adapted to well-drained upland soils.

**USE AND MANAGEMENT**

Green silkyscale is seldom abundant enough to be a key management species but it adds variety to livestock diet. Cattle graze it readily during summer, fall, and early winter. It is an indicator of good range condition.

This grass is a decreaser when closely grazed throughout its growing season. To maintain it in the plant community, defer grazing 70 to 90 days every 3 to 4 years during the growing season. Foliage can be burned if done during the dormant season and no oftener than every 2 to 3 years. But grazing should be deferred 90 days during the spring growing season following a burn.



▨ Area of importance

*Aristida oligantha*, oldfield threeawn



*Aristida oligantha* Michx., oldfield threeawn

DESCRIPTION

*Cool-season*, annual.

*Height*: 6 to 20 inches.

*Leaf blade*: Flat; about 1/4 inch wide; rolls inward during hot, dry weather.

*Leaf sheath*: Mostly basal.

*Seedhead*: Loose, open panicle; glumes have 3 awns about 1-1/2 to 3 inches long that curve at base.

GROWTH CHARACTERISTICS

Growth starts in early spring from seed. Life cycle is a month to 6 weeks. Oldfield threeawn is a good seed producer. Seedlings are vigorous. Sometimes called prairie threeawn.

DISTRIBUTION

Mostly in eastern half of United States; some in Arizona, California, and southern Oregon.

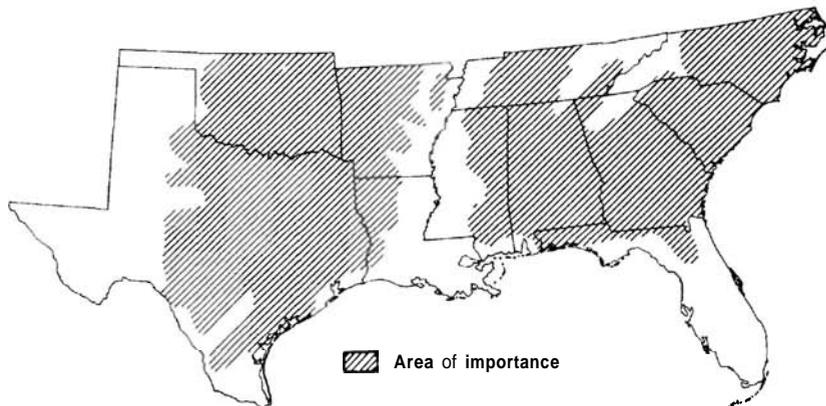
SITE ADAPTATION

Grows mostly on areas such as old abandoned fields, oil-well locations and cattle round-up grounds.

USE AND MANAGEMENT

Oldfield threeawn is practically worthless as a forage grass. After maturity, seed get in the wool of sheep and in the eyes of both cattle and sheep if they graze areas with a dense stand. This grass establishes easily under adverse conditions and protects soil against erosion until more desirable grasses take over. It is an indicator of deteriorated range condition.

Range reseeding is the most practical and economical way to kill this grass and improve heavily infested ranges. Use perennial grasses adapted to the particular site.



*Aristida purpurascens*, arrowfeather threeawn



*Aristida purpurascens* Poir., arrowfeather threeawn

#### DESCRIPTION

*Cool-season*, weak, perennial bunch grass.

*Height*: 1-1/2 to 2 feet.

*Leaf blade*: Flat; narrow; 4 to 12 inches long; tends to lie down and curl into ringlets, especially as plant matures.

*Seedhead*: Narrow panicle sometimes lax and nodding, one-third to one-half the height of plant; awns about 1/2 to 3/4 inch long, equal length, drop off a few weeks after seed ripen.

#### GROWTH CHARACTERISTICS

Growth starts about 2 weeks before that of most warm-season grasses. Usually produces a good seed crop in June, then becomes dormant. Greens up in fall if moisture is available. Barblike hairs on base of seed help to plant them. Seedstalks do not deteriorate readily unless they are burned or broken off.

#### DISTRIBUTION

Throughout most of states east of Great Plains.

#### SITE ADAPTATION

Grows best on sandy soils. Tolerates moderate shade.

#### USE AND MANAGEMENT

Arrowfeather threeawn is grazed by cattle a few weeks in early spring. It produces low-quality forage the rest of year.

Because this grass is an increaser on all sites, it should be managed to reduce it from the plant community by close grazing 2 to 3 weeks in spring just before seedheads appear. Deferred grazing that allows warm-season grasses to grow and mature later in season will convert the range through natural plant succession to warm-season grasses. Withstands annual burning.

*Aristida rhizomophora*, Florida threeawn



*Aristida rhizomophora* Swallen, Florida threeawn

**DESCRIPTION**

*Warm-season*, rhizomatous perennial.

*Height*: 2 to 3 feet.

*Leaf blade*: 1/16 inch wide; may be 18 inches long; dark green on upper side, lighter green on underside; characteristic spiral or twist.

*Leaf sheath*: Smooth; rounded; open.

*Ligule*: Absent or minute.

*Stem*: Round; smooth; usually 1 to 3 nodes 2 to 4 inches above ground.

*Seedhead*: Slender panicle 7 to 14 inches long; awns about 1/2 inch long of equal length.

**GROWTH CHARACTERISTICS**

Growth starts in late January or February. Leaf blades are maximum length by May. On burned areas, plants produce seed-stalks in May and again in September; on unburned areas, only once in August or September. Reproduces largely from well-developed, scaly rhizomes. Forms a dense sod.

**DISTRIBUTION**

Primarily east of central ridge of Florida and north of Lake Okeechobee to Georgia line.

**SITE ADAPTATION**

Adapted to poorly drained deep sandy soils that are strongly to slightly acid.

**USE AND MANAGEMENT**

Florida threeawn is grazed by livestock from early spring until May or June. Palatability decreases sharply after May. It can be used for winter grazing following a spring burn but a protein supplement should be fed.

This grass withstands burning every 2 years in January if ground is wet and grazing is deferred until mid-March. After March it should be grazed moderately until June.

*Aristida stricta*, pineland threeawn

*Aristida stricta* Michx., pineland threeawn

DESCRIPTION

*Cool-season*, perennial bunch grass.

*Height*: 1-1/2 to 2-1/2 feet.

*Leaf blade*: Mostly basal; 12 to 20 inches long; narrow; rolled inward; wiry; hairy on upper side at base.

*Ligule*: Hairy.

*Seedhead*: Slender panicle 10 to 12 inches long; glumes have 3 awns about 1/2 to 3/4 inch long, one a little longer than other two.

GROWTH CHARACTERISTICS

Growth starts in January in south Florida and in early March in Georgia and is rapid. Leaf blades usually grow 6 to 8 inches in 4 weeks. Seedheads appear during May and June. Pineland threeawn is a poor seed producer and a low forage producer. It tolerates shade. Occasionally short, thin rhizomes develop on plants that have been burned repeatedly.

DISTRIBUTION

Along Atlantic coast from North Carolina to Florida; and in southern half of Mississippi, Alabama, and Georgia.

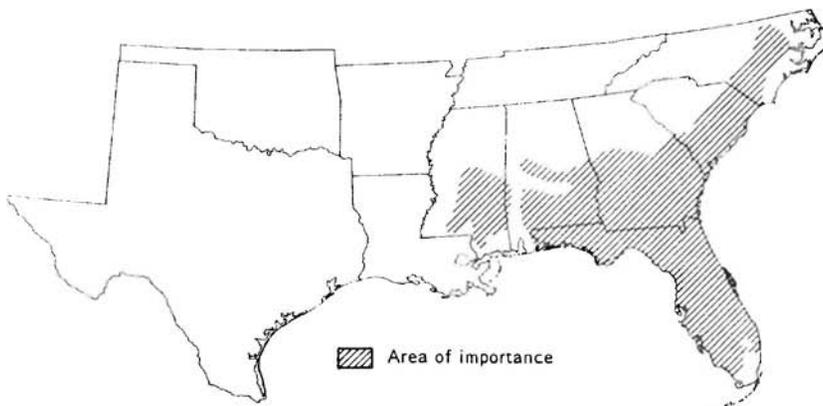
SITE ADAPTATION

Grows on well-drained sands over finer textured subsoil and on sands covered with shallow water for part of year. Does well on moderate to well-drained strongly acid soils.

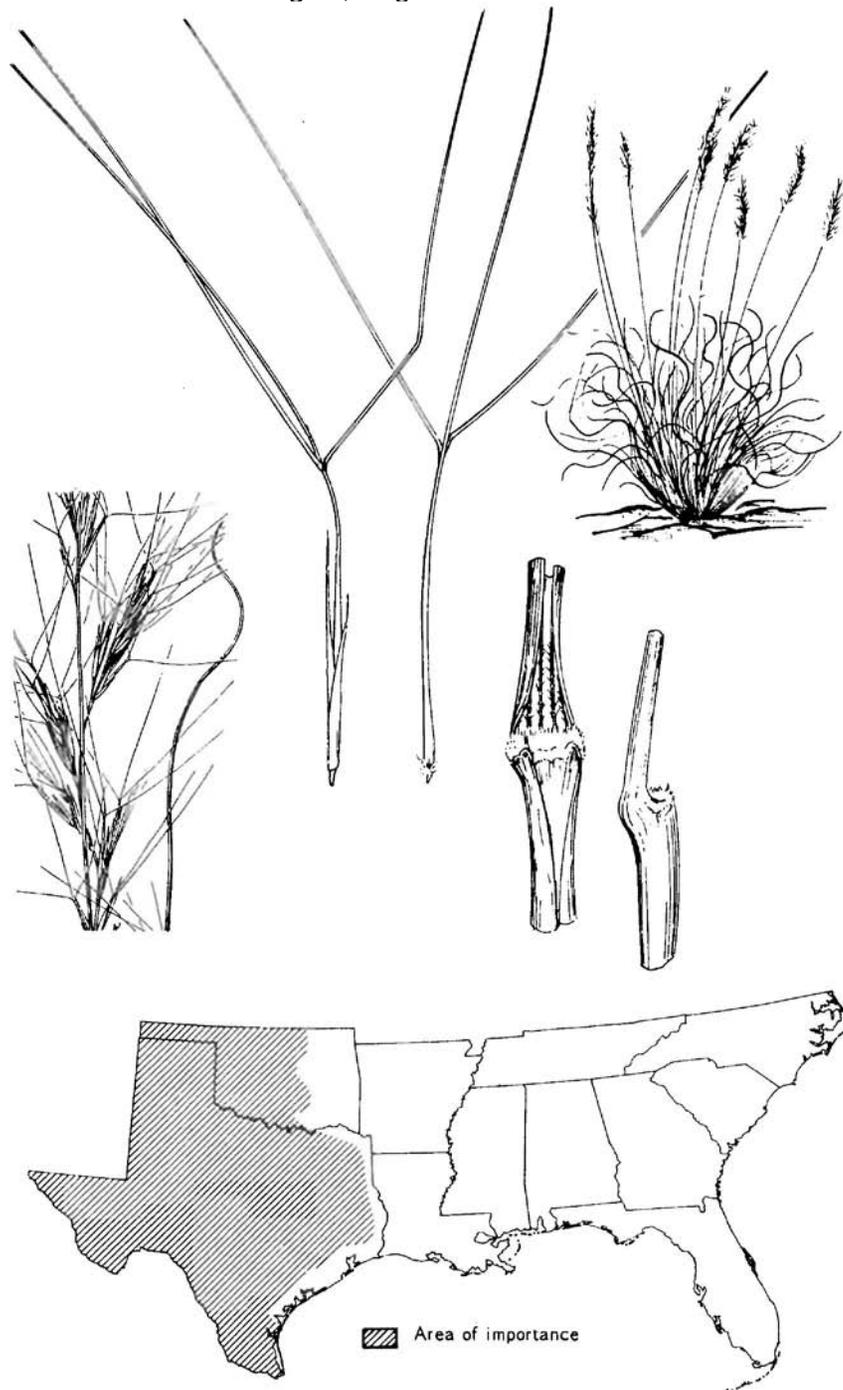
USE AND MANAGEMENT

Pineland threeawn is grazed by cattle in early spring. Spring growth becomes wiry and unpalatable during May and June.

This grass increases slowly on areas burned annually and grazed all year. It decreases on areas grazed heavily in early spring and on which grazing is deferred during summer and early fall. Double chopping with heavy rolling cutters in early spring easily kills it.



*Aristida wrightii*, wright threeawn



*Aristida wrightii* Nash, wright threeawn

#### DESCRIPTION

*Warm-season*, weak, short-lived, perennial bunch grass.

*Height*: 10 to 20 inches.

*Leaf blade*: Rolled; threadlike; tufted; twisting.

*Leaf sheath*: Mostly basal; rounded; open.

*Ligule*: Row of short hair.

*Seedhead*: Narrow panicle 6 to 8 inches long, purplish at first, turning straw yellow after maturity; seed covered with stiff barbs.

#### GROWTH CHARACTERISTICS

Wright threeawn is one of the first warm-season grasses to start growing in spring. Seedheads appear within 30 days after growth starts. Becomes dormant in summer; greens up again in early fall. Reproduces mostly from seed and is a prolific seed producer.

#### DISTRIBUTION

Throughout western two-thirds of Oklahoma, southern Kansas, Texas, west to California, and south to central Mexico.

#### SITE ADAPTATION

Grows best on calcareous to neutral sandy loam soils but also grows on clay loams.

#### USE AND MANAGEMENT

Wright threeawn is grazed readily early in spring. After seedheads form, it becomes less palatable. Cattle and horses graze it more readily than sheep and goats. If it greens up at base late in fall after other warm-season grasses have matured, cattle and horses graze it again.

This grass is never a key management species, and most ranchers want to get rid of it. It can be killed by close grazing in spring. Summer grazing deferments allow more vigorous warm-season grasses associated with it to take over. Seed collect in the wool and mohair of sheep and goats that graze this grass during summer.

*Arundinaria gigantea*, giant cane



*Arundinaria gigantea* (Walt.) Muhl., giant cane

**DESCRIPTION**

*Warm-season*, robust, rhizomatous perennial.

*Height*: 4 to 20 feet.

*Leaf blade*: 5 to 12 inches long; at least 1/2 inch wide; tapers to a sharp point; generally, groups of 3 to 5 blades at end of small branches; a short petiole between blade and sheath.

*Leaf sheath*: Rounded; overlapping.

*Ligule*: Row of short hair.

*Stem*: Hollow; woody.

*Seedhead*: Open panicle; 8 to 12 spikelets per seedhead.

**GROWTH CHARACTERISTICS**

Produces green leaves and stems all year. Grows vigorously from rhizomes and from axillary buds at basal nodes. Grows in small colonies, thickets, and large canebrakes. Makes vigorous growth under a dense stand of trees. (Recent literature indicates that giant cane and switch cane may be the same species with different growth characteristics due to environment.)

**DISTRIBUTION**

From east Texas and Oklahoma to the Atlantic coast, north to Missouri, Indiana, Illinois, Kentucky, and Ohio.

**SITE ADAPTATION**

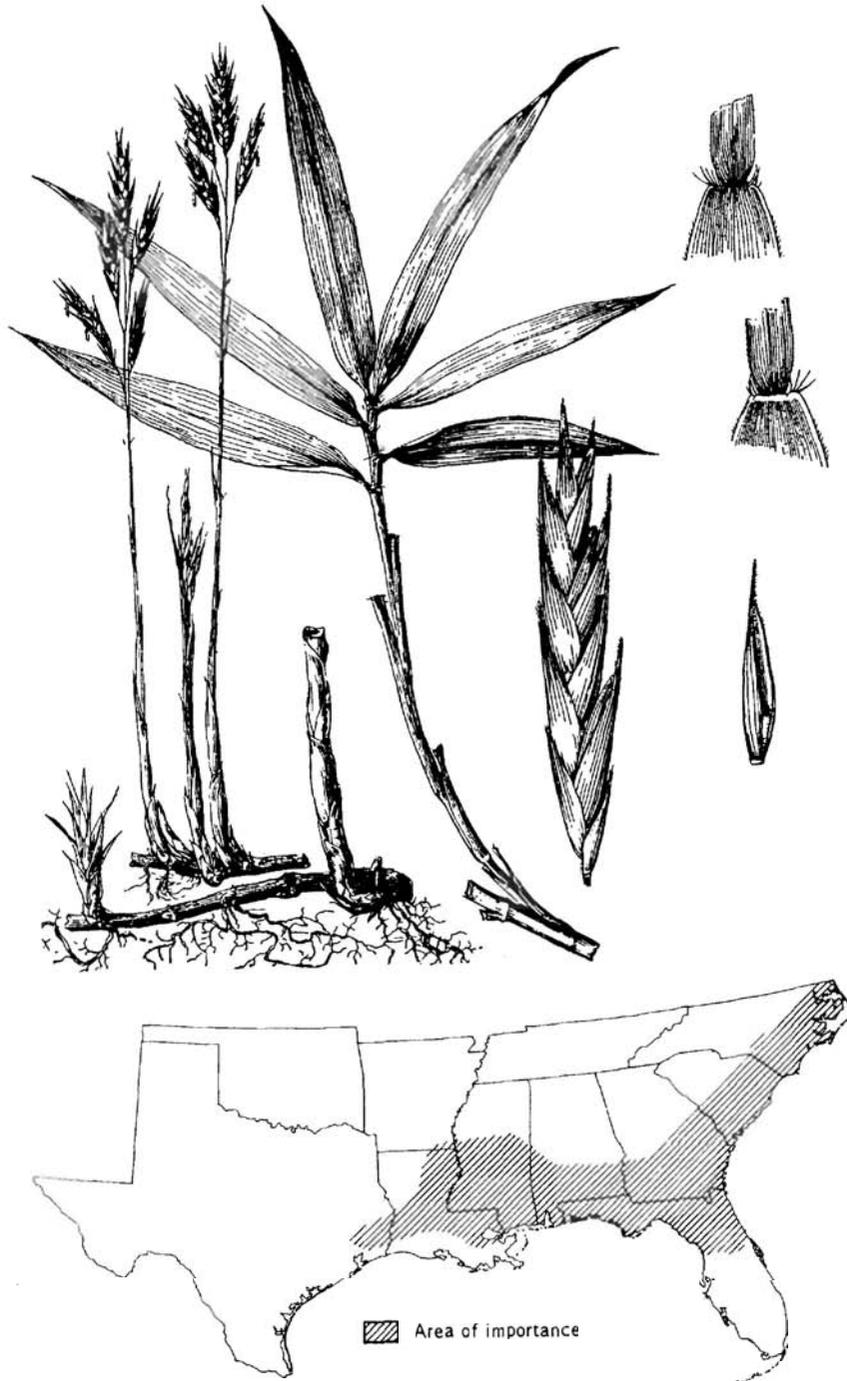
Adapted to moist soils along riverbanks and in bottom lands and similar sites. Does best on soils of high fertility.

**USE AND MANAGEMENT**

Giant cane provides lots of high-quality forage for cattle, horses, hogs, and sheep. It is valued for summer grazing in northern part of range and for winter grazing in states along gulf coast. Stems of this grass are also used for fishing poles, pipe-stems, baskets, and mats.

This grass is easily killed by overgrazing and uncontrolled burning. For maximum production, no more than 50 percent of current year's growth by weight should be grazed off at any season. Controlled burning should be done under ideal humidity, soil moisture, and wind conditions no oftener than every 3 to 4 years. Deferred grazing for at least 90 days during summer every 2 to 3 years improves plant vigor. Overgrazed stands require complete protection from grazing and fire during growing season to allow plants to regain vigor.

*Arundinaria tecta*, switch cane



*Arundinaria tecta* (Walt.) Muhl., switch cane

#### DESCRIPTION

*Warm-season*, robust, rhizomatous, woody perennial.

*Height*: 4 to 10 feet.

*Leaf blade*: Lance-shaped; underside usually hairy.

*Leaf sheath*: Commonly as long as internodes; ring of short, stiff hair across collar.

*Stem*: Round; hollow; woody.

*Rhizomes*: Air canals in the periphery continue through nodes.

*Seedhead*: Racemes produced on top of leafless or nearly leafless stems.

#### GROWTH CHARACTERISTICS

Grows all year if conditions are favorable. Leaves are produced from buds at nodes along the stems. Produces seedheads in early fall. Reproduces primarily from rhizomes. Air canals in the rhizomes may help the grass plant adapt to waterlogged soils or frequently flooded sites. Grows in pure stands on most sites.

#### DISTRIBUTION

From Virginia to southern Ohio and Illinois, south to Florida, and west to Texas.

#### SITE ADAPTATION

Grows best in swampy woods and sandy flood plains.

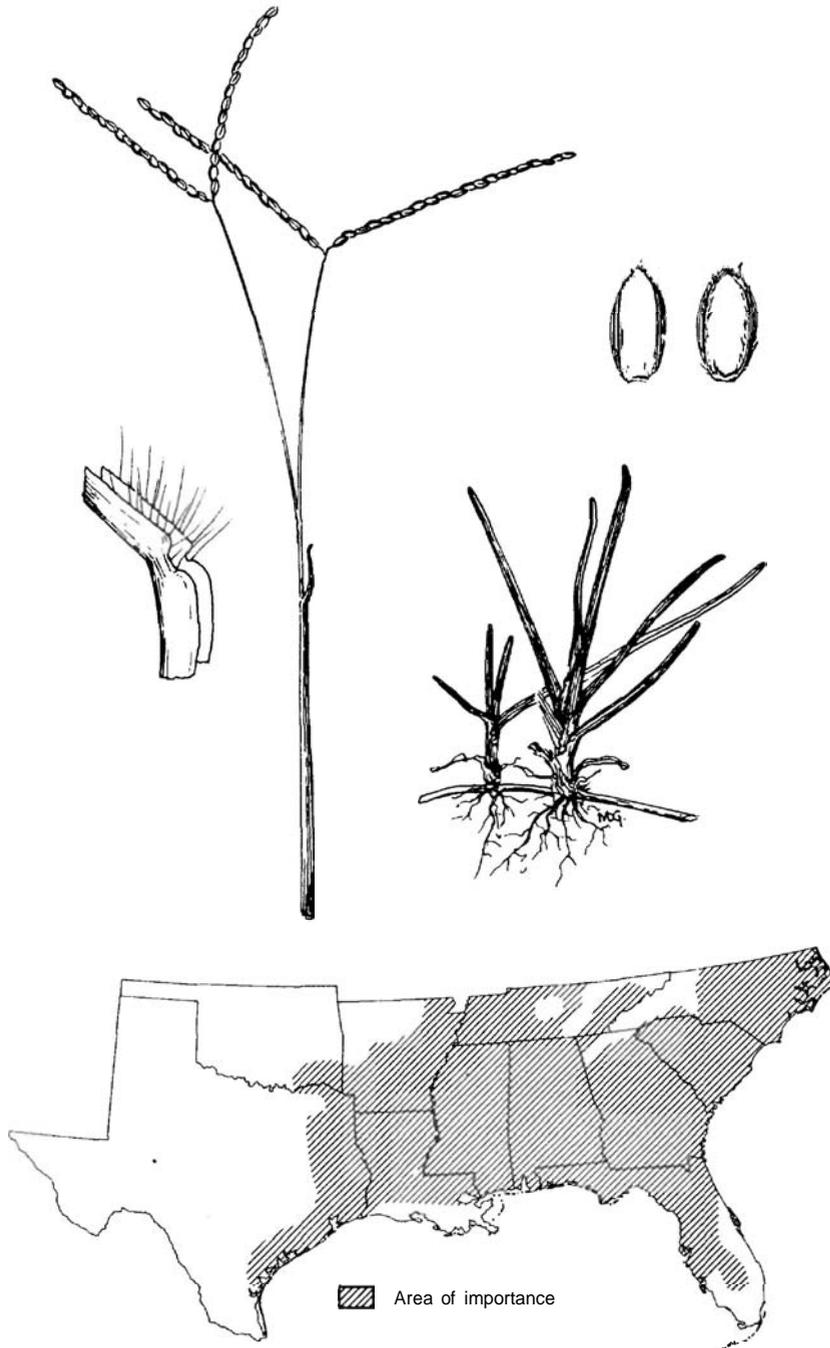
#### USE AND MANAGEMENT

Switch cane is a good forage plant and is grazed by all livestock. It is grazed mostly in summer in northern part of range and is highly valued as winter forage in southern Coastal Plain and along Gulf of Mexico. The robust rhizomes of switch cane bind the soil and protect it from erosion. In southern Mississippi, switch cane is called muttongrass because of its value as sheep forage.

Leaves along stem are within easy reach of most livestock. They sometimes "ride down" large plants to get the terminal leaves. Removing more than 50 percent of green leaves weakens the plant. This is particularly true in August when plant food reserves are lowest.

*Axonopus affinis*, common carpetgrass

*Axonopus affinis* Chase, common carpetgrass



DESCRIPTION

*Warm-season, stoloniferous perennial.*

*Height:* 8 to 20 inches.

*Leaf blade:* Usually flat or folded; 1/4 to 1/2 inch wide; fine hair along margin near base; rounded or slightly pointed; reddish or purplish near maturity.

*Ligule:* Minute membrane.

*Seedhead:* Usually 3 slender racemes 1-1/2 to 4 inches long, 2 at summit and 1, rarely 2, below.

GROWTH CHARACTERISTICS

In southern Florida, stays green all year. Elsewhere, becomes dormant early in fall and starts growth in spring. Produces seedheads and stolons during active growth period. Reproduces from stolons and from seed. Pure stands are common.

DISTRIBUTION

Throughout South from Virginia to Florida and west to Texas and Arkansas.

SITE ADAPTATION

Adapted to clays, sands, mucks, and peats. Most commonly found on slightly acid sandy to sandy loam soils that have a favorable soil-moisture relationship.

USE AND MANAGEMENT

Common carpetgrass is grazed all year by livestock. It is a managed pasture grass in some localities. It is also used on recreational areas such as campgrounds, parking lots, baseball fields, and picnic areas.

For maximum production and most efficient harvest by livestock, grazing should be rotated about every 30 to 40 days and no more than 50 percent of current year's growth by weight grazed off. A 2- to 3-inch stubble height is a good gauge of proper use. Fertilization is not profitable on all sites.

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 8 to 12 inches.

*Leaf blade*: Usually flat; narrow; 1 to 3 inches long; curls during prolonged dry periods and at maturity.

*Leaf sheath*: Rounded; smooth; overlapping; about two-thirds as long as internodes.

*Ligule*: Hairy.

*Stem*: Solid.

*Seedhead*: 2 spikes resembling a chicken's comb on top of each stalk.

GROWTH CHARACTERISTICS

Reproduces largely from axillary buds at basal nodes. Some new plants are established from seed. When growth starts in late spring or early summer, most of old growth greens up because this grass stores nutrients in stems as well as in roots.

DISTRIBUTION

West Texas, southern New Mexico, and northern Mexico.

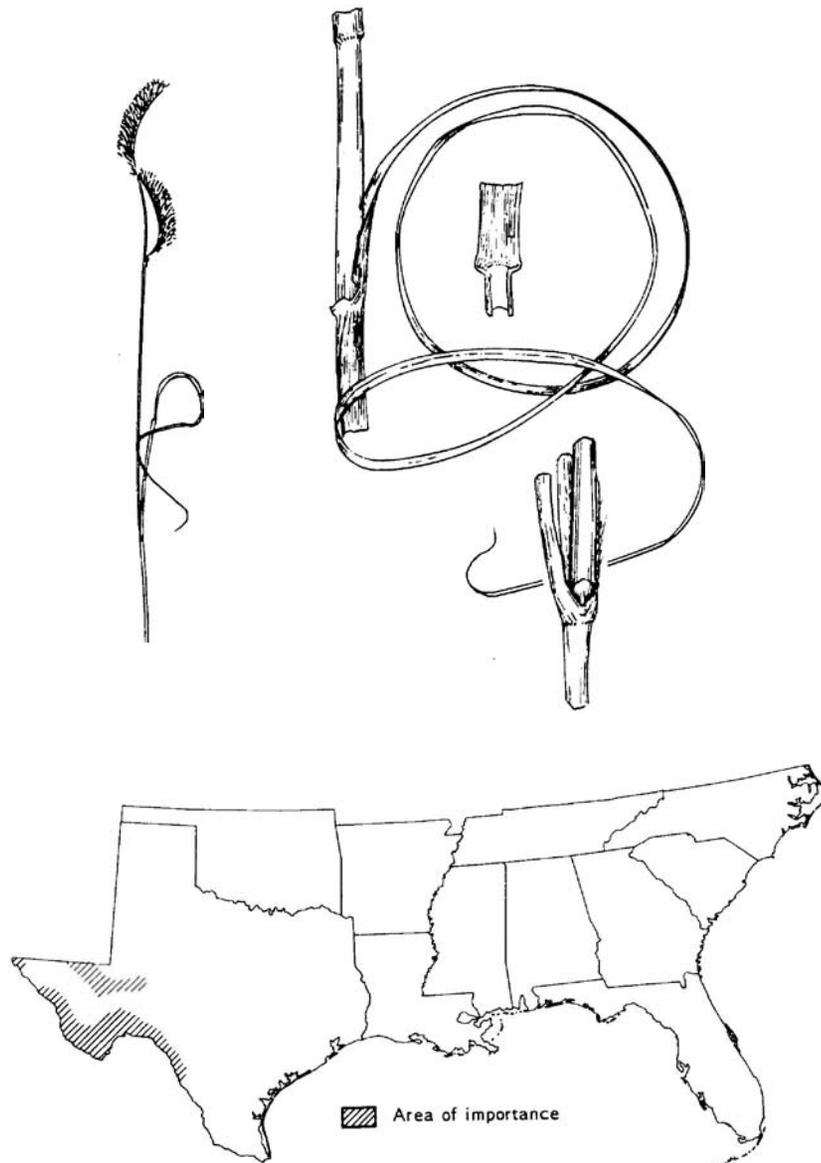
SITE ADAPTATION

Grows in nearly pure stands on gypsum sands and highly calcareous clay loam soils.

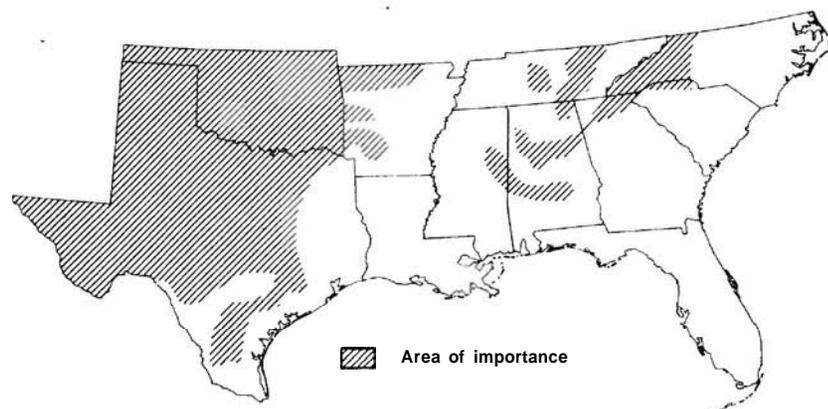
USE AND MANAGEMENT

Chino grama is grazed by cattle, horses, sheep, and goats. Sometimes limited amounts are hand harvested for hay. It is an important conservation grass because it is adapted to sites on which few other species will grow.

This grass dies if overgrazed. It requires a full growing season deferment every 2 to 3 years for maximum production.



*Bouteloua curtipendula*, sideoats grama



***Bouteloua curtipendula* (Michx.) Torr., sideoats grama**

#### DESCRIPTION

*Warm-season, rhizomatous perennial.*

*Height: 12 to 20 inches.*

*Leaf blade: 4 to 8 inches long; flat; hair along edge.*

*Leaf sheath: Rounded; overlapping; nearly as long as internodes.*

*Seedhead: 35 to 50 spikes along one side of a slender zigzag rachis; 5 to 8 spikelets resembling oats suggests the name, sideoats.*

#### GROWTH CHARACTERISTICS

Growth begins in early spring. Seedstalks appear from early July to September. Seed produced in fall are more viable than those produced in summer. Seed set is rare in midsummer. This grass has two growth forms: (1) Low growing (8 to 14 inches) rhizomatous produces few seedheads and reproduces from rhizomes; (2) tall upright (16 to 30 inches) bunch grass produces many seedheads and reproduces from seed.

#### DISTRIBUTION

Throughout Great Plains from southern Canada to northern Mexico and east to Virginia.

#### SITE ADAPTATION

Grows on well-drained uplands, shallow ridges, and rocky slopes. This grass is better adapted to calcareous and moderately alkaline soils than to neutral or acid soils.

#### USE AND MANAGEMENT

Sideoats grama produces high-quality nutritious forage that is readily eaten by livestock. Wild turkeys eat the seed.

This grass responds to proper grazing use and rotation-deferred grazing. It is often a key management species and responds favorably to fertilizer. Good yields of seed can be harvested with a combine. This grass is widely used for seeding depleted ranges and cropland no longer cultivated.

*Bouteloua eriopoda*, black grama

*Bouteloua eriopoda* (Torr.) Torr., black grama

DESCRIPTION

*Warm-season*, stoloniferous perennial.

*Height*: 10 to 20 inches.

*Leaf blade*: Narrow; rolls inward during dry periods, giving a threadlike appearance.

*Leaf sheath*: Short; clasps stem tightly.

*Ligule*: Ring of short hair.

*Stem*: Solid; lower half of internodes woolly, upper half smooth.

*Seedhead*: 3 to 8 spikes per seedhead; 18 to 20 spikelets per spike.

GROWTH CHARACTERISTICS

During mild winters and with adequate moisture, lower stems stay green all winter. New leaves grow from buds at nodes on stolons and from axillary buds at basal nodes. Seeding habits are not dependable. In some years when a good seed crop is produced, seed viability is low. Reproduces primarily from stolons. A healthy plant generally produces 6 to 9 stolons. Two favorable successive growing seasons are required for reproduction by stolons: First year, to produce stolons; second year, for stolons to take root and establish new plants. Generally grows in pure stands.

DISTRIBUTION

West Texas, New Mexico, Arizona, and northern Mexico.

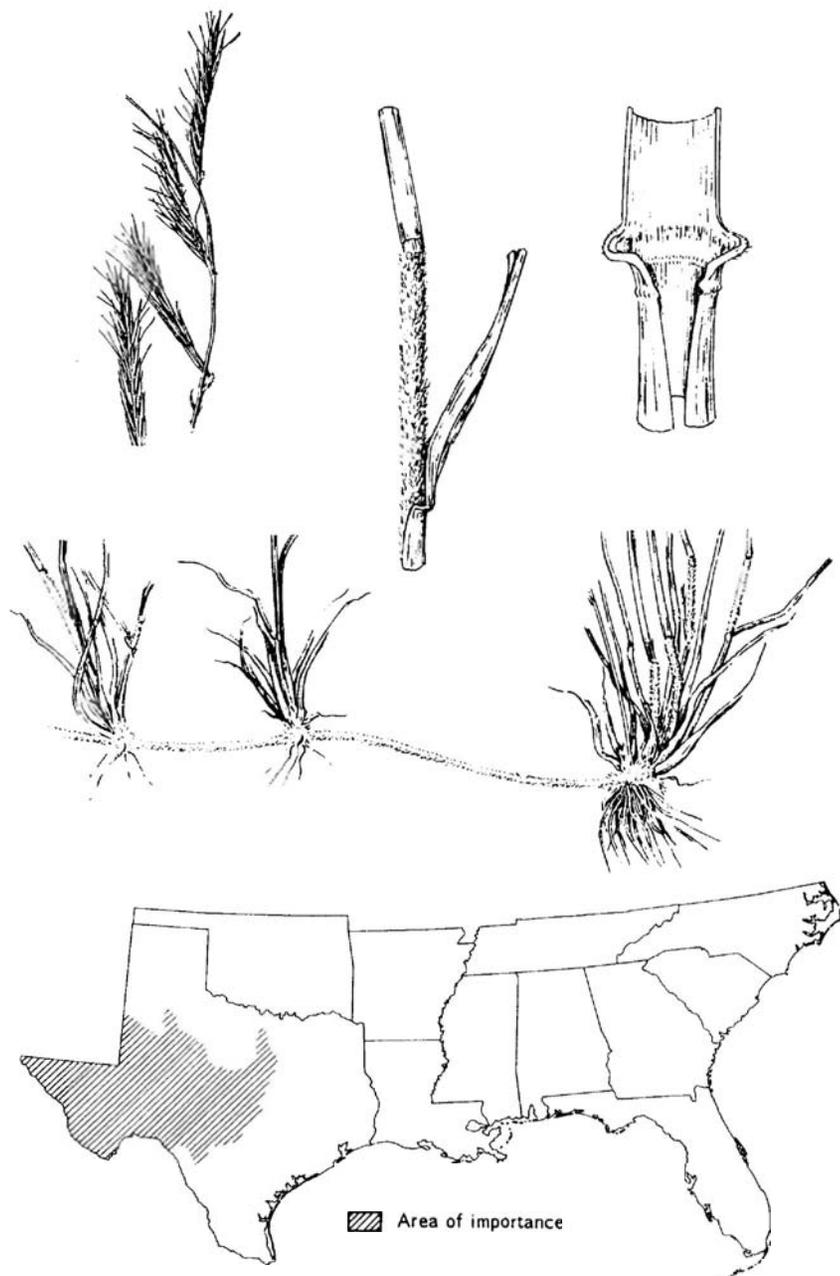
SITE ADAPTATION

Grows mostly on dry gravelly or sandy soils; seldom grows on clay loams or adobe (clay) flats. Black grama is characteristically a lower altitude grass (3,500 to 5,500 feet elevation) but occasionally grows at elevations of 7,000 feet.

USE AND MANAGEMENT

Black grama is a choice forage grass grazed by all livestock. It is cut for hay on some ranges in wet seasons.

This grass is easily killed by overgrazing. To improve black grama ranges, defer grazing 2 successive years during growing season and do not graze more than 50 percent of current growth by weight during dormancy. To maintain ranges, defer grazing one growing season every third year.



*Bouteloua gracilis*, blue grama

*Bouteloua gracilis* (H.B.K.) Lag. ex Steud., blue grama

DESCRIPTION

*Warm-season, perennial.*

*Height:* 12 to 16 inches in northern range; 2 to 2-1/2 feet in west Texas and northern Mexico.

*Leaf blade:* 1 to 4 inches long; narrow; flat; smooth.

*Leaf sheath:* Rounded; smooth; shorter than internodes.

*Ligule:* Few soft hairs.

*Seedhead:* 1 to 4 spikes resembling a chicken's comb.

GROWTH CHARACTERISTICS

Growth starts in late May and early June. Plant matures 60 to 70 days later. Becomes dormant during summer dry periods. Greens up again as soon as moisture is available. Seed ripen in early fall. May assume a sodlike aspect in the northern part of range in the Great Plains. In the southern part, generally retains a bunch-grass aspect.

DISTRIBUTION

Throughout Great Plains to southern Canada and to central Mexico.

SITE ADAPTATION

Grows best on loams and sandy loam soils but does grow on sandy, gravelly, and clayey soils. Also grows in the mountains of Colorado, New Mexico, and Texas. This grass is moderately salt tolerant.

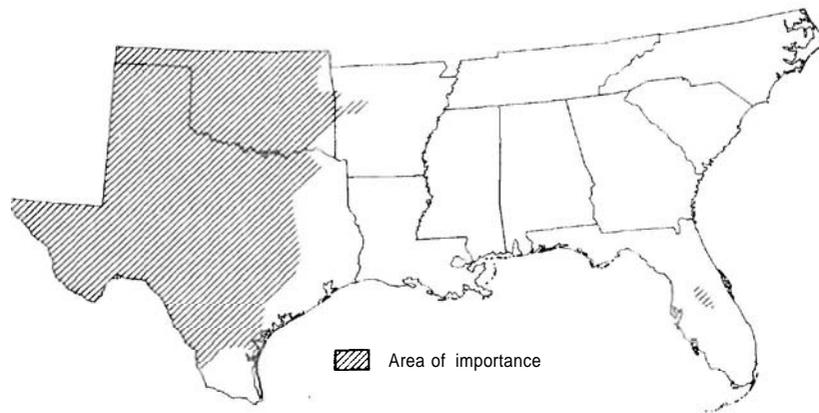
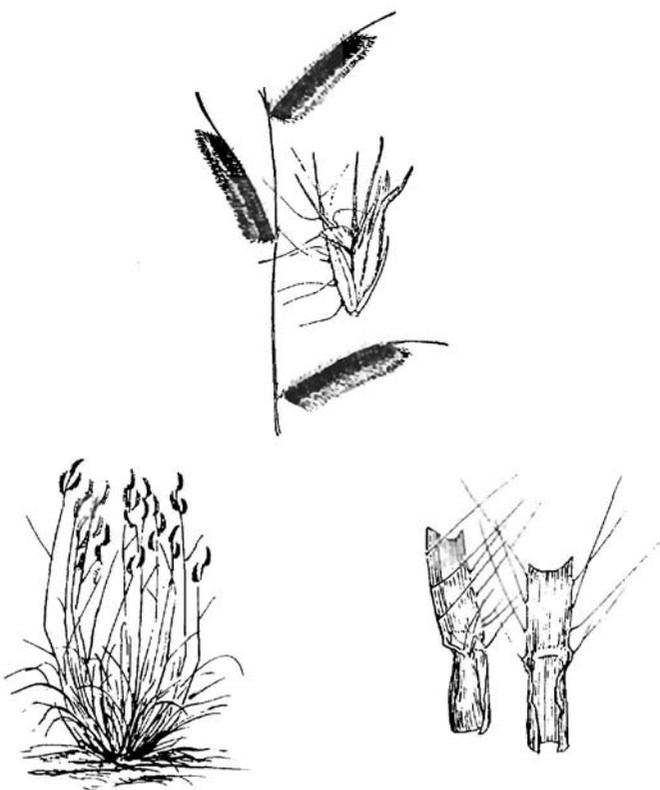
USE AND MANAGEMENT

Blue grama is choice forage for all livestock, It is harvested occasionally for hay.

Since growing points are at or near the ground surface, this grass withstands close grazing. For best yields, defer grazing every 2 to 3 years during the growing season and graze off no more than 50 percent of the current year's growth by weight. It cures well on stem, making it a good grass to graze during dormant season.



*Bouteloua hirsuta*, hairy grama



*Bouteloua hirsuta* Lag., hairy grama

#### DESCRIPTION

*Warm-season, perennial.*

*Height: 10 to 20 inches.*

*Leaf blade: Flat or slightly rolled; narrow; mostly basal; margins hairy,*

*Leaf sheath: Rounded; smooth; shorter than internodes.*

*Seedhead: 1 to 4 spikes, purplish before maturity, about 1 inch long; rachis extends beyond spikelets, resembling a bee's stinger.*

#### GROWTH CHARACTERISTICS

Makes little growth before summer rains begin. If moisture is adequate, matures rapidly. During exceptionally dry years, produces little forage but withstands drought well. Reproduces from axillary buds at basal nodes, from short stolons in some localities, and from seed. In northern part of range, this grass usually has only 1 or 2 spikes per seedhead and short stolons which form a sod. Further south, it grows taller, more like a bunch grass, and has 2 to 4 spikes per seedhead. A tall variety (*B. hirsuta pectinata*) grows mostly in central Texas.

#### DISTRIBUTION

Throughout Southwest, north to Wisconsin and North Dakota, in central Florida, and in almost pure stands on mesas in central Mexico.

#### SITE ADAPTATION

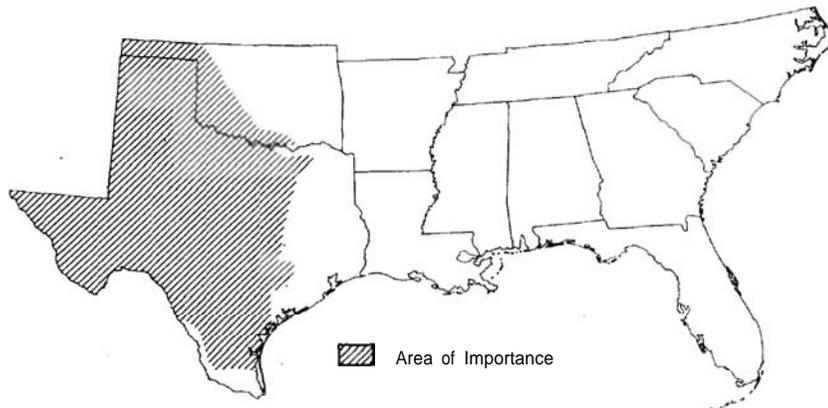
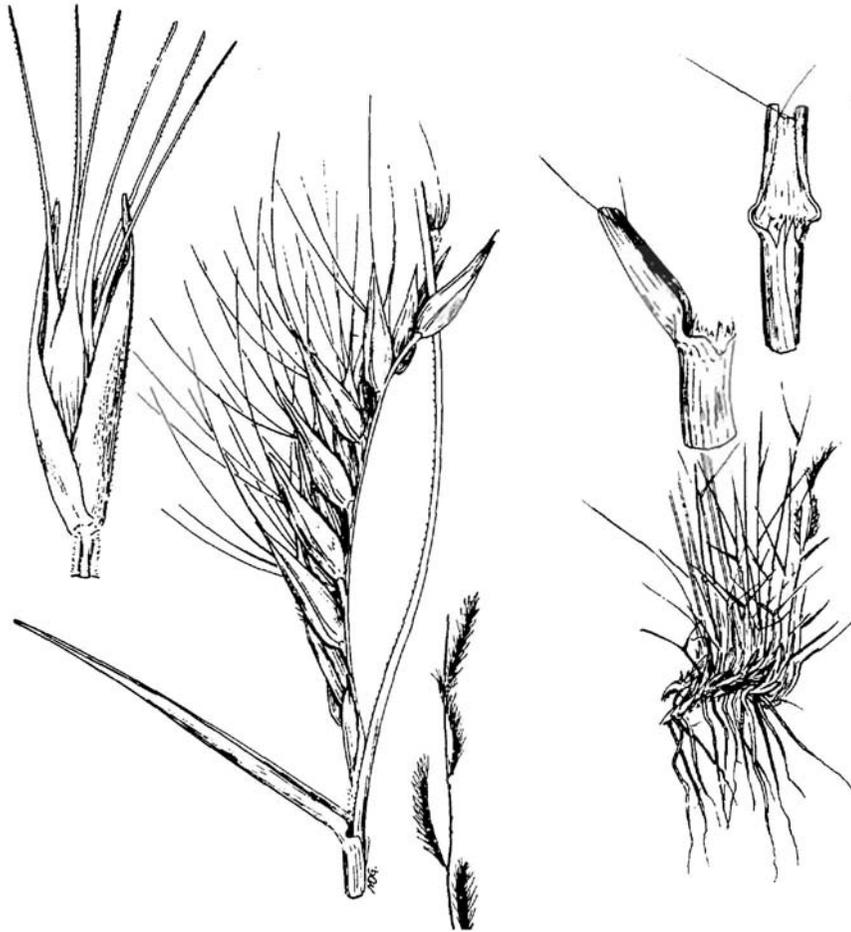
Adapted to sandy and sandy loam soils and gravelly loams. Does well on soils neutral to slightly calcareous. Often associated with blue grama but is more drought resistant.

#### USE AND MANAGEMENT

Hairy grama is used primarily for grazing and withstands it well. Most livestock graze it readily any season. It makes especially good winter forage because it cures well. It is not considered a hay grass.

This grass yields more if it is not overgrazed and grazing is deferred every 2 to 3 years during period of most active growth.

*Bouteloua trifida*, red grama



*Bouteloua trifida* Thurb., red grama

#### DESCRIPTION

*Warm-season, weak perennial.*

*Height: 5 to 10 inches.*

*Leaf blade: Short; narrow; flat or rolled; surface slightly rough; scattered long hairs on margin.*

*Leaf sheath: Shorter than internodes; smooth or slightly rough.*

*Ligule: Ring of short hair.*

*Stem: Smooth; young plants erect, old plants bent at base; nodes naked and darker than rest of stem.*

*Seedhead: 3 to 7 spikes per seedhead; about 12 spikelets per spike; rachis hairy; fertile lemma of each spikelet tipped with 3 short awns.*

#### GROWTH CHARACTERISTICS

Growth starts in spring when daytime temperature is about 70° F. and moisture is adequate. Seed mature 6 weeks after growth starts. Because of this characteristic, red grama is often referred to as 6 weeks' grama. Reproduces from seed. Has a shallow root system. Becomes semidormant during summer.

#### DISTRIBUTION

West Texas and Oklahoma, Arizona, southern California, and south to central Mexico.

#### SITE ADAPTATION

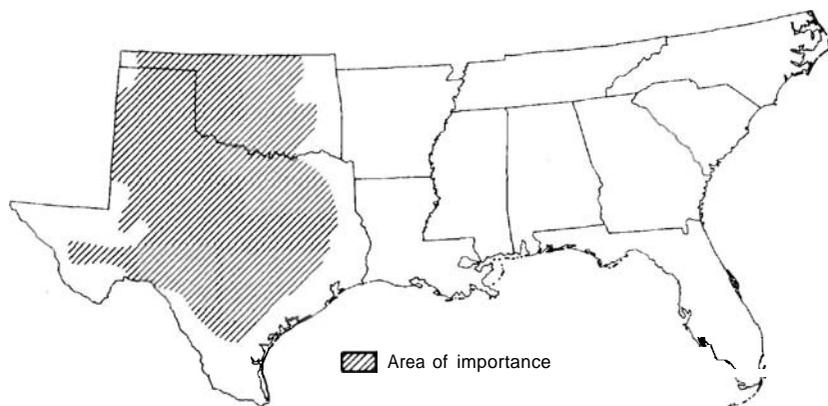
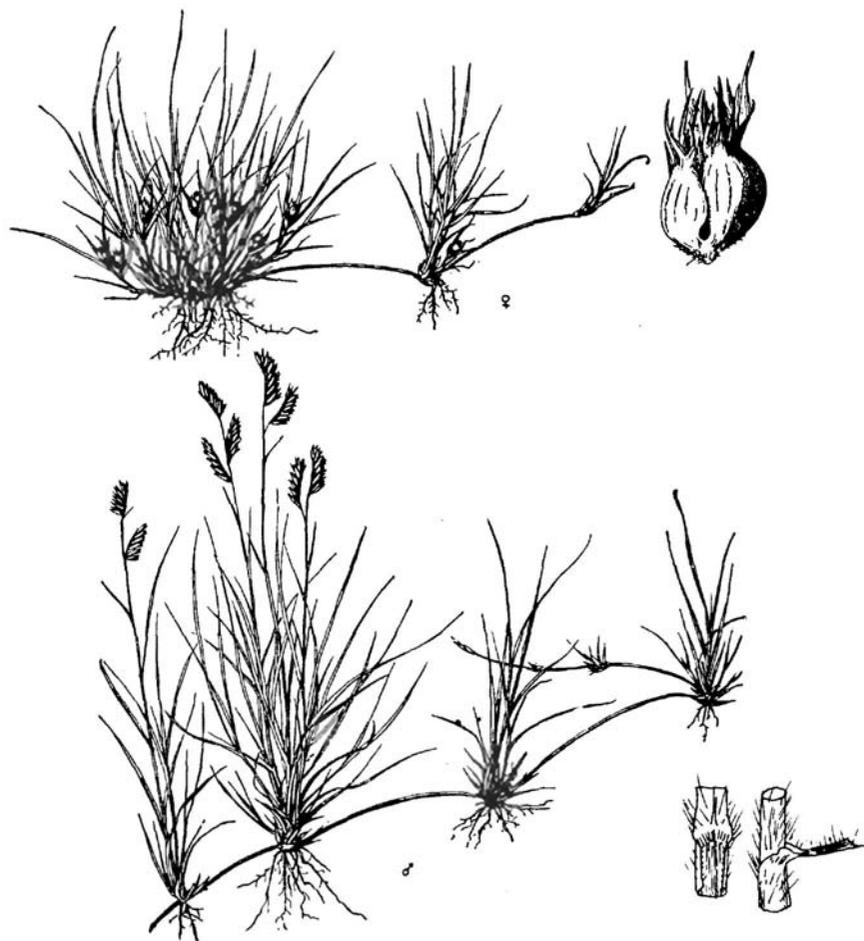
Adapted to shallow, gravelly, stony soils in southwest Texas that have a poor soil-moisture relationship. Invades deep, loamy soils denuded by overgrazing.

#### USE AND MANAGEMENT.

Red grama is grazed by all livestock. Forage production is low but quality is good when plants are green. After seedheads appear, nutritive value declines rapidly. This grass helps to protect soil from wind and water erosion if lightly grazed.

Growing points and basal leaves are so close to the ground that most livestock cannot harvest more than 50 percent of current year's growth by weight. Deferred grazing during growing season every 2 to 3 years maintains plant vigor and allows plants to mature seed for maintaining a stand. This grass is seldom a key management species except on ranges where it grows in almost pure stands.

*Buchloe dactyloides*, buffalograss



*Buchloe dactyloides* (Nutt.) Engelm., buffalograss

DESCRIPTION

*Warm-season, stoloniferous perennial.*

*Height: 4 to 6 inches.*

*Leaf blade: 1/8 inch wide; 3 to 6 inches long; sometimes curls.*

*Leaf sheath: Rounded; smooth; shorter than internodes.*

*Ligule: Row of short hair.*

*Seedhead: Spike; female flowers are in sessile heads or burs, partly hidden among the leaves; male flowers are in 2 or 3 short spikes on slender, erect stems.*

GROWTH CHARACTERISTICS

Growth starts in late spring and continues through summer. Spreads rapidly by stolons and forms a dense sod. During growing season, foliage is grayish green but turns light straw colored when plants mature. Growing points are close to the ground.

DISTRIBUTION

Throughout short-grass region of Great Plains.

SITE ADAPTATION

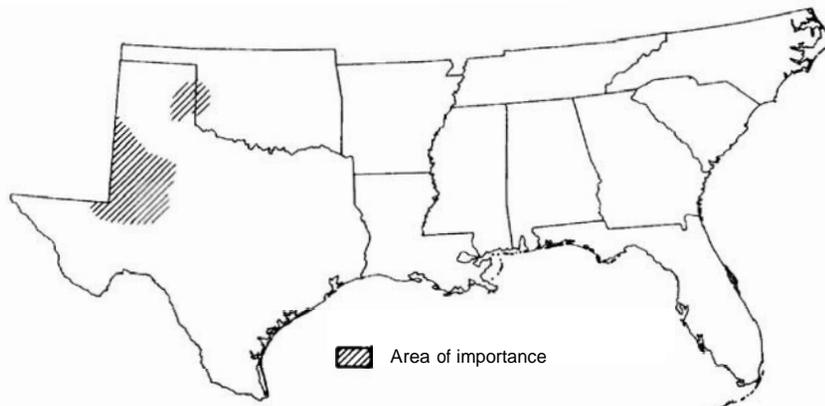
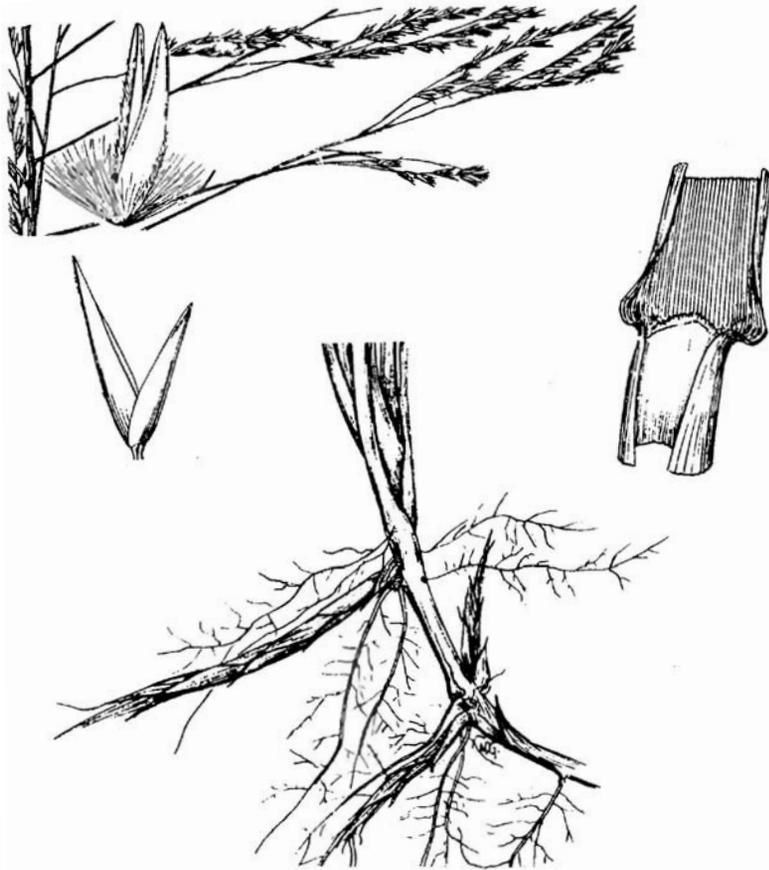
Adapted best to loamy clay soils that get extra water from run-off. Dominant on sites intermittently wet and dry. Withstands submergence and prolonged summer droughts.

USE AND MANAGEMENT

Buffalograss is used primarily for range grazing. It is also used for seeding grass waterways on farms and for seeding lawns and recreational areas. Natural stands yield as much as 100 pounds of seed per acre. Suction machines, brooms, or beater equipment must be used to harvest seed.

Cattle and horses usually harvest no more than 50 percent of current year's growth by weight because this grass grows so close to the ground. Continuous close grazing weakens plants and reduces next season's production.

Calamovilfa gigantea, big sandreedgrass



***Calamovilfa gigantea* (Nutt.) Scribn. and Merr.,  
big sandreedgrass**

**DESCRIPTION**

*Warm-season*, robust, rhizomatous perennial.

*Height*: 4 to 6 feet.

*Leaf blade*: 1/4 to 1/2 inch wide at base; rolls inward; tapers to a long tip.

*Leaf sheath*: Mostly basal; overlapping; smooth.

*Seedhead*: Open panicle 1 to 2 feet long; lemma and palea hairy on back.

**GROWTH CHARACTERISTICS**

Growth starts several days before that of other warm-season grasses in same locality. Reproduces from seed and from rhizomes. Grows in large colonies and if properly managed dominates site.

**DISTRIBUTION**

North Dakota south to northwest Texas and in Utah and Arizona.

**SITE ADAPTATION**

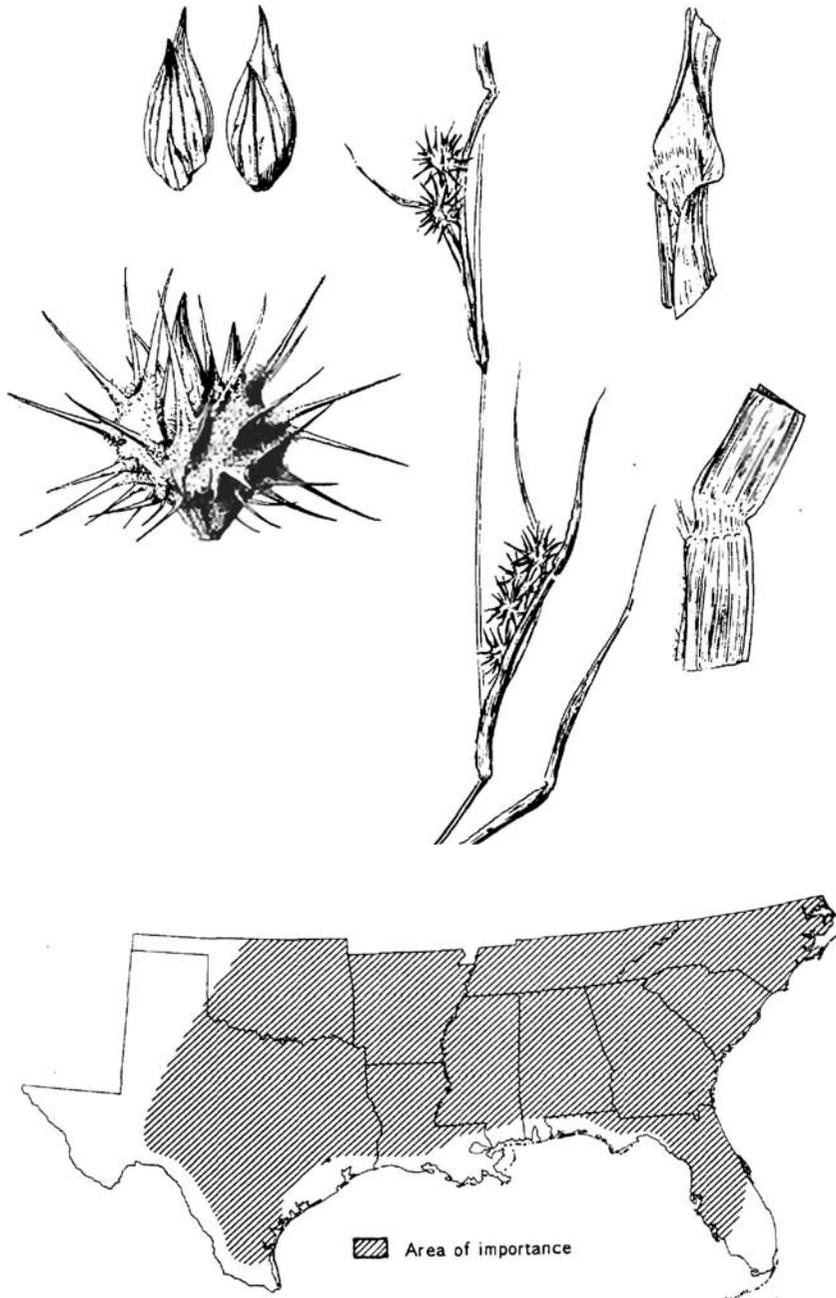
Adapted to deep sands and sand dunes.

**USE AND MANAGEMENT**

Big sandreedgrass is valuable for controlling erosion on deep sands subject to severe wind erosion. It cures well on stem, thus providing good winter forage for cattle. It is sometimes cut for hay. When it grows on sites large enough to be managed as separate units, it is often reserved for winter use.

If grazed during summer, no more than 50 percent of current year's growth by weight should be removed. This maintains a vigorous healthy stand and leaves adequate mulch to control wind erosion.

*Cenchrus pauciflorus*, mat sandbur



*Cenchrus pauciflorus* Benth., mat sandbur

DESCRIPTION

*Warm-season*, annual; at times, short-lived perennial.

*Height*: 8 to 24 inches.

*Leaf blade*: 2 to 6 inches long; flat.

*Leaf sheath*: Flattened; hairy along margins.

*Stem*: Erect or grows along ground.

*Seedhead*: Raceme 6 to 20 spiny burs covered with fine hair, each enclosing 2 spikelets often topped by leaves.

GROWTH CHARACTERISTICS

Growth starts in early spring. Seedheads first appear about July. Plants may become semidormant when moisture is scarce and green up and produce seed again after a rain. Grows in tufts or dense mats.

DISTRIBUTION

All states of continental United States except possibly Montana, Idaho, and Maine; north to Canada and south to South America.

SITE ADAPTATION

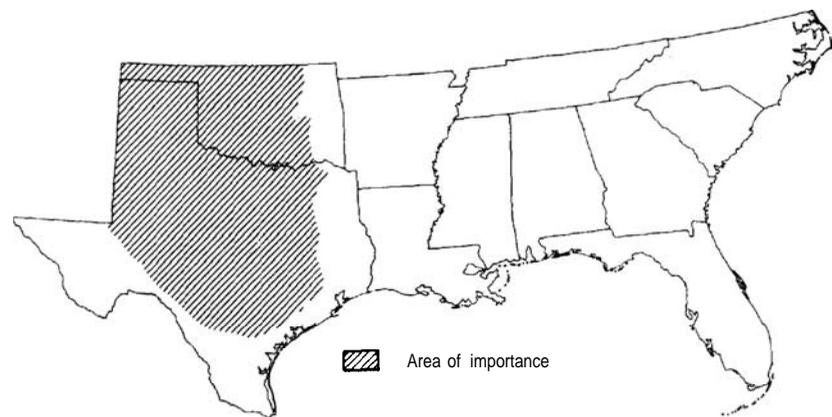
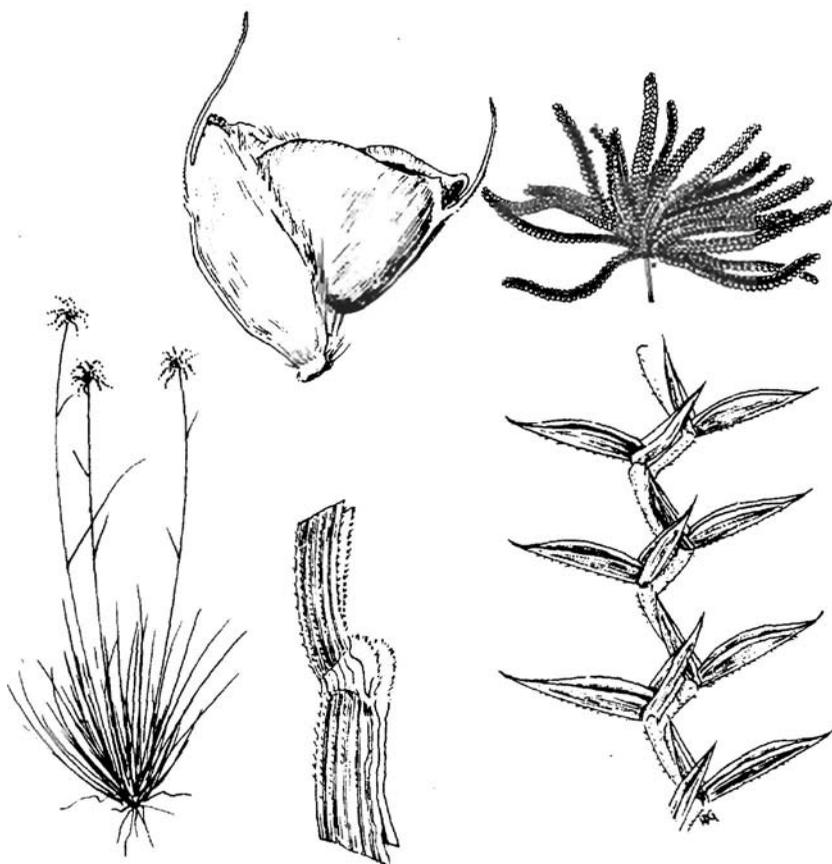
Best adapted to dry sandy and sandy loam soils but grows on soils of heavier texture. This grass is particularly well adapted to waste places, old fields, and sandy flood plains. It is an invader. Its presence indicates a severely overused range.

USE AND MANAGEMENT

Mat sandbur is grazed by cattle and sheep before seedheads form. Forage is of fair quality but is seldom of significant quantity.

This grass is usually managed to reduce or eliminate it from the plant community. Heavy grazing of mat sandbur in the spring when it is palatable and deferred grazing until fall allow more favorable associated deep-rooted perennial grasses to crowd it out. Because the burs are injurious to livestock and greatly reduce the value of wool and mohair, livestock should be removed from ranges before burs form.

*Chloris cucullata*, hooded windmillgrass



*Chloris cucullata* Bisch., hooded windmillgrass

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*; 1 to 2 feet.

*Leaf blade*: 2 to 6 inches long; folded to a sharp point; bluish green.

*Leaf sheath*: Mostly basal; shorter than internodes; compressed or flattened.

*Seedhead*: 7 to 12 purplish spikes 1 or 2 inches long, clustered at end of stem; spikes turn straw yellow to brownish gray at maturity; lemma of each spikelet has short awn.

GROWTH CHARACTERISTICS

New growth starts in early spring and stays green until fall. May produce several seed crops during growing season, the earliest one about June. Sometimes has short rhizomes. The windmill appearance of seedhead makes identification easy when in flower.

DISTRIBUTION

Texas, Oklahoma, and New Mexico.

SITE ADAPTATION

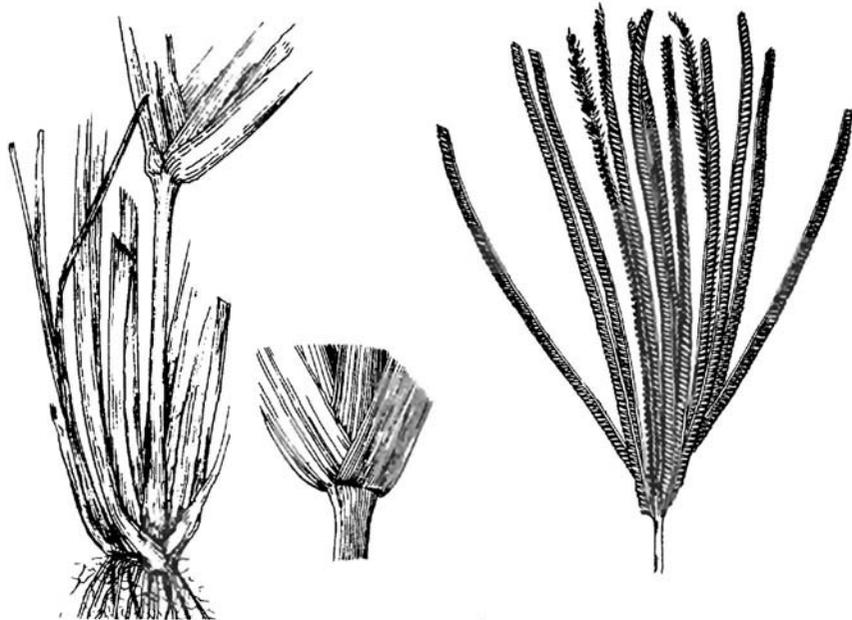
Adapted to acid to neutral medium- and coarse-textured soils. Not adapted to calcareous or clay soils.

USE AND MANAGEMENT

Hooded windmillgrass is grazed moderately by all livestock. Quality of forage is fairly high. Amount of forage produced is relatively low compared with that of taller growing associated grasses. It provides fair-quality forage during winter but should be supplemented with protein concentrate.

Because of low productivity, this grass is seldom a key management species. When it is, no more than 50 percent of the current year's growth by weight should be grazed off.

*Chloris glauca*, saltmarsh chloris



***Chloris glauca* (Chapm.) Wood, saltmarsh chloris**

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height*: 3 to 4 feet.

*Leaf blade*: Folded; 12 to 14 inches long; rounded at tip; dark green.

*Leaf sheath*: Crowded at base; keeled; overlapping; merges into blade without distinct collar.

*Ligule*: Minute fringe of hair.

*Seedhead*: 15 to 20 spikes, each 4 to 5 inches long; spikelets brown, all on one side of rachis.

**GROWTH CHARACTERISTICS**

Growth starts early in spring and continues through summer. Makes good regrowth. Growing points are 3 to 4 inches above ground early in season. Produces seed two to three times during long growing season. In southern Florida, parts of plant stay green all year.

**DISTRIBUTION**

Coasts of North Carolina, South Carolina, Georgia, and in Florida.

**SITE ADAPTATION**

Adapted to coastal flatwoods, swamp margins, and sloughs on calcareous soils. Grows best in brackish marshes.

**USE AND MANAGEMENT**

Saltmarsh chloris is grazed readily by cattle, horses, and sheep.

This grass is easily killed by continuous close grazing. For maximum production and spread, graze it properly at all times and defer grazing every 2 to 3 years for at least 90 days throughout the growing season.

*Chloris verticillata*, tumble windmillgrass

*Chloris verticillata* Nutt., tumble windmillgrass

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 4 to 12 inches.

*Leaf blade*: Crowded at base; 3 to 7 inches long; tightly folded; abruptly pointed; light green.

*Leaf sheath*: Shorter than internodes; compressed; flattened.

*Stem*: Erect or decumbent; sometimes roots at lower nodes.

*Seedhead*: 7 to 10 slender spikes 2 to 6 inches long, arranged in 1 to 3 whorls, finally widely spreading; each spikelet tipped with short awn.

GROWTH CHARACTERISTICS

Growth starts in spring. Becomes dormant in fall. May produce two seed crops during growing season — first, from May to July; second, in September. Seedheads break off at maturity and tumble in the wind.

DISTRIBUTION

Missouri and Colorado, south to Louisiana, Texas, Oklahoma, and Arizona; introduced into California, Indiana, Illinois, and Maryland.

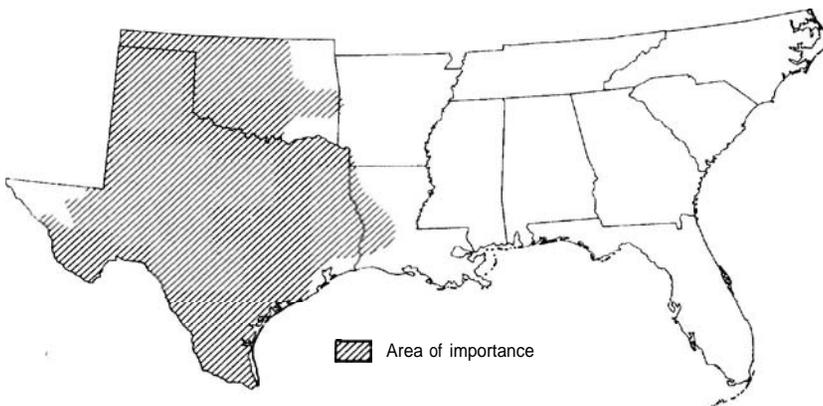
SITE ADAPTATION

Adapted to wide range of soils; best adapted to acid to neutral medium- and coarse-textured soils.

USE AND MANAGEMENT

Tumble windmillgrass is grazed by all livestock in spring and early summer. If grazed during dormancy, supplement with protein and mineral concentrates. Its quality is moderately high but production is low. It is not a choice forage plant but is important as an indicator of fair to poor range condition.

This grass is seldom, if ever, a key management species. When it is, it responds to proper grazing use and deferred grazing periods of 50 to 60 days.



*Ctenium aromaticum*, toothachegrass

*Ctenium aromaticum* (Walt.) Wood, toothachegrass

DESCRIPTION

Warm-season, perennial bunch grass.

Height: 2 to 3 feet.

Leaf blade: 1/4 to 1/2 inch wide; 6 to 10 inches long; pale green on bottom, darker green on top.

Leaf sheath: Mostly basal; shorter than internodes.

Ligule: Small membrane and short hair.

Stem: Erect; base enlarged and contains a substance that deadens the tongue and gums when chewed.

Seedhead: Curved spike; spikelets sessile on one side of rachis, giving a comblike appearance.

GROWTH CHARACTERISTICS

Growth starts in early spring and again in October or November. Seed ripen in late May or early June. Occasionally grows in pure stands. Each plant produces many seedstalks. This grass produces an abundant seed crop the first growing season after a burn.

DISTRIBUTION

Coastal Plain from North Carolina, west to Louisiana, Arkansas, and east Texas and throughout Florida.

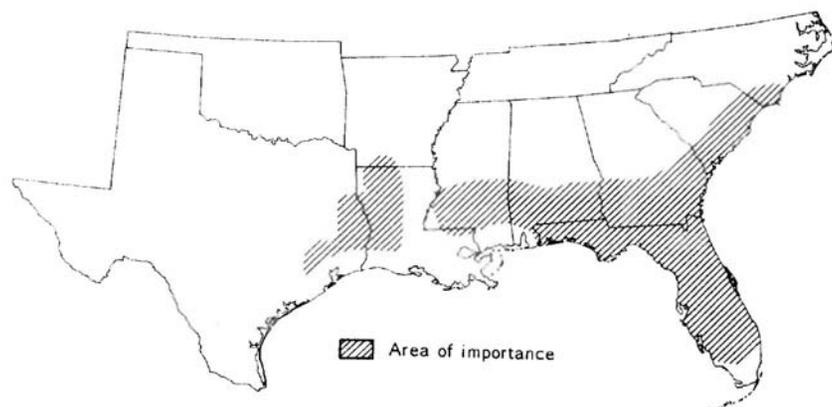
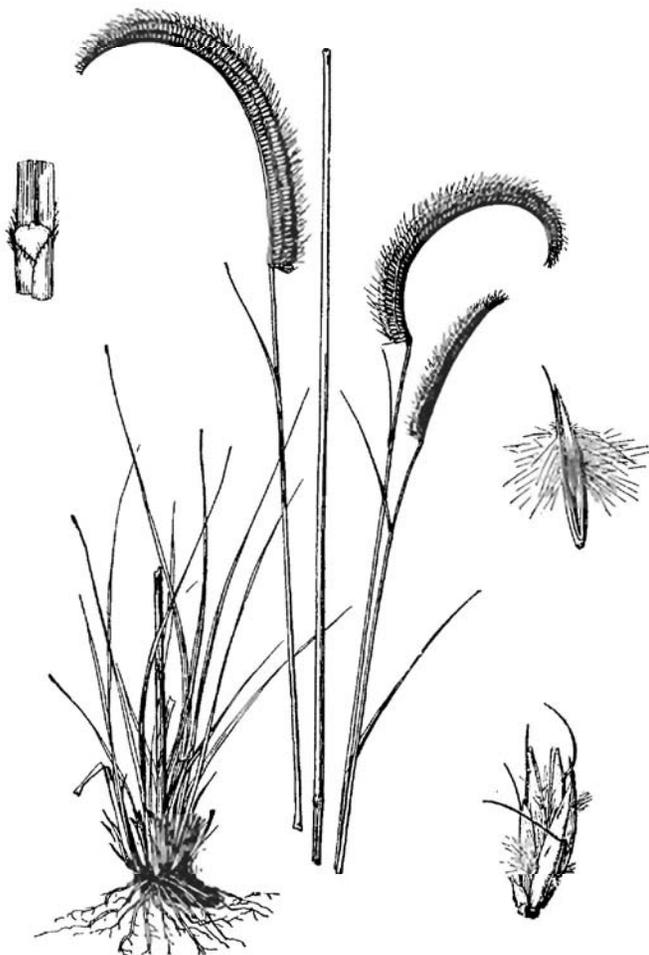
SITE ADAPTATION

Adapted to wet, poorly drained, acid soils. Typical sites are flatwoods with clayey subsoil and sloughs which have standing or slow-moving water following heavy rains.

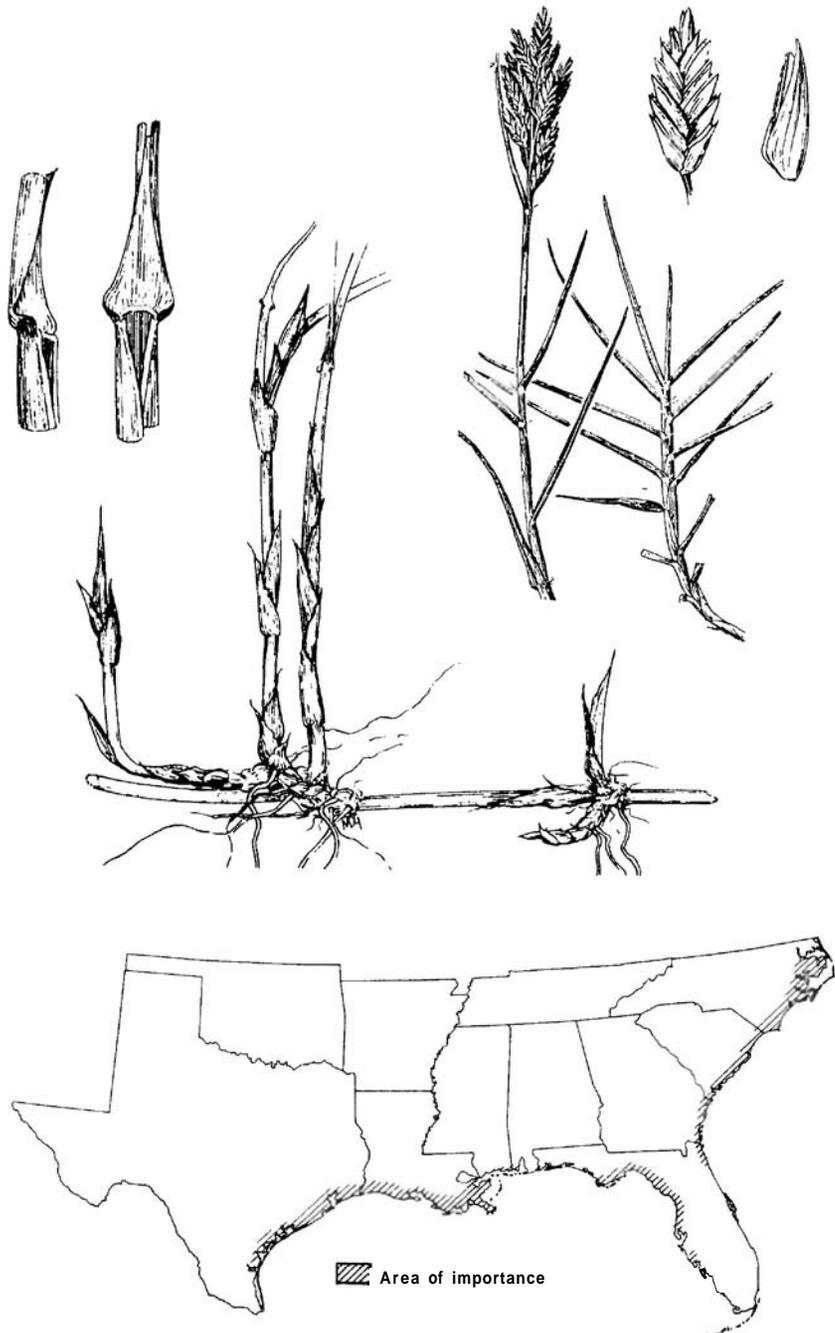
USE AND MANAGEMENT

Toothachegrass is grazed most readily by livestock during spring and summer. An abundance of this grass indicates good range condition on wet sites.

This grass responds to same management as major associated grasses.



*Distichlis spicata*, seashore saltgrass



*Distichlis spicata* (L.) Greene, seashore saltgrass

DESCRIPTION

*Warm-season*, rhizomatous, stoloniferous perennial.

*Height*: 6 to 18 inches.

*Leaf blade*: Conspicuously paired; sharp pointed; rolled when dry.

*Leaf sheath*: Numerous; closely overlapping; open at throat.

*Seedhead*: Dense spike 1 to 2 inches long; male and female flowers produced on different plants.

GROWTH CHARACTERISTICS

Makes primary growth during summer and some all year. Reproduces from both stolons and rhizomes. Produces seed several times during growing season. Dense colonies and pure stands are common. Salt crystals are usually present on leaves and stems.

DISTRIBUTION

Saline coastal marshes and flats of the Atlantic, Gulf, and Pacific coasts.

SITE ADAPTATION

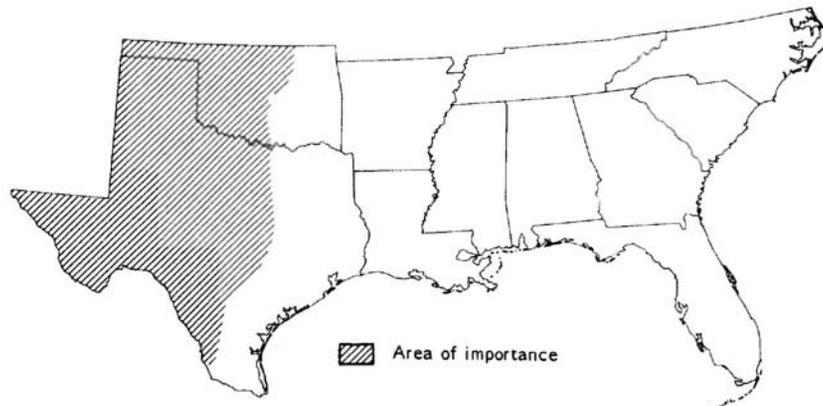
Adapted to highly saline marsh soils of clay to sandy texture. Does best if water level fluctuates between 2 inches above soil surface and 6 inches below.

USE AND MANAGEMENT

Seashore saltgrass is grazed by cattle and horses. Its best season of use is winter. Regrowth following a controlled burn in fall provides excellent food for wild geese. Ducks occasionally eat the seed.

Controlled burning results in lush, tender forage. Burning should be done every 2 years between September 1 and February 1 when water is above soil surface. Following a burn, 4 inches of regrowth is necessary before grazing. Prolonged inundation kills seashore saltgrass. Water-control systems should be installed, if needed, to maintain favorable water level. Cattle walkways are usually necessary to make the forage more accessible.

*Distichlis stricta*, inland saltgrass



***Distichlis stricta* (Torr.) Rydb., inland saltgrass**

**DESCRIPTION**

*Warm-season*, rhizomatous, stoloniferous perennial.

*Height*: 6 to 8 inches.

*Leaf blade*: Numerous; short, usually less than 3 inches long; flat; sharply pointed.

*Leaf sheath*: Closely overlapping; flattened; open at throat.

*Seedhead*: Panicle usually pale greenish; spikelets usually 5- to 9-flowered; pistillate flowers are broader and have fewer florets than staminate flowers.

**GROWTH CHARACTERISTICS**

Makes most of growth in early summer; stays green until late fall. Growth rate is slow. Reproduces mostly from stolons and rhizomes. Produces some seed. Grows mostly in pure stands.

**DISTRIBUTION.**

Throughout the 17 Western States, southern Canada, and south to central Mexico.

**SITE ADAPTATION**

Grows primarily on saline soils of any texture. Adapted to subirrigated sites and to sites intermittently wet and dry.

**USE AND MANAGEMENT**

Inland saltgrass is grazed by horses and cattle during summer when it is green and during other seasons when it is the only forage available. It is one of the few plants that grows on highly saline soils and protects them from wind erosion.

Management of other associated grasses keeps inland saltgrass vigorous.

*Elymus virginicus*, Virginia wildrye



*Elymus virginicus* L., Virginia wildrye

**DESCRIPTION**

*Cool-season*, perennial bunch grass.

*Height*: 3-1/2 to 4 feet.

*Leaf blade*: Wide; flat.

*Leaf sheath*: Rounded; smooth; almost as long as internodes.

*Seedhead*: Spike, which tends to nod or bend over; glumes with long awns.

**GROWTH CHARACTERISTICS**

In the South, growth starts in late fall when daily temperature is 50° to 60° F. Grows best under 20- to 30-percent shade and in association with other grasses. Produces seed in May and early June. Becomes dormant during hot summer months. Most of the leaves grow widely spaced along the stem rather than from the base of plant. For this reason, Virginia wildrye is not a high forage producer.

**DISTRIBUTION**

Throughout most of United States and southern Canada.

**SITE ADAPTATION**

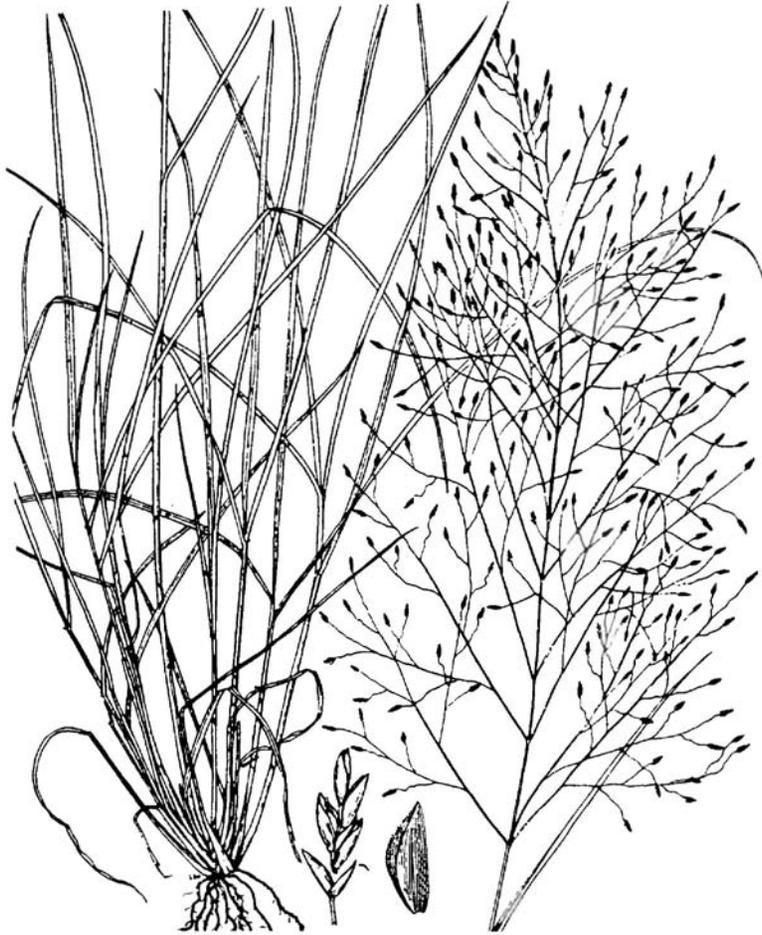
Grows principally on moist soils in woodlands and along drainageways that overflow occasionally. Does well on light-textured soil that has good internal drainage.

**USE AND MANAGEMENT**

Virginia wildrye is readily grazed by all livestock and deer, particularly during fall, winter, and spring. Many upland game birds eat the seed.

Because leaves are easily accessible to all livestock, frequent grazing deferments, particularly in late spring and early fall, are essential.

*Eragrostis intermedia*, plains lovegrass



*Eragrostis intermedia* Hitchc., plains lovegrass

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height:* 2 to 3-1/2 feet.

*Leaf blade:* Flat; rolls inward under dry conditions, giving threadlike appearance.

*Leaf sheath:* Mostly basal; smooth; as long as internodes; conspicuous line of hair at collar.

*Seedhead:* Open panicle large and showy, brownish green before seed ripen; spikelets 3- to 8-flowered extend horizontally from main stem; silver hair around stem at base of panicle.

**GROWTH CHARACTERISTICS**

Growth starts in early spring. Because this grass has a high seedstalk to leaf ratio, it is a low forage producer. Seldom found in pure stands but is generally scattered throughout the plant community.

**DISTRIBUTION**

Primarily throughout southern Plains, east to Georgia, west to California, and south to Central America.

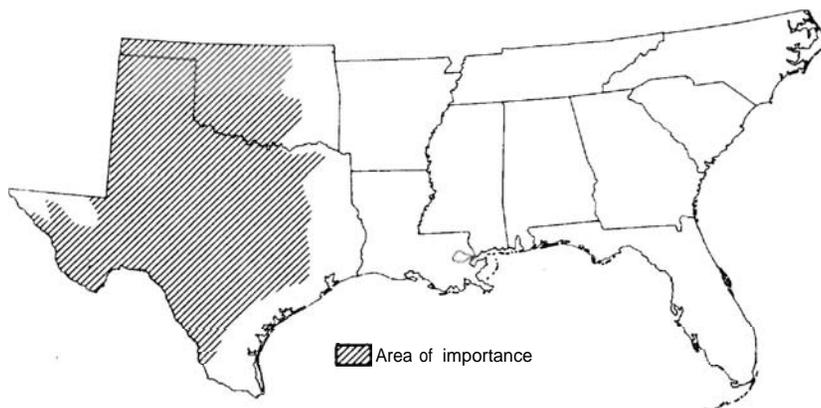
**SITE ADAPTATION**

Grows on dry upland soils ranging from clay to sand.

**USE AND MANAGEMENT**

Plains lovegrass provides good forage for livestock. Its seed are eaten by upland game birds. Because it usually makes up a small percentage of the forage production on any site, it is seldom a key management species.

Management of other associated grasses keeps lovegrass vigorous.



*Eragrostis spectabilis*, purple lovegrass

*Eragrostis spectabilis* (Pursh) Steud., purple lovegrass

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 1 to 3 feet.

*Leaf blade*: 8 to 18 inches long; densely hairy; stiffly ascending when young; tapers to fine point.

*Leaf sheath*: Longer than internodes; covered with long, gray hair.

*Ligule*: Hairy.

*Seedhead*: Open panicle 1 to 2 feet long and about as wide, bright purple until maturity; tuft of hair in axil of seed-stalks; spikelets 6- to 12-flowered.

GROWTH CHARACTERISTICS

Growth starts in early spring and continues into fall. Grows in colonies. Never makes up large percentage of plant composition. Seedheads are weak, break off easily, and tumble in the wind. Some plants produce short, slender rhizomes.

DISTRIBUTION

All states east of Rocky Mountains.

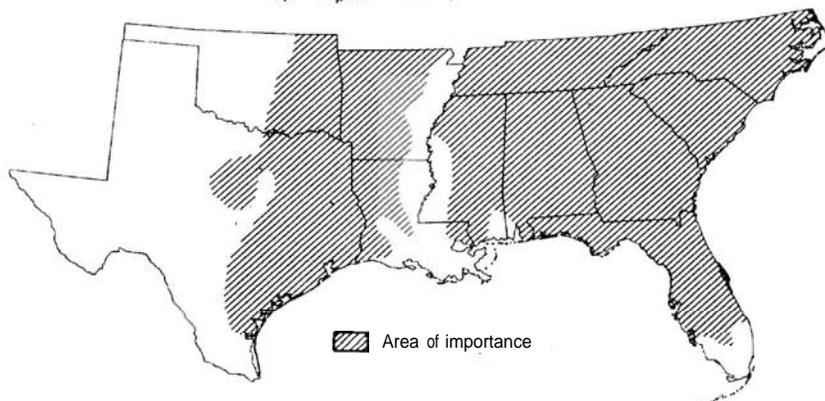
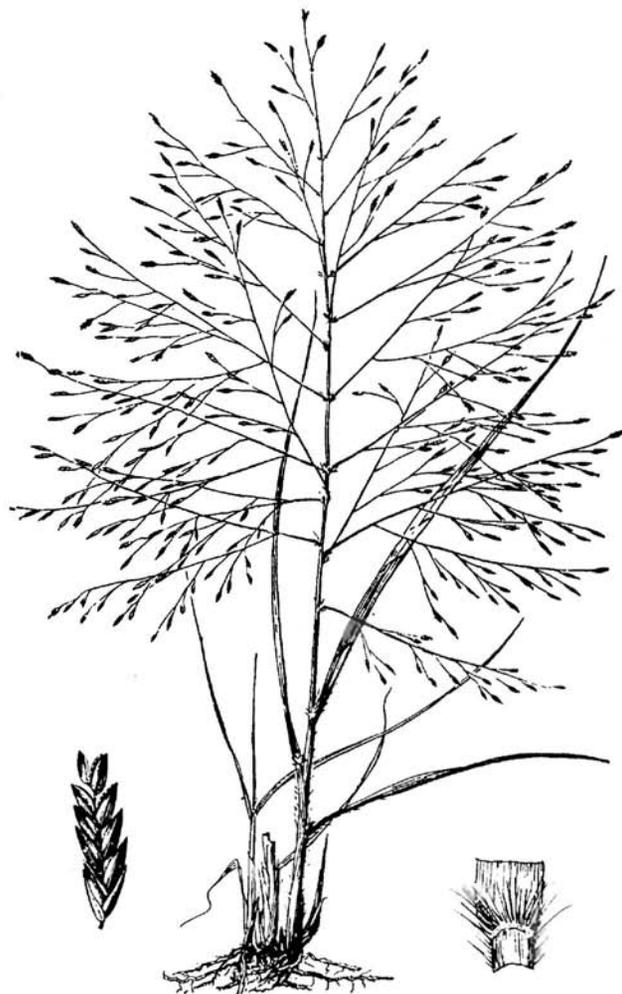
SITE ADAPTATION

Primarily adapted to medium- and coarse-textured soils.

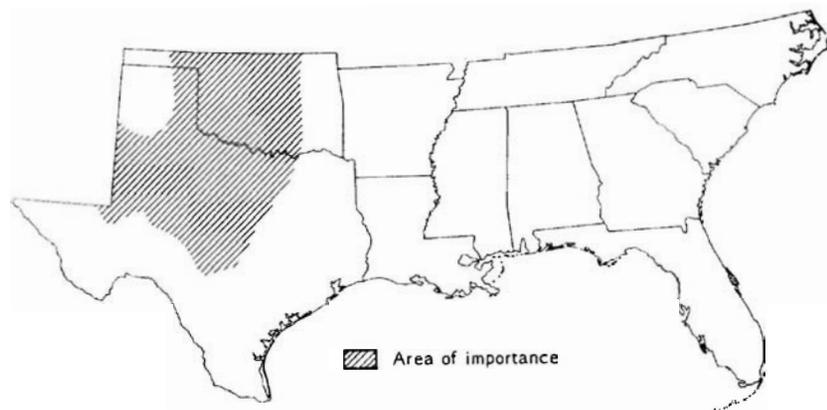
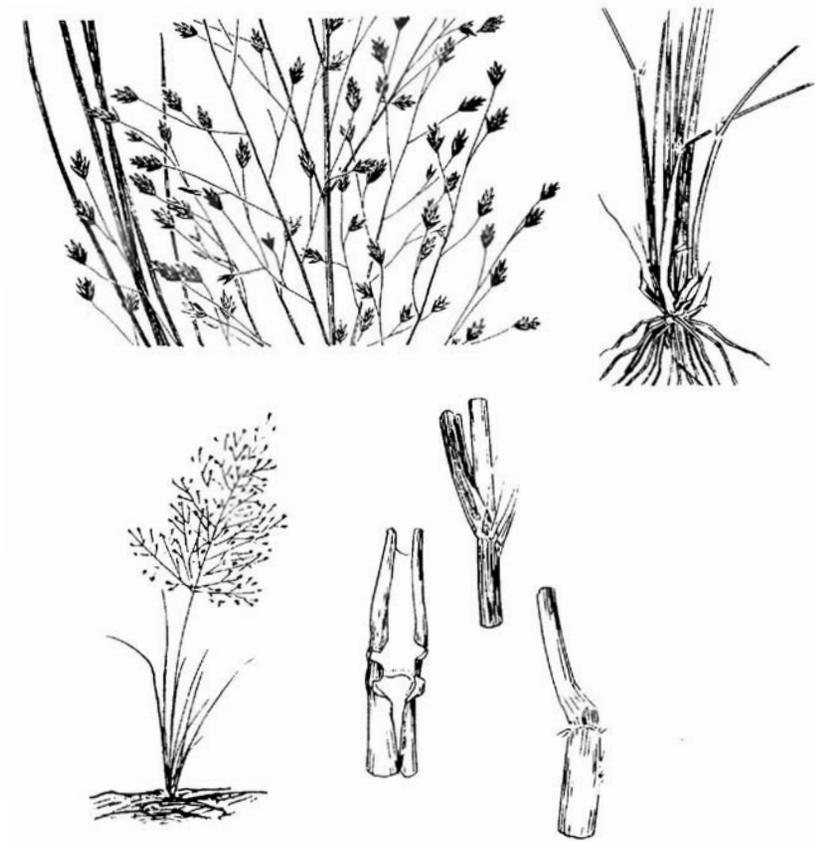
USE AND MANAGEMENT

Purple lovegrass is readily grazed by livestock in spring and early summer. On heavily grazed areas, deer dig up and eat the basal part of the stem during winter.

This grass adds variety to livestock diet but is seldom abundant enough to be a key management species. It makes maximum production when no more than 50 percent of current year's growth by weight is grazed off. A summer grazing deferment of at least 90 days improves plant vigor. This grass increases under controlled annual burning.



*Eragrostis trichodes*, sand lovegrass



*Eragrostis trichodes* (Nutt.) Wood, sand lovegrass

DESCRIPTION

Warm-season, short-lived, perennial bunch grass.

Height: 2-1/2 to 5 feet.

Leaf blade: Flat; narrow; rolls inward under dry conditions, giving threadlike appearance.

Leaf sheath: Rounded; nearly as long as internodes; hairy an inch or so below collar.

Seedhead: Large, open, purplish panicle; spikelets mostly 4- to 6-flowered.

GROWTH CHARACTERISTICS

This grass has a high stem to leaf ratio. After stems are grazed off, they often become stiff and harsh to touch.

DISTRIBUTION

Nebraska to Illinois, south to Texas.

SITE ADAPTATION

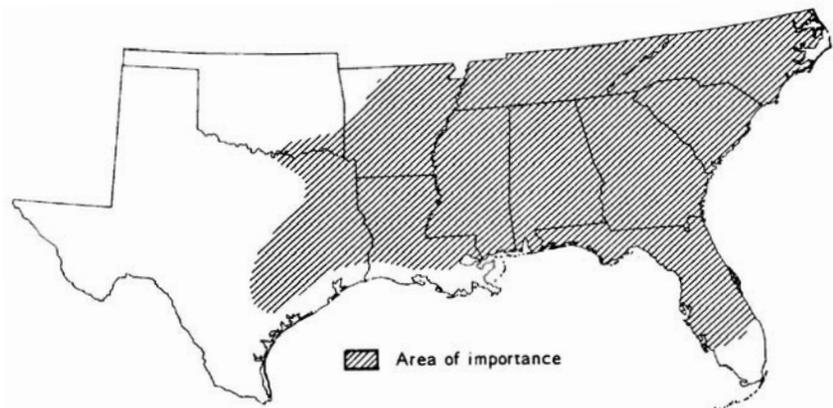
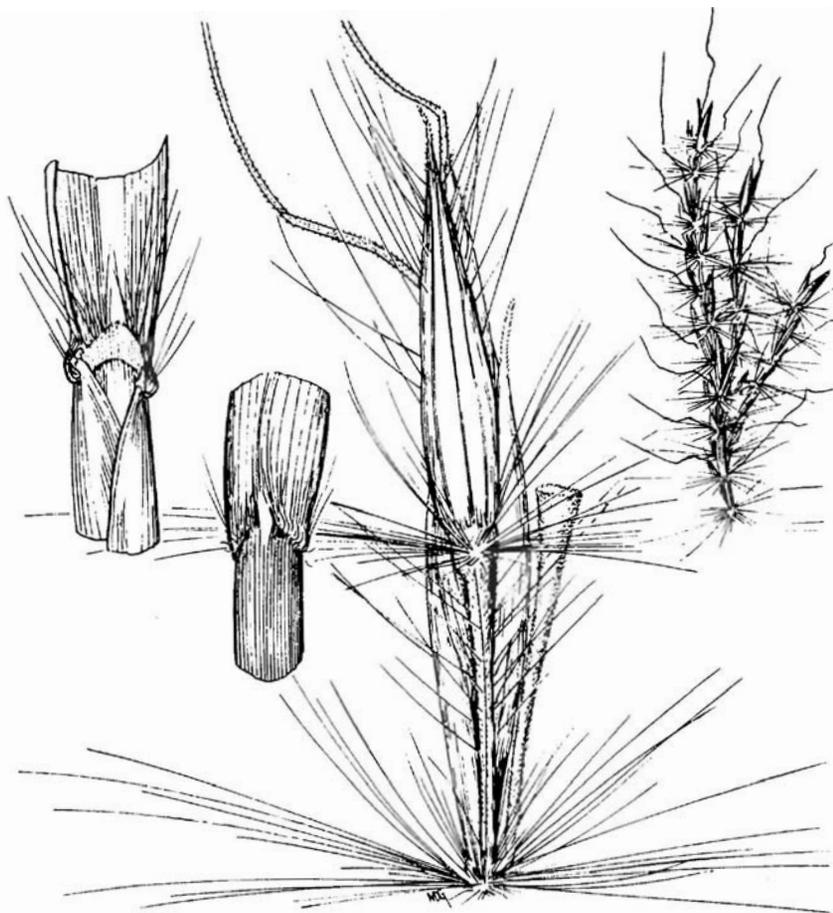
Grows principally on deep sands and sandy loam soils.

USE AND MANAGEMENT

Sand lovegrass is grazed by livestock and is sometimes cut for hay. Occasionally, it is included in range-seeding mixtures for quick cover and forage production.

This grass is seldom a key management species. It cures well on stem and provides good grazing in fall and winter if grazing is deferred during summer months.

*Erianthus contortus*, bent-awn plumegrass



*Erianthus contortus* Baldw. ex Ell., bent-awn plumegrass

#### DESCRIPTION

*Warm-season*, robust, perennial bunch grass.

*Height*: 4 to 7 feet.

*Leaf blade*: Wide; flat; strong midrib.

*Leaf sheath*: Few hairs, especially at upper end; shorter than internodes.

*Stem*: Large; rigid; sometimes 3/8 to 1/2 inch in diameter at base. Nodes smooth or covered with short white hair.

*Seedhead*: Open panicle brownish at maturity, hair as long as spikelets at its base; glume has awn 3/8 to 1/2 inch long spirally coiled at base of spikelet.

#### GROWTH CHARACTERISTICS

New growth comes from axillary buds at basal nodes each year about April or May. Also reproduces from seed. Grows in large bunches 8 to 10 inches in diameter. Seedheads appear in September and October.

#### DISTRIBUTION

Throughout forested areas of South.

#### SITE ADAPTATION

Grows mostly on moist sandy to sandy loam soils high in natural fertility.

#### USE AND MANAGEMENT

Bent-awn plumegrass is grazed by cattle and horses.

This grass is easily overgrazed. A season-long grazing deferment every 2 to 3 years maintains healthy, vigorous plants.

*Eriochloa sericea*, Texas cupgrass

*Eriochloa sericea* (Scheele) Munro, Texas cupgrass



DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 1 to 4 feet.

*Leaf blade*: 4 to 12 inches long; basal; tightly rolled inward; hairy at collar.

*Leaf sheath*: Shorter than internodes; lower sheath hairy.

*Ligule*: Dense ring of straight hair.

*Seedhead*: Several racemes pressed against rachis; 4 to 10 fuzzy spikelets; pedicels with several stiff hairs one-half as long as spikelets; seedhead 4 to 8 inches long.

GROWTH CHARACTERISTICS

Growth starts in late winter or early spring, giving it some characteristics of a cool-season grass. Produces seedheads in early summer, usually June and July. May become semidormant in midsummer and grow again in fall if moisture is available. Generally, leaves stay green during winter. After seed are disseminated, seedhead appears hairy and end of rachis is cup shaped.

DISTRIBUTION

South-central Oklahoma to south Texas and a few locations in eastern New Mexico.

SITE ADAPTATION

Best adapted to dry, mostly limestone soils on prairie and hill-sidesites. Seldom grows in thick stands.

USE AND MANAGEMENT

Texas cupgrass is relished by all livestock after new growth starts and remains palatable all year. Forage quality is high. When grazed in winter, supplement with protein concentrate. It is an indicator of good range condition.

Because this grass seldom dominates a site, it is seldom a key management species. An early spring grazing deferment of at least 90 days every 2 to 3 years allows it to maintain vigor and produce a seed crop.

*Heteropogon contortus*, tanglehead



***Heteropogon contortus* (L.) Beauv. ex Roem. and Schult,  
tanglehead**

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height*: 2 to 3 feet.

*Leaf blade*: Flat or folded; narrow.

*Leaf sheath*: Smooth; compressed or keeled; mostly basal.

*Seedhead*: Solitary raceme 1-1/2 to 3 inches long, one-sided; spikelets sessile; glumes have long, black, tangled awns at maturity.

**GROWTH CHARACTERISTICS**

Growth starts in late spring. If moisture is adequate, continues to grow until August when seedheads start to mature. Awns on seed twist and untwist as moisture changes. This characteristic and the needle shape of the seed assist in planting it in the soil. Mature plant is a reddish color in fall.

**DISTRIBUTION.**

Southern Arizona and Texas and Cape Sable, Florida.

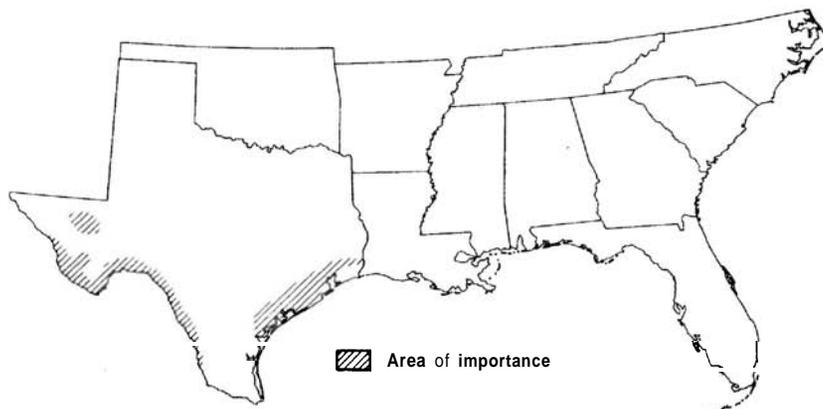
**SITE ADAPTATION**

Grows best on immature soils on rocky hillsides and in canyons.

**USE AND MANAGEMENT**

Tanglehead is grazed by all livestock. In Hawaiian Islands, where it is called pili, it is used by natives to thatch grasshuts.

This grass will not stand continuous grazing, although close grazing is recommended to reduce injury to sheep from awns. If grazed by sheep, grazing should be deferred 60 to 90 days while seed ripen and fall to the ground.



*Hilaria belangeri*, curly mesquite

*Hilaria belangeri* (Steud.) Nash, curly mesquite

DESCRIPTION

*Warm-season*, stoloniferous perennial.

*Height*: 4 to 10 inches.

*Leaf blade*: Flat; curly; usually short.

*Leaf sheath*: Shorter than internodes; mostly basal.

*Stem*: Erect and stoloniferous.

*Seedhead*: Solitary spike usually 3/4 to 1 inch long.

GROWTH CHARACTERISTICS

Growth starts in late spring. Seedheads emerge 30 to 40 days later. Reproduces primarily from stolons. Some stolons are aerial and produce leaves and no roots; others creep along the ground and produce both leaves and roots at nodes, which usually have a ring of hair. Grows mostly in pure stands. Sometimes grows in clusters from axillary buds on basal nodes. Does not tolerate shade. Plants are pale green. This grass is not a vigorous competitor.

DISTRIBUTION

Most of Texas, southern Oklahoma, west to Arizona and in northern Mexico.

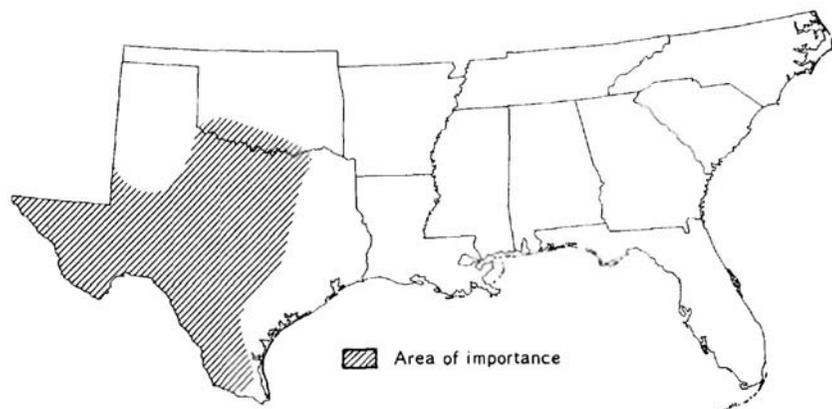
SITE ADAPTATION

Grows on a wide variety of soils. Grows best on loams to clay loams that have a pH of 6.8 to 7.4.

USE AND MANAGEMENT

Curly mesquite is grazed all year by horses, cattle, sheep, goats, antelope, and deer.

For maximum production, this grass requires proper grazing use and periodic grazing deferments of 30 to 40 days all year.



*Hilaria mutica*, tobosagrass



***Hilaria mutica* (Buckl.) Renth., tobosagrass**

**DESCRIPTION**

*Warm-season, rhizomatous perennial.*

*Height: 18 to 36 inches.*

*Leaf blade: Flat or somewhat rolled inward.*

*Leaf sheath: Shorter than internodes.*

*Stem: Twists and curves inward at top at maturity; nodes hairy.*

*Seedhead: Spike 1-1/2 to 2 inches long; spikelets bearded at base, whitish at maturity.*

**GROWTH CHARACTERISTICS**

Grows and spreads from vigorous scaly rhizomes. This grass is a low seed producer. On some sites, it forms a sod; on others, it grows more like a bunch grass. Stems and leaves green up after long dormant periods. Gray-white leaves and stems tend to tangle at maturity. Often grows in pure stands.

**DISTRIBUTION**

Central Texas to California, north to Oklahoma and Colorado; in northern Mexico.

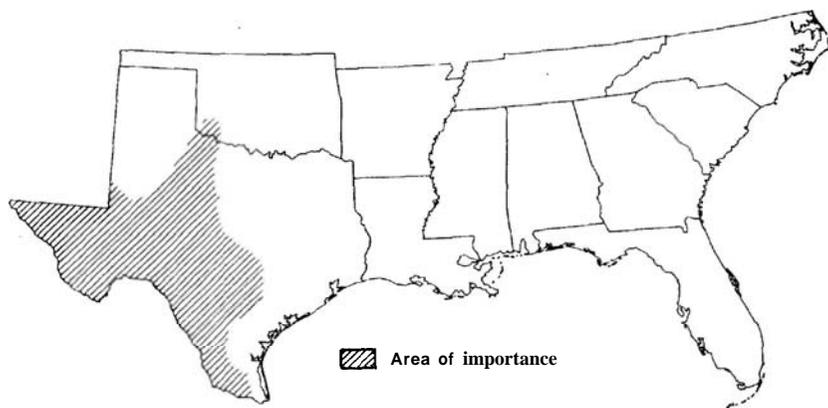
**SITE ADAPTATION**

Grows best on adobe (clay) flats and upland clay loams, giving rise to the common name, tobosa flats. Occasionally grows on loams or sandy loams and on slopes.

**USE AND MANAGEMENT**

Tobosagrass is grazed by cattle and horses. It makes good quality hay if cut about the time seedheads appear, generally July.

Because this grass is less palatable than blue grama and side-oats grama, two associated climax grasses, it increases under continuous grazing. It responds readily to extra moisture during growing season. Water spreading on some sites increases production. Overgrazing kills this grass.



*Leptochloa dubia*, green sprangletop



*Leptochloa dubia* (H. B. K.) Nees, green sprangletop

#### DESCRIPTION

*Warm-season*, short-lived, perennial bunch grass.

*Height*: 1 to 3 feet.

*Leaf blade*: 6 to 18 inches long; usually flat; sometimes folded.

*Leaf sheath*: Sometimes longer than internodes; flattened; often purplish.

*Ligule*: Hairy.

*Seedhead*: Spreading, open, nodding panicle 4 to 12 inches long, consisting of 5 to 20 slender, well separated branches 2 to 5 inches long; each spikelet 5- to 8-flowered.

#### GROWTH CHARACTERISTICS

Growth starts about April. If moisture is scarce, may become semidormant in summer and make new growth after fall rains. Becomes dormant in late fall. May produce two seed crops--one in spring and one in fall. Seedhead turns pale and droops at maturity.

#### DISTRIBUTION

Florida, Texas, Oklahoma, New Mexico, and Arizona.

#### SITE ADAPTATION

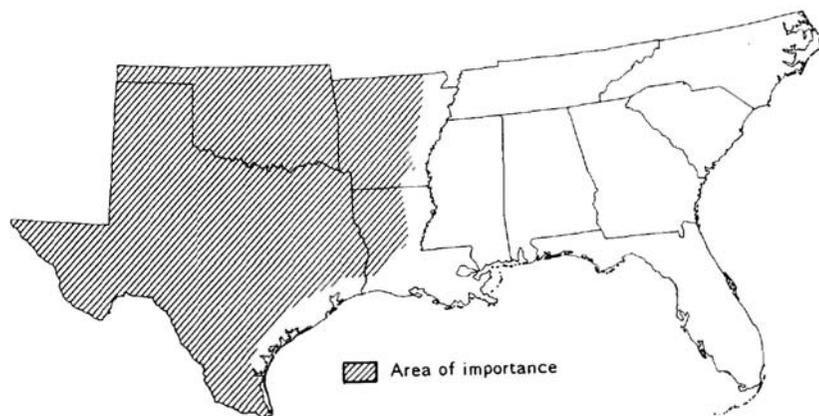
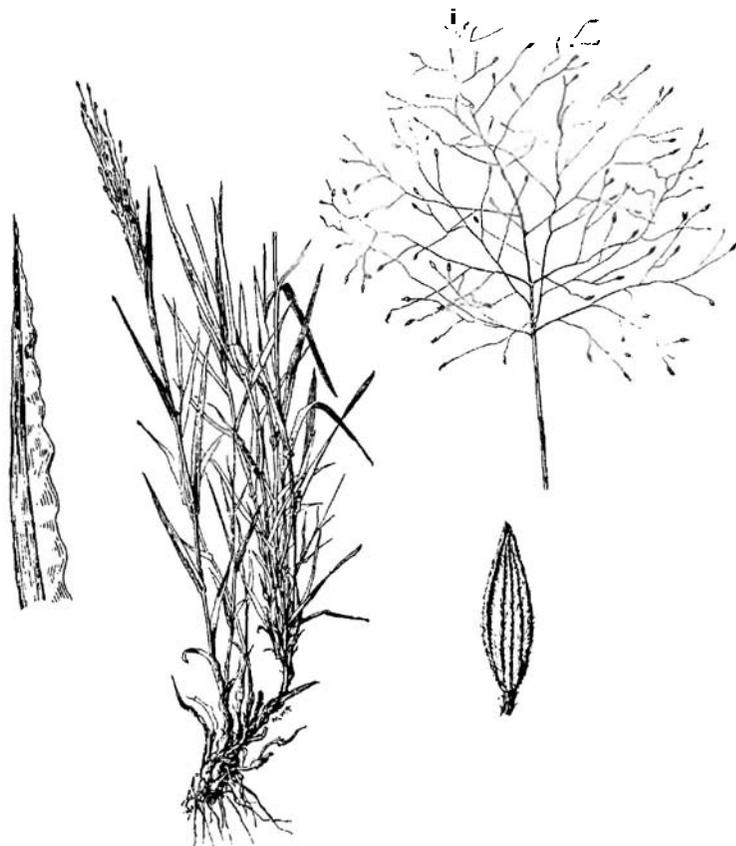
Best adapted to deep sandy soils in Florida and to rocky hills and canyons in the rest of range. Seldom found on deep clay or deep sandy soils in western part of range.

#### USE AND MANAGEMENT

Green sprangletop is grazed readily by all livestock, especially when green and succulent. During dormant season, it furnishes good quality forage but should be supplemented with a protein concentrate. It is used in range seeding mixtures.

When this grass is a key management species, no more than 50 percent of current growth by weight should be removed at any season. Summer and fall grazing deferments of at least 90 days improve vigor, increase seed production, and provide forage for winter use.

*Leptoloma cognatum*, fall witchgrass



*Leptoloma cognatum* (Schult.) Chase, fall witchgrass

DESCRIPTION

*Warm-season*, short-lived, perennial bunch grass.

*Height*: 1 to 2 feet.

*Leaf blade*: Narrow; generally less than 4 inches long; one side wavy, the other smooth.

*Leaf sheath*: Rounded; shorter than internodes.

*Stem*: Knotty; hairy at base.

*Seedhead*: Open purplish panicle one-third to one-half as tall as plant; branches hairy in axils; spikelets 1-flowered, solitary at end of long pedicel.

GROWTH CHARACTERISTICS

Growth starts in spring. Seedheads are produced a month later. Foliage remains green for 2 to 3 weeks longer. When climate is favorable, makes some fall growth. Seed remain on plant until winter. Fall witchgrass is shallow rooted. Individual plants are usually widely scattered in any plant community.

DISTRIBUTION

Minnesota to New Hampshire, south to Florida, west to Texas and Arizona, and in northern Mexico.

SITE ADAPTATION

Grows best on sandy loams with a heavier subsoil.

USE AND MANAGEMENT

Fall witchgrass is grazed by all domestic livestock and by deer and antelope. Upland game birds eat the seed.

Proper use and management of associated grasses maintain this grass in the plant community.

*Manisuris cylindrica*, Carolina jointtail



*Manisuris cylindrica* (Michx.) Kuntze, Carolina jointtail

DESCRIPTION

*Warm-season, rhizomatous perennial.*

*Height: 1 to 3-1/2 feet.*

*Leaf blade: Slender; pointed; 8 to 14 inches long; flat at first; rolled inward at maturity; basal blades shorter than those higher on stem.*

*Leaf sheath: Rounded; about as long as internodes.*

*Stem: Erect with swollen, purplish nodes.*

*Seedhead: Raceme cylindric, slightly curved; seedhead 2 to 6 inches long; spikelets sessile, awnless, in pairs at nodes of a thickened rachis.*

GROWTH CHARACTERISTICS

Growth starts in early spring. Produces seedheads in May and June. Seed disseminate in early summer. Becomes dormant in fall. Reproduces from short, bulb-shaped rhizomes. Does not grow in pure stands but is scattered throughout plant community.

DISTRIBUTION

North Carolina to Florida, west to Texas, and north to Oklahoma and Missouri.

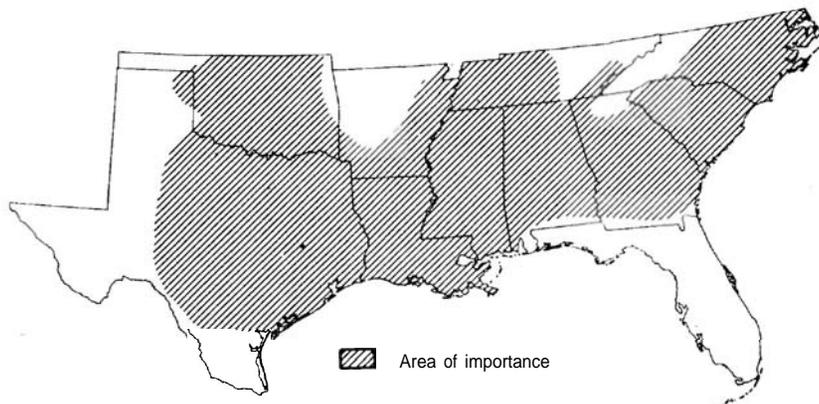
SITE ADAPTATION

Grows best on well-drained soils.

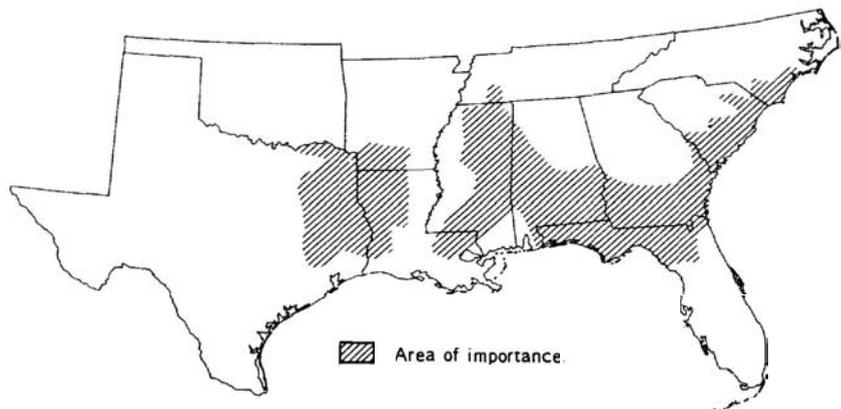
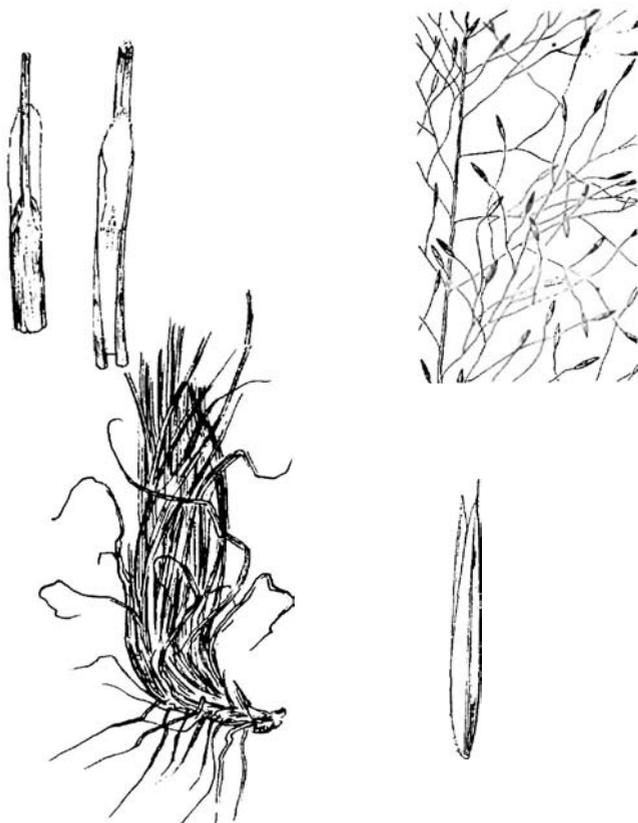
USE AND MANAGEMENT

Carolina jointtail is grazed readily by all livestock.

This grass is never abundant enough to be a key management species. Proper use and management of associated grasses maintain it in the plant community.



*Muhlenbergia expansa*, cutover muhly



*Muhlenbergia expansa* (DC.)Trin., cutover muhly

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 1 to 3 feet.

*Leaf blade*: 12 to 14 inches long; narrow; wiry; tough; twists slightly at maturity; margins fold or roll inward.

*Leaf sheath*: Rounded; mostly basal; curls into fibrous mass at maturity.

*Ligule*: White, papery membrane 1/8 to 1/4 inch long.

*Seedhead*: Open, delicate, purple panicle 14 to 20 inches long; spikelets 1/4 inch long; short awns on glumes.

GROWTH CHARACTERISTICS

Makes major growth from April through September. A mixture of young, mature, and dead growth in a single clump is usual. Little, if any, growth is made during cool season. Summer growth, however, remains green during fall and winter. Seed-stalks produced in late August and September frequently persist through winter and early spring.

DISTRIBUTION

Throughout Coastal Plain from Virginia to northern Florida; southern half of Alabama, Mississippi, Arkansas, and Louisiana; and east Texas.

SITE ADAPTATION

Adapted to level to very gently sloping, poorly drained strongly acid sands with a fine-textured subsoil.

USE AND MANAGEMENT

New growth of cutover muhly is fair forage. Old growth, which is partly green during winter, furnishes fair forage but livestock should be fed a protein supplement.

Generally this grass makes up a small part of the plant community. It is controlled by burning and grazing. It responds to proper grazing use and a grazing deferment of at least 60 days during growing season.

*Muhlenbergia lindheimeri*, lindheimer muhly



*Muhlenbergia lindheimeri* Hitchc., lindheimer muhly

#### DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 3 to 6 feet.

*Leaf blade*: 6 to 30 inches long; firm; usually folded.

*Leaf sheath*: Mostly basal; overlapping; keeled.

*Ligule*: Long, slender, white, pointed, papery membrane somewhat hidden in folded blades.

*Seedhead*: Narrow, somewhat loose panicle 8 to 24 inches long, often purplish; numerous branches, usually less than 2-1/2 inches long, crowded with spikelets which lie close to main stem.

#### GROWTH CHARACTERISTICS

Grows from early spring until fall. Large, dense bunches have some green leaves throughout winter. Seedheads formed in summer persist for several months.

#### DISTRIBUTION

Certain sites in the Edwards Plateau and Grand Prairie land resource areas in Texas.

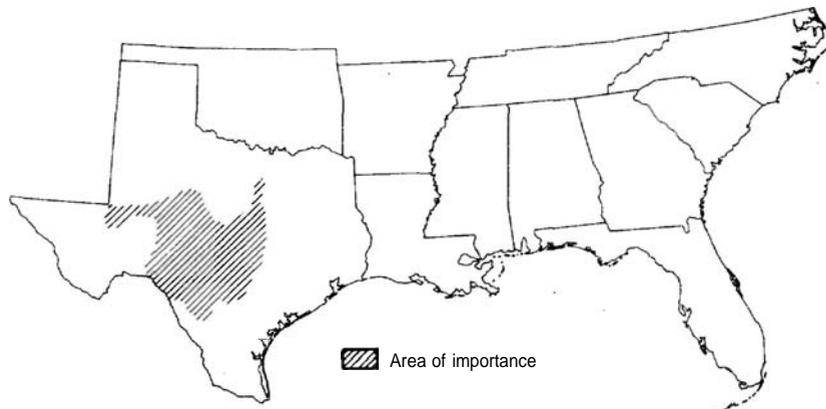
#### SITE ADAPTATION

Adapted to highly calcareous, somewhat seepy sites on hillsides and in draws.

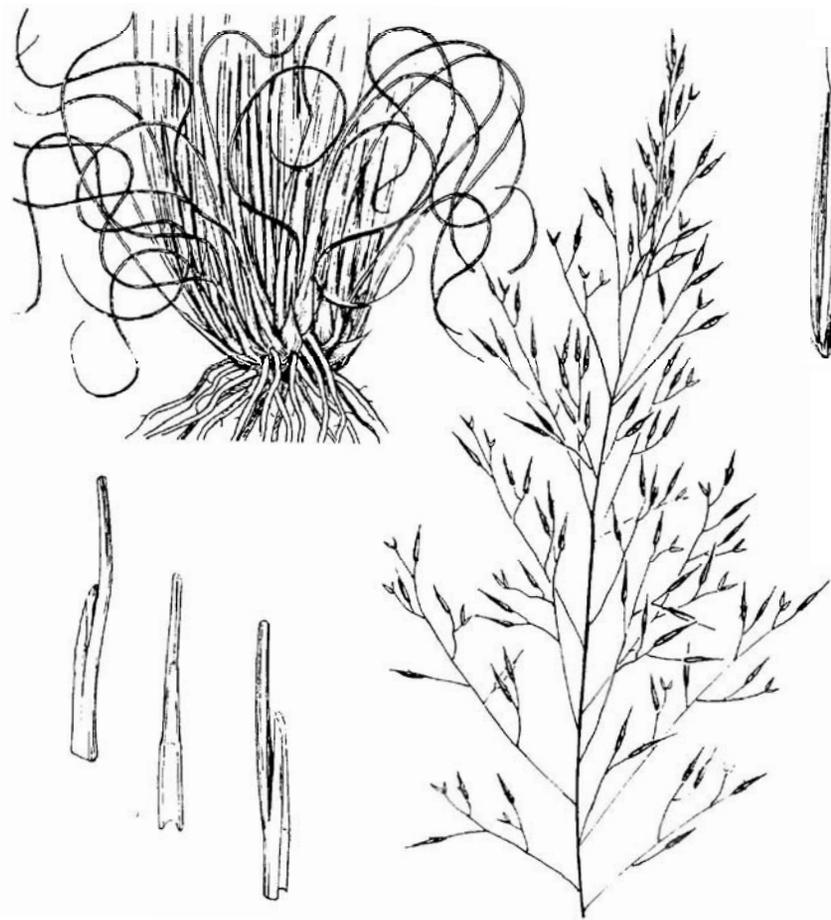
#### USE AND MANAGEMENT

Cattle graze the leaves of lindheimer muhly that remain green during winter. Horses sometimes choose this grass. It is an indicator of fair range condition.

This grass is seldom, if ever, abundant enough to be a key management species. Because it is tough and wiry, it is seldom overgrazed. Proper grazing use and management of more palatable associated grasses favor lindheimer muhly. It can be decreased by close mowing in June and July if terrain permits use of mowing equipment.



*Muhlenbergia reverchoni*, seep muhly



*Muhlenbergia reverchoni* Vasey and Scribn., seep muhly

#### DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 1 to 3 feet.

*Leaf blade*: Narrow; 6 to 10 inches long; upper blades shorter than lower ones; mostly twisting and sharp pointed.

*Leaf sheath*: Mostly basal; longer than internodes.

*Seedhead*: Open panicle about 10 inches long; branchlets 1 to 2 inches long with 1 to 8 spikelets each; a short awn on lemma of each spikelet.

#### GROWTH CHARACTERISTICS

Growth starts in early spring. If moisture is scarce, plants may become semidormant during midsummer and green up again in fall. Foliage is usually a mixture of old and new growth. Seedheads form in late summer and early fall. Forms dense bunches and grows in almost pure stands. Old basal sheaths form a curly, fibrous mass.

#### DISTRIBUTION

Only in Texas and Oklahoma.

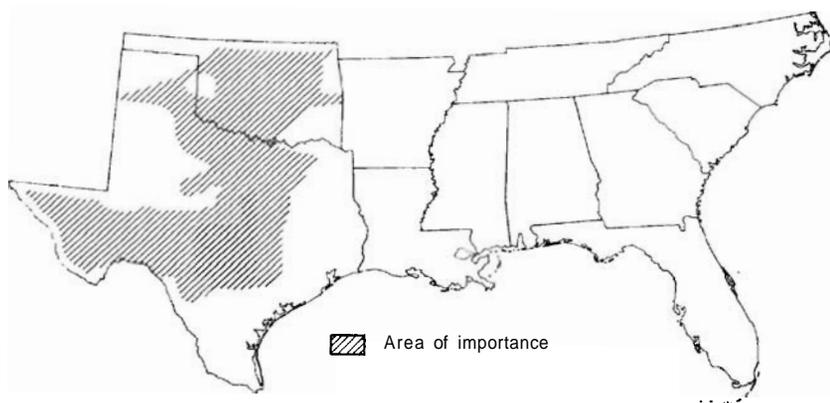
#### SITE ADAPTATION

Adapted to rocky, highly calcareous, often seepy hillsides.

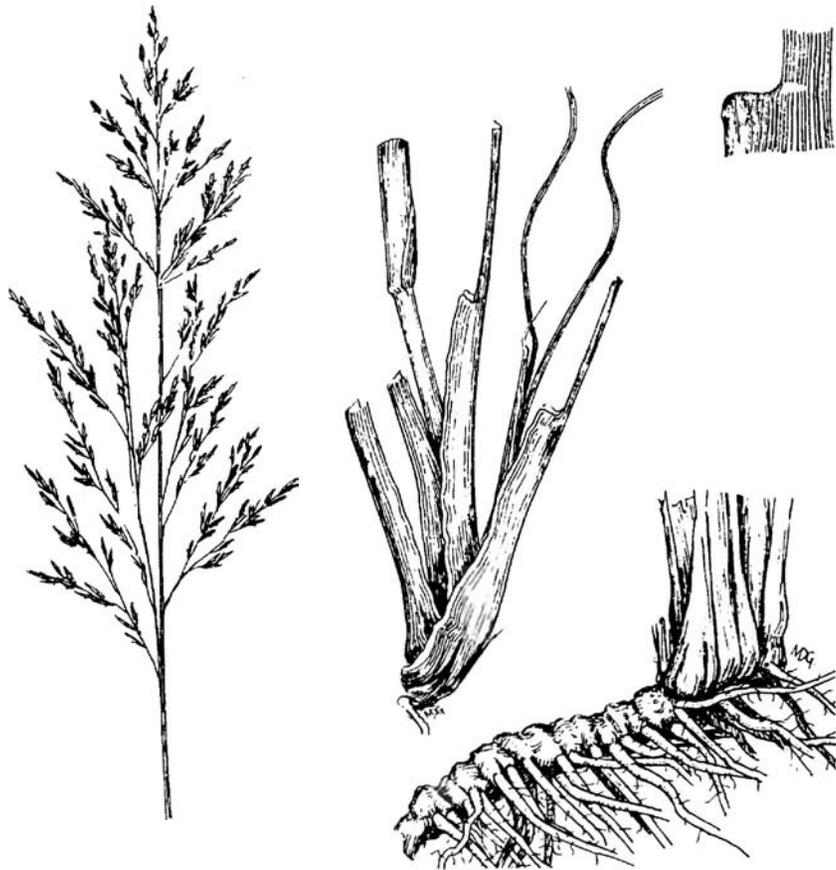
#### USE AND MANAGEMENT

Because seep muhly is tough and wiry, it is grazed mostly during winter. It is a good conservation plant on steep, highly erodible soils where adapted.

This grass is seldom selected as a key management species. When selected, no more than 50 percent of current year's growth by weight should be removed at any season. Summer and fall grazing deferments of at least 90 days result in a forage reserve for winter. Seep muhly withstands frequent burning primarily because it grows on moist to wet sites.



*Panicum abscissum*, cutthroatgrass



*Panicum abscissum* Swallen, cutthroatgrass

DESCRIPTION

*Warm-season*, robust, rhizomatous perennial.  
*Height*: 2 to 4 feet.  
*Leaf blade*: Narrow; keeled; 16 to 18 inches long; twisted when dry.  
*Leaf sheath*: Mostly basal; overlapping; keeled; wide; cuts back sharply at collar.  
*Ligule*: Membrane about 1/32 inch long.  
*Seedhead*: Open purple panicle 8 to 10 inches long.

GROWTH CHARACTERISTICS

Growth starts in January but little foliage is produced until March, April, and May. Regrows well after spring grazing. Seedheads appear in June; seed ripen in late July and early August. Reproduces primarily from robust, thick rhizomes. Grows well in 35- to 40-percent shade.

DISTRIBUTION

Only in south-central Florida.

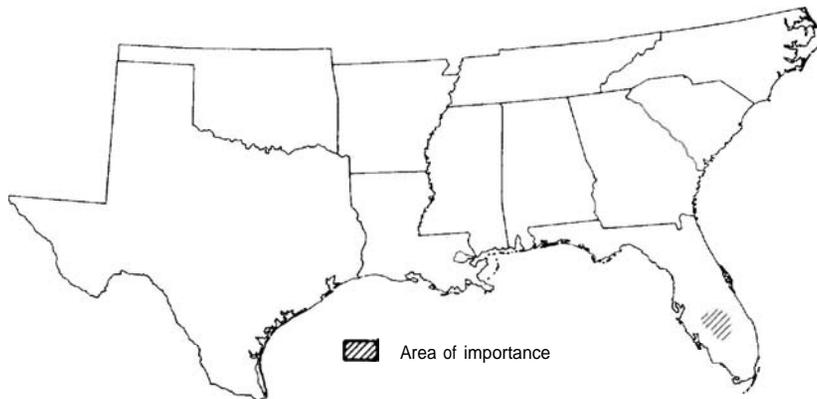
SITE ADAPTATION

Grows only on strongly acid, seepy, sandy sites.

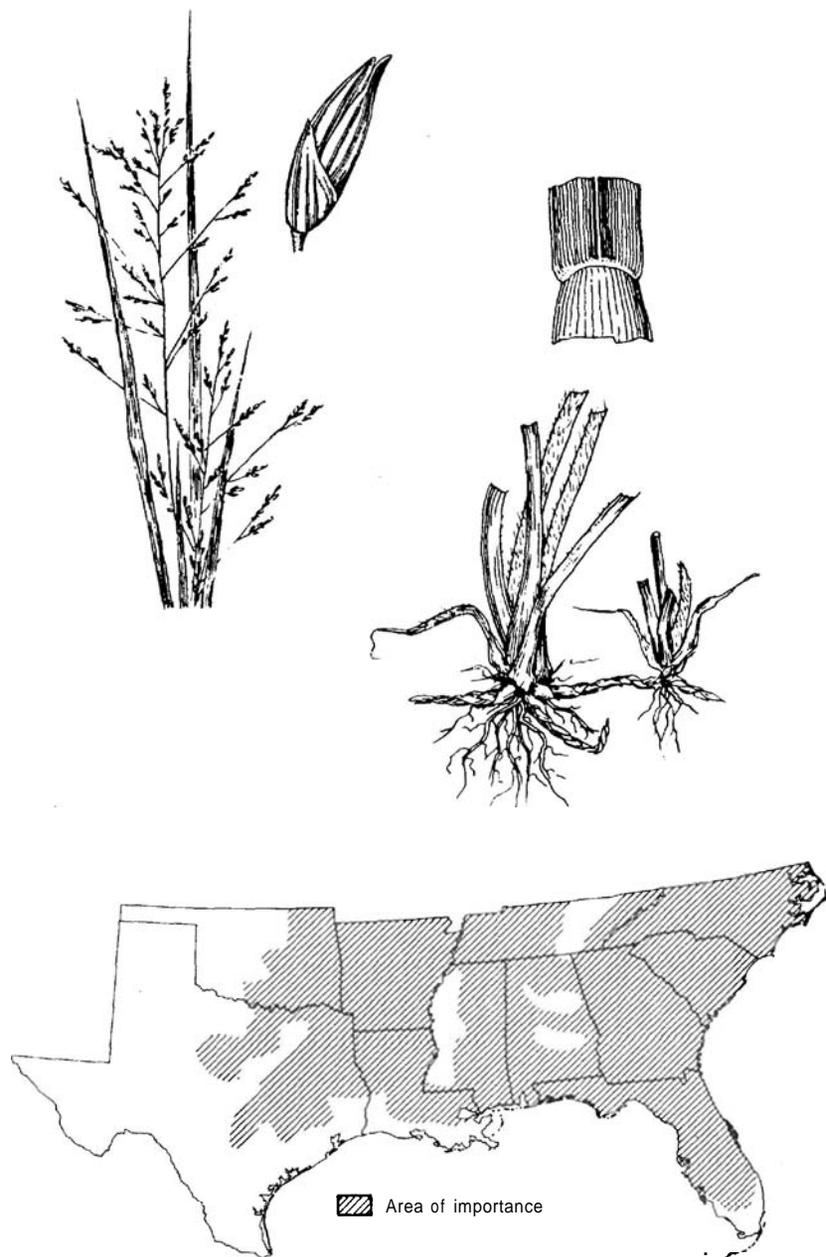
USE AND MANAGEMENT

Cutthroatgrass is grazed by cattle all year. Deer graze it in the spring. Livestock grazing it in winter must be fed a complete mineral and protein supplement.

Deferred grazing every few years during spring for at least 90 days keeps this grass vigorous and productive. Occasional controlled burning eliminates unused material. New growth following a burn is excellent forage.



*Panicum anceps*, beaked panicum



*Panicum anceps* Michx., beaked panicum

DESCRIPTION

*Warm-season*, weak, rhizomatous perennial.

*Height*: 2 to 4 feet.

*Leaf blade*: Folded at base; somewhat V-shaped at tip; about 1/2 inch wide; upper side hairy near base; stiffly erect, giving the plant a distinct upright appearance.

*Leaf sheath*: Mostly basal; keeled; frequently purple tinged; covered with soft hair.

*Ligule*: Minute membrane.

*Seedhead*: Open panicle 6 to 14 inches long; each spikelet 1/4 to 1/8 inch long; second glume curved at end like a bird's beak.

GROWTH CHARACTERISTICS

Growth starts in February. Most of the vegetative growth is completed by May or June. Plants remain green until fall. Seed-heads appear during September. Beaked panicum is a prolific seed producer but few data are available on germination or viability. Tolerates shade. Pure stands are common. Forms large clumps as it spreads laterally from short rhizomes.

DISTRIBUTION

Mostly in forested region of the South and Southeast but grows in North and Northeast.

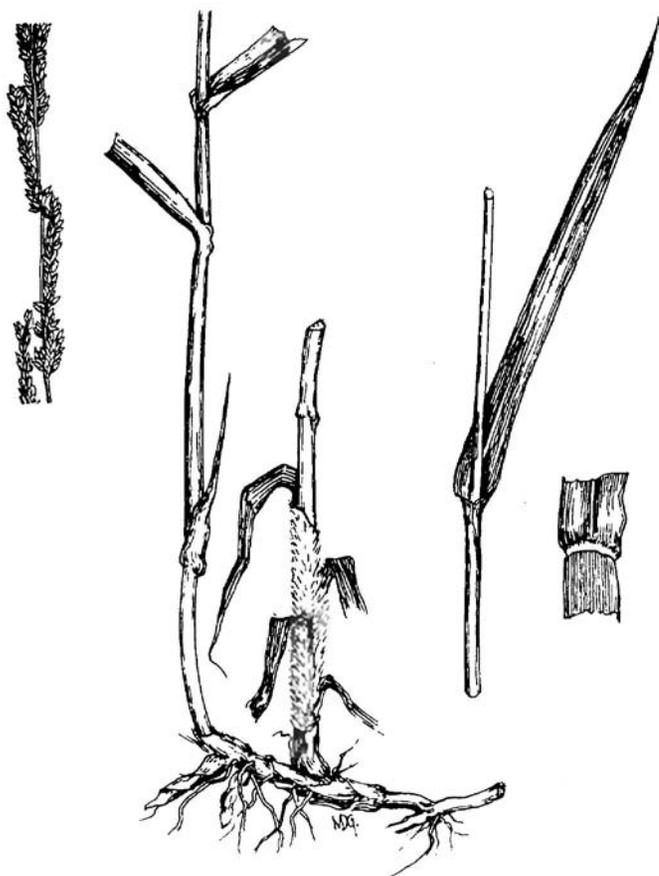
SITE ADAPTATION

Grows on moist to wet soils along margins of fresh marshes, swamps, and bottom lands that overflow occasionally. Grows best under 30- to 35-percent shade.

USE AND MANAGEMENT

Beaked panicum is grazed by cattle, horses, and deer. Seed are eaten by most upland birds and by some waterfowl.

This grass maintains its production and fits best into an annual grazing program if it is grazed in fall and winter and grazing is deferred during summer.



## DESCRIPTION

*Warm-season*, rhizomatous perennial.

*Height*: 2 to 6 feet.

*Leaf blade*: 8 to 12 inches long; 1/2 inch wide; usually rough on upper side, smooth on lower; grows along stem.

*Leaf sheath*: Rounded; overlapping; shorter than internodes; sheath around fertile seedstalk smooth; sheath around sterile seedstalk hairy at base.

*Rhizomes*: Numerous; long internodes 1/8 to 1/4 inch in diameter.

*Seedhead*: Compact, elongated panicle 6 to 8 inches long.

## GROWTH CHARACTERISTICS

Grows from late winter until fall. Produces seedheads in June and July. Dies back immediately after first frost, turning a characteristic gray.

## DISTRIBUTION

Fresh-water marshes, swamps, moist areas, and road ditches in all Gulf Coast States and along the Atlantic coast as far north as New Jersey.

## SITE ADAPTATION

Grows on a wide range of soils from firm mineral clays to floating organic soils. Tolerates practically no salt in free soil water. Grows best if water level fluctuates from 2 inches above soil surface to 4 inches below.

## USE AND MANAGEMENT

Maidencane is an important forage grass. It is occasionally harvested for hay. On most sites, it produces 4 to 5 tons of high-quality forage per acre. Chemical analysis of forage shows it is especially high in crude protein. This grass becomes tougher and less palatable as it matures.

For maximum production and feed quality, no more than 50 percent of current year's growth by weight should be grazed off. Grazing should be rotated every 60 to 70 days during spring and summer and grazing deferred 90 to 100 days in fall every third year. On some marsh ranges in Louisiana, cattle walkways make large areas of this grass more accessible to cattle and improve grazing distribution.

<sup>1</sup>Paille fine is the accepted common name for this grass in Louisiana and east Texas

*Panicum obtusum*, vine-mesquite

*Panicum obtusum* H. B. K., vine-mesquite

DESCRIPTION

*Warm-season*, stoloniferous perennial.

*Height*: 1-1/2 to 2-1/2 feet.

*Leaf blade*: Long; narrow; upright; smooth.

*Leaf sheath*: Mostly basal; one-half to three-fourths as long as internodes.

*Stolon*: Several feet long; long internodes; nodes swollen and covered with hair.

*Seedhead*: Narrow panicle 1 to 4 inches long; spikelets large, nearly round, brownish.

GROWTH CHARACTERISTICS

Growth starts in April or May. Produces seedheads in July and August. Seed are slow to disseminate. Reproduces from stolons and from seed. Often associated with other grasses but grows in more or less pure stands.

DISTRIBUTION

Throughout Southwest, northern Mexico, north to Colorado, and east to Missouri.

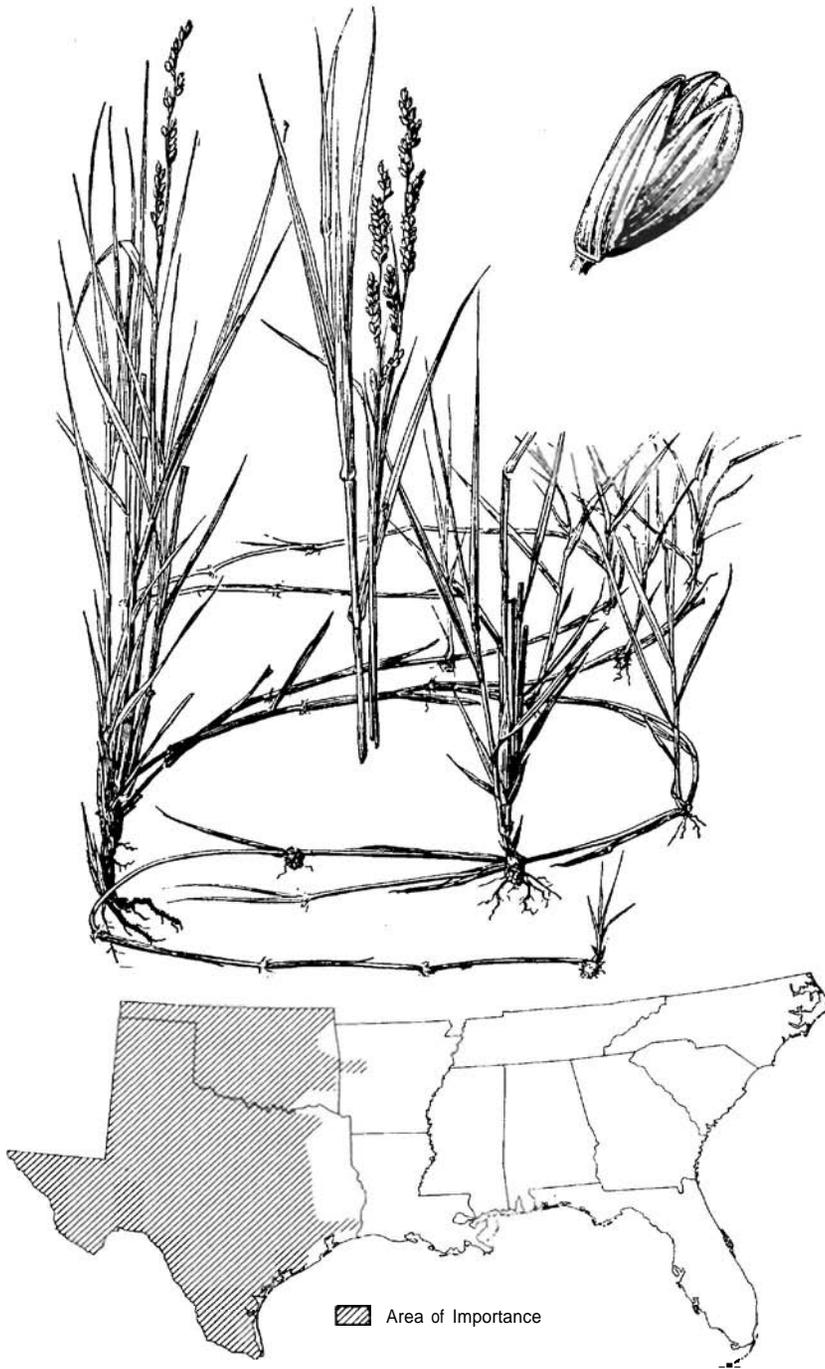
SITE ADAPTATION

Grows mostly in small depressions or along drainageways where water accumulates. Grows best on sandy to sandy loam soils. Also grows on clay loams and gravelly loams.

USE AND MANAGEMENT

Grazing is the primary use of vine-mesquite but it has been cut for hay. It is used to control erosion in waterways and small gullies. Quail and doves eat the seed in fall and early winter.

This grass is seldom abundant enough to be a key management species. Generally, it is less palatable than most grasses associated with it. Therefore, it is seldom overgrazed. When used for hay or erosion control, grazing should be deferred until after seed production.



DESCRIPTION

Warm-season, rhizomatous perennial.  
Height: 2 to 3 feet.  
Leaf blade: Flat; 1/4 to 1/2 inch wide; 12 to 18 inches long; both sides covered with long, soft hair.  
Leaf sheath: Rounded; as long as internodes; hairy; lower part purple tinged.  
Ligule: Tuft of hair.  
Seedhead: Open panicle 4 to 5 inches long, 2 inches wide; spikelets set at angle on pedicel.

GROWTH CHARACTERISTICS

Grows from axillary buds at basal nodes and from rhizomes from early spring until late August or early September. Plants low in vigor produce a single shoot from a rhizome. Although reproduction is primarily from rhizomes, spreading panicum produces an abundant seed crop each year if plants are healthy and vigorous. Produces seedheads in early September. Seed ripen in October. Plants are pale green. On severely grazed ranges, leaves and stems lie flat on the ground.

DISTRIBUTION

Throughout forested areas in South at elevations below 400 to 500 feet and north along Atlantic coast to Maryland.

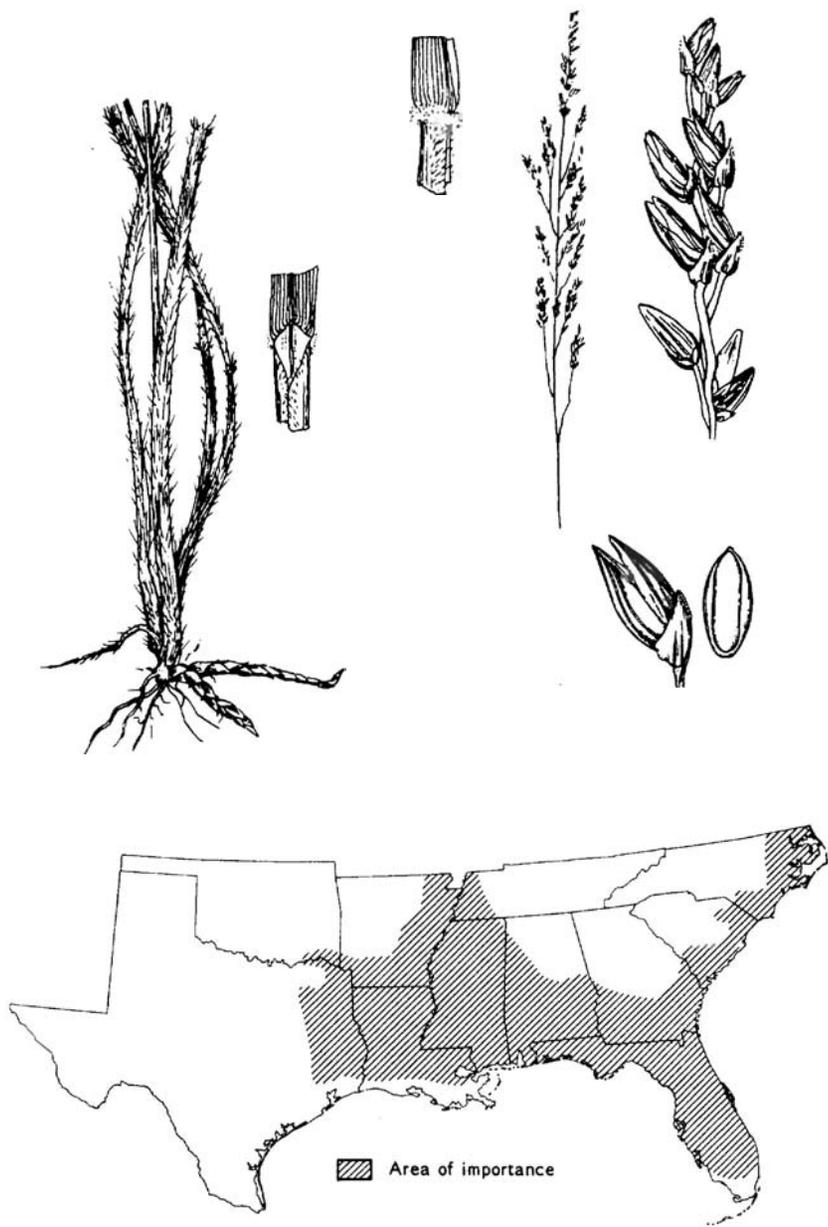
SITE ADAPTATION

Adapted primarily to poorly drained acid to neutral deep sandy soils but grows on strongly acid well-drained deep sandy soils.

USE AND MANAGEMENT

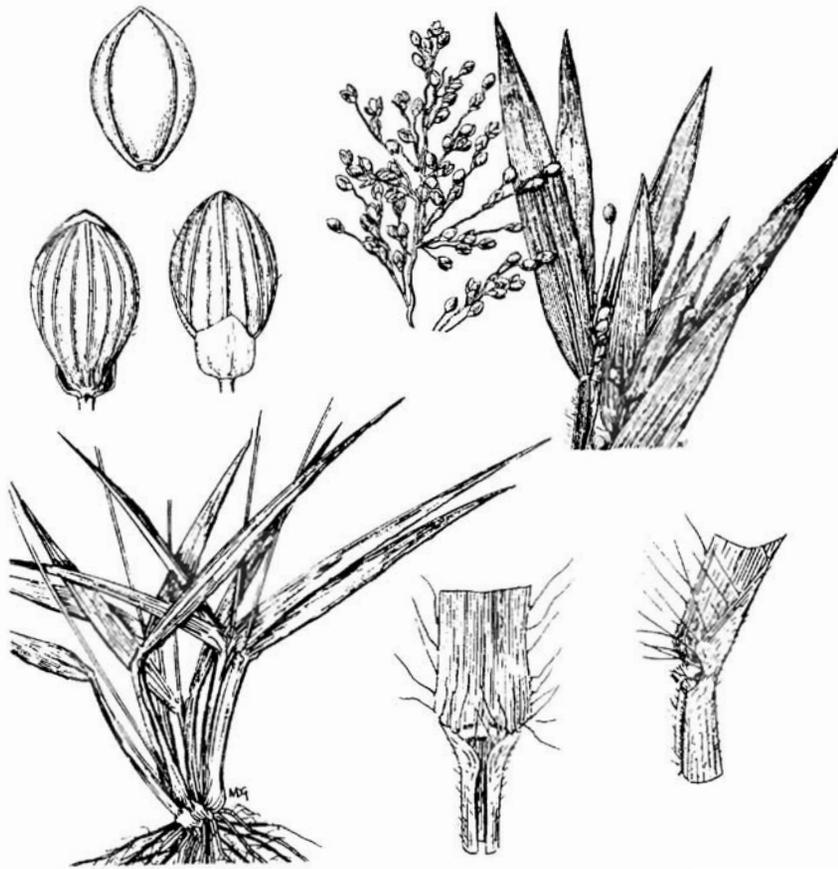
Spreading panicum is used primarily for livestock grazing. It is selected by livestock from early spring until late fall but is only fair roughage during winter. Seed are eaten by birds.

Grazing should be deferred for at least 60 days periodically during the main growing season to improve vigor and density.



*Panicum scribnerianum*, scribner panicum

*Panicum scribnerianum* Nash, scribner panicum



DESCRIPTION

*Cool-season*, perennial bunch grass.

*Height*: Less than 18 inches.

*Leaf blade*: Broad; long stiff hairs on margin; sometimes hairy underneath.

*Leaf sheath*: Mostly basal; short; hairy.

*Seedhead*: Open panicle.

GROWTH CHARACTERISTICS

Scribner panicum is fairly typical of the 50 to 60 species of low panicums which grow throughout the South. Growth generally starts in late fall. Basal leaves form rosettes which grow little during winter but stay green. Most low panicums produce seedheads and leaves along the stems in spring. A few start growth in spring and in fall produce a reduced seedhead partly protected by leaves. Spring growth and winter rosettes of mature basal leaves suggest two different plants. All species of low panicums tolerate shade.

DISTRIBUTION

Most of South but most abundant in Southeast.

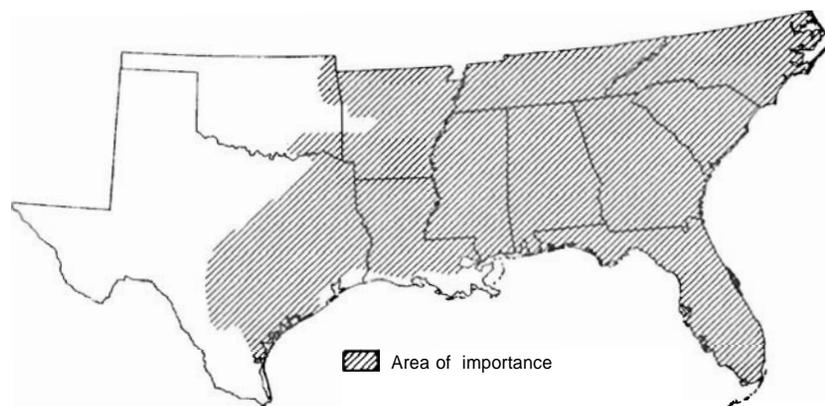
SITE ADAPTATION

Low panicums grow on all sites except marshes.

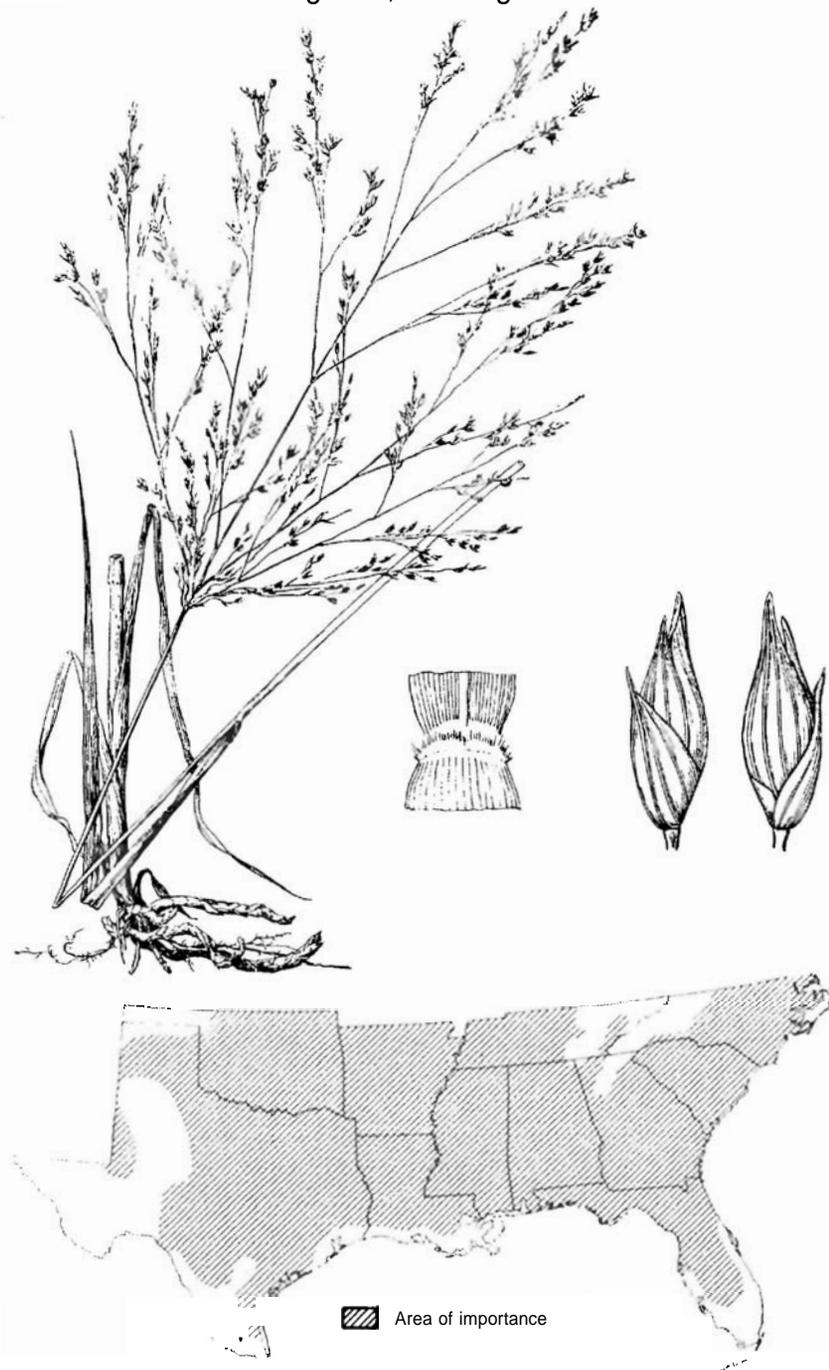
USE AND MANAGEMENT

Scribner panicum and other low panicums furnish some green forage to livestock during winter. Deer eat the green leaves; birds eat the seed.

Low panicums grow so close to the ground that it is difficult for livestock to overgraze them. Because they are seldom grazed between the time seedheads emerge in spring and growth starts in fall, no special management practices are required.



*Panicum virgatum*, switchgrass



*Panicum virgatum* L., switchgrass

**DESCRIPTION**

*Warm-season*, rhizomatous perennial.

*Height*: 3 to 6 feet.

*Leaf blade*: Flat; 1/2 inch wide; sometimes 30 inches long.

*Leaf sheath*: Rounded; smooth; as long as or longer than internodes.

*Ligule*: Dense ring of hair; 1/8 inch long.

*Seedhead*: Open panicle about 10 inches long.

**GROWTH CHARACTERISTICS**

Makes major growth from March through September. Growing points are 4 to 5 inches above ground during latter part of growing season. Seedheads form during late August and September. Rhizomes grow actively during January, February, March, and April. Withstands temperatures of  $-25^{\circ}$  to  $-30^{\circ}$  F. without apparent damage. Produces 3 to 4 tons of forage and 100 to 150 pounds of seed per acre in pure stands. But the number of pure live seed per pound is low.

**DISTRIBUTION**

Rocky Mountains, south into Arizona and northern Mexico, east to Atlantic coast.

**SITE ADAPTATION**

Grows equally well on the highly calcareous soils of central Texas and the wet, acid soils of south Florida. Also grows well in brackish marshes.

**USE AND MANAGEMENT**

Switchgrass is used primarily for livestock grazing. In some localities, it is cut for hay. It is also used for seeding ranges and pastures. Birds eat the seed.

This grass responds to proper grazing use and periodic deferments of at least 90 days any time of year. For maximum production of good-quality hay, meadows should not be grazed in early spring and hay crops should be harvested when seedheads are well formed. Meadows can be grazed moderately in late fall.

*Pappophorum bicolor*, pink pappusgrass

*Pappophorum bicolor* Fourn., pink pappusgrass

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 1 to 2 feet.

*Leaf blade*: Narrow; flat or slightly rolled inward, giving threadlike appearance when dry.

*Leaf sheath*: Mostly basal; rounded; shorter than internodes.

*Ligule*: Tuft of long hair.

*Seedhead*: Spikelike, pinkish panicle 4 to 5 inches long; lemmas somewhat hard; end dissected into about 12 awns of unequal length about as long as lemmas; glumes transparent.

GROWTH CHARACTERISTICS

Growth starts in late spring and early summer. Seedheads appear about 6 weeks later. Leaves remain green until early fall. Reproduces from seed. Seldom grows in pure stands.

DISTRIBUTION

South and west Texas, southern New Mexico and Arizona, and northern Mexico.

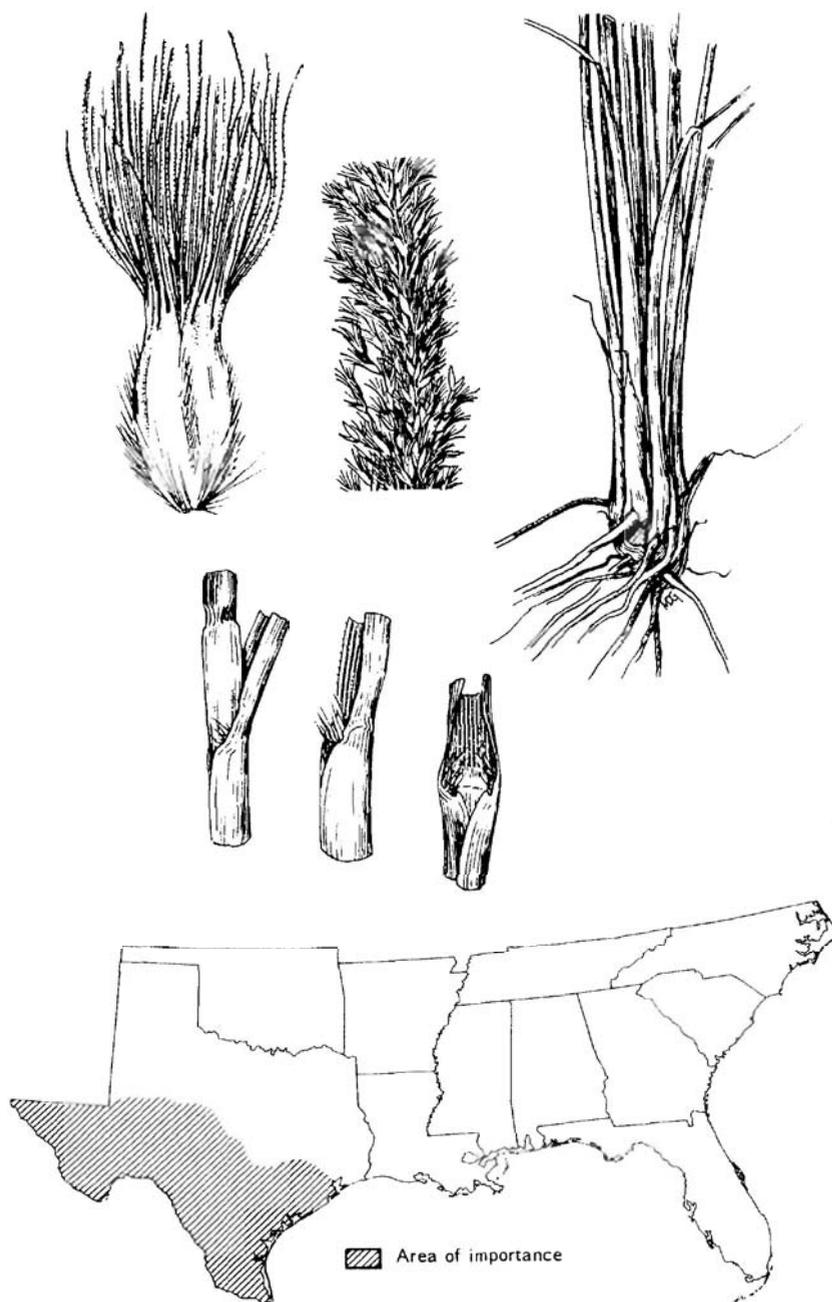
SITE ADAPTATION

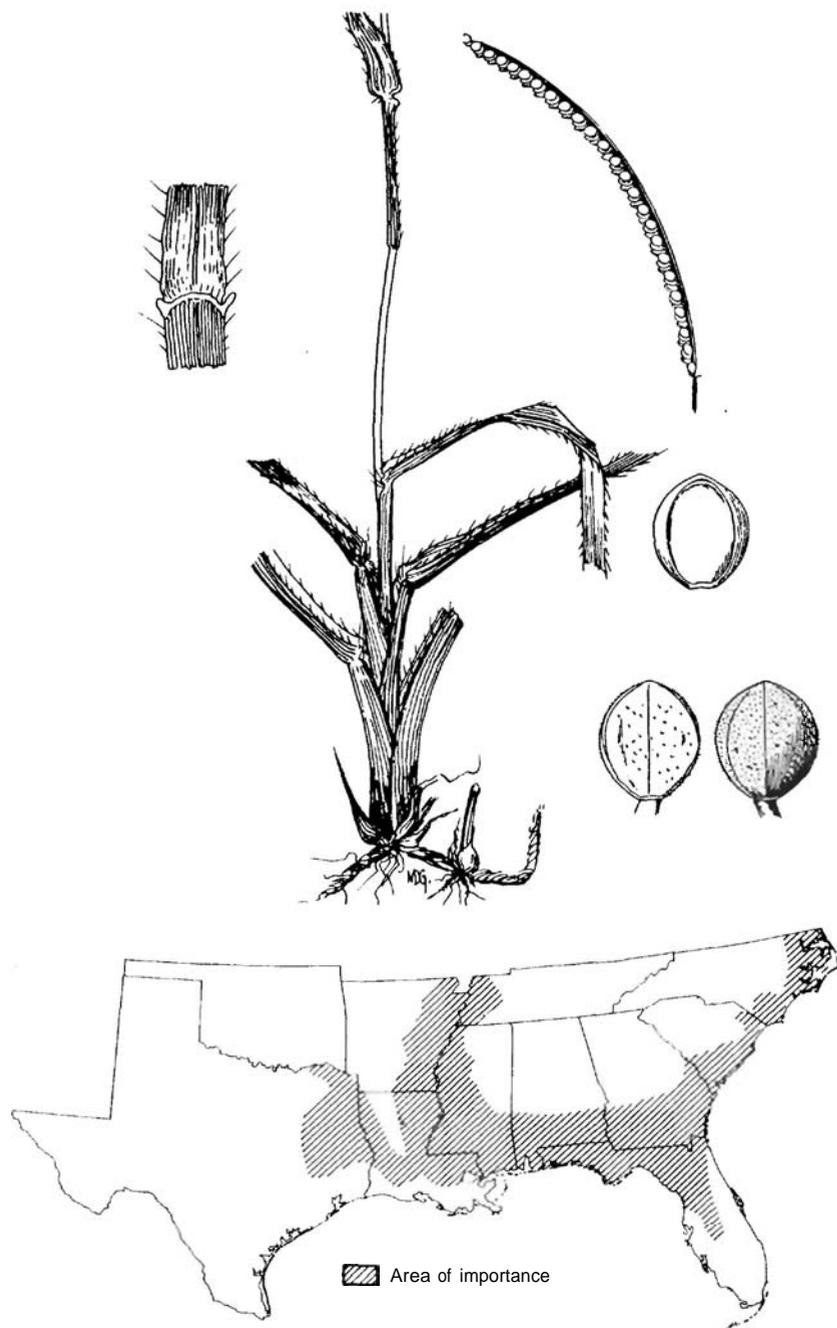
Grows best on deep loam to clay loam soils that are subject to overflow.

USE AND MANAGEMENT

Pink pappusgrass is grazed by all livestock.

This grass is seldom used as a key management species. It responds to proper use and deferred grazing during the growing season.





#### DESCRIPTION

*Warm-season*, low-growing perennial.

*Height*: 6 inches to 2 feet.

*Leaf blade*: Flat; 4 to 14 inches long; 1/2 inch wide; may have hair on margin.

*Leaf sheath*: Hairy

*Seedhead*: 1 to 3 racemes 2 to 5 inches long on each seedstalk  
→ a terminal raceme and 1 or 2 axillary racemes hidden in sheath.

#### GROWTH CHARACTERISTICS

Fringeleaf paspalum is one of the eight species of low paspalums that are similar and often hybridize, making it difficult to separate them in the field. The other seven species are barestem paspalum (*P. longepedunculatum*), thin paspalum (*P. setaceum*), goldhair paspalum (*P. debile*), longhair paspalum (*P. supinum*), hurrah-grass (*P. pubescens*), little seed paspalum (*P. propinquum*), and stiff paspalum (*P. rigidifolium*). Low paspalums grow from March or April until freezing weather. They produce seed through summer and fall. Major reproduction is from seed; a few species spread from short, weak rhizomes. Low paspalums are dormant during winter except in south Florida.

#### DISTRIBUTION

Throughout the South.

#### SITE ADAPTATION

Low paspalums grow on all sites in the South except marshes.

#### USE AND MANAGEMENT

Most low paspalums are fair forage for cattle and deer during spring and summer. Their value as winter roughage is poor. Quail and other birds eat the seed.

Low paspalums increase on areas continuously grazed closely. Although they respond to proper grazing use and deferred grazing, management is generally planned to favor the more productive associated grasses.

*Paspalum distichum*, knotgrass

*Paspalum distichum* L., knotgrass

DESCRIPTION

*Warm-season*, rhizomatous, stoloniferous perennial.

*Height*: 1 to 2 feet.

*Leaf blade*: Flat to V-shaped; tapers to sharp point.

*Stolons*: Often pinkish; nodes hairy, usually swollen.

*Seedhead*: 2 racemes often curved inward, usually a few long, white hairs at fork.

GROWTH CHARACTERISTICS

New growth starts in early March in warm parts of range. Foliage stays green until frost. Produces seed several times during late spring and summer. Reproduces from rhizomes, stolons, and seed.

DISTRIBUTION

Throughout 11 Southern States and along west coast from California to Washington and east to Idaho.

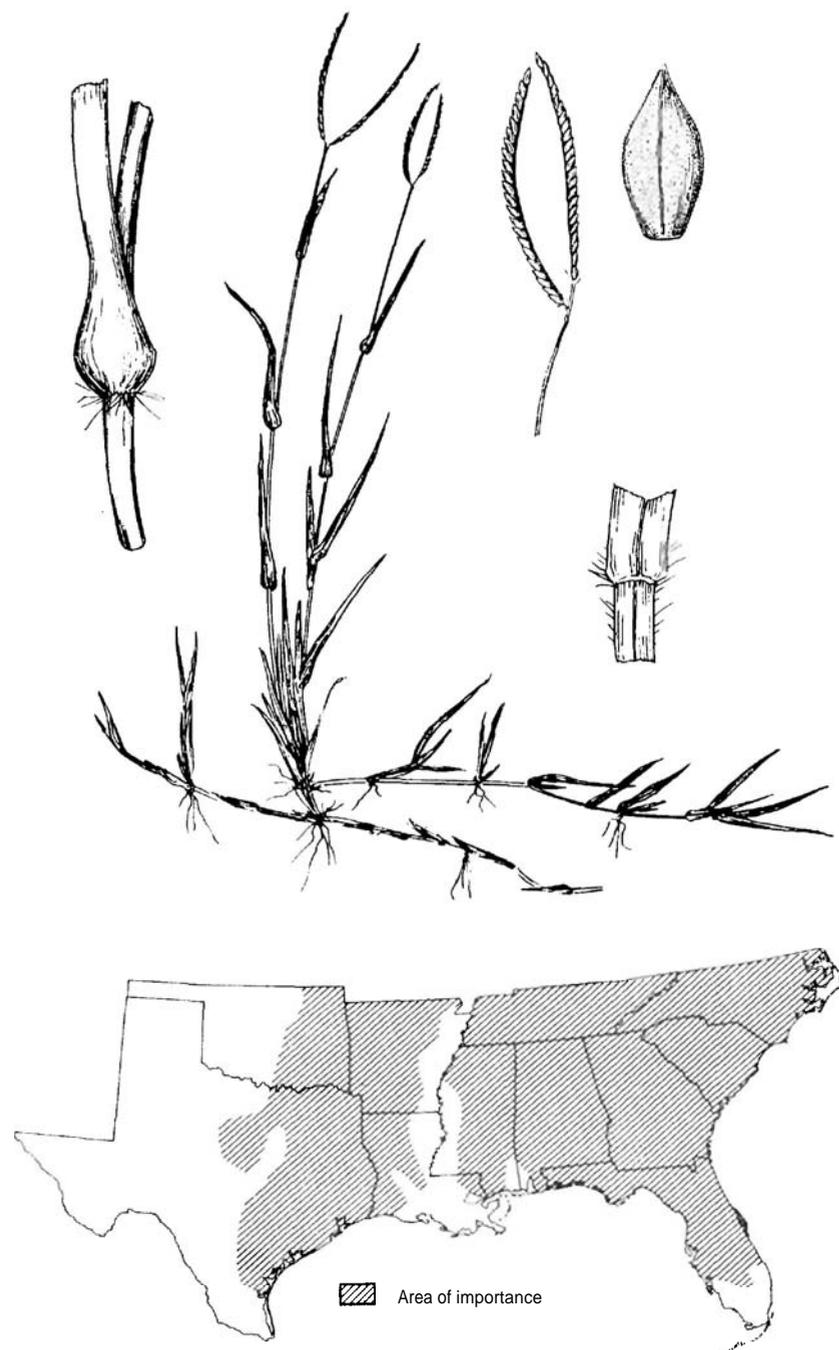
SITE ADAPTATION

Grows primarily on fresh-water marshes and occasionally on brackish marshes. Tolerates moderate salinity and some standing water.

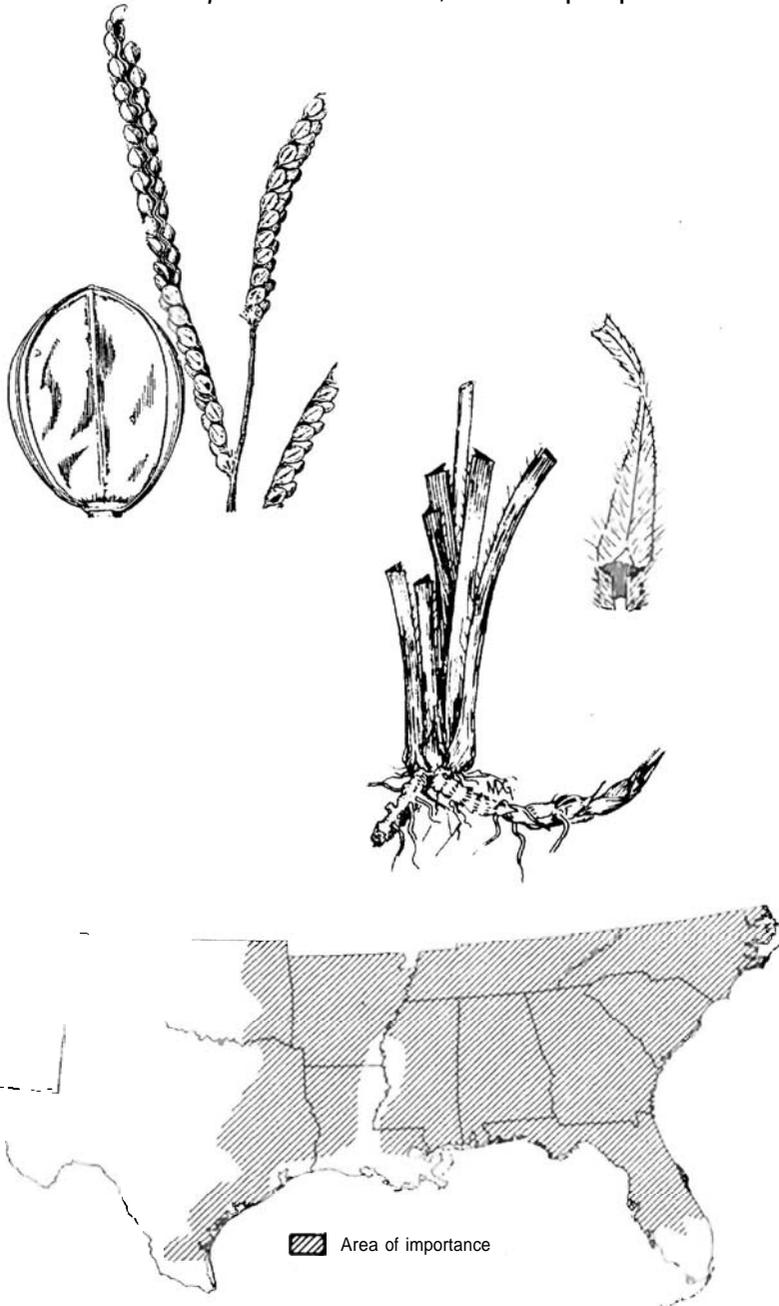
USE AND MANAGEMENT

Knotgrass is readily grazed by cattle and horses from spring until fall. It may increase on wet sites if tall, dominant grasses are grazed out. Provides little usable forage during dormant season. Seed are choice food for wild ducks on fresh-water marshes.

This grass withstands heavy grazing. For maximum production, no more than 50 percent of current year's growth by weight should be grazed off. Controlled burning is not recommended. Knotgrass withstands accidental burning if water is above soil surface. Grazing deferments of 60 to 90 days every 2 to 3 years during growing season increase seed production and improve plant vigor.



*Paspalum floridanum*, Florida paspalum



***Paspalum floridanum* Michx., Florida paspalum**

**DESCRIPTION**

*Warm-season, robust, rhizomatous perennial.*

*Height: 3 to 4 feet.*

*Leaf blade: Flat; 1/4 to 1/2 inch wide; 14 to 20 inches long, tapering to point; frequently covered with long silky hair.*

*Leaf sheath: Open; rounded; seldom covers nodes; frequently covered with long hair.*

*Ligule: Ragged membrane 1/8 inch long.*

*Seedhead: 2 to 3 racemes 3 to 4 inches long; spikelets about 3/16 inch long.*

**GROWTH CHARACTERISTICS**

Rhizomes begin to grow in late December and January. New leaf growth starts in late winter and early spring. Seedheads appear during late July and mature about a month later.

**DISTRIBUTION**

Throughout 11 Southern States and in Kansas and Missouri.

**SITE ADAPTATION**

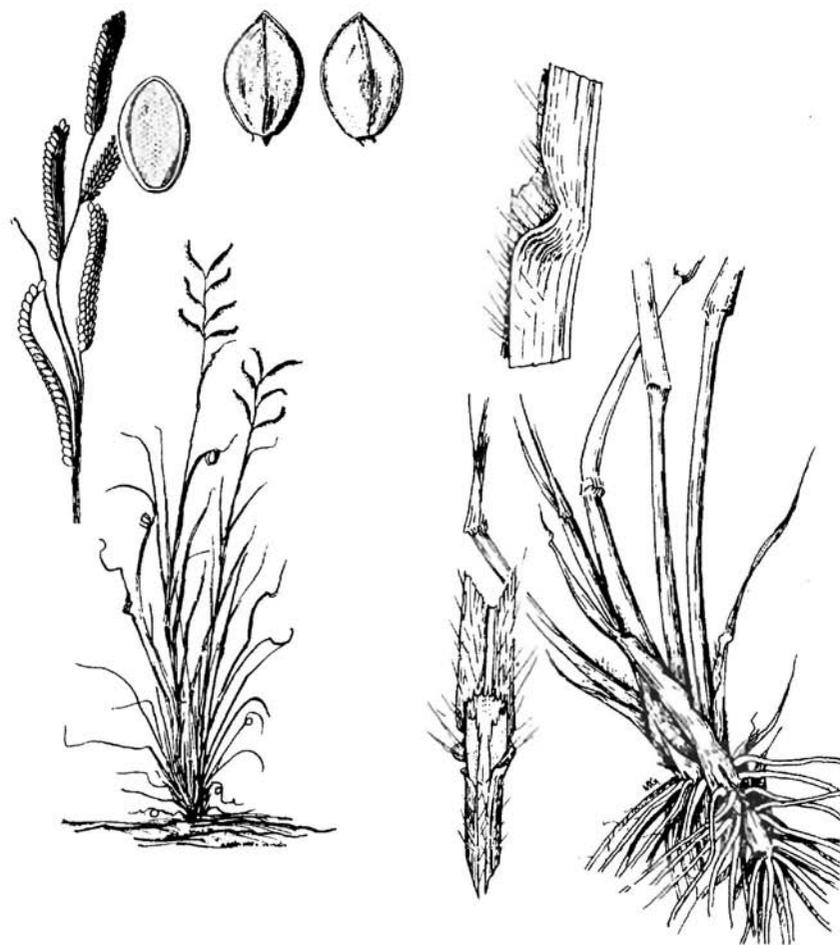
Adapted to the nearly level, acid to neutral, somewhat poorly drained flatwoods soils in the Coastal Plain and Florida. Also adapted to well-drained deep soils on uplands that have a sandy surface over a fine-textured subsoil.

**USE AND MANAGEMENT**

Florida paspalum is palatable and is readily grazed by cattle during its growing season.

Because this grass is succulent, it deteriorates rapidly after maturity, making it unimportant as dry winter forage. A 60-day grazing deferment between April and August every 2 to 3 years improves the vigor of Florida paspalum and associated desirable grasses.

*Paspalum lividum*, longtom



*Paspalum lividum* Trin., longtom

#### DESCRIPTION

*Warm-season*, stoloniferous perennial.

*Height*: 1 to 3 feet.

*Leaf blade*: 2 to 10 inches long; smooth; folded at base.

*Leaf sheath*: Distinctly flattened; hairy inside.

*Ligule*: Membrane.

*Seedhead*: 4 to 7 racemes 1 to 2 inches long; seed borne in straight rows along one side of rachis.

#### GROWTH CHARACTERISTICS

Growth starts in late February or early March; foliage stays green until frost. Produces seed in late summer. Reproduces from stolons and from seed.

#### DISTRIBUTION

Fresh to slightly brackish marshes and other wet areas along the gulf coast from Alabama to Texas.

#### SITE ADAPTATION

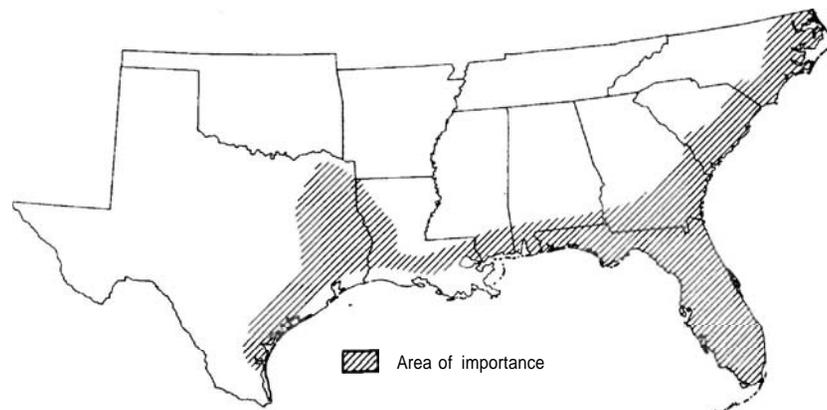
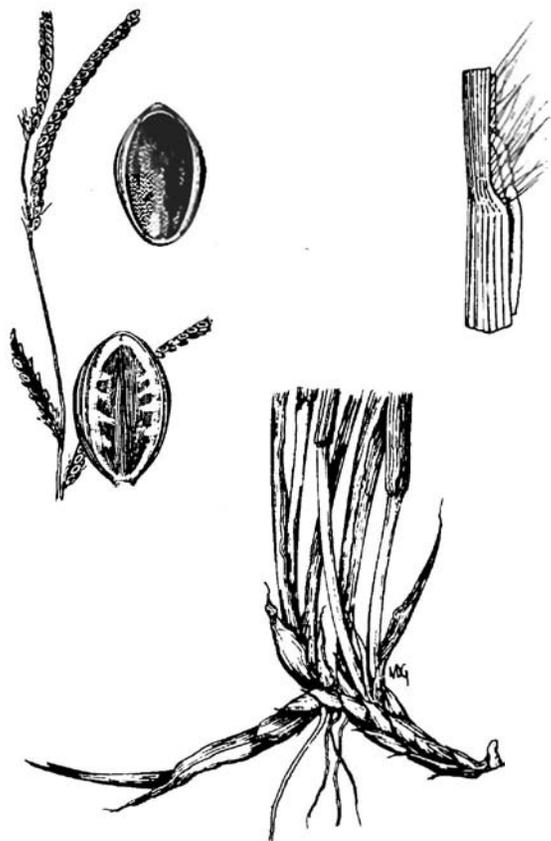
Well adapted to firm mineral soils that are wet but not flooded for long periods. Grows on sides of ridges near marshes. Tolerates no more than 4 inches of water above soil surface for long periods. Tolerates moderate salinity.

#### USE AND MANAGEMENT

Longtom is a valuable summer forage and hay plant from March through November. Seed are occasionally eaten by wild ducks but are rated as inferior food.

This grass is most productive when no more than 50 percent of current year's growth by weight is grazed off. It withstands short periods of heavy use because of its stoloniferous growth. Grazing deferments of 30 to 60 days increase seed production and improve plant vigor. Burning is not recommended. On some marsh ranges, pure stands can be established by controlling the water level. When managed for hay production, longtom should be harvested every 3 to 4 weeks when soil surface is dry.

*Paspalum plicatulum*, brownseed paspalum



▨ Area of importance

*Paspalum plicatulum* Michx., brownseed paspalum

DESCRIPTION

*Warm-season*, rhizomatous perennial.

*Height*: 2 to 4 feet.

*Leaf blade*: Slightly folded ; stiff; bluish green; 8 to 20 inches long; smooth; hairy near base.

*Leaf sheath*: Compressed; smooth and papery; slightly purple at base.

*Ligule*: Brown membrane 1/8 inch long.

*Stem*: Compressed; often purplish at base.

*Seedhead*: 3 to 7 racemes, each 2-1/2 to 3 inches long; mature seed dark brown; spikelets extremely cross wrinkled on flat side.

GROWTH CHARACTERISTICS

Growth starts during late winter and early spring. New growth is usually mixed with old. Produces seedheads from early summer until frost. Mature seedheads are mixed with green leaves and new seedheads. In Florida, basal leaves stay green all winter. Reproduces from short rhizomes and from seed.

DISTRIBUTION

Throughout Florida and the Coastal Plain from North Carolina to east Texas and in Puerto Rico.

SITE ADAPTATION

Grows well on strongly acid to neutral, poorly drained, clay loam soils and on excessively drained, deep, sandy soils. Grows in the mountainous region of Puerto Rico on clay soils.

USE AND MANAGEMENT

Brownseed paspalum is grazed by livestock any season. Quail and wild ducks eat the seed.

This grass responds to grazing deferments of about 30 days. It decreases under continuous grazing.

*Paspalum vaginatum*, seashore paspalum

*Paspalum vaginatum* Swartz, seashore paspalum

DESCRIPTION

*Warm-season*, rhizomatous, stoloniferous perennial.

*Height*: 10 to 12 inches, occasionally 20 inches.

*Leaf blade*: 2 to 5 inches long; somewhat rolled toward tip; distinctly 2-ranked; dark green.

*Leaf sheath*: Usually overlapping.

*Seedhead*: 2 paired racemes, which separate at maturity.

GROWTH CHARACTERISTICS

Stolons usually remain green all year, especially if they are growing in water. Blades turn brown and deteriorate after the first frost. Produces seedheads several times during growing season but seed are seldom viable. Often grows in pure stands.

DISTRIBUTION

Along the gulf and Atlantic coasts as far north as North Carolina.

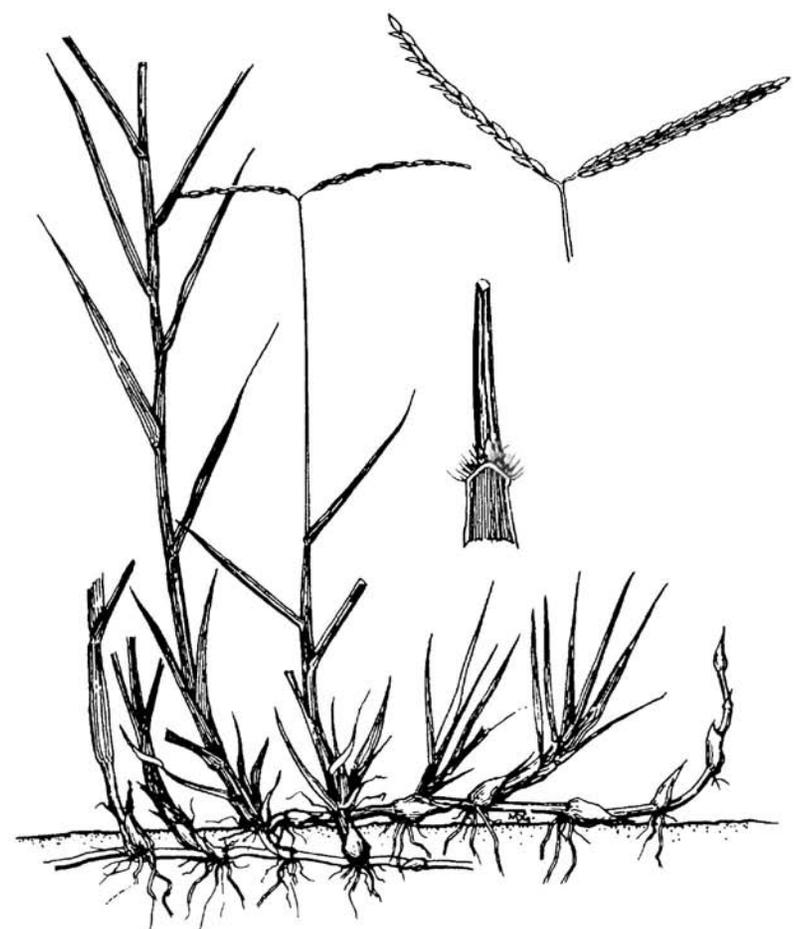
SITE ADAPTATION

Adapted primarily to firm mineral marsh soils of moderate salinity. Does best if water level fluctuates from 6 inches below soil surface to 2 inches above. Tolerates deeper water during winter.

USE AND MANAGEMENT

Seashore paspalum is an important forage plant. Cattle and horses graze the leaves and stems from March through November on salt marshes and the green stolons during winter. This grass also provides green feed for wild geese. It is an indicator of moderate salinity, usually enough to make the area unsuitable for cropland.

This grass is most productive if no more than 50 percent of current year's growth by weight is grazed off. Cattle and horses seldom overgraze it because much of its foliage lies flat on the ground. Burning is not recommended as a management practice. A 90-day grazing deferment is beneficial in improving plant vigor and producing a forage reserve.



*Phragmites communis*, common reed

*Phragmites communis* Trin., common reed

DESCRIPTION

Warm-season, rhizomatous, stoloniferous perennial.

Height: 6 to 12 feet.

Leaf blade: Flat; smooth; 1/2 to 2 inches wide; 6 to 18 inches long.

Seedhead: Open panicle purplish or tawny, flaglike appearance after seed shatter.

GROWTH CHARACTERISTICS

Growth starts in February in some locations. Foliage stays green until frost. New shoots grow from buds at nodes of old stems, stolons, and rhizomes. Common reed is readily identified by its height. It is the tallest grass in southern marshes and swamps.

DISTRIBUTION

To some extent throughout the United States, southern Canada, and as far south as South America.

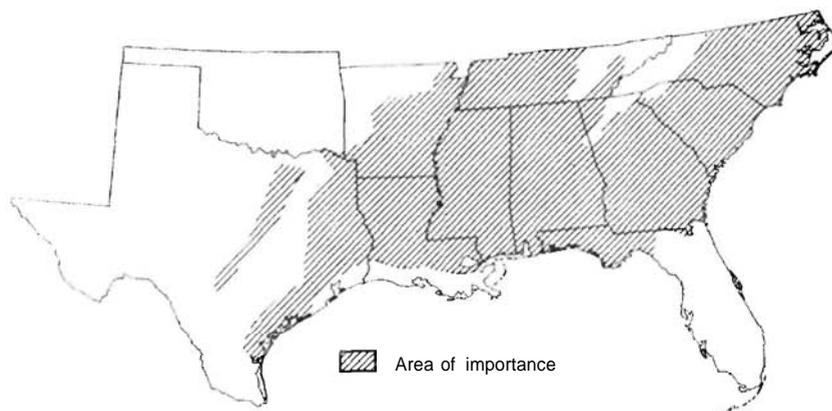
SITE ADAPTATION

Grows in marshes and swamps, on banks of streams and lakes, and around springs. Grows best in firm mineral clays. Tolerates moderate salinity. Does best if water level fluctuates from 6 inches below soil surface to 6 inches above. Common reed is often codominant with big cordgrass (*Spartina cynosuroides*) on the gulf coast marsh rangelands.

USE AND MANAGEMENT

Although coarse, common reed is readily eaten by cattle and horses. It provides high quality warm-season forage but becomes tough and unpalatable after maturity. Animals grazing this grass during winter should be fed a protein concentrate. Common reed has been used by Mexicans in the Southwest for lattices in constructing adobe houses. Indians have used the stems for arrows and for weaving mats and carrying nets.

This grass cannot withstand prolonged heavy grazing. Its upright growth makes it easy for livestock to remove all the leaves. For maximum production, no more than 50 percent of current year's growth by weight should be grazed off during growing season. Common reed tolerates burning if water is above soil surface. Burning is not essential for management. Water control that lowers the water level but does not drain the area increases production. Grazing deferments of 60 to 90 days every 2 to 3 years during the growing season improve plant vigor.



*Poa arachnifera*, Texas bluegrass



*Poa arachnifera* Torr., Texas bluegrass

DESCRIPTION

*Cool-season*, rhizomatous perennial.

*Height*: 10 to 20 inches.

*Leaf blade*: Mostly basal; long; narrow; boat shaped at end.

*Seedhead*: Panicle narrow, somewhat compressed, 2 to 4 inches long; male and female spikelets on same plant.

GROWTH CHARACTERISTICS

Growth starts in fall. Foliage stays green all winter if moisture is available. Becomes dormant through hot summer months. In extremely low temperatures, leaves freeze but more leaves grow from axillary buds on basal nodes. Reproduces from stolons and from seed. Seed produced in spring germinate in fall.

DISTRIBUTION

Southern Kansas, Arkansas, Oklahoma, and Texas.

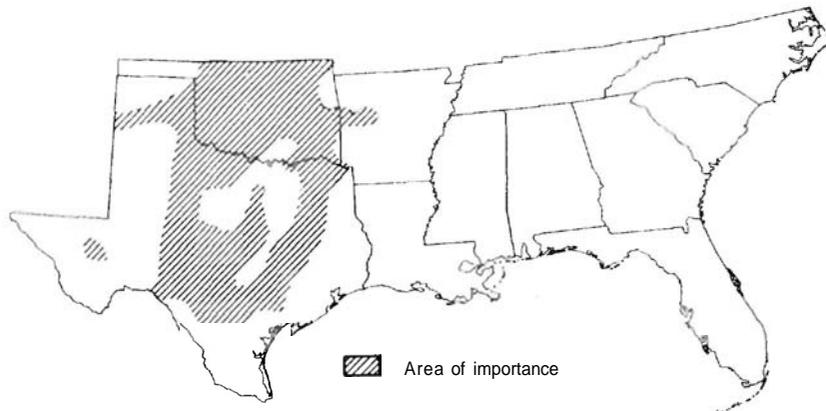
SITE ADAPTATION

Grows best on clay and clay loam soils.

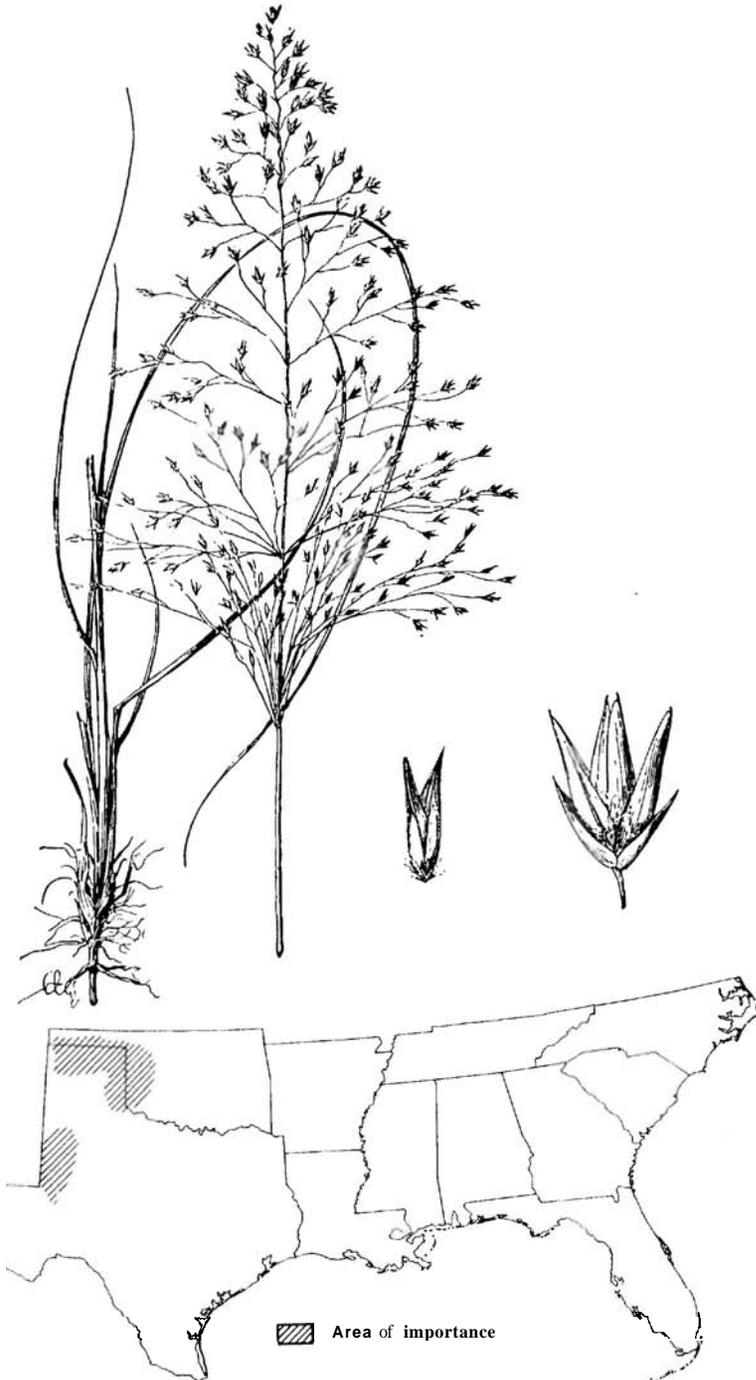
USE AND MANAGEMENT

Texas bluegrass is used by all livestock for winter grazing throughout its range. It has been used as a lawn grass.

Grazing should be deferred in spring every few years to allow this grass to produce a seed crop. It is a key management species on some sites that are grazed during winter by cattle and sheep. If it is, no more than 50 percent of current year's growth by weight should be grazed off.



*Redfieldia flexuosa*, blowoutgrass



*Redfieldia flexuosa* (Thurb.) Vasey, blowoutgrass

**DESCRIPTION**

*Warm-season, rhizomatous perennial.*

*Height: 2 to 2-1/2 feet.*

*Leaf blade: Smooth; rolls inward; tapers to fine point.*

*Seedhead: Open panicle one-third to one-half as long as seed-stalk.*

**GROWTH CHARACTERISTICS**

Growth starts in spring when average daily temperature is 60° to 65° F. Most leaves are basal. Long, slender rhizomes grow in upper few inches of soil. Reproduces from rhizomes. Grows in colonies.

**DISTRIBUTION**

Throughout Great Plains from South Dakota to Oklahoma and Texas and in Arizona.

**SITE ADAPTATION**

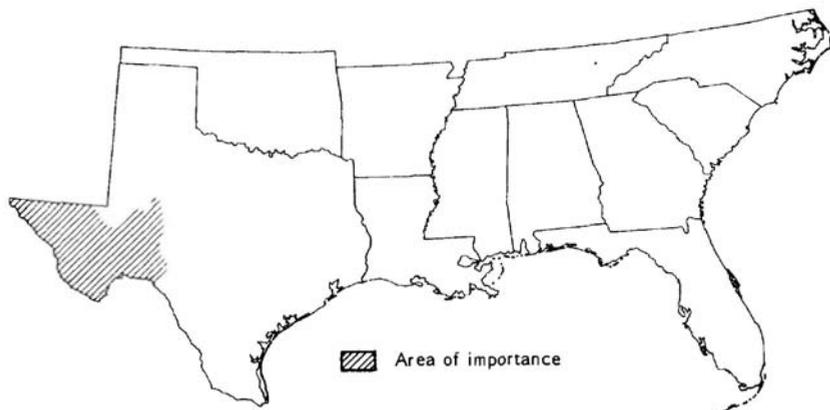
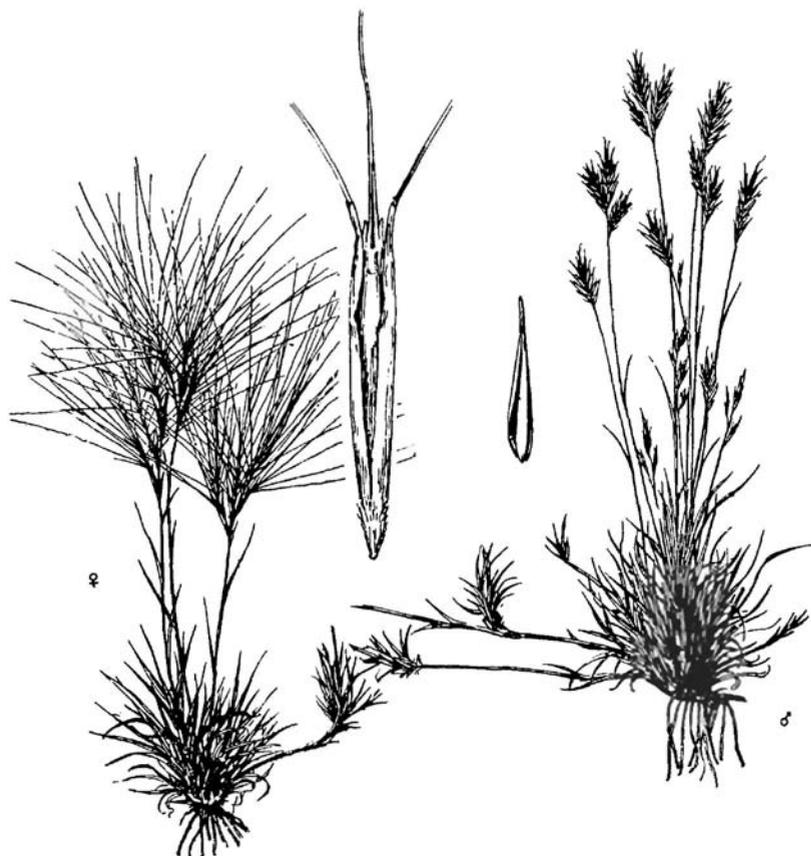
Grows on deep sandy to very sandy soils that are subject to blowing and on sand deposits several inches deep.

**USE AND MANAGEMENT**

The primary use of blowoutgrass is to protect sandy areas from blowing.

This grass is managed primarily as a wind-erosion-control plant. It may be grazed lightly by cattle and horses during dormant season.

*Scleropogon brevifolius*, burrograss



*Scleropogon brevifolius* Phil., burrograss

**DESCRIPTION**

*Warm-season*, weak, stoloniferous perennial.

*Height*: 4 to 8 inches.

*Leaf blade*: Flat; narrow; sharp pointed.

*Leaf sheath*: Rounded; shorter than internodes; mostly basal.

*Seedhead*: Raceme; staminate (male) spikelets, awnless; pistillate (female) spikelets, numerous long awns.

**GROWTH CHARACTERISTICS**

Growth starts in May or June. Seedheads appear 3 to 4 weeks later. Burrograss is a low forage producer. It reproduces from seed and from stolons. Generally grows in pure stands. Because it is shallow rooted, this grass cannot compete with taller, deeper rooted grasses. Mature female spikelets with awns break off and form tumbleweeds that are moved around by wind.

**DISTRIBUTION**

West Texas to Arizona, north to Colorado, south to central Mexico, and in Argentina.

**SITE ADAPTATION**

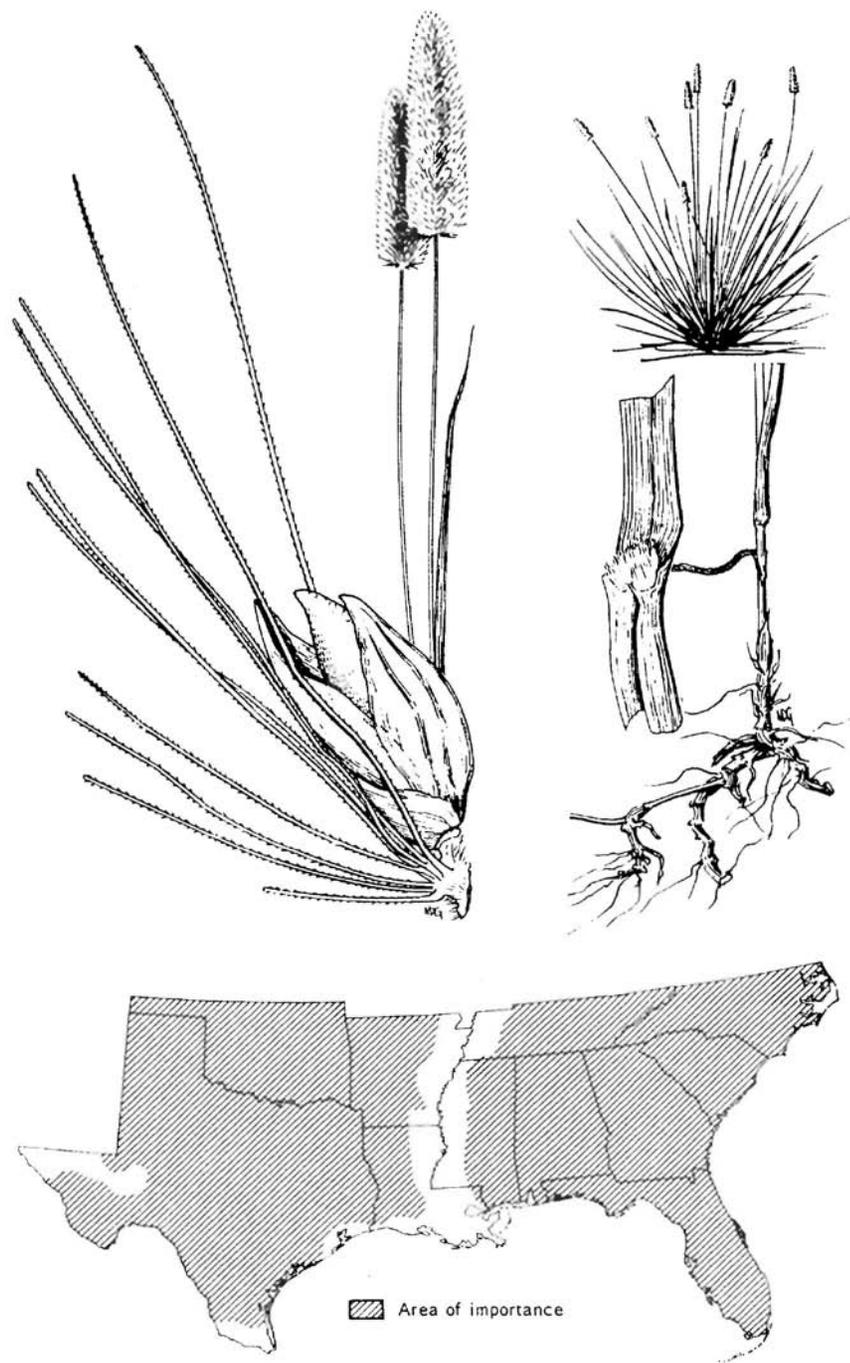
Grows on calcareous clay and clay loam soils.

**USE AND MANAGEMENT**

Burrograss is grazed by cattle, horses, and sheep.

Cattle and horses seldom overgraze this grass because it grows so close to the ground. Sheep can graze it close enough to kill it. Sheep should graze this grass only in spring before seed mature and in late fall and winter after seed dissemination to prevent awns from collecting in their wool and causing eye irritation.

*Setaria geniculata*, knotroot bristlegrass



▨ Area of importance

*Setaria geniculata* (Lam.) Beauv., knotroot bristlegrass

DESCRIPTION

Warm-season, weak, rhizomatous perennial.

Height: 1 to 3 feet.

Leaf blade: Flat; 6 to 10 inches long; 1/4 inch wide; prominent midrib; upper surface covered with soft hair.

Leaf sheath: Rounded; generally shorter than internodes; often purple tinged.

Ligule: Fringe of short hair.

Seedhead: Spikelike panicle 1 to 2 inches long, yellowish; each spikelet surrounded by 5 or more yellow or purple bristles.

GROWTH CHARACTERISTICS

Grows from late March or early April until fall from short, knotty, branching rhizomes. Foliage is a distinctive whitish green. Base of plant is slender and wiry. Produces two and sometimes three seed crops during one growing season—the first one during May or June. Bristles are left along the seedstalk after seed disseminate.

DISTRIBUTION

Massachusetts to Florida, west to California, north to Illinois and Kansas, and in South America.

SITE ADAPTATION

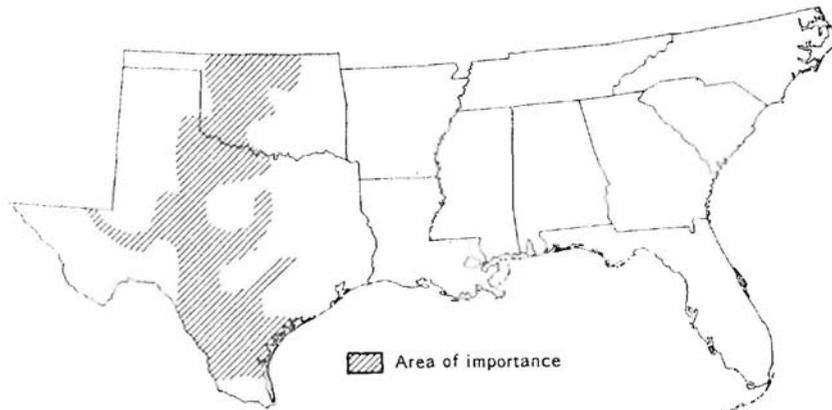
Grows best on moist or wet sites. In Florida, grows on wet sandy soils, sloughs, and acid flatwoods. In Texas and Louisiana, grows well on salty prairie sites; also grows on salt marshes if water level is relatively low.

USE AND MANAGEMENT

Knotroot bristlegrass is grazed moderately by livestock, usually during spring and summer. It becomes unpalatable in fall and provides poor forage after maturity. When grazed for roughage, it should be supplemented with a mineral and protein concentrate. Seed are readily eaten by birds.

This grass is seldom abundant enough to be a key management species. For maximum production, no more than 50 percent of current year's growth by weight should be removed during growing season. Summer grazing deferments of at least 90 days every 2 to 3 years improve plant vigor. This grass can withstand controlled burning if done after September.

*Setaria macrostachya*, plains bristlegrass



*Setaria macrostachya* H.B.K., plains bristlegrass

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height*: 1 to 2-1/2 feet.

*Leaf blade*: Flat to folded; upper surface rougher than lower.

*Leaf sheath*: Open; as long or longer than internodes.

*Ligule*: Hairy.

*Seedhead*: Slender spikelike panicle 3 to 5 inches long; 2 to 4 bristles below each pair of spikelets.

**GROWTH CHARACTERISTICS**

Grows from midspring until fall. Generally produces two seed crops, one in late spring, the other in early fall. This grass is a good seed producer because it has a high seedstalk to leaf ratio. Nodes are enlarged and close together near the base of the stem. Foliage is yellowish green, becoming straw colored at maturity.

**DISTRIBUTION**

South Texas to Oklahoma, eastern Colorado, and southern Kansas.

**SITE ADAPTATION**

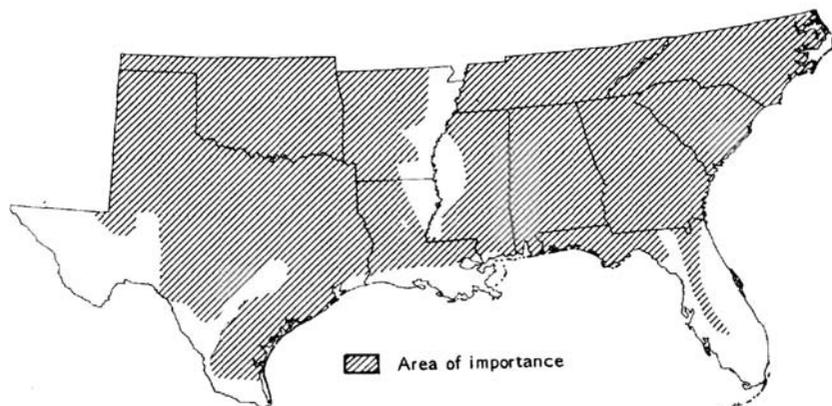
Grows mostly on sandy to sandy loam soils.

**USE AND MANAGEMENT**

Plains bristlegrass is grazed by all livestock. It provides high-quality forage when green and succulent but becomes strawy after maturity. If grazed during dormant period, a mineral supplement should be provided. Birds eat the seed. This grass is used in seeding mixtures on some range sites in the Rio Grande plains.

Plains bristlegrass decreases on ranges that are grazed continuously. To maintain vigor and produce a seed crop, grazing should be deferred every 2 to 3 years for 80 to 90 days before seed mature.

*Sorghastrum nutans*, indiagrass



*Sorghastrum nutans* (L.) Nash, indiagrass

DESCRIPTION

*Warm-season*, rhizomatous perennial.

*Height*: 3 to 7 feet.

*Leaf blade*: 10 to 24 inches long; flat; narrow at base; sometimes hairy.

*Leaf sheath*: Generally shorter than internodes; prominent auricles.

*Ligule*: Membrane 1/2 inch long, notched at tip.

*Seedhead*: Panicle golden bronze to yellow, 6 to 12 inches long, rather dense and narrow; spikelets paired, hairy; awns 1/2 inch long, bent, twisted.

GROWTH CHARACTERISTICS

Growth starts in midspring from short, scaly rhizomes. Seed-stalks usually form in late August and September. Indiangrass is a good seed producer.

DISTRIBUTION

From the east coast to the Rocky Mountains and Arizona and in southern Canada and Mexico.

SITE ADAPTATION

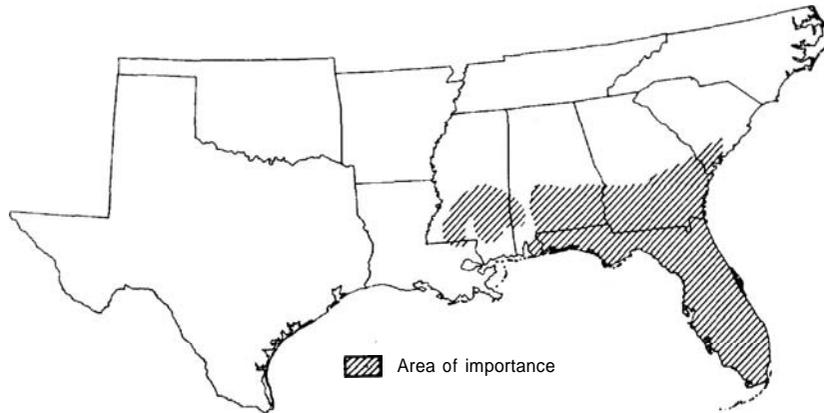
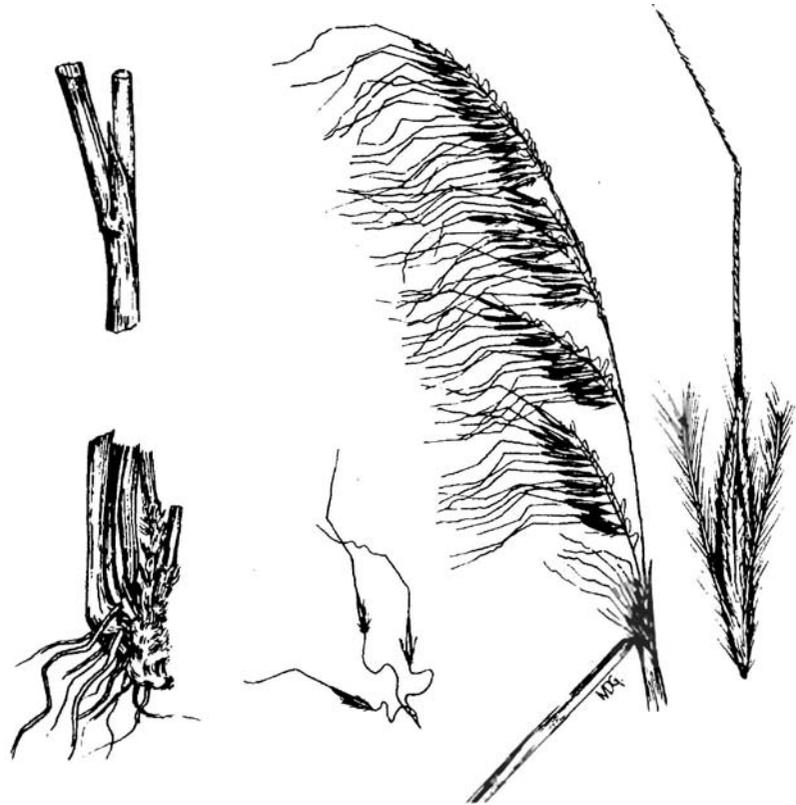
Best adapted to deep, moist soils from heavy clays to deep sands.

USE AND MANAGEMENT

Indiangrass is relished by all livestock. It provides high-quality forage when green and fair quality when mature. It is used in range seeding mixtures. In some areas, indiagrass is an important component of native prairie meadows and is cut for hay.

This grass is planted and managed in pure stands as a pasture grass because it responds to fertilizer and irrigation. On sites that have a high percentage of indiagrass in the plant community, it is the key management species. On less productive sites, its presence indicates that the range is in good to excellent condition. Grazing deferments of 90 to 100 days during the growing season every 2 to 3 years are needed for plants to regain vigor and produce seed.

*Sorghastrum secundum*, lopsided indiagrass



*Sorghastrum secundum* (Ell.) Nash, lopsided indiagrass

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 3 to 6 feet.

*Leaf blade*: Flat; 1/4 to 1/2 inch wide; 12 to 24 inches long.

*Leaf sheath*: Rounded.

*Ligule*: Membrane 1/4 to 1/2 inch long, pointed.

*Seedhead*: Panicle narrow, golden brown; one-sided, giving it the name lopsided indiagrass.

GROWTH CHARACTERISTICS

In south Florida, growth starts by mid-January; in the northern part of range by mid-March or early April. Most of leaf growth is in April, May, and June. Seedstalks appear during July or August and seedheads in September. Seed mature during October. Little, if any, new growth occurs after seed form.

DISTRIBUTION

Florida, southern Alabama, Georgia, South Carolina, and southeast Texas.

SITE ADAPTATION

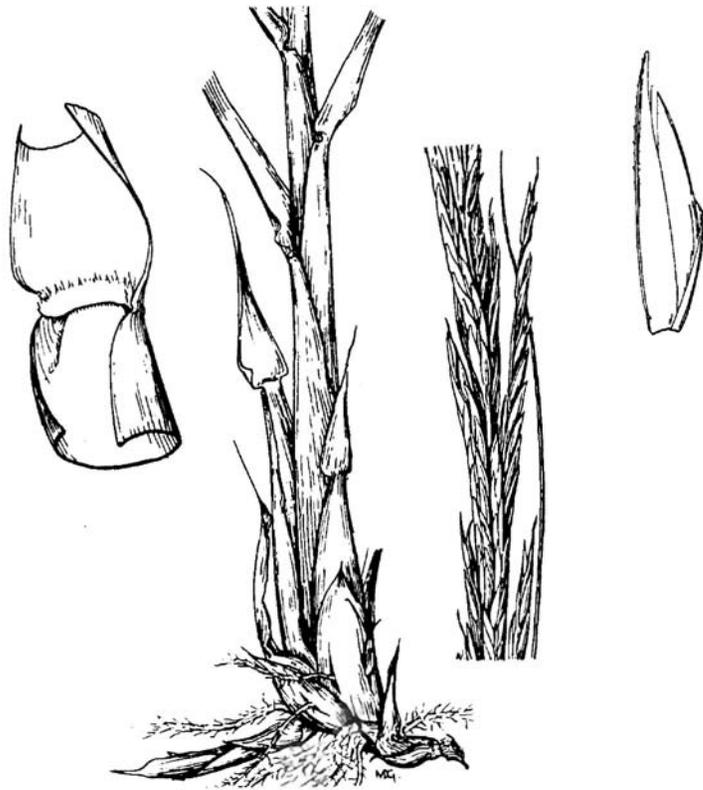
Adapted to well-drained soils. Does not grow on poorly drained sites or on sites subject to standing water.

USE AND MANAGEMENT

Lopsided indiagrass is readily eaten by all livestock during growing season. It cures well on stem and provides good dry forage during winter.

On ranges in good condition, this grass contributes as much as 15 percent of total production. To increase it on ranges in poor and fair condition, complete growing-season grazing deferments every 2 to 3 years are required.

*Spartina alterniflora*, smooth cordgrass



*Spartina alterniflora* Loisel., smooth cordgrass

**DESCRIPTION**

*Warm-season*, robust, rhizomatous perennial.

*Height*: 3 to 4 feet.

*Leaf blade*: Flat at base; 3/4 to 1 inch wide; 12 to 20 inches long; tapering to a point; rolls inward when dry, giving a round, threadlike appearance; purple tinged at collar.

*Leaf sheath*: Rounded; closely overlapping.

*Ligule*: Ring of fine dense hair.

*Seedhead*: 12 to 15 spikes, each 2 to 3 inches long; spikelets on one side of rachis; seedhead 10 to 12 inches long.

**GROWTH CHARACTERISTICS**

Major growth is from April through September. Produces seedheads during October and November. Basal part of plant remains green during most winters. Often grows in pure sea water. Forms dense stands on areas subject to daily tidal action. Does best if water level fluctuates from soil level to 12 inches above. Requires moderate salinity.

**DISTRIBUTION**

Coastal marshes along Gulf of Mexico and Atlantic Ocean.

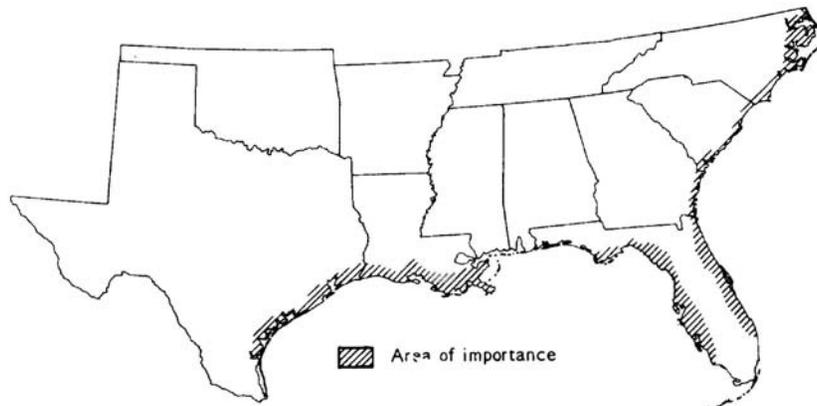
**SITE ADAPTATION**

Grows on organic soils in salt marshes in almost pure stands. Grows extensively on firm mineral soils and salt marshes where it is associated with marshhay cordgrass, big cordgrass, and sea-shore saltgrass.

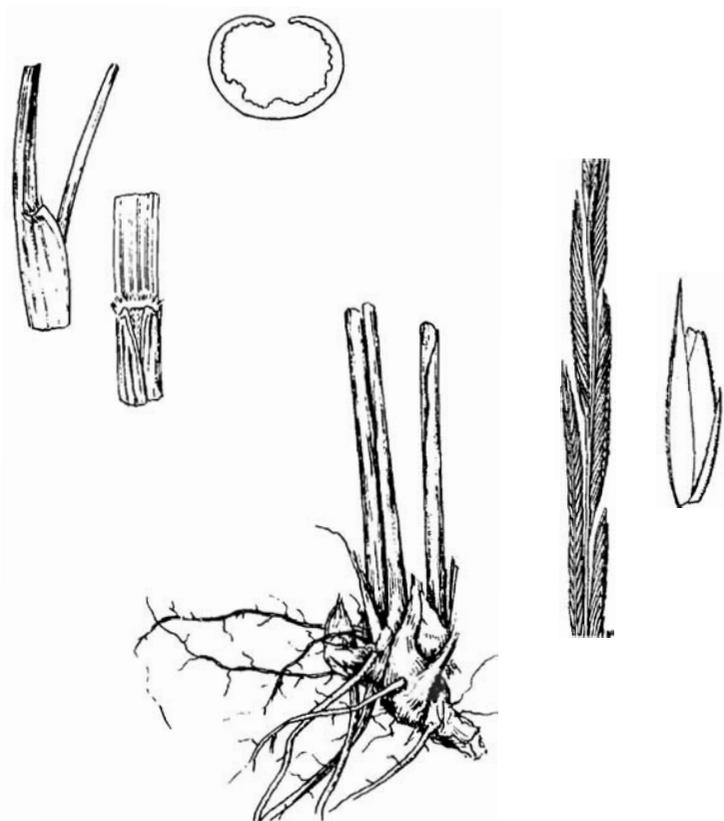
**USE AND MANAGEMENT**

Smooth cordgrass is excellent forage for cattle during winter. It is a valuable wildlife food, particularly for geese.

For quality forage, burn smooth cordgrass ranges every 2 to 3 years to eliminate old material. Defer grazing on ranges burned in early fall until new growth is 6 to 8 inches high; then use for winter grazing. Ranges burned in spring should not be grazed during summer but may be used for winter grazing.



*Spartina bakeri*, sand cordgrass



*Spartina bakeri* Merr., sand cordgrass

DESCRIPTION

*Warm-season*, robust bunch grass.

*Height*: 3 to 5 feet.

*Leaf blade*: Flat; rolls inward when drying; 1/4 inch wide; upper surface dark green, lower light green; coarse ridges on upper surface.

*Leaf sheath*: Rounded.

*Seedhead*: 5 to 12 spikes, each 1-1/4 to 2-1/2 inches long, lying close to stem; spikelets grow on one side of rachis; seedhead 2 to 8 inches long.

GROWTH CHARACTERISTICS

Makes its major growth during spring. Seed form during late May and June in most of range, later in northern part. Vegetative growth continues until fall. Some basal leaves remain green during winter in south Florida. Mature plants often form bunches 18 to 20 inches in diameter.

DISTRIBUTION

Coastal Plain of North Carolina, South Carolina, and Georgia, throughout Florida, and in scattered stands in extreme southern Alabama and Mississippi.

SITE ADAPTATION

Adapted to margins of sand ponds and fresh marshes throughout range. During growing season, tolerates periodic flooding. Will not grow on saline soils.

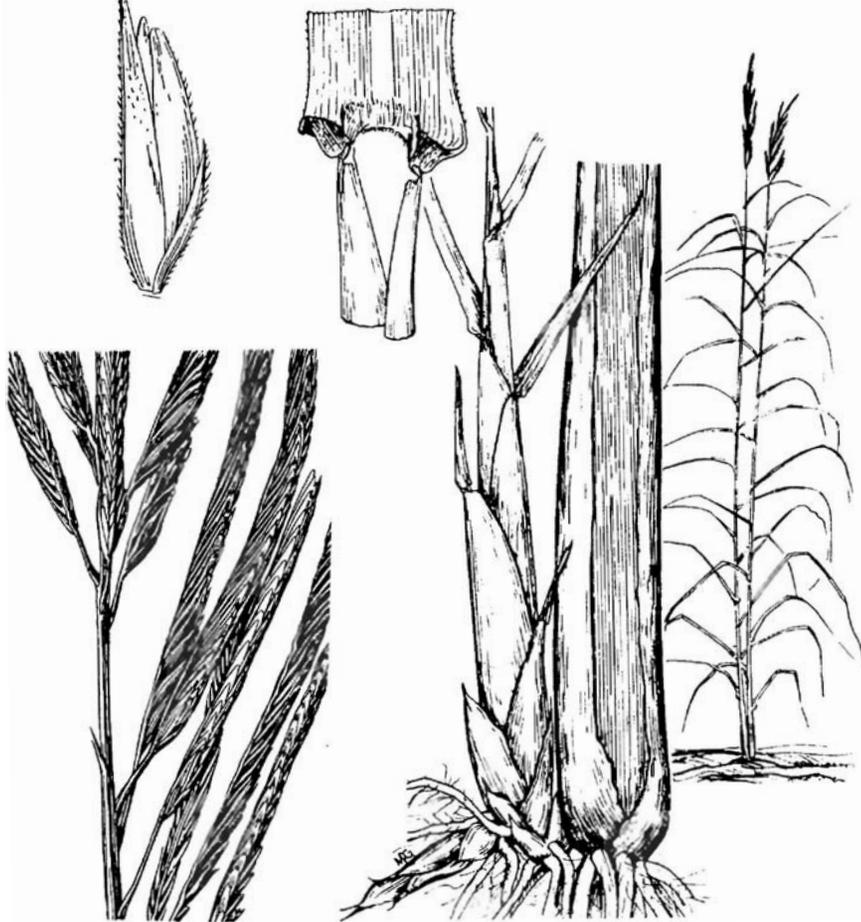
USE AND MANAGEMENT

Sand cordgrass burned in early fall provides fair-quality grazing for cattle during winter and spring. It is tough and unpalatable during summer months.

This grass increases on ranges that are grazed continuously.



1 *Spartina cynosuroides*, big cordgrass



***Spartina cynosuroides* (L.) Roth, big cordgrass**

**DESCRIPTION**

*Warm-season*, robust, rhizomatous perennial.

*Height*: 3 to 10 feet.

*Leaf blade*: Flat; 1/2 to 1 inch wide; often 18 to 24 inches long; rough, sharp margin.

*Leaf sheath*: Rounded.

*Ligule*: Short membrane densely hairy.

*Stem*: Thick; round; often 3/4 inch in diameter at base.

*Seedhead*: 20 to 40 spikes, each about 3 inches long; spikelets about 1/2 inch long grow on one side of rachis; seedhead 12 to 18 inches long.

**GROWTH CHARACTERISTICS**

Major growth is from late March through September or October. Seedheads form during fall. Base of plant remains green through winter. Reproduces from robust rhizomes which form dense colonies.

**DISTRIBUTION**

Coastal marshes along Gulf of Mexico and Atlantic Ocean.

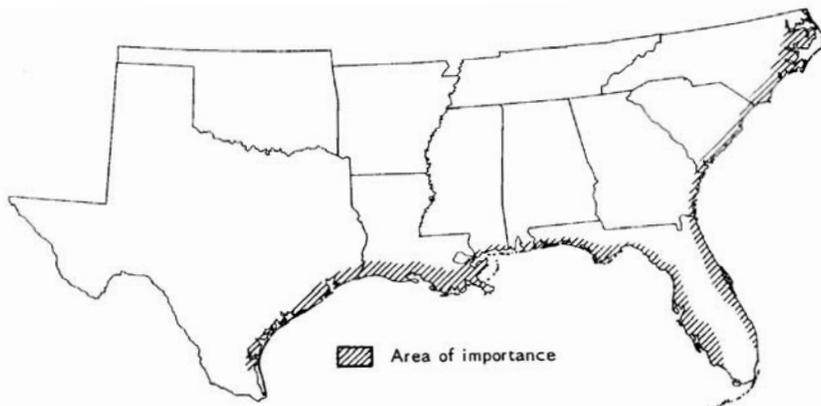
**SITE ADAPTATION**

Primarily adapted to mineral soils in salt marshes. Tolerates moderate salinity and water levels that fluctuate from 4 inches below soil surface to 2 inches above. Closely associated with marshhay cordgrass and common reed.

**USE AND MANAGEMENT**

Big cordgrass is grazed by cattle. Ducks and geese eat the tender shoots that grow after marshes are burned in early fall.

For best production and plant vigor, graze big cordgrass during fall and winter and defer grazing during summer.



*Spartina patens*, marshhay cordgrass

*Spartina patens* (Ait.) Muhl., marshhay cordgrass

DESCRIPTION

Warm-season, rhizomatous perennial.

Height: 1 to 4 feet.

Leaf blade: Long; narrow; usually rolled inward, giving a wiry appearance; upper side rough.

Leaf sheath: Rounded.

Ligule: Ring of short hair.

Seedhead: 3 to 5 spikes, each 2 to 6 inches long, growing almost at right angle to stem; spikelets grow on one side of rachis.

GROWTH CHARACTERISTICS

Makes primary growth during warm season and some growth all year. Produces most of seed by October. Mature plants turn a grayish color. Frequently grows in almost pure stands. Reproduces from seed and from rhizomes. Although rhizomatous, often gives appearance of being a bunch grass.

DISTRIBUTION

Brackish to saline marshes along Atlantic and gulf coasts and saline marshes in New York and Michigan.

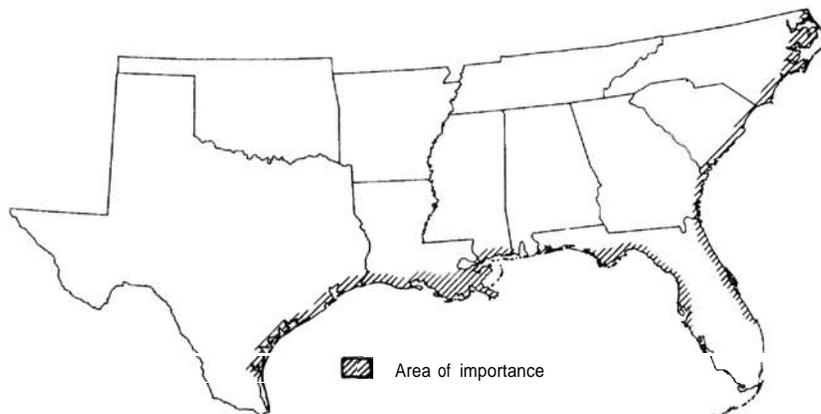
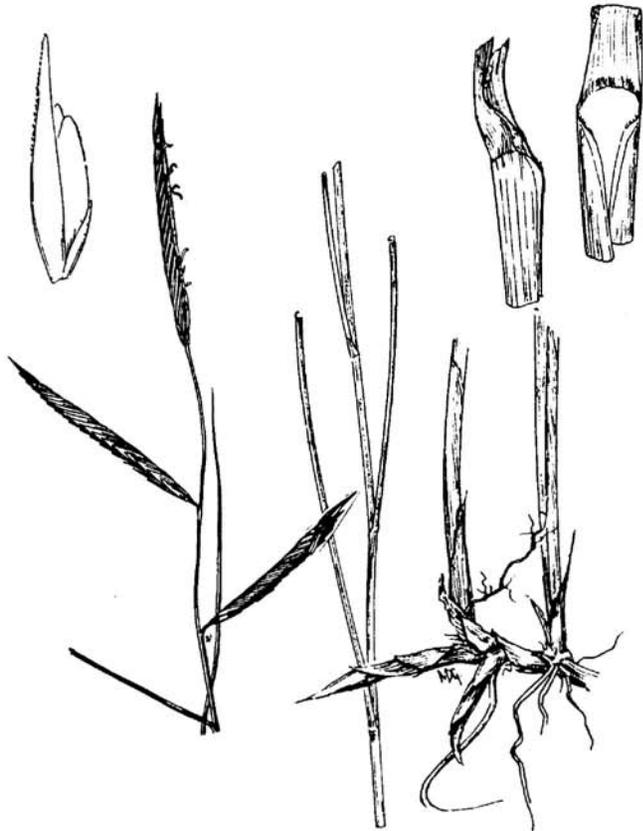
SITE ADAPTATION

Grows best on firm mineral soils. Tolerates moderate salinity. Does best if water level fluctuates from 2 inches above soil surface to 4 inches below. Occasionally grows in scattered stands on slightly salty, heavy-textured uplands soils.

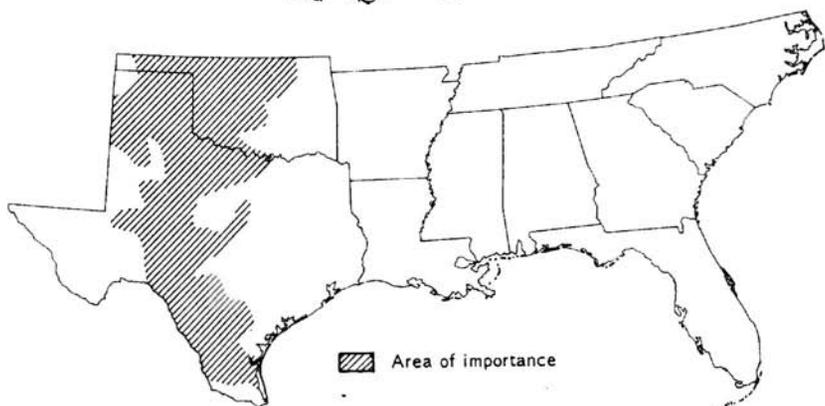
USE AND MANAGEMENT

Marshhay cordgrass is the most important forage plant on adapted sites. It provides forage for cattle, muskrats, and wild geese. Muskrats use it for building houses.

This grass is managed mostly for winter grazing. Forage quality is improved if ranges are burned every second year between September and February when water level is above soil surface. Ranges burned and grazed in winter should not be grazed for at least 120 days the following summer. Water-control systems are sometimes installed to maintain favorable water level and salinity if natural conditions have been disturbed. Cattle walkways are built to make more of the range accessible to cattle.



*Spartina pectinata*, prairie cordgrass



*Spartina pectinata* Link., prairie cordgrass

DESCRIPTION

Warm-season, coarse, rhizomatous perennial.

Height: 3 to 6 feet.

Leaf blade: 8 to 24 inches long; rolled when dry; rough on margins.

Leaf sheath: Prominently veined and rough.

Seedhead: 6 to 20 spikes, 1-1/2 to 2-1/2 inches long, cling to main stem; as many as 40 spikelets, each containing 1 floret, grow in 2 rows on one side of rachis.

GROWTH CHARACTERISTICS

Growth starts in early spring. Rapid growth is from late spring through summer. Grows in dense mats from stout, scaly rhizomes. May grow in almost pure stands. Produces seedheads in late summer.

DISTRIBUTION

Throughout Great Plains, north to Canada.

SITE ADAPTATION

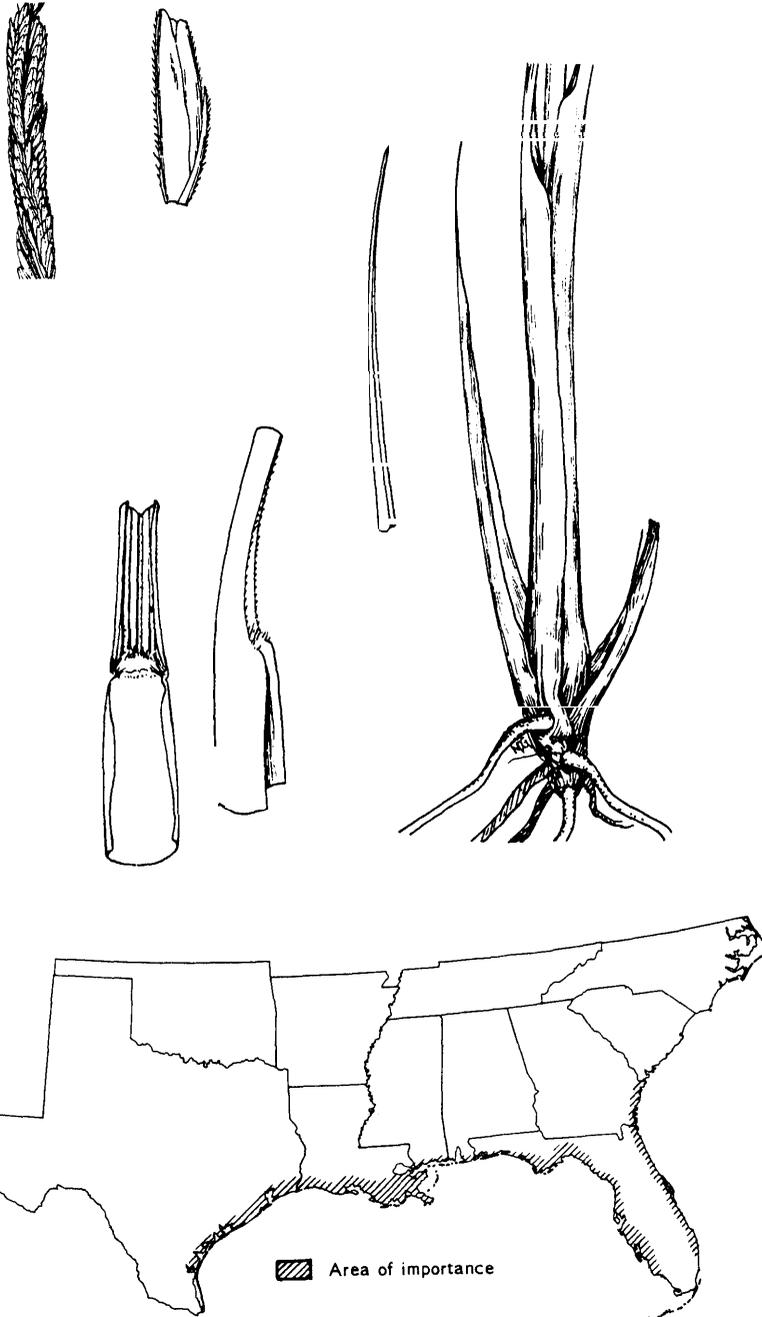
Best adapted to saline soils along streams and lake edges and on subirrigated areas.

USE AND MANAGEMENT

Early growth of prairie cordgrass is grazed readily. In some areas it is cut for hay. Mature growth becomes harsh and stemmy.

Where this grass is a key management species, no more than 50 percent of current year's growth by weight should be grazed off. Heavy grazing in early spring weakens it. Prairie cordgrass responds favorably to summer grazing deferments of at least 90 days every 2 to 3 years.

*Spartina spartinae*, gulf cordgrass



*Spartina spartinae* (Trin.) Merr., gulf cordgrass

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 3 to 5 feet.

*Leaf blade*: Narrow; strongly rolled inward, giving a wiry appearance; needlelike tip.

*Leaf sheath*: Rounded.

*Ligule*: Ring of short hair.

*Seedhead*: Numerous short spikes pressed against stem, overlapping each other in regular order; glumes covered with short hair.

GROWTH CHARACTERISTICS

Makes primary growth during summer. Produces seed in August or September. Often grows in almost pure stands of large, dense bunches. Mature growth is tough and wiry. Tips of leaf blades are sharp enough to stick through clothing.

DISTRIBUTION

Upland soils along coasts of Florida, Georgia, Alabama, Mississippi, Louisiana, and Texas.

SITE ADAPTATION

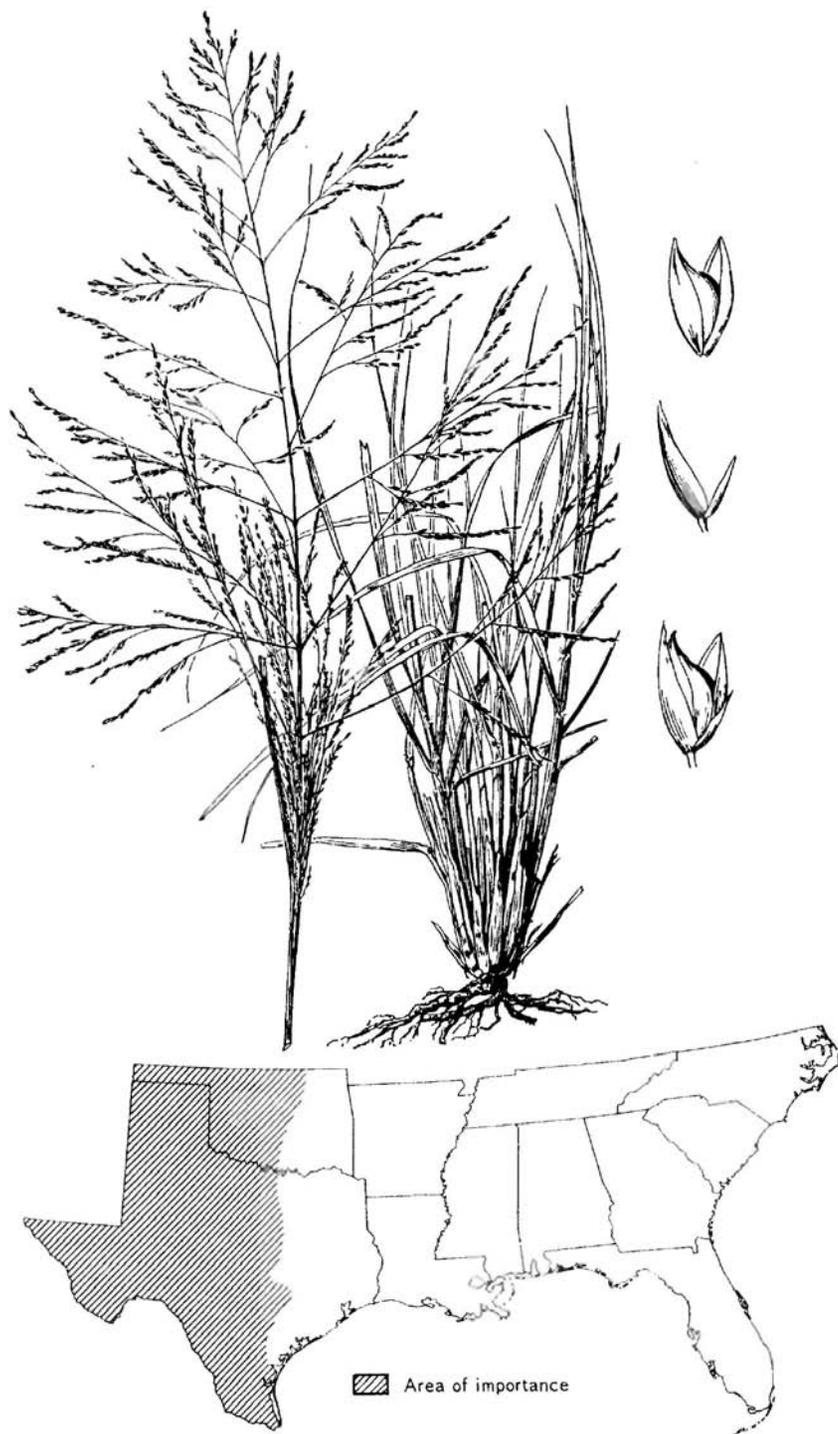
Grows on moist, saline, heavy clay soils. Tolerates moderate salinity. Does best if water level fluctuates from soil surface to 12 inches below. Tolerates water above soil surface for short time.

USE AND MANAGEMENT

Gulf cordgrass is the principal forage grass for cattle grazing on salty prairie sites along the gulf coast. If mature foliage is grazed, a protein concentrate should be fed. Geese graze the tender shoots during the winter following an early fall burn.

This grass is best managed for winter grazing. Because of its tough, wiry characteristics, controlled burning is necessary to keep the foliage tender and palatable. Burn every second or third year between September and February when soil is saturated. Defer grazing at least 120 days after burning to maintain plant vigor. Build cattle walkways, if needed, to make more of the range accessible to cattle.

*Sporobolus airoides*, alkali sacaton



*Sporobolus airoides* (Torr.) Torr., alkali sacaton

**DESCRIPTION**

*Warm-season, perennial bunch grass.*

*Height: 1 to 3 feet.*

*Leaf blade: Narrow; flat; rolls inward, especially when dry; bottom smooth, top rough.*

*Leaf sheath: Rounded; smooth except hairy at throat.*

*Ligule: Hairy.*

*Seedhead: Open panicle about 1 to 1-1/2 feet long.*

**GROWTH CHARACTERISTICS**

Reproduces from small seed. Seed remain viable for several years and will germinate without being scarified. The deep, coarse root system gives the appearance of short, thick rhizomes. Generally, the individual bunches of alkali sacaton are 8 to 12 inches in diameter at ground level. Withstands flooding and considerable deposition of sand and silt.

**DISTRIBUTION**

Throughout the 17 Western States and Mexico.

**SITE ADAPTATION**

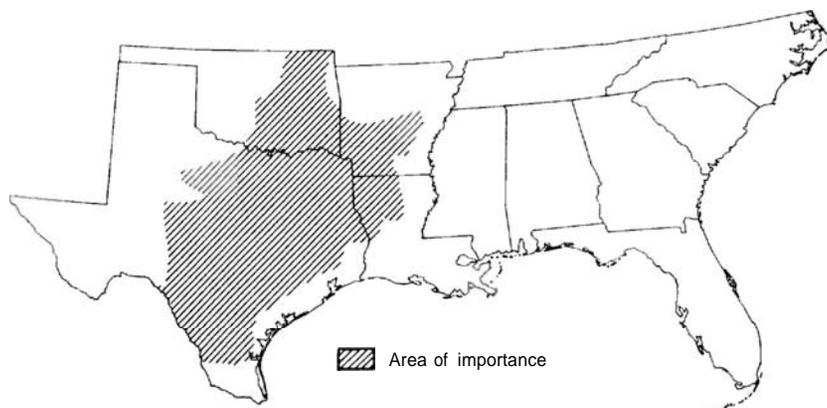
Grows mostly in pure stands on moist alkali soils.

**USE AND MANAGEMENT**

Alkali sacaton produces abundant forage which is grazed by cattle and horses.

Because of its long green growing season, this grass can be grazed for long periods if grazed properly. Total annual production is reduced, however, if more than 50 percent of current year's growth by weight is grazed off. To increase production, rotate grazing.

*Sporobolus asper* var. *hookeri*, meadow dropseed



*Sporobolus asper* var. *hookeri* (Trin.) Vasey, meadow dropseed

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 2 to 4 feet.

*Leaf blade*: Flat; narrow; at least 20 inches long; rolls inward, becoming threadlike at tip.

*Leaf sheath*: Shorter than internodes; upper sheath, often inflated, encloses seedhead.

*Ligule*: Short, hairy membrane.

*Seedhead*: Narrow purplish panicle usually 3 to 8 inches long; spikelets 1-flowered, wedge shaped.

GROWTH CHARACTERISTICS

Growth starts in late winter or early spring. Seedheads form in August. Some leaves remain green in the dense bunches through winter.

DISTRIBUTION

Missouri, Kansas, Mississippi, Louisiana, Arkansas, Texas, and Oklahoma.

SITE ADAPTATION

Best adapted to deep clay soils that are intermittently wet and dry. Does not grow on soils with a high water table or on deep sandy soils.

USE AND MANAGEMENT

Meadow dropseed is tough and wiry and is not grazed as readily as tall or hairy dropseed. Cattle and horses graze it in winter when associated grasses are dormant.

This grass increases on ranges that are grazed only in summer because associated grasses are more palatable. If it is the key management species during the winter grazing season, no more than 50 percent of current year's growth by weight should be grazed off.

*Sporobolus cryptandrus*, sand dropseed



*Sporobolus cryptandrus* (Torr.) A. Gray, sand dropseed

#### DESCRIPTION

*Warm-season, weak, perennial bunch grass.*

*Height: 2 to 3 feet.*

*Leaf blade: Flat; about 1/8 inch wide; tapers toward tip; rolls inward as plant matures.*

*Leaf sheath: Longer than internodes; upper sheath partly or entirely encloses seedhead.*

*Ligule: Conspicuous tuft of long white hair.*

*Seedhead: Open panicle densely flowered, often in pairs, sometimes hairy at axil of branch and stem; spikelets less than 1/8 inch long, lead colored; one glume twice as long as the other.*

#### GROWTH CHARACTERISTICS

Grows best in association with other grasses but may grow in pure stands. Usually produces an abundant seed crop. Many seeds are held between the stem and sheath until the plant deteriorates. Because seeds remain viable for many years, this grass reseeds itself readily on ranges following overgrazing or drought.

#### DISTRIBUTION

Most of United States except forested areas in Southeast and California; most common in southern Plains and in parts of Snake River plains in Idaho and Oregon.

#### SITE ADAPTATION

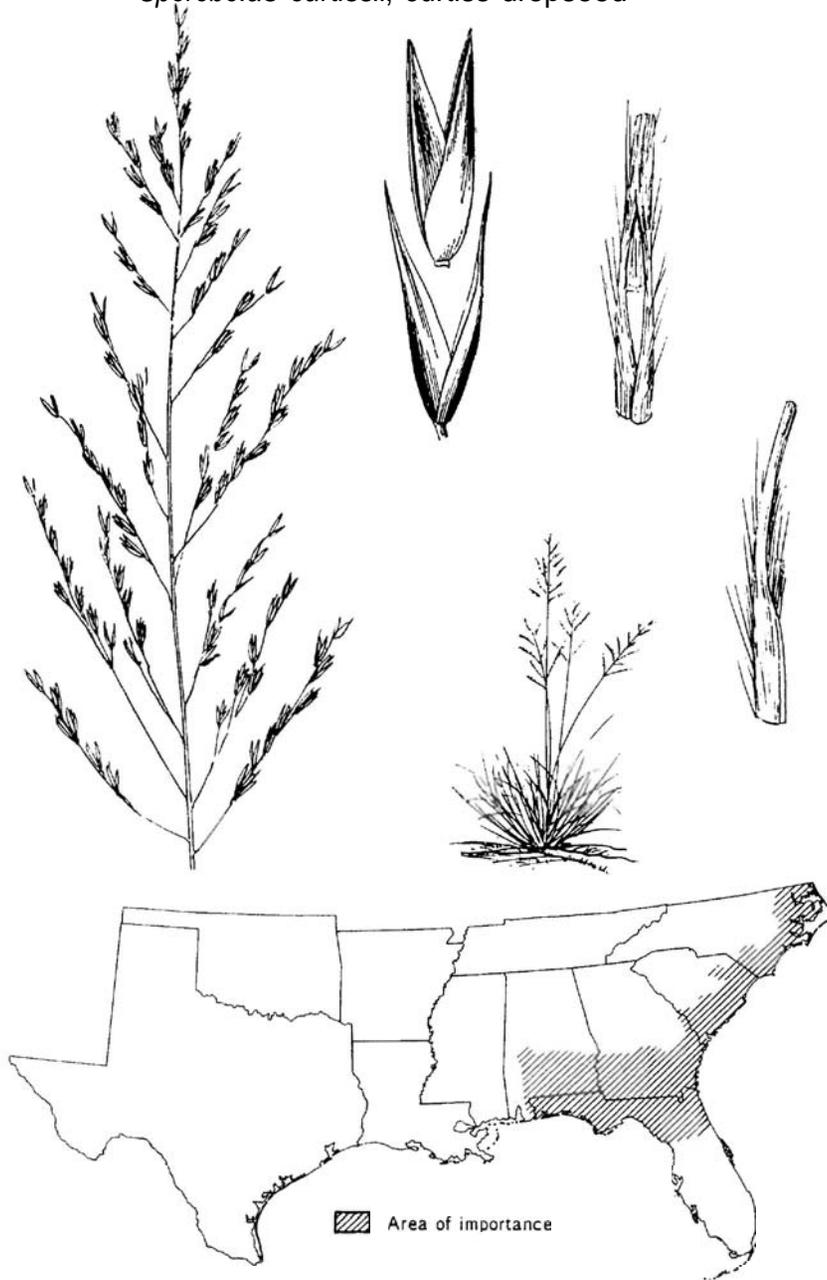
Grows best on sandy soils at lower elevations of its range. Also grows on coarse, gravelly soils and at elevations to 8,000 feet.

#### USE AND MANAGEMENT

Sand dropseed produces lots of forage that is fairly palatable to all livestock.

This grass increases on ranges that are closely grazed during summer.

*Sporobolus curtissii*, curtiss dropseed



*Sporobolus curtissii* (Vasey) Small ex Scribn., curtiss dropseed

DESCRIPTION

Cool-season, perennial bunch grass.

Height: 1 to 2 feet.

Leaf blade: Mostly basal; flat; narrow; 6 to 10 inches long; upper surface near base hairy.

Leaf sheath: Shorter than internodes; basal sheaths hairy at throat.

Seedhead: Open panicle 6 to 8 inches long; straw-colored glumes remain after seed disseminate.

GROWTH CHARACTERISTICS

Makes considerable growth during winter. Produces seed in early May and June. Sometimes remains green during summer and early fall. Few seedstalks are produced from a single plant.

DISTRIBUTION

North Carolina to north-central Florida and west to Mississippi.

SITE ADAPTATION

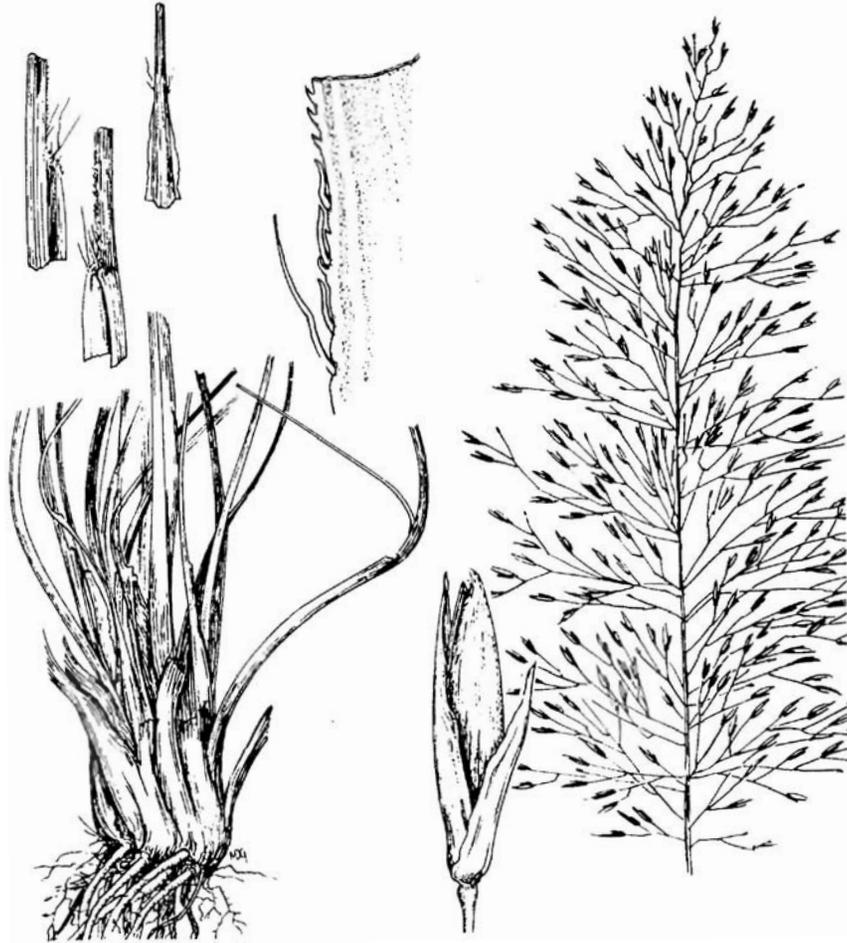
Primarily adapted to moist sandy soils.

USE AND MANAGEMENT

Curtiss dropseed is grazed readily by cattle during winter and spring.

If growth accumulates after winter deferments of 2 or more years, ranges should be burned in late winter and grazing deferred for 3 to 4 weeks or until fall.

*Sporobolus floridanus*, Florida dropseed



*Sporobolus floridanus* Chapm., Florida dropseed

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height*: 2-1/2 to 3-1/2 feet.

*Leaf blade*: Mostly basal; wide; folded at base; upper part usually flat; slightly twisted; saw-toothed bristles on edge.

*Leaf sheath*: Keeled; basal ones hairy at throat; base hard and shining.

*Ligule*: Hairy.

*Seedhead*: Open panicle 12 to 20 inches long; only 1 or 2 seedstalks produced from single bunch.

**GROWTH CHARACTERISTICS**

Growth starts in late spring. Produces seedheads in October. Usually scattered throughout plant community, although pure stands do occur.

**DISTRIBUTION**

Lower Coastal Plain from middle of North Carolina to central Florida.

**SITE ADAPTATION**

Adapted to poorly drained soils that have a low pH.

**USE AND MANAGEMENT**

Florida dropseed is grazed by cattle and occasionally by deer during spring and summer.

This grass increases on areas grazed during winter and on which grazing is deferred during summer. It is not easily damaged by burning.



*Sporobolus junceus*, pineywoods dropseed

*Sporobolus junceus* (Michx.) Kunth, pineywoods dropseed

DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 2 to 3 feet.

*Leaf blade*: Primarily basal; less than 1/6 inch wide; 8 to 15 inches long; distinctive blue green; a few hairs at base; upper blade rolls inward, resembling a long pine needle.

*Leaf sheath*: Rounded; longer than internodes.

*Seedhead*: Open panicle bronze to purple, 4 to 6 inches long; branches in regular whorls around stem; 1 to 3 seedstalks produced from each bunch.

GROWTH CHARACTERISTICS

Grows during late winter and spring. Vegetative growth is generally completed when seedheads appear in late April and May. Grows mostly in shaded areas.

DISTRIBUTION

Throughout Coastal Plain from Virginia to east Texas.

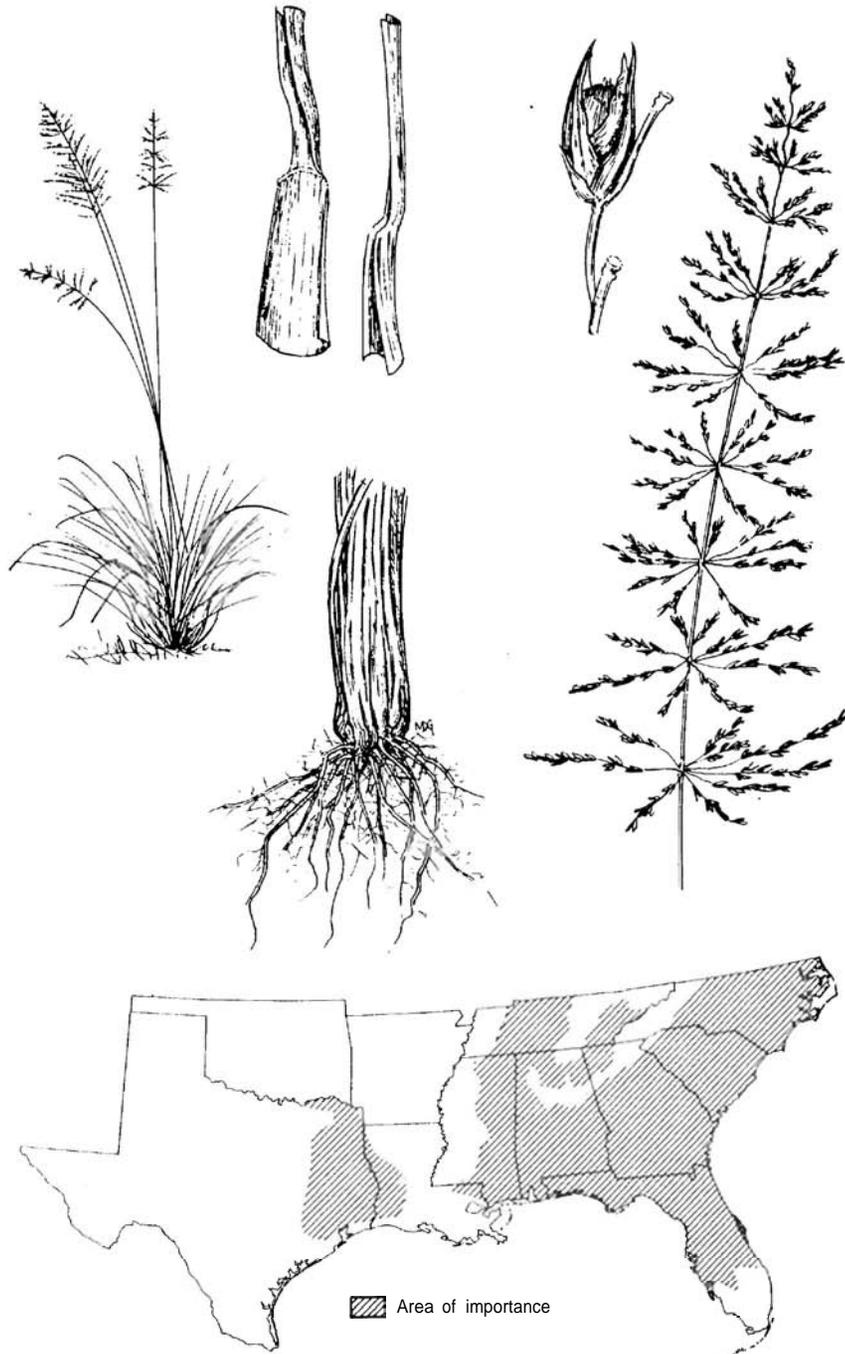
SITE ADAPTATION

Adapted to fairly well drained sandy loam soils. Seldom grows on wet or flooded sites.

USE AND MANAGEMENT

Pineywoods dropseed is grazed mostly by livestock and deer during spring.

Studies in central Louisiana show that this grass makes up only 1 percent of plant composition and provides only 3 to 5 percent of livestock diet on well-managed ranges. It increases, however, when more palatable associated grasses are grazed out. An abundance of this grass indicates a deteriorating range. It is not easily damaged by fire.



*Sporobolus virginicus*, seashore dropseed



*Sporobolus virginicus* (L.) Kunth, seashore dropseed

#### DESCRIPTION

*Warm-season, rhizomatous perennial.*

*Height: 4 to 8 inches.*

*Leaf blade: 1 to 4 inches long; distinctly two-ranked; salt crystals common on leaves and stems.*

*Leaf sheath: Overlapping; hairy at throat.*

*Seedhead: Panicle dense, spikelike.*

#### GROWTH CHARACTERISTICS

Makes some growth all year. Produces seed several times during year. Dense colonies and pure stands are common. Seashore dropseed is similar to seashore saltgrass (*Distichlis spicata*) and they grow on the same site. Their seedheads distinguish them.

#### DISTRIBUTION

Salt marshes and sandy soils of gulf coast and along Atlantic coast to North Carolina.

#### SITE ADAPTATION

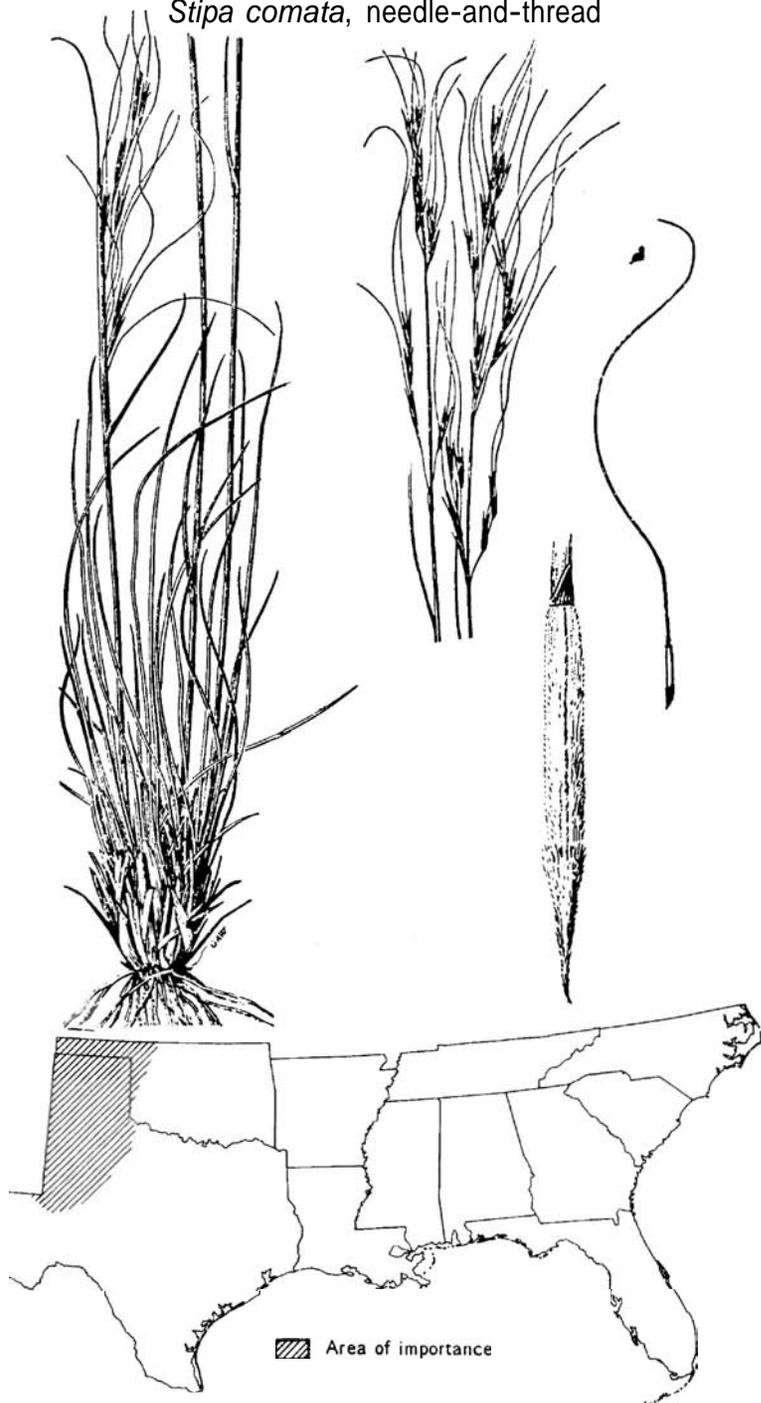
Grows on highly saline marsh soils from clays to sands. Does best if water level fluctuates from 2 inches above soil surface to 6 inches below.

#### USE AND MANAGEMENT

Seashore dropseed is an important forage grass high in protein and mineral content. Regrowth following a controlled burn in fall provides excellent winter food for wild geese.

Controlled burning of this grass results in lush, tender forage for winter grazing. Burning should be done no oftener than every 2 years between September and February and when water is above soil surface. Allow 4 inches of regrowth after burning before grazing. Summer deferments of at least 120 days are important to maintain vigor. For maximum production, no more than 50 percent of current growth by weight should be removed at any season. Prolonged inundation kills this grass. Cattle walkways are built to make more of the marsh range accessible to cattle.

*Stipa comata*, needle-and-thread



### ***Stipa comata* Trin. and Rupr., needle-and-thread**

#### **DESCRIPTION**

*Cool-season*, perennial bunch grass.

*Height*: 1 to 4 feet.

*Leaf blade*: Basal leaves narrow, usually rolled inward, 3 to 12 inches long; leaves along stem shorter and wider than basal leaves.

*Seedhead*: Open panicle 5 to 10 inches long, loosely spreading; 1-flowered spikelet; each seed  $\frac{3}{8}$  inch long; lemma has slender awn usually 4 to 5 inches long, sometimes 9 inches; part of awn next to seed tightly twisted and covered with fine soft hair; tip end of awn rough and usually straight.

#### **GROWTH CHARACTERISTICS**

Grows in early spring and in late fall if moisture is available. Produces an abundance of basal leaves which stay green during most seasons. Reproduces from seed.

#### **DISTRIBUTION**

Throughout Western States and Great Plains and in upper Yukon Valley in Alaska.

#### **SITE ADAPTATION**

Primarily adapted to sandy or gravelly loam soils.

#### **USE AND MANAGEMENT**

Needle-and-thread is grazed readily by all livestock, especially in early spring and late fall. Cures well on stem and provides good forage in fall and winter.

Periodic grazing deferments of at least 90 days and proper grazing use allow this grass to make maximum production and keep it in balance with associated grasses. To prevent seed from injuring sheep and contaminating wool, remove sheep for 2 to 3 weeks until seed ripen and fall to the ground.

*Stipa leucotricha*, Texas wintergrass



*Stipa leucotricha* Trin. and Rupr., Texas wintergrass

DESCRIPTION

*Cool-season*, short-lived, perennial bunch grass.

*Height*: 2 to 3 feet.

*Leaf blade*: Long; narrow.

*Leaf sheath*: Longer than internodes; basal sheaths enclose a nearly awnless self-pollinated seed called cleistogene.

*Seedhead*: Open panicle; spikelets 1-seeded; lemma has awn 6 to 10 inches long, rather stout, light colored, twisted like a rope in lower part.

GROWTH CHARACTERISTICS

Makes most rapid growth in early fall before cold weather. Stays green and continues to grow through winter and spring until June. Becomes dormant during hot summer. Reproduces from seed. New plants are also established from cleistogenes (seed produced in axil of lower sheath and stem). Awns on seed twist and untwist as moisture changes. This characteristic and the needlelike end that holds the seed assist in planting the seed. Also seed become attached to the hair and wool of grazing animals, which help distribute them.

DISTRIBUTION

Primarily, southwestern Oklahoma, central Texas, and central Mexico.

SITE ADAPTATION

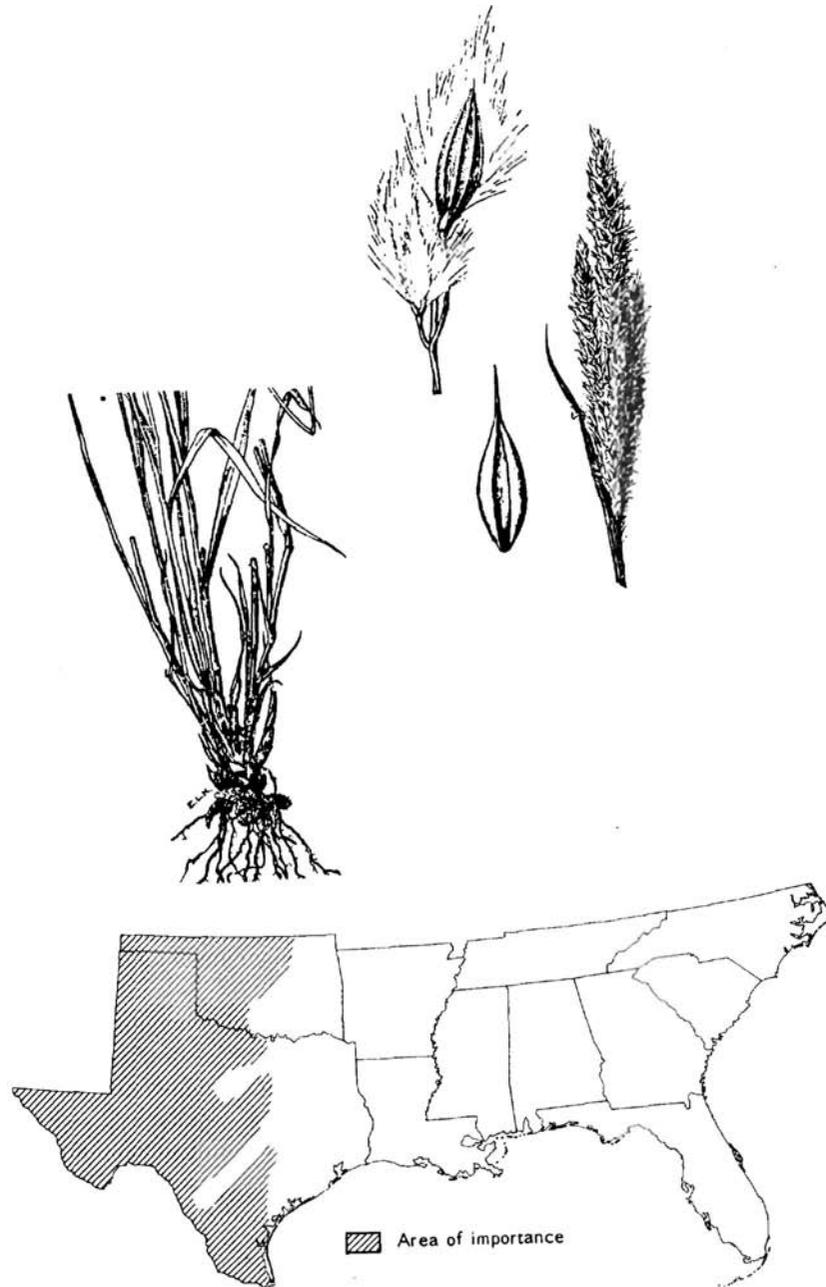
Grows best on deep loam soils.

USE AND MANAGEMENT

Texas wintergrass is grazed by all livestock. It is good forage, primarily because it is green and succulent during winter when most other grasses are dormant. Because its foliage disintegrates rapidly at end of growing season, it is a poor grass for soil protection.

This grass is best managed for winter grazing. To prevent seed from injuring sheep and contaminating wool, remove sheep for 2 to 3 weeks until seed ripen and fall to the ground. For maximum production, no more than 50 percent of current year's growth by weight should be grazed off. Periodic grazing deferments during growing season allow plants to remain vigorous and produce a seed crop.

*Trichachne californica*, Arizona cottontop



*Trichachne californica* (Benth.) Chase, Arizona cottontop

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height*: 1-1/2 to 2 feet.

*Leaf blade*: Flat; narrow; usually less than 5 inches long.

*Leaf sheath*: Covered with small hair.

*Stem*: Swollen base, scaly and hairy.

*Seedhead*: Open panicle; second glume and sterile lemma covered with long white (occasionally purple) hair, giving a silky cottony appearance after seed ripen.

**GROWTH CHARACTERISTICS**

Grows rapidly following late spring and summer rains and continues to grow as long as moisture is available. Reproduces primarily from seed. Usually produces a good seed crop; seed remain viable as long as 10 years. Seldom grows in pure stands.

**DISTRIBUTION**

Arizona to Colorado, south to Texas and northern Mexico.

**SITE ADAPTATION**

Grows best on gravelly and sandy loam soils.

**USE AND MANAGEMENT**

Arizona cottontop is grazed by cattle, horses, and sometimes by sheep and goats. It is most palatable when green. Cures well on stem and provides dry forage for cattle. It has been used in range seedings in south Texas following brush control.

To keep Arizona cottontop vigorous and maintain it in the plant community, defer grazing 60 to 70 days every 2 to 3 years before seed maturity. No more than 50 percent of current year's growth by weight should be grazed off.

*Trichloris crinita*, twoflower trichloris



*Trichloris crinita* (Lag.) Parodi, twoflower trichloris

DESCRIPTION

*Warm-season*, tufted, perennial bunch grass.

*Height*: 1 to 2 feet.

*Leaf blade*: Flat; 3 to 8 inches long; upper side hairy near base.

*Leaf sheath*: Open; shorter than internodes.

*Ligule*: Ring of short hair.

*Stem*: Branches at lower nodes.

*Seedhead*: Dense, feathery spikes 1 to 2 inches long; green seedheads turn light brown at maturity; spikelets 2-flowered, thus the common name.

GROWTH CHARACTERISTICS

Twoflower trichloris is one of the last grasses to start growth in spring and one of the first to become dormant in fall. Growth is rapid during late spring and summer. May produce several seed crops in one season. Seedstalk to leaf and stem ratio is high. Growing points are several inches above ground. Plants have a weak root system.

DISTRIBUTION

Rio Grande plains in south Texas to northern Mexico.

SITE ADAPTATION

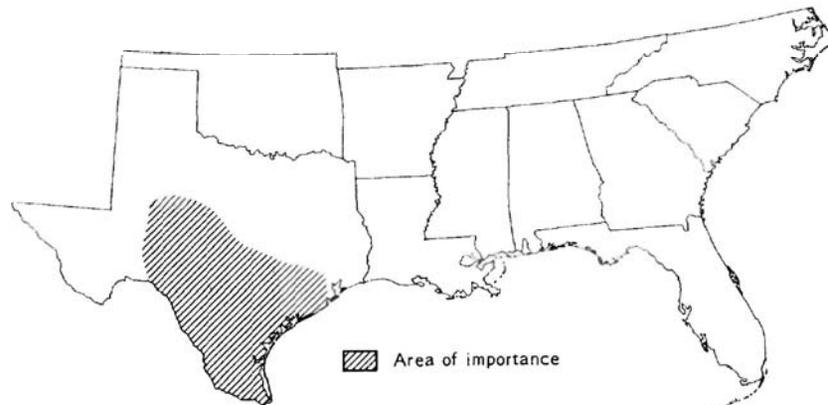
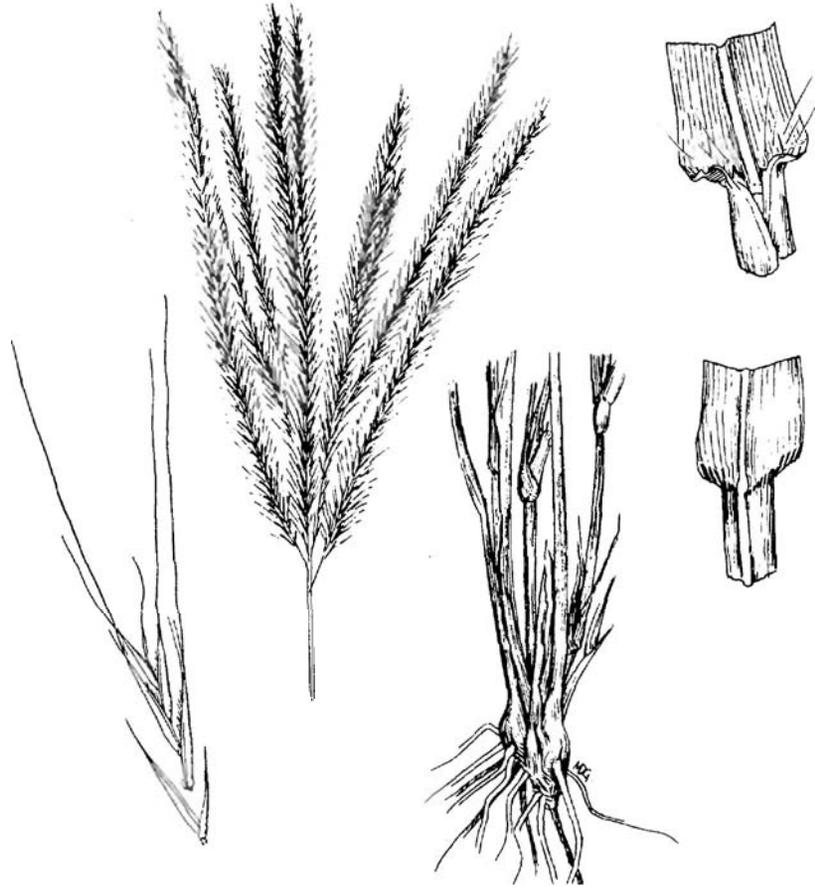
Grows best on deep sandy to sandy loam soils.

USE AND MANAGEMENT

Twoflower trichloris is grazed readily by livestock.

This grass decreases under continuous grazing because it is so palatable that livestock graze it close to the ground all year. Also, young plants are easily pulled from the ground. Periodic grazing deferments of 60 to 70 days throughout the year are needed to maintain plant vigor.

*Trichloris pluriflora*, fourflower trichloris



*Trichloris pluriflora* Fourn., fourflower trichloris

#### DESCRIPTION

*Warm-season, erect, tufted perennial.*

*Height: 1 to 2 feet.*

*Leaf blade: Wide; flat; strong midrib.*

*Leaf sheath: Open; shorter than internodes.*

*Ligule: Few long hairs.*

*Stem: Branches at lower nodes; nodes enlarged.*

*Seedhead: Several spikes 2 to 3 inches long; looser and less feathery than twoflower trichloris; spikelets 3- to 5-flowered, usually 4-flowered, thus the common name.*

#### GROWTH CHARACTERISTICS

Growth starts in late spring. Grows throughout summer if moisture is available. Produces seed several times in one season. Has a shallow, fibrous root system. The high ratio of seedstalks to leaves and the unpalatable stems help protect plant from close grazing. Growing points are 3 to 4 inches above ground.

#### DISTRIBUTION

Primarily in Rio Grande plains of south Texas, prairies along gulf coast of Texas and Louisiana, and south to Mexico.

#### SITE ADAPTATION

Best adapted to sandy loam soils but grows on heavier soils.

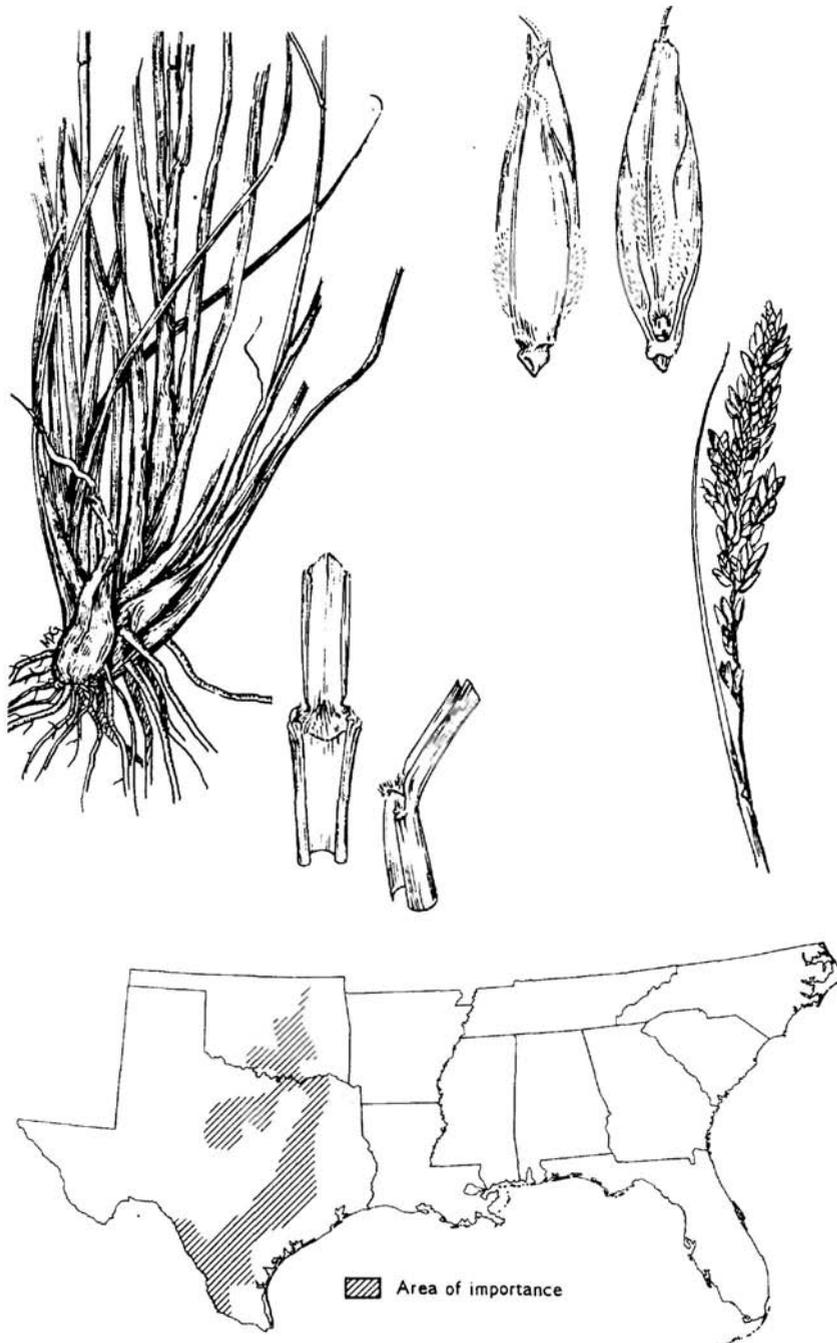
#### USE AND MANAGEMENT

Fourflower trichloris is grazed by livestock and occasionally by deer. Birds eat the seed.

This grass is a decreaser on ranges grazed throughout the summer. Periodic grazing deferments of 60 to 70 days throughout the year, especially during spring and summer, are needed to maintain plant vigor.

*Tridens albescens*, white tridens

*Tridens albescens* (Vasey) Woot. and Standl., white tridens



DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 1 to 3 feet.

*Leaf blade*: Long; narrow; rolls inward when drying.

*Leaf sheath*: Rounded; open; basal sheaths shorter than internodes.

*Ligule*: Row of hair.

*Stem*: Swollen at base; white to purple.

*Seedhead*: Dense panicle distinctly green to purple before maturity.

GROWTH CHARACTERISTICS

Growth starts in late spring. Seedheads start to form about 5 to 6 weeks later. Seed are fairly large. Plants often have a sour odor.

DISTRIBUTION

Texas, Oklahoma, and New Mexico.

SITE ADAPTATION

Grows best along drainageways and sites that overflow occasionally. Best adapted to sandy to sandy loam soils but grows on clayey soils if moisture is adequate.

USE AND MANAGEMENT

White tridens is grazed by cattle and horses. The large seed are eaten by birds.

Because this grass never makes up a large percentage of the plant composition, it is seldom a key management species. It is generally less palatable than associated grasses; therefore, requires no special management. White tridens is an increaser on most sites; its abundance indicates fair range condition.

*Tridens flavus*, purpletop



*Tridens flavus* (L.) Hitchc., purpletop

#### DESCRIPTION

*Warm-season*, perennial bunch grass.

*Height*: 3 to 5 feet.

*Leaf blade*: Flat; often 1/2 inch wide; 10 to 28 inches long; lax; smooth; glossy green.

*Leaf sheath*: Flattened near base; keeled; overlapping.

*Ligule*: Ring of short hair.

*Seedhead*: Open panicle 8 to 14 inches long, spreading, pyramid shaped, usually purple, sometimes nearly black; branchlets droop and are covered with an oily or greaselike substance. Purpletop is sometimes called greasegrass.

#### GROWTH CHARACTERISTICS

Growth starts in early spring and continues until July. Produces seedheads during August and September; seed mature during October. Long, lax blades become pronounced under medium and dense shade. Generally, the individual bunches of this grass are 6 to 8 inches in diameter at ground level.

#### DISTRIBUTION

All the states east of 30-inch rainfall belt.

#### SITE ADAPTATION

Adapted to both bottom lands and uplands. In Florida, grows primarily on hummocky sites.

#### USE AND MANAGEMENT

Purpletop is grazed by all livestock. The seed are eaten by birds.

Because this grass is not palatable until after frost, proper grazing is the only management practice required to maintain it in a vigorous condition.

*Tridens muticus*, slim tridens



*Tridens muticus* (Torr.) Nash, slim tridens

**DESCRIPTION**

*Warm-season*, perennial bunch grass.

*Height*: 8 to 12 inches.

*Leaf blade*: Narrow; rolled, giving needlelike appearance; sometimes sparsely covered with fine hair.

*Leaf sheath*: Shorter than internodes; usually covered with short hair.

*Ligule*: Ring of hair.

*Stem*: Erect; slender; somewhat swollen at base.

*Seedhead*: Dense panicle; spikelets 6- to 8-flowered, pale purplish; back of palea densely covered with hair.

**GROWTH CHARACTERISTICS**

Makes most of growth in late spring. Seedheads generally appear 4 to 5 weeks later. Bunches are seldom more than 3 to 4 inches in diameter.

**DISTRIBUTION**

West Texas and Oklahoma to California.

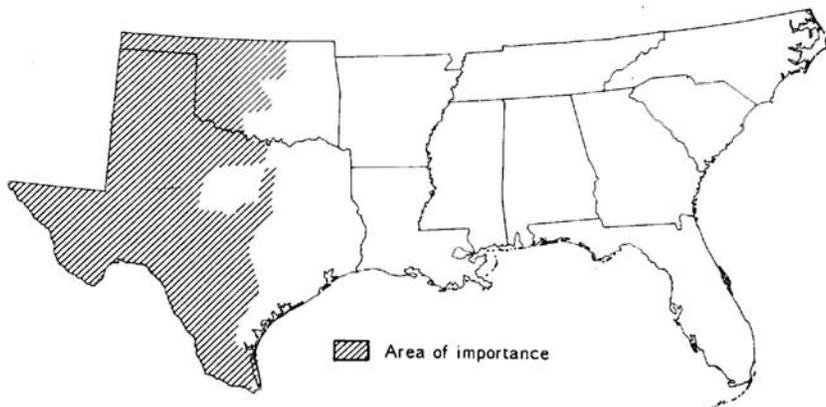
**SITE ADAPTATION**

Adapted to well-drained, rocky calcareous soils.

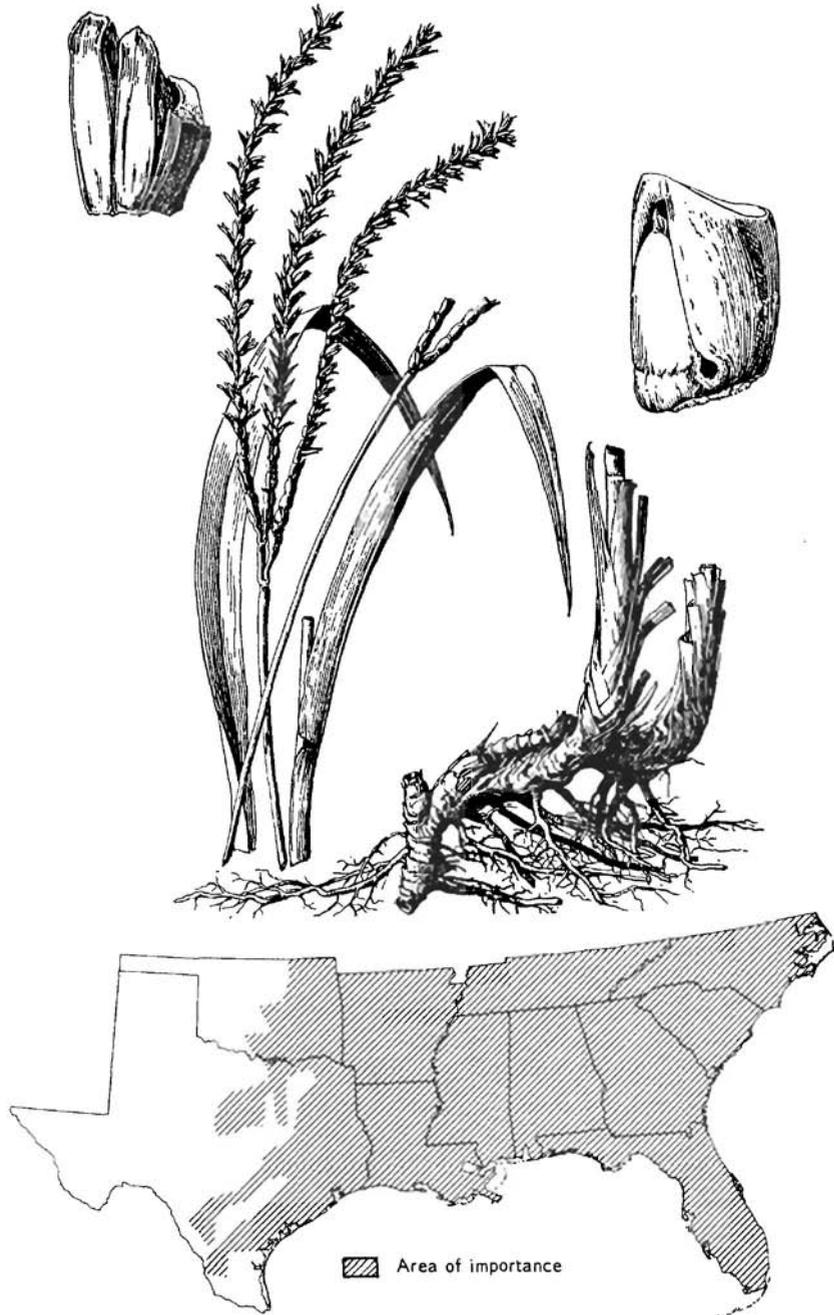
**USE AND MANAGEMENT**

Slim tridens is grazed by cattle and horses. The seed are eaten by rodents and birds.

Although this grass makes up 10 to 15 percent of the total production on some sites, it is seldom considered a key management species because associated grasses are more palatable. It is an increaser on cattle ranges; its abundance indicates fair to poor range condition.



*Tripsacum dactyloides*, eastern gamagrass



*Tripsacum dactyloides* (L.) L., eastern gamagrass

**DESCRIPTION**

*Warm-season*, robust, rhizomatous perennial.

*Height*: 5 to 9 feet.

*Leaf blade*: 12 to 24 inches long; 3/8 to 1/2 inch wide; flat; pronounced midrib.

*Leaf sheath*: Flattened; shorter than internodes.

*Seedhead*: 2 or 3 terminal racemes, occasionally 1; spikelets unisexual: pistillate (female) spikelets on lower fourth of spike; staminate (male) above on same spike.

**GROWTH CHARACTERISTICS**

Makes major growth in early spring. Stays green until late fall or frost if moisture is available. Produces seed from July to September. May grow in almost pure stands over a large acreage. Robust growth makes eastern gamagrass very conspicuous. Produces few viable seed.

**DISTRIBUTION**

From Massachusetts to Michigan, Iowa, and Nebraska and throughout the Southern States.

**SITE ADAPTATION**

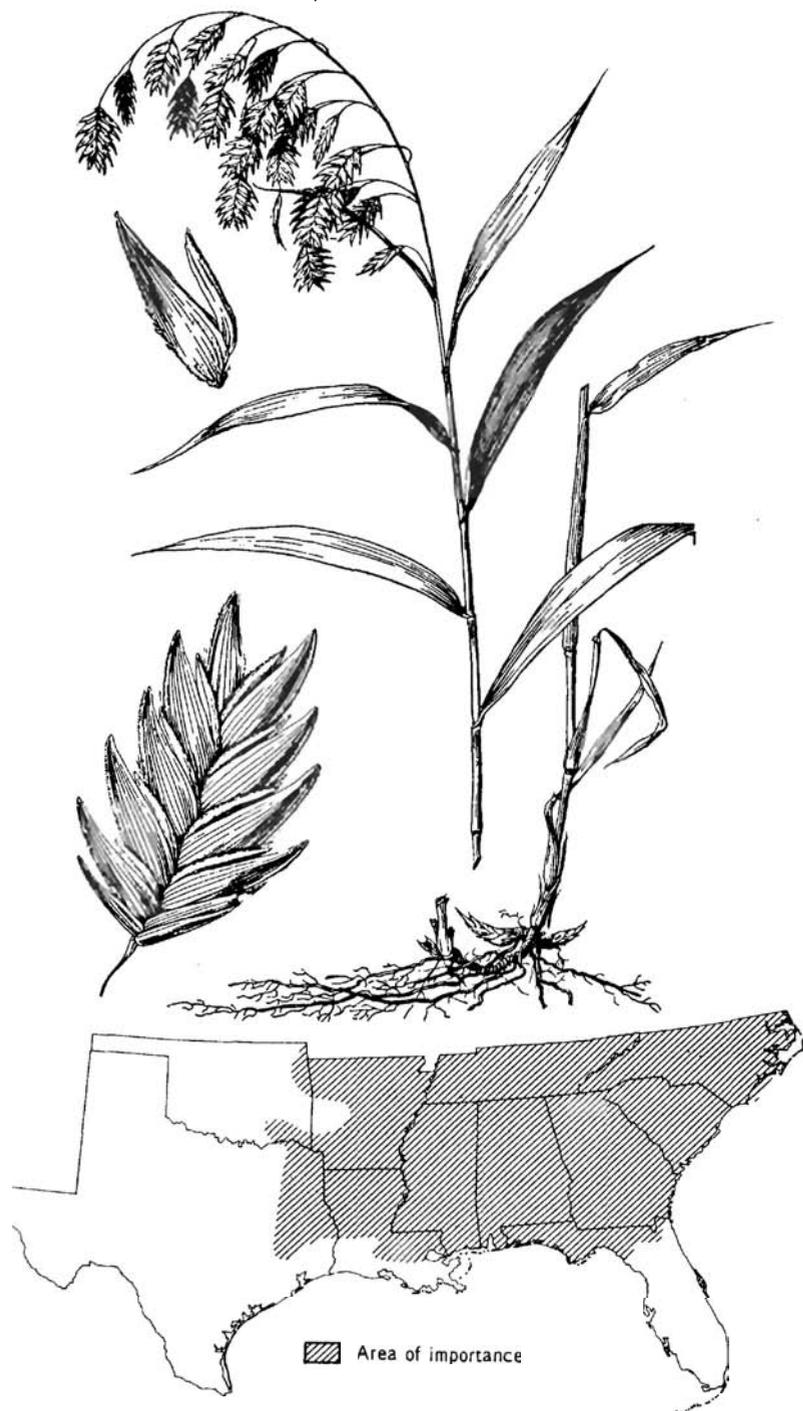
Grows best on moist, well-drained fertile soils. Does not tolerate standing water for long periods.

**USE AND MANAGEMENT**

Eastern gamagrass is a choice hay plant and, if possible, is usually managed for hay production. It is readily grazed by all livestock during spring and summer. Because its foliage breaks down and deteriorates rapidly after frost, this grass is not dependable for winter grazing.

For maximum production of this grass, do not remove more than 50 to 60 percent of current growth by weight at any time during growing season. Defer grazing at least 90 days every 2 to 3 years to enable plants to produce seed. For quality hay, cut when seedheads start appearing. Set the mower to leave a 6- to 8-inch stubble.

*Uniola latifolia*, broadleaf uniola



*Uniola latifolia* Michx., broadleaf uniola

#### DESCRIPTION

*Cool-season*, robust, rhizomatous perennial.

*Height*: 3 to 3-1/2 feet.

*Leaf blade*: Flat; wider in middle than at either end; 4 to 6 inches long.

*Leaf sheath*: Open; rounded; smooth; shorter than internodes.

*Seedhead*: Open panicle strongly drooping; branches bear a few large, flat spikelets 8- to 12-flowered.

#### GROWTH CHARACTERISTICS

Growth starts in early spring. As summer approaches, becomes semidormant; then greens up in fall when temperature is cool. Produces seed in fall. Reproduces from seed and from rhizomes. Is shade tolerant and grows in colonies.

#### DISTRIBUTION

Throughout forested areas of 11 Southern States.

#### SITE ADAPTATION

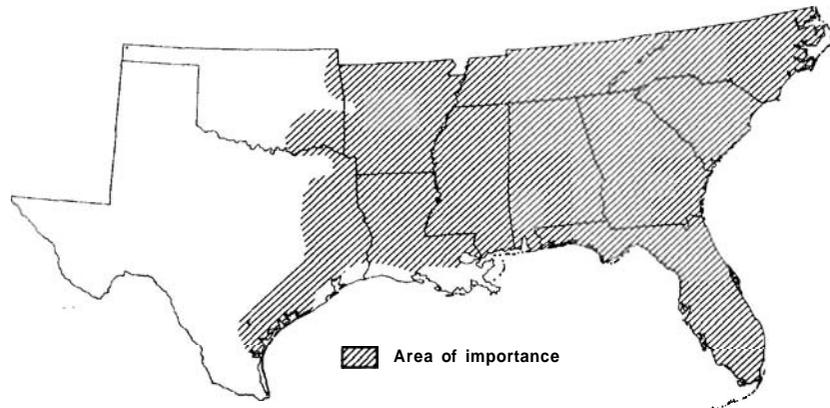
Adapted to moist, fertile bottom-land soils. Grows best under at least 40 percent shade.

#### USE AND MANAGEMENT

Broadleaf uniola is usually managed for winter grazing.

Fall grazing deferments every 2 to 3 years until seedheads develop insure a healthy, vigorous stand. No more than 50 percent of current growth by weight should be removed during grazing season.

*Uniola sessiliflora*, longleaf uniola



▨ Area of importance

*Uniola sessiliflora* Poir., longleaf uniola

DESCRIPTION

*Cool-season*, rhizomatous perennial.

*Height*: 2 to 3 feet.

*Leaf blade*: 12 to 24 inches long; bluish green; wide; flat at top.

*Leaf collar*: Dense cluster of hair.

*Leaf sheath*: Open; covered with few to many short hairs; basal sheaths narrow.

*Seedhead*: Spikelike panicle; branches grow close to main stem; spikelets flat and broadly V-shaped at maturity.

GROWTH CHARACTERISTICS

Remains green during most of winter and summer following major growth. Produces most of seed in June and July and some in fall. Does best in shade; seldom grows in direct sunlight. Reproduces from short, knotty, pointed rhizomes and from seed.

DISTRIBUTION

East Texas and Oklahoma to Atlantic coast, north to Virginia.

SITE ADAPTATION

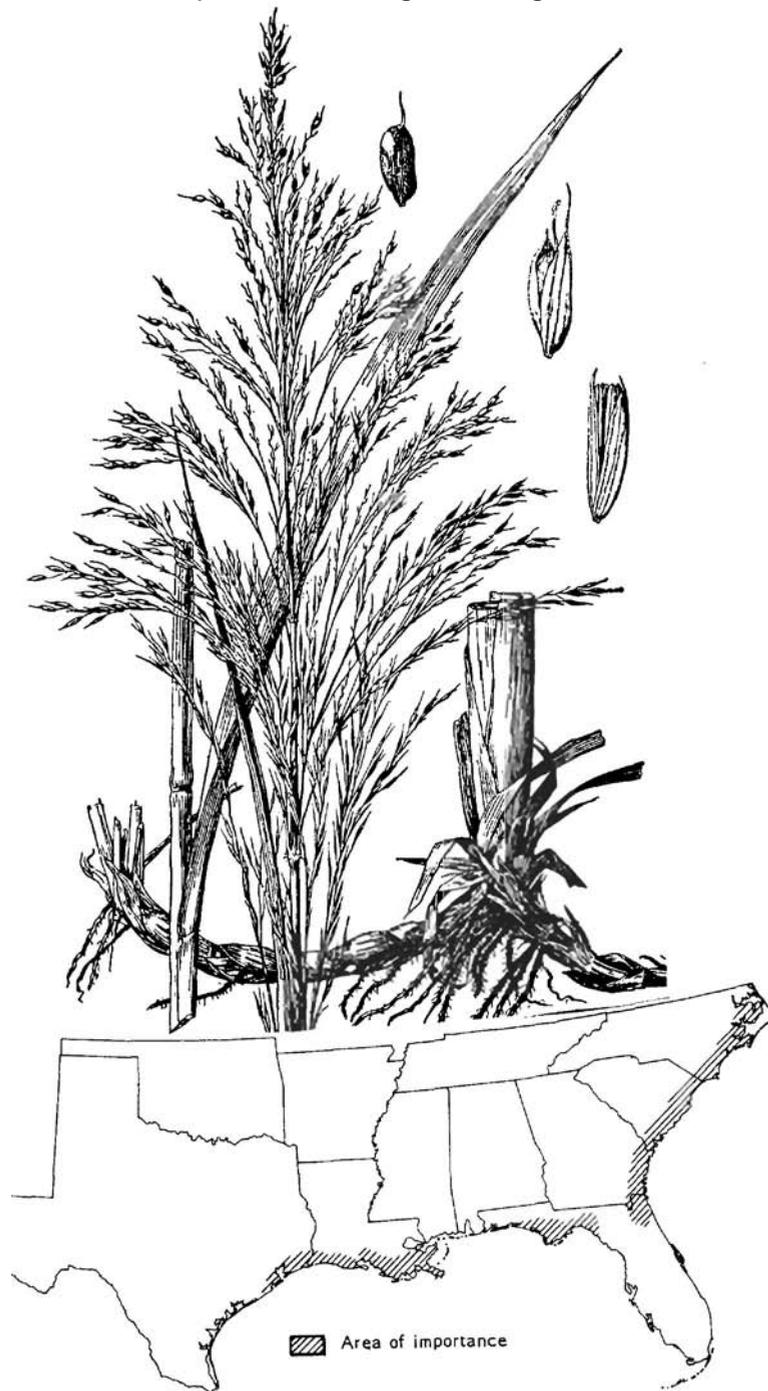
Adapted to moist, shaded bottom-land and upland soils. Best adapted to areas that are shaded more than 50 percent at midday. Grows best on fertile soils but also grows on soils of low fertility. It is the principal grass on mixed pine-hardwood forests of the South.

USE AND MANAGEMENT

Longleaf uniola is grazed by cattle.

This grass is managed mostly for winter and early spring grazing. For maximum production, no more than 50 percent of current year's growth by weight should be grazed off. Late winter and early spring grazing deferments of 90 days every 2 to 3 years improve plant vigor and allow plants to produce seed. This grass is moderately tolerant of controlled burning.

*Zizaniopsis miliacea*, giant cutgrass



*Zizaniopsis miliacea* (Michx.) Doell and Aschers, giant cutgrass

DESCRIPTION

*Warm-season*, rhizomatous perennial.

*Height*: 3 to 9 feet.

*Leaf blade*: Long; flat; rough on edges, almost sawlike.

*Leaf sheath*: Rounded; open; shorter than internodes.

*Seedhead*: Narrow, nodding panicles; spikelets unisexual, 1-flowered, male and female on same branch of panicle.

GROWTH CHARACTERISTICS

Although a warm-season grass, giant cutgrass grows some in late fall along the gulf coast. Produces seed mostly in spring and early summer. Grows in dense bunches from large, creeping rhizomes. Mature plants turn yellowish after first frost. Usually has green basal leaves all year.

DISTRIBUTION

Kentucky, Virginia, Maryland, and most of Southern States.

SITE ADAPTATION

Grows primarily on firm mineral clays or silty soils. Also grows in fresh-water marshes and swamps, on creek and river banks, and in drainage ditches and canals. Tolerates small amount of salt in free soil water. Does best if water level fluctuates from soil surface to 12 inches above.

USE AND MANAGEMENT

Giant cutgrass is readily grazed by cattle from late winter through summer. If grazed in dormant season, a mineral supplement should be provided. This grass is also used for erosion control around lakes and on streambanks. Geese and ducks forage on its green basal leaves.

For maximum production, no more than 50 percent of current growth by weight should be removed at any season. Controlled burning is recommended if enough dead leaves and stems accumulate on the ground to smother new growth. Burn only when there is at least 1 inch of water above soil surface. Defer grazing after burning to permit 8 inches of regrowth. Cattle walkways are essential to distribute grazing and provide access to forage on fresh marshes where this grass is important.

## Reference List

- Bernstein, Leon. 1958. Salt tolerance of grasses and forage legumes. U.S. Dept. of Agr. Inf. Bull. 194. 7 p.
- Branson, Farral A. 1953. Two new factors affecting resistance of grasses to grazing. *J. Range Mgmt.* 6(3): 165–171.
- Crider, Franklin J. 1955. Root-growth stoppage resulting from defoliation of grass. U.S. Dept. Agr. Tech. Bull. 1102. 23 p. (Out of print.)
- Featherly, H. I. 1938. Grasses of Oklahoma. Okla. Agr. Expt. Sta. Tech. Bull. 3. 132 p.
- Forest Service, U.S. Department of Agriculture. 1937. Range plant handbook.
- Frandsen, Waldo R. 1960. Grass makes its own food. U.S. Dept. Agr. Inf. Bull. 223.
- Gates, Frank C. 1937. Grasses in Kansas. Kans. State Bd. Agr. Rpt. 220–A. 55: 349.
- Gay, Charles W., Jr., and Don D. Dwyer. 1965. New Mexico grasses. N. Mex. State Univ. Circ. 374. 85 p.
- Gould, F. W. 1962. Texas plants—a checklist and ecological summary. *Tex. Agr. Expt. Sta. Misc. Bull.* 585. 112 p.
- Grelen, Harold E., and Vinson L. Duvall. 1966. Common plants of longleaf pine-bluestem range. U.S. Dept. Agr. Forest Serv. Res. Paper SO–23. 96 p.
- Halls, L. K., O. M. Hale, and B. L. Southwell. 1956. Grazing capacity of wiregrass—pine ranges of Georgia. *Ga. Agr. Expt. Sta. Tech. Bull. N.S.* 2. 38 p.
- Hitchcock, A. S. 1950. Manual of the grasses of the United States. 2d ed., revised by Agnes Chase. U.S. Dept. Agr. Misc. Pub. 200. 1051 p.
- Hoffman, G. O., and B. J. Ragsdale. [n.d.] Know your grasses. *Tex. A.&M. Univ. Agr. Ext. Serv. Bull.* 182 (Rev.). 48 p.
- Judd, B. Ira. 1962. Principal forage plants of southwestern ranges. U.S. Dept. Agr. Forest Serv. Rocky Mountain Forest and Range Expt. Sta. Paper No. 69. 93 p.
- Phillips Petroleum Company. 1963. Pasture and range plants. Bartlesville, Okla. 176 p.
- Rechenthin, C. A. 1956. Elementary morphology of grass growth and how it affects utilization. *J. Range Mgmt.* 9(4): 167–170.
- Shiflet, Thomas N. 1963. Major ecological factors controlling plant communities in Louisiana marshes. *J. Range Mgmt.* 16(5): 231–235.
- Silveus, W. A. 1933. Texas grasses. W. A. Silveus, San Antonio, Tex. 782 p.
- Silveus, W. A. 1942. Grasses, classification and description of species of Paspalum and Panicum in the United States. W. A. Silveus, San Antonio, Tex. 526 p.
- Williams, Robert E., John T. Cassidy, Lowell K. Halls, and E. J. Woolfolk. 1955. Range resources of the South. *Ga. Agr. Expt. Sta. Bull. N.S.* 9. 31-p.

## Glossary

- annual.* A plant that completes its life cycle in 1 year or less.
- auricle.* An ear-shaped projection or appendage.
- auxillary.* Additional, supplemental.
- awn.* A bristlelike appendage, often the extension of nerves or veins in glumes and lemmas.
- axil.* The angle between an organ and its axis. Applied especially to the angle between a leaf and its stem and between a branch or pedicel and its axis.
- axillary.* Growing in an axil.
- axis.* The main stem of a seedhead, especially of a panicle.
- barb.* A hooked hair or bristle.
- blade.* The upper expanded part of a grass leaf.
- brackish.* Mixed with salt.
- bract.* A reduced or modified leaf.
- bristle.* Any short, stiff, hairlike growth.
- bunch grass.* A grass that habitually grows in a well-defined tuft, as opposed to one that spreads by long stolons or rhizomes.
- cleistogene.* Self-pollinated seed that is produced between the basal sheath and stem or in subterranean spikelets.
- collar.* The outside area of a grass leaf where blade and sheath join.
- colony.* A group of plants of the same species.
- composition.* A mixture of various species of plants.
- compressed.* Flattened laterally; if the organ is also sharply keeled, it is said to be compressed-keeled.
- cool-season grasses.* Grasses that make their active growth in winter, early spring, or late fall.
- culm.* The stem of a grass.
- decreaser.* A plant that decreases as the result of overgrazing.
- decumbent.* Said of stems which curve upward from a horizontal or inclined base.
- dissected.* Cut or divided into parts.
- disseminate.* To scatter or spread seed for growth.
- dominant.* Superior to the other grasses with which it is associated.
- filiform.* Threadlike.
- floret.* The lemma and palea with included flower. In grasses, the floret is a unit of a spikelet.
- forage.* Parts of plants eaten by wild and domestic animals.
- glumes.* The pair of bracts at the base of a grass spikelet.
- hybridize.* Interbreed; crossbreed; to produce or cause to produce hybrids.

*increaser.* A plant that increases at least temporarily as the result of overgrazing.

*inflorescence.* The seedhead or flowering part of a plant.

*internode.* That part of the grass stem between two nodes or joints.

*inundate.* To cover with water as with a flood; overflow.

*invader.* A plant that invades; enters and spreads to an area to which it is not native.

*involute.* With the margins rolled inward.

*keel.* The sharp fold at the back of a compressed sheath, blade, glume, or lemma.

*lance shaped.* Several times longer than broad, broadest below the middle, and tapered toward the end.

*lemma.* The bract of a spikelet above the pair of glumes.

*ligule.* In grasses, a thin, membranous, hairy, or ridgelike appendage on the inside of the leaf where blade and sheath join.

*membrane.* A thin, soft, pliable sheet or layer, serving as a covering or lining.

*midrib.* The central vein of a leaf.

*nerve.* The vascular veins of lemmas, glumes, and blades.

*node.* The joint of a grass stem.

*palatability.* Indicated by the preference that an animal shows for a particular species, plant, or plant part.

*palea.* The inner bract of a grass floret.

*panicle.* A seedhead with a main axis and subdivided branches. It may be open or compact and spikelike.

*pedicel.* The stalk of a spikelet. Opposed to sessile.

*perennial.* A plant that produces aboveground parts from the same root system for at least three growing seasons.

*petiole.* The stalk of a leaf blade.

*pistillate.* Applied to flowers bearing pistils only and to a plant with pistillate (female) flowers.

*raceme.* A seedhead in which the spikelets are pediceled on a rachis, as in the paspalums.

*rachilla.* A small rachis; applied especially to the axis of a spikelet.

*rachis.* The axis of a spike or raceme.

*range condition.* The present state of vegetation of a range site in relation to the climax or potential plant community for that site.

*rhizome.* An underground stem with nodes, buds, and scalelike leaves.

*rib.* Any of the main veins in a leaf.

*robust.* Strong; healthy; hardy.

*rosette.* A cluster of radiating basal leaves.

*rudimentary.* Underdeveloped.

*scale.* The reduced leaves at the base of a shoot. Said especially of the reduced or rudimentary leaves on a rhizome.

*seedstalk.* The stem on which a grass seedhead develops.

*sessile.* Without a stalk. Opposed to pediceled.

*sheath.* The lower part of a grass leaf that encloses the stem.

*shoot.* Individual stem and leaf growth.

*spathe.* A large bract that encloses or partly encloses the seedhead, as in the bluestems.

*spike.* An unbranched seedhead in which the spikelets are sessile on a rachis.

*spikelet.* The basic unit of a grass seedhead, consisting of one or more florets and a pair of glumes.

*staminate.* Applied to flowers bearing stamens only and to a plant with staminate (male) flowers.

*stolon.* A horizontal, aboveground stem or runner that roots at nodes.

*subtend.* To be below.

*succulent.* Having juicy tissues.

*unisexual.* Said of flowers containing only stamens or only pistils.

*warm-season grasses.* Grasses that make their active growth during spring and summer.

## Index

This is an index to genera, species, and common names of the grass plants discussed in the text.

- Agropyron smithii*, 11  
alkali sacaton, 173  
*Amphicarpum muhlenbergianum*, 13  
*Andropogon*  
  *barbinodis*, 15  
  *capillipes*, 17  
  *divergens*, 19, 35  
  *elliottii*, 21  
  *gerardi*, 23  
  *hallii*, 25  
  *saccharoides*, 27  
  *scoparius*, 29, 35  
  *stolonifer*, 31  
  *tener*, 33  
  *ternarius*, 35  
  *virginicus*, 37  
*Anthaenantia villosa*, 39  
*Aristida*  
  *oligantha*, 41  
  *purpurascens*, 43  
  *rhizomophora*, 45  
  *stricta*, 47  
  *wrightii*, 49  
Arizona cottontop, 191  
arrowfeather threeawn, 43  
*Arundinaria*  
  *gigantea*, 51  
  *lecta*, 53  
*Axonopus affinis*, 55  
barestem paspalum, 133  
beaked panicum, 119  
bent-awn plumegrass, 95  
big bluestem, 23  
big cordgrass, 145, 165  
big sandreedgrass, 71  
black grama, 61  
blowoutgrass, 149  
blue grama, 63  
bluegrass, Texas, 147  
blue maidencane, 13  
bluestem  
  big, 23  
  broomsedge, 37  
  cane, 15  
  chalky, 17  
  creeping, 31  
  elliott, 21  
  little, 29, 35  
  pinehill, 19, 35  
  sand, 25  
  silver, 27  
  slender, 33  
  splitbeard, 35  
*Bouteloua*  
  *brevisetata*, 57  
  *curtipendula*, 59  
  *eriopoda*, 61  
  *gracilis*, 63  
  *hirsuta*, 65  
  *trifida*, 67  
bristlegrass  
  knotroot, 153  
  plains, 155  
broadleaf uniola, 205  
broomsedge bluestem, 37  
brownseed paspalum, 141  
*Buchloe dactyloides*, 69  
buffalograss, 69  
burrograss, 151  
*Calamovilfa gigantea*; 71  
cane  
  giant, 51  
  switch, 53  
cane bluestem, 15  
Carolina jointtail, 109  
carpetgrass, common, 55  
*Cenchrus pauciflorus*, 73  
chalky bluestem, 17  
chino grama, 57  
*Chloris*  
  *cucullata*, 75  
  *glauca*, 77  
  *verticillata*, 79  
chloris, saltmarsh, 77  
common carpetgrass, 55  
common reed, 145  
cordgrass  
  big, 145, 165  
  gulf, 171  
  marshhay, 167  
  prairie, 169  
  sand, 163  
  smooth, 161  
cottontop, Arizona, 191  
creeping bluestem, 31  
*Ctenium aromaticum*, 81  
cupgrass, Texas, 97  
curly mesquite, 101  
curtiss dropseed, 179  
cutgrass, giant, 209  
cutover muhly, 111  
cutthroatgrass, 117  
*Distichlis*  
  *spicata*, 83, 185  
  *stricta*, 85  
dropseed  
  curtiss, 179  
  Florida, 181  
  meadow, 175  
  pineywoods, 183  
  sand, 177  
  seashore, 185  
eastern gamagrass, 203  
elliott bluestem, 21  
*Elymus virginicus*, 87  
*Eragrostis*  
  *intermedia*, 89  
  *spectabilis*, 91  
  *trichodes*, 93  
*Erianthus contortus*, 95  
*Eriochloa sericea*, 97  
fall witchgrass, 107  
Florida dropseed, 181  
Florida paspalum, 137  
Florida threeawn, 45  
fourflower trichloris, 195  
fringeleaf paspalum, 133  
gamagrass, eastern, 203  
giant cane, 51  
giant cutgrass, 209  
grama  
  black, 61  
  blue, 63  
  chino, 57  
  hairy, 65  
  red, 67  
  sideoats, 59  
green silkscale, 39  
green sprangletop, 105  
gulf cordgrass, 171  
hairy grama, 65  
*Heteropogon contortus*, 99  
*Hilaria*  
  *belangeri*, 101  
  *mutica*, 103  
hooded windmillgrass, 75  
hurrahgrass, 133  
indiangrass, 157  
indiangrass, lopsided, 159  
inland saltgrass, 85  
jointtail, Carolina, 109  
knotgrass, 135  
knotroot bristlegrass, 153  
*Leptochloa dubia*, 105  
*Leptoloma cognatum*, 107  
lindheimer muhly, 113  
little bluestem, 29, 35  
longleaf uniola, 207  
longtom, 139  
lopsided indiangrass, 159  
lovegrass  
  plains, 89  
  purple, 91  
  sand, 93  
maidencane, blue, 13  
maidencane (paille fine), 121  
*Manisuris cylindrica*, 109  
marshhay cordgrass, 167  
mat sandbur, 73  
meadow dropseed, 175  
mesquite, curly, 101  
*Muhlenbergia*  
  *expansa*, 111  
  *lindheimeri*, 113  
  *reverchoni*, 115  
muhly  
  cutover, 111  
  lindheimer, 113  
  seep, 115  
needle-and-thread, 187  
oldfield threeawn, 41  
paille fine, 121  
*Panicum*  
  *abscissum*, 117  
  *anceps*, 119  
  *hemitomom*, 121  
  *obtusum*, 123  
  *rhizomatium*, 125  
  *scribnerianum*, 127  
  *virgatum*, 129  
panicum  
  beaked, 119  
  scribner, 127  
  spreading, 125  
*Pappophorum bicolor*, 131  
pappusgrass, pink, 131  
*Paspalum*  
  *ciliatifolium*, 133  
  *debile*, 133  
  *distichum*, 135  
  *floridanum*, 137  
  *lividum*, 139  
  *longepedunculatum*, 133  
  *plicatulum*, 141  
  *propinquum*, 133  
  *pubescens*, 133  
  *rigidifolium*, 133  
  *setaceum*, 133  
  *supinum*, 133  
  *vaginatum*, 143  
paspalum  
  barestem, 133  
  brownseed, 141  
  Florida, 137  
  fringeleaf, 133  
  goldhair, 133  
  little seed, 133  
  longhair, 133  
  seashore, 143  
  stiff, 133  
  thin, 133  
*Phragmites communis*, 145  
pinehill bluestem, 19, 35  
pineland threeawn, 47  
pineywoods dropseed, 183  
pink pappusgrass, 131  
plains bristlegrass, 155  
plains lovegrass, 89  
plumegrass, bent-awn, 95  
*Poa arachnifera*, 147  
prairie cordgrass, 169  
purple lovegrass, 91  
purpletop, 199  
*Redfieldia flexuosa*, 149  
red grama, 67  
reed, common, 145  
sacaton, alkali, 173  
saltgrass  
  seashore, 83, 185  
  inland, 85  
saltmarsh chloris, 77  
sand bluestem, 25  
sand cordgrass, 163  
sand dropseed, 177  
sand lovegrass, 93  
sandbur, mat, 73  
sandreedgrass, big, 71  
*Scleropogon brevifolius*, 151  
scribner panicum, 127  
seashore dropseed, 185  
seashore paspalum, 143  
seashore saltgrass, 83, 185  
seep muhly, 115  
*Setaria*  
  *geniculata*, 153  
  *macrostachya*, 155  
sideoats grama, 59  
silkscale, green, 39  
silver bluestem, 27  
slender bluestem, 33  
slim tridens, 201  
smooth cordgrass, 161

*Sorghastrum*  
*nutans*, 157  
*secundum*, 159  
*Spartina*  
*alterniflora*, 161  
*bakeri*, 163  
*cynosuroides*, 145, 165  
*patens*, 167  
*pectinata*, 169  
*spartinae*, 171  
splitbeard bluestem, 35  
*Sporobolus*  
*airoides*, 173  
*asper* var. *hookeri*, 175  
*cryptandrus*, 177  
*curtissii*, 179  
*floridanus*, 181  
*junceus*, 183  
*virginicus*, 185  
sprangletop, green, 105  
spreading panicum, 125  
*Stipa*  
*comata*, 187  
*leucotricha*, 189  
switch cane, 53  
switchgrass, 129  
tanglehead, 99  
Texas bluegrass, 147  
Texas cupgrass, 97  
Texas wintergrass, 189  
threeawn  
arrowfeather, 43  
Florida, 45  
oldfield, 41  
pineland, 47  
wright, 49  
tobosagrass, 103  
toothachegrass, 81  
*Trichachne californica*, 191  
*Trichloris*  
*crinita*, 193  
*pluriflora*, 195  
*trichloris*  
fourflower, 195  
twoflower, 193  
*Tridens*  
*albescens*, 197  
*flavus*, 199  
*muticus*, 201  
*tridens*  
slim, 201  
white, 197  
*Tripsacum dactyloides*, 203  
tumble windmillgrass, 79  
twoflower trichloris, 193  
*Uniola*  
*latifolia*, 205  
*sessiliflora*, 207  
*uniola*  
broadleaf, 205  
longleaf, 207  
vine-mesquite, 123  
Virginia wildrye, 87  
western wheatgrass, 11  
wheatgrass, western, 11  
white tridens, 197  
wildrye, Virginia, 87  
windmillgrass  
hooded, 75  
tumble, 79  
wintergrass, Texas, 189  
witchgrass, fall, 107  
wright threeawn, 49  
*Zizaniopsis miliacea*, 209