Warm-Season Grasses of South Dakota

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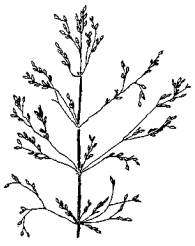
Introduction

There are several types of grasses found in pastures and rangelands throughout South Dakota and the Northern Great Plains. Knowing which grasses are in your pastures and rangelands can influence grazing management decisions, and ultimately impact animal performance.

This guide focuses on common South Dakota warm-season grasses – grasses that utilize the highly efficient C4 photosynthetic pathway. Warm-season grasses have an optimum temperature range of 90-95°F for active growth, with growth starting when the soil temperature reaches 60-65°F. They are specifically triggered by daylengths and are most productive during warmer summer months. Warm-season plants generally provide a lower percentage of crude protein compared to cool-season plants, but what protein is found is used more efficiently by animals. The presence of warm-season grasses in pastures allows you to provide superior midsummer grazing for livestock at a time when cool-season grasses are semi-dormant. Ultimately, a mixture of cool and warm-season grasses allows you to extend your grazing season earlier and later, respectively. Warm-season grasses are less common than their cool-season counterparts throughout South Dakota rangelands but increase in abundance as you move farther south in the state.

For each grass, the common and most current scientific name are provided, as well as an identification description – Figure 1 provides images of Poaceae (grass) inflorescence types and vegetative features that are helpful for identification. In addition, a discussion of the habitat and grazing considerations are given for each grass.

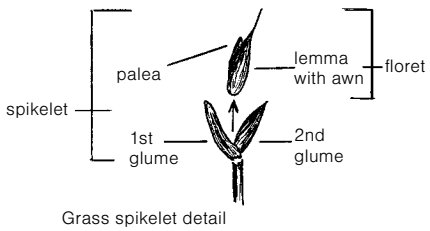


Panicle

Wheatgrass spike

One-sided spikes of blue grama (6 cm long)

Inflorescence of big bluestem, spicate raceme (10 cm long), plus closeups of paired spikelets; 1 sessile, 1 stalked (20 mm long)



Grass spikelet detail

Laterally compressed floret and stylized cross-section

Dorsally compressed floret, its spikelet, and stylized cross-section of floret

Figure 1a. Poaceae (Grass) Inflorescence Types

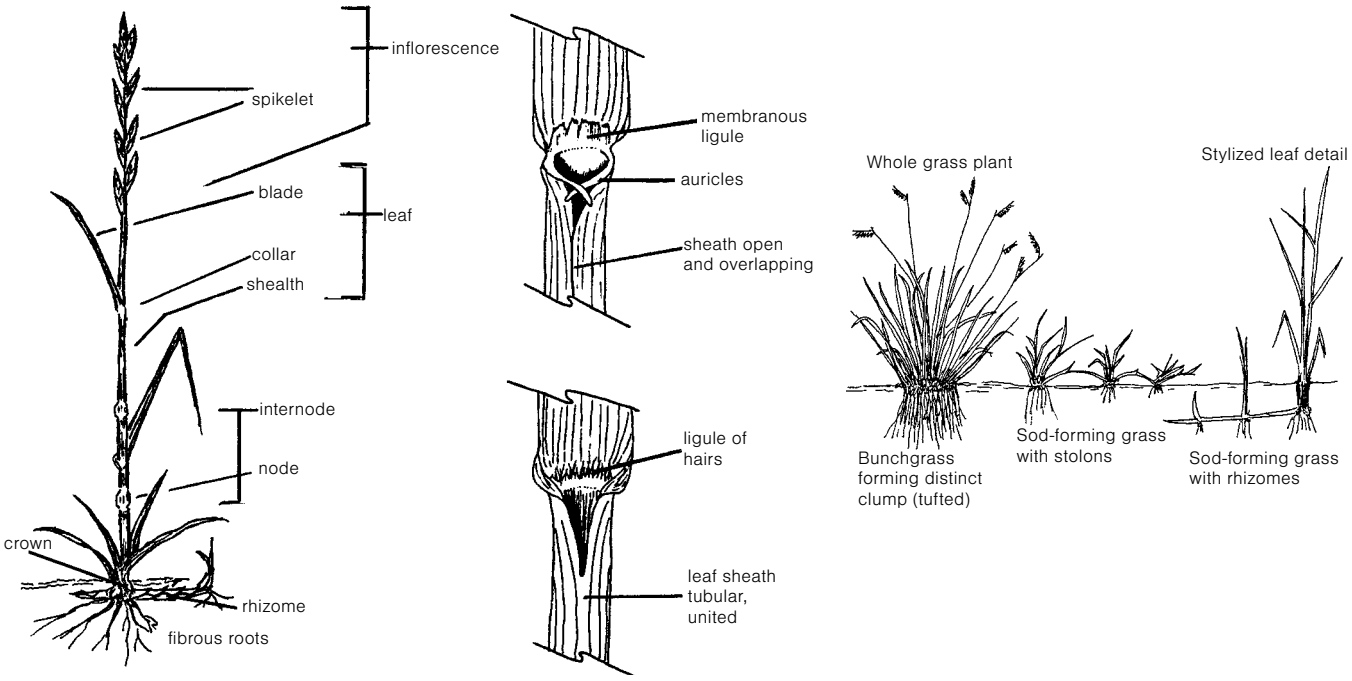


Figure 1b. Poaceae (Grass) Vegetative Features

Terms Used

Alkali soil: soil that has a very high degree of alkalinity (pH > 8.5 or higher), or it has a higher percentage of exchangeable sodium (15% or more), or both characteristics. Growth of most plants is reduced or prevented.

Auricle: "ear lobes" at the base of leaf blades, often clasping the stem; the lateral appendages at the collar of a grass leaf.

Bunchgrass: grass with a characteristic growth habit that forms a bunch or tuft. Example: crested wheatgrass.

Decreaser: plant species that decreases in relative abundance with grazing pressure, fire, drought, or other continued disturbance.

Increaser: plant species that increases in relative abundance, at least for a time period, under continued disturbances like grazing, fire, or drought.

Introduced: a plant species that is not part of the original plant community of the area in question. Generally, from a different continent. Some introduced species have been cultivated for pasture and hayland.

Invader: a plant species that was not found in undisturbed portions of the original vegetation of a specific range site; however, it will invade and increase following disturbance or continued heavy grazing. Some invader species can enter a site that has not been disturbed.

Ligule: within the grass family, the ligule is the appendage, membrane, or ring of hairs on the inner side of a leaf at the junction of the sheath and blade.

Membranous: thin, soft, flexible – more or less translucent, like a membrane.

Native: a plant species that is part of the original plant community of the area in question. Generally, from the same continent.

Perennial: a plant that lives for 3 years or more.

Rhizome or Rhizomatous: a rhizome is a creeping underground stem, that often has scale leaves. Can produce shoots and roots at the nodes, which gives rise to new plants. Rhizomatous = a plant that has rhizomes.

Saline soil: soil that contains soluble salts, usually chlorides or sulfates. Concentrations are high enough to reduce plant growth; pH is < 8.5. Often has a white or gray crust on the soil surface.

Sod-forming: grasses that form a sod by rhizomes or stolons. Examples: Kentucky bluegrass, buffalograss.

Stolon: a horizontal stem above the ground surface that roots at the nodes and produces new plants. Examples: strawberry, buffalograss.

Native Warm-season Grasses

Switchgrass, *Panicum vigratum*

Switchgrass

Switchgrass

Identification

Sod forming, perennial. Can reach 3-6 feet tall, with a wide-spreading panicle seed head that is 6-12 inches long, which matures in September. A V-shaped patch of white hair on the upper surface of the leaf blade near the stem is an identifying characteristic. Round stem can have a reddish tint. Absent auricles; ligule is a fringe of short hairs. Tight, large clumps form from coarse, scaly rhizomes. Can appear green or blueish green in color.

Habitat

Native and found in central and eastern Canada, nearly all U.S. states except for five in the West and Northwest and can also be found in Central and South America. In the tallgrass prairie, switchgrass is found in abundance in uplands and lowlands. In native stands, it grows with big bluestem, prairie cordgrass, Canada wildrye, and Indiangrass. Does poorly on heavy soils. Within South Dakota, it is common on upland sites in the east and likes overflow and subirrigated sites throughout the state; it can also be found in ravines in the west, in the Sandhills and Black Hills.

Grazing considerations

Consumed by livestock if the stems are green and can be very productive with controlled grazing. Has heavy growth during late spring and early summer. Can have excellent yields of good quality hay. Is one of the earliest maturing of common native warm-season grasses and therefore is normally ready to graze in early summer. Decreases with grazing pressure. With continuous grazing management, it is recommended to start grazing after switchgrass reaches 14-16 inches and stop when it is within 4 inches of the ground during late spring, 8 inches in early summer, and 12 inches in late summer. A rest period is needed before a frost so that carbohydrates can be stored in the base of the stem and crown of the plant. After frost, plants can be grazed to a height of 6-8 inches. A winter stubble is needed to provide insulation for the plant to prevent winterkill.

Big bluestem, *Andropogon gerardii*

Big bluestem

Big bluestem

Identification

Sod forming, perennial. Has short, scaly rhizomes. Seed stalks are coarse and can reach 3-7 feet tall. Each stalk produces one or more hairy, 3-6 fingered spikes, that are 1.5-4 inches long – these are often referred to as “turkey feet.” Numerous leaves are large, ¼ to ½ inch wide, with coarse hairs. Leaf sheaths are usually hairy and slightly flat. Absent auricle; 1/8-inch-long membranous ligule. Plants turn a beautiful red/purple color in the fall or when cured.

Habitat

Native to North America, where it occurs in all states except a few in the far West. Primarily found in the Central and Southern Great Plains where it is typical of lowland tallgrass prairie communities. In South Dakota, big bluestem is dominant in the east on unbroken soil and on overflow and subirrigated sites throughout the state. In western South Dakota, it can be found in small, protected areas that have adequate soil moisture.

Grazing considerations

Considered one of the most palatable warm season grasses for livestock and is even preferred over switchgrass, often called the “ice cream” plant. Has a sweet smell. Excellent in quality. Decreases with heavy grazing pressure. In the instance where big bluestem co-occurs with introduced cool-season grasses (e.g. Kentucky bluegrass, smooth brome, or crested wheatgrass), you will want to graze those introduced cool-season grasses after a frost in the fall but before big bluestem reaches 1 inch height in the spring – this will facilitate pasture turnover to more desirable native species. This should not be done if soil conditions are too wet. Big bluestem is an indicator plant – if it is naturally present in your pastures it indicates good range management has been established.

Little bluestem, *Schizachyrium scoparium*

Little bluestem

Identification

Bunchgrass, perennial. Can reach 1-3 feet tall. Lower stem and leaf sheath are flattened – even more so than big bluestem. Sheath is not hairy. Leaf blade is up to 10 inches long, 1/8 to ¼ inch wide and flat at the base. Leaves fold with maturity. Absent auricles; ligule is 1/16 inch long and membranous. Spikelets are fuzzy and fluffy white at maturity with the plant turning a red color. Hillsides that are perceived as red in color are usually filled with little bluestem.

Habitat

Native and distributed widely from southern Quebec to Alberta in Canada, throughout the U.S., and into Mexico. Not found in five western states. Excellent drought tolerance and is well adapted to well-drained, medium to dry, infertile soils. In South Dakota, it is dominant on uplands in the east and is found on sandy and shallow sites throughout the state.

Grazing considerations

Considered a fair forage species, it is readily grazed by livestock and wildlife when immature. Nutrition and palatability drops when mature. Increases in tallgrass prairie and decreases in mixed prairie with grazing pressure. Valued summer forage. In the instance where little bluestem co-occurs with introduced cool-season grasses (e.g. Kentucky bluegrass, smooth brome, or crested wheatgrass), you will want to graze those introduced cool-season grasses after a frost in the fall but before little bluestem reaches 1 inch height in the spring – this will facilitate pasture turnover to more desirable native species. This should not be done if soil conditions are too wet.

Sideoats grama, *Bouteloua curtipendula*

Sideoat grama

Identification

Rhizomatous and sod forming, perennial. Reaches 8 to 24 inches tall. Leaf blades are flat with stiff hairs on the edges. Basal leaves curl and dry to a brownish-white color with maturity. Ten to thirty one-sided spikes hang downward along one side of the flower stalk – a key identifying characteristic, thus the name “sideoats;” this characteristic can resemble a flag. Has a blueish-green color early in the season and cures to a reddish-brown color.

Habitat

Native and occurs from Maine to Montana, into Mexico, but is absent in the Northwest and Southeast. In the Northern Great Plains, it occurs in upland plant communities, with western wheatgrass, blue grama, and/or little bluestem. In South Dakota, it is dominant on uplands in the east and occurs on sandy and shallow sites throughout the state.

Grazing considerations

Highly important range grass. Remains green later in the fall and begins growth in the spring before other grama grasses. Highly palatable to both livestock and grazing wildlife. Produces much greater volume of forage compared to blue grama, however is not as drought tolerant. Maintains relatively high feeding value throughout the year. Returns and can be found in most range sites under good management. Among one of the first native range grasses to disappear under overgrazing. Sideoats grama is an indicator plant – if it is naturally present in your pastures it indicates good range management has been established.

Blue grama, *Bouteloua gracilis*

Blue grama

Identification

Bunchgrass that tillers to form an open sod, perennial. Can be 6-20 inches tall. Seed heads each have 1-3 comb-shaped, one-sided spicate branches that are bluish-purple when young and turn straw-colored when mature. Each spike can be up to 2 inches long and resembles a human eyebrow. Foliage is gray-green and curls with maturity. Unlike sideoats grama or buffalograss, blue grama leaf blades have nearly no hairs and none along the leaf margins. Leaf blades are 1-6 inches long, flat, usually smooth. Absent auricles; ligule is a fringe of very short hairs.

Habitat

Native throughout the Great Plains and Southwest and extends all the way from Canada to Mexico. Prefers drier and upland sites. In the Northern Great Plains, it is well adapted to medium and fine textured, relatively deep soils of rolling uplands. Commonly found with buffalograss, sideoats grama, and western wheatgrass. Important for ground cover between mid and tallgrasses.

Grazing considerations

Once established, very palatable to livestock throughout the year. Growing points are at or near the ground surface, so it can withstand heavy grazing pressure. For improved yields, it is recommended to defer grazing during the growing season every 2-3 years. Because it cures well on the stem, it is good for grazing during the dormant season. If grazing pressure is too intense, it can create a shortgrass sod, causing the replacement of more productive mid and tallgrasses, and eventually will turn to a blue grama and buffalograss based plant community.

Buffalograss, *Bouteloua dactyloides*

Buffalograss

Identification

Sod forming, perennial. Low growing mat of curly blades that reaches only 2-4 inches tall. One of the few shortgrasses to reproduce by above-ground stems called stolons. Another defining characteristic is that the male and female flowers are usually produced on different plants. Florets are on a short, one sided spike on a stem that is typically not taller than 6 inches for the male plant. For the female plant, seeds are in a small, hard bur that matures in August that is partially hidden among the leaves. Leaf blades are 1/16 inch wide and hairy on both sides and edges, unlike the hair-less blue grama leaves. Absent auricles; ligule is a fringe of short hairs. Not always differentiated from blue grama; however, blue grama is less hairy and very rarely will produce stolons.

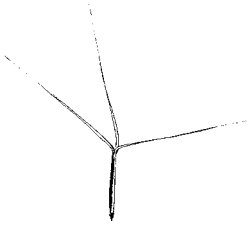
Habitat

Native to the mixed and shortgrass prairies of the Great Plains, from North Dakota down to Mexico. Found on clay soils in moderate to low rainfall areas (15-30 inches annually). Tolerates alkaline soils. Important for ground cover between mid and tallgrasses.

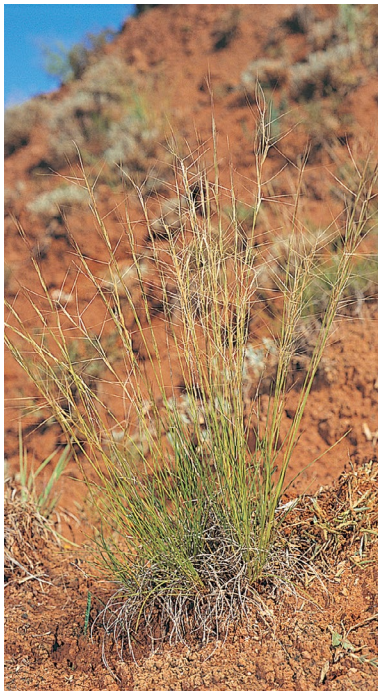
Grazing considerations

Utilized by all classes of livestock and is considered good quality forage, with nutritional qualities that do not decline during curing. Increases with grazing pressure. As it grows close to the ground, grazing animals typically harvest less than 50% of the current year's growth; although sheep are able to graze more of the plant. Commonly occurs with blue grama; as discussed above, if overgrazing occurs on moderately fine soils, buffalograss and blue grama will replace midgrasses like western wheatgrass. If overgrazing continues, blue grama is excluded, leaving a tight sod of buffalograss in the long term.

Red (Purple) Threeawn, *Aristida purpurea*



Red threeawn floret with awns. Actual length of seed and upright awn is 1¾ inches.



Red threeawn

Identification

Bunchgrass, perennial. Can reach 6-20 inches tall. Panicles are narrow and have a floret tipped with three spreading awns – awns can be ¾ to 3.25 inches long. Awns are purple, and leaves are short, curly when dry, and fine but wiry.

Habitat

Occurs in the prairie providences of Canada down to Mexico. Likes drier upland sites and is frequently found on hillsides. Often associated with sand dropseed and grama species. Adapted to dry, recently disturbed sites.

Grazing considerations

Poor to worthless as forage. Increases on poor range condition because it is seldom grazed. The awns can cause injury to eyes, mouths, and nostrils if it is grazed or consumed from contaminated hay. Awns are also troublesome and decrease fleece value when they become entangled in wool. Red threeawn is an indicator plant – if it is naturally present in your pastures it indicates a disturbance in the plant community such as overgrazing, erosion, or fire.

Prairie sandreed, *Calamovilfa longifolia*

Prairie sandreed

Identification

Sod forming, perennial. Can reach 2-5 feet tall. Seed head is a 6-12 inch long panicle that matures in late September. Light green foliage that turns straw-colored when mature. Leaf blades are 4-20 inches long, flat to rolled, smooth, 1/8 to ½ inch wide, and taper to a long, fine point. When leaves are torn in half, the edges will be hairy. Absent auricles; ligule is a fringe of short hairs. Rhizomes are extensive, horizontally creeping, pale white, scaly, with very long, sharp tips that extend out of the soil - they hurt if you kneel/sit/put your hand on them!

Habitat

Native in Canada from Alberta to Quebec and south and west to Indiana, Kansas, Colorado, and Montana. Restricted to sandy soils and shales. When it is present, found in large patches. Drought tolerant and adapted to areas with average annual precipitation of 10-20 inches.

Grazing considerations

Low palatability during the growing season; cures well and therefore is good winter feed for cattle. Concentrations of crude protein decrease as prairie sandreed matures. When found, considered a key species in grazing programs because of its abundance, yield potential, and distribution of forage production during the growing season. Can provide early grazing as it begins growth earlier in the spring compared to other warm-season grasses; livestock can be trained to select for the plant early in the season. Usually acts as a decreaser under grazing pressure.

Prairie cordgrass, *Spartina pectinata*

Prairie cordgrass

Identification

Rhizomatous, perennial. Reaches 3-8 feet tall, and depending on conditions can grow 5-10 feet per year. There are 10-30 one-sided, comb-like spikes that are present in the panicle – the comb-like spikes resemble the seed head of blue grama – they look like human eyebrows. This contrasts with the narrow panicle of prairie sandreed, which has florets with a basal ring of white hairs. Leaf blades are very coarse and thick, and up to 30 inches long – the rough leaf margins can cut your skin when you rub it from tip to base.

Habitat

Native and is found in the wet soils of Canadian prairie provinces and most U.S. states except those in the Southwest and Southeast. Typically found in pure stands that border sloughs, prairie potholes, ditches, and wet prairies. Found with switchgrass, Canada wildrye, sedges, and rushes. Within South Dakota, it is very common East River and is found West River along drainage ways.

Grazing considerations

Prairie cordgrass is seldom eaten by livestock except when it is early in the spring or if other available forage is dry. It is often called “ripgut” because of the tough and abrasive leaves. However, despite having low palatability, prairie cordgrass is an excellent soil stabilizer, helping with streambank stabilization, wetland restoration and enhancement, and riparian buffer, and also provides valuable nesting and cover habitat for wildlife.

Plant Identification

If you are unsure of identifying a plant, collect the plant, and take it to your local SDState Extension or NRCS office for help with identification.

The easiest and best way to get a collection is to pick the plant at ground level and cut it with a scissors or garden shears, and then place it in a Ziploc bag and place it in the refrigerator before you bring it in – this prevents mold. If you are able to dig the plant up for a sample, the roots can sometimes aid in identification. If it will be more than 2 days before you can bring it in to the office, it needs to be dried – place it between sheets of newspaper and place a heavy weight on top (like a stack of books). You will need to change the newspaper about every 2 days until it completely dries out to again reduce the risk of mold. It is also often helpful to share pictures of the habitat where the plant is growing and what it is growing next to, in addition to bringing the plant itself in for identification.

Summary

Although this list of warm-season grasses is not exhaustive, it provides details of common warm-season grasses that occur in South Dakota. It is important to note the grazing considerations for each plant, as they can be useful when developing a grazing plan for your operation. For more information, see the references below.

References

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