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Plants of South Dakota Grasslands: A Photographic Study

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Plants of South Dakota Grasslands

A Photographic Study

Bulletin 566 • December 1970 • Agricultural Experiment Station • South Dakota State University, Brookings

Plants of South Dakota Grasslands

A Photographic Study

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Bulletin 566 • December 1970
Agricultural Experiment Station
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COVER PHOTO. Late afternoon summer thundershowers followed by rainbows are a common sight throughout South Dakota. This is western wheatgrass rangeland 50 miles west of Pierre, S.D. The photo was taken at 9 o'clock on a mid-July evening.

Originals of the 35mm color transparencies used in this publication are filed with the Agricultural Editor, Editorial Office, South Dakota State University, Brookings, S. D., 57006

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Introduction

Grasslands, both native and tame, occupy more than 65% of the land area of South Dakota. All of us—rancher, farmer, or urban dweller—have a stake in our grasslands and should have an interest in them. Although many of us do not make a living directly from the grasslands, life as we know it in the Great Plains would be totally different if not for them. Whether we manage these resources to provide a long-term supply of animal products, or simply enjoy them for the wild-life, recreation, and beauty they offer, we cannot truly be knowledgeable or have a reasonable appreciation unless we know the grasses, forbs, and shrubs that make our State one of majestic grasslands.

Often we see a hillside expanse of rust-colored grasses, or a beautiful meadow with scattered, purple-flowering forbs, but all too frequently we are unable to name the plants we see and seldom do we know much about them. Knowing names of plants is as important as knowing names of people. Without names, communication becomes difficult at best, or even impossible. With names, we can share and gain information about vegetation. We can also find added enjoyment and satisfaction in knowing more about plants which form an essential part of our environment.

This publication is intended for persons interested in the grasslands of South Dakota and the Northern Great Plains. With the necessary exception of scientific names and some terminology, plant narratives are intentionally nontechnical. Technical terms are defined in the glossary. The authors hope that this bulletin will be of value to those interested in plants for aesthetic reasons, and will provide pertinent information helpful to ranchers, farmers, conservationists, and students.

Plant descriptions are brief because the photographs are intended to be the primary tool for identification. In cases where possible confusion between closely related species exists, an effort has been made to point out these potential pitfalls. Common names that the authors feel are best known or most appropriate are given first, frequently followed by other names.

Plant distributions are discussed in very broad terms, inclusive enough to be useful to people in areas outside of South Dakota. Greater details generally are given for distribution within the State.

Items of interest listed for plants, particularly for nongrasses, include more than forage value for live-

stock. Little attempt has been made to discuss management, except that when known, grazing responses of native plants are given. Where applicable, poisonous properties, medicinal value, wildlife uses, and other notes of interest are presented. Some grasses and forbs are of little known value for livestock or wildlife, but their prominence makes them impossible to ignore by anyone with an eye for plains and prairie beauty.

Only a few of the more than 1,100 plant species that occur in South Dakota could be included and still have a convenient, useful tool for the greatest number of people. Grasses and forbs are given primary consideration, although several shrubs are included if they are particularly prominent, have high value as range forage, or are indicators of range condition. Aquatic vegetation and certain other groups of plants are ignored. Willows are omitted, partially because of a publication by Sven G. Froiland dealing with Black Hills willows. Froiland's publication contains distribution maps for the entire State. No trees or vegetation unique to forest lands are discussed, although some trees occur on the plains. Only a few weedy plants are included. Two illustrated bulletins, "Trees of South Dakota" and "South Dakota Weeds," are available from the South Dakota Extension Service. Other publications concerning South Dakota are listed as References.

The primary aim of this publication is to deal with vegetation of the plains, prairies, and associated tame pastures of South Dakota, as they exist today. Geographically, the major grassland area is in the western two-thirds of the State. Vegetation of the Tall Grass Prairie in the eastern third is considered in some detail, but more plants are listed that are characteristic of the mixed prairie in the remainder of the State. While no attempt was made to include vegetation of the Black Hills, many species common to plains are also found in the Hills and, where appropriate, this dual distribution is mentioned.

The authors are indebted to many people who have previously written about vegetation in South Dakota and surrounding areas. Although not individually acknowledged, they are included in the reference list, and it is these papers that were gleaned, compiled, and edited to form much of the information about the "Plants of South Dakota Grasslands."

South Dakota Grasslands, Past and Present

By JAMES R. JOHNSON

Man's Challenge as Grassland Husbandrymen

Before domestic livestock entered the scene, the area of South Dakota was one vast grassland, rolling from one hill to the next, interrupted occasionally by forested streams. This carpet of grass stretched from the deciduous forests in the far eastern part of the State to the Black Hills in the extreme west. Even forested areas offered much in the way of grasslands.

In the days of wandering bison and nomadic plains Indians, the grasslands were abundantly beautiful with immense diversity in vegetation. If overgrazing, drought, or fire depleted a portion of the grassland, bison and other grazing animals were forced to move to areas where both forage and water were more plentiful. The Indians followed.

This was Nature's check and balance system that insured productive and diversified grasslands. Vegetation that developed under these conditions was able to persist, thus insuring a continued protective mantle for the soil, in an environment that took no more from the land than was returned. Changes in vegetation were largely induced by fluctuations in climate. Climate controlled the environment, and man was an integral part. Every living and non-living "thing" in the environment was an important, harmonious portion of the *total* ecological picture.

The day came when man discovered he could manipulate his environment to better serve his needs. His numbers were small; his tools were limited. Initially man-made ecological alterations of planting patches of grain or herding a few livestock did not disrupt the en-

vironment to any great extent. Early man was still in harmony with Nature, although he had learned to modify some of her restrictions.

As man progressed in his "battle" with Nature, his numbers grew; likewise his needs for food, shelter, and clothing expanded. Greater efforts were necessary to make Nature's "desirable" products more abundant and readily available. Eventually, man began to colonize new areas previously unsuited for sustaining large numbers of people. To places like South Dakota he brought tools to work the earth so that he could plant grain that could easily be harvested. He also brought domestic livestock to harvest grasses from areas that were not suited for cultivation.

The upland prairies of eastern South Dakota proved to be a remarkable garden spot, as soils that developed under the tall grass prairie were rich in plant foods. Livestock were confined to areas too steep or rocky for plowing. As settlers moved into western South Dakota, many realized precipitation was too scanty and unpredictable for supporting large acreages of cultivated crops. Much of the plains which supported mid- and short grasses was never plowed. The natural crop, the existing grasslands, became the primary product upon which man depended for a livelihood.

Vegetational Scene Changed

The current vegetational scene in South Dakota is vastly changed from the pre-1800's. In many eastern South Dakota counties more than 75% of the land is

under cultivation. West of the Missouri River, less than 25% of the area is cultivated. The non-cultivated areas, primarily grasslands, are also changed. Livestock are selective in what they eat. The more palatable forage is eaten first. Because livestock numbers are large, and livestock are confined to specific areas, selective and intensive use has greatly altered the vegetation. Although most of the early plants can still be found, the proportions in many cases have been drastically changed. Natural grassland productivity has been reduced. Except for isolated tracts, the once diverse plains display an unnatural uniformity consisting primarily of more hardy vegetation. Fenced relict areas throughout the Great Plains give indications of potential productiveness from plants which were once plentiful.

In brief, man's ability to alter his environment has preceded his knowledge of ecological reactions to such alterations. In South Dakota some of the changes in native grasslands are readily evident:

(1) Cultivation and intensive grazing have reduced abundance and vigor of desirable native vegetation thereby producing conditions favorable for less desirable plants. These lesser desirables are often introductions from other lands. A dramatic case in point is the recent (1967) primary noxious weed list of South Dakota. Seven of the eight plants in that list are natives of other continents, mainly Europe, and were brought here, probably unintentionally, by settlers. They are difficult to control and generally are of low palatability. Such plants compete vigorously with existing vegetation and/or cultivated crops.

(2) Most short grass sods (buffalograss and/or blue grama) in western South Dakota are a result of intensive grazing. In this region these grasses are low in productive potential. In many cases they have replaced more desirable, higher producing midgrasses.

(3) Many eastern South Dakota tall grass prairies were not plowed, but were managed as native vegetation and have been taken over by less productive Kentucky bluegrass. This switch is also common in many meadows and foothills of the Black Hills.

(4) Several grass-shrub communities have become dominated by less palatable shrubs. In southwestern South Dakota, sand sagebrush has become increasingly abundant. Elsewhere, broom snake-weed, fringed sagewort, and pricklypear have increased their foothold and warrant control measures.

(5) Removal of naturally occurring grassland vegetation by farming or deterioration by overgrazing in some areas has made the soil susceptible to wind and water erosion. Loss of valuable top soil seriously alters the environment for plant growth.

As man recognizes the undesirable ecological changes he has created, hopefully he will gain the knowledge and courage to counteract adverse results. In South Dakota much has been done, but much more needs to be accomplished to stabilize and increase grassland productivity. Some successful practices listed without regard to order of importance include: (1) conversion of erodible farmland to permanent pastures; (2) fertilization of grasses to increase production; (3) chemical and mechanical control of undesirable vegetation (4;) livestock rotation designed to give grasslands rest during crucial periods; (5) development of more livestock watering places for better livestock distribution; (6) planting of early spring pastures to give native grasslands a rest; and (7) reintroduction of more productive native vegetation into areas where once plentiful.

The challenge is to all of us as husbandrymen of our environment. Our responsibility towards the grasslands is to use them, yet protect them, for upcoming generations. We cannot divorce ourselves from the fact that unless we live compatibly *with* our environment, we will not be able to live *because* of it. We must learn to cooperate with Nature or she will defeat us. We can become responsible husbandrymen only when we learn to recognize the actions and reactions of Nature. As man induces environmental changes in the grasslands, he must learn to recognize the indicators, set forth by Nature, telling of significant reactions to come. Such indicators are frequently in the form of readily observable plant responses including lost vigor, depleted plant

populations, changes in plant composition, or arrival of new plants. It behooves us, then, to know our grasslands if we are to know our environment.

South Dakota Grasslands Today

By some standards, the more than 28 million acres of South Dakota grasslands are by no means complex. It has been estimated that more than 90% of the native grassland forage is composed of less than a dozen grasses and sedges. The most common tame grasses add but a few names to the list. The major differences in native grassland types are correlated closely with precipitation. Exclusive of the Black Hills, precipitation increases from west to east; thereby creating north-south belts of grassland types. This has been illustrated by Kuchler (1964), who mapped the major "potential" grassland types of the United States. The South Dakota portion of that map is redrawn (page 7) with primary vegetation dominants shown. The map is not intended to convey the erroneous idea that vegetation types on the scale drawn actually have distinct boundaries. Neither should the conclusion be reached that a vegetation type is restricted to the indicated limits. There are a multitude of environmental factors, other than precipitation, that actually control the kind of vegetation present in a specific locale.

Weaver in 1954, and Weaver and Albertson (1956) wrote about the grasslands of South Dakota as they existed in the 1950's. The following discussions of tall grass and mixed grass prairies are based largely on descriptions by Weaver and Albertson.

Tall Grass Prairie

As indicated on the map by Kuchler, the major area of tall grass prairie (true prairie) in South Dakota lies in the eastern third of the State. Fingers of prairie stretch westward in the more favorable locations. Gradually, the true prairie gives way to the mixed grass prairie. In higher precipitation areas of the Black Hills and surrounding foothills, tracts of true prairie vegetation are also found. Soils that developed under the tall grass prairie in eastern South Dakota are very fertile, dark, and deep. Treelessness characterizes the tall grass

prairie. Although some have thought fire is the primary reason for a lack of trees, summer drought appears to be a second factor that restricts tree growth in all but the more moist locations. Vegetation of the true prairie is rather drought tolerant. When periodic late spring or early summer droughts occur, true prairie vegetation can become dormant, whereas young trees have more difficulty in weathering dry periods.

The original true prairie in South Dakota corresponds closely to what is now the corn belt region of the State. Because of high agricultural productivity of the area, and rather level topography, by far the greatest portion of the true prairie is farmland. Isolated tracts can still be found in old cemeteries; railroad right-of-ways; and other relatively undisturbed plots such as the Altamont Prairie, a small protected area, north of Brookings.

True prairie vegetation in its natural condition contained many species. The major grasses included big bluestem, little bluestem, indiangrass, switchgrass, porcupine grass, prairie dropseed, and tall dropseed. Some of the principal forbs are leadplant, groundplum, milkvetch, American licorice, white and purple prairie clover, the scurfpeas, onions, pussytoes, black sampson, perennial sunflowers, false boneset, and prairie rose.

With deterioration caused by drought and/or grazing—depending on the site—several grasses increase in abundance. They are generally less productive and less palatable than the tall grass prairie vegetation that is present when conditions are favorable. The common grasses that increase include Kentucky bluegrass, western wheatgrass, sideoats grama, blue grama, hairy grama, buffalograss, and panic grasses. Some of the more common forbs that increase are yarrow, cudweed sage, whorled milkweed, many-flowered aster, skeletonweed, and some goldenrods.

With further deterioration, another group of plants become increasingly abundant and are referred to as invaders. Included are cheatgrass, prairie threeawn, foxtail barley, Canada bluegrass, and sand dropseed. Weedy forbs include ragweeds, perennial thistles, and curlycup gumweed among many others.

COLOR KEY to Map



Principal Dominant Vegetation of:

MIXED GRASS PRAIRIE

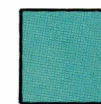


Western wheatgrass
Blue grama
Needleandthread
Green needlegrass



Western wheatgrass
Blue grama
Buffalograss

MIXED GRASS Tall Grass Transition



Western wheatgrass
Big bluestem
Porcupine grass



Big bluestem
Sand bluestem
Prairie sandreed
Needleandthread

TALL GRASS PRAIRIE



Big bluestem
Little bluestem
Switchgrass
Indiangrass

WOODED TYPES

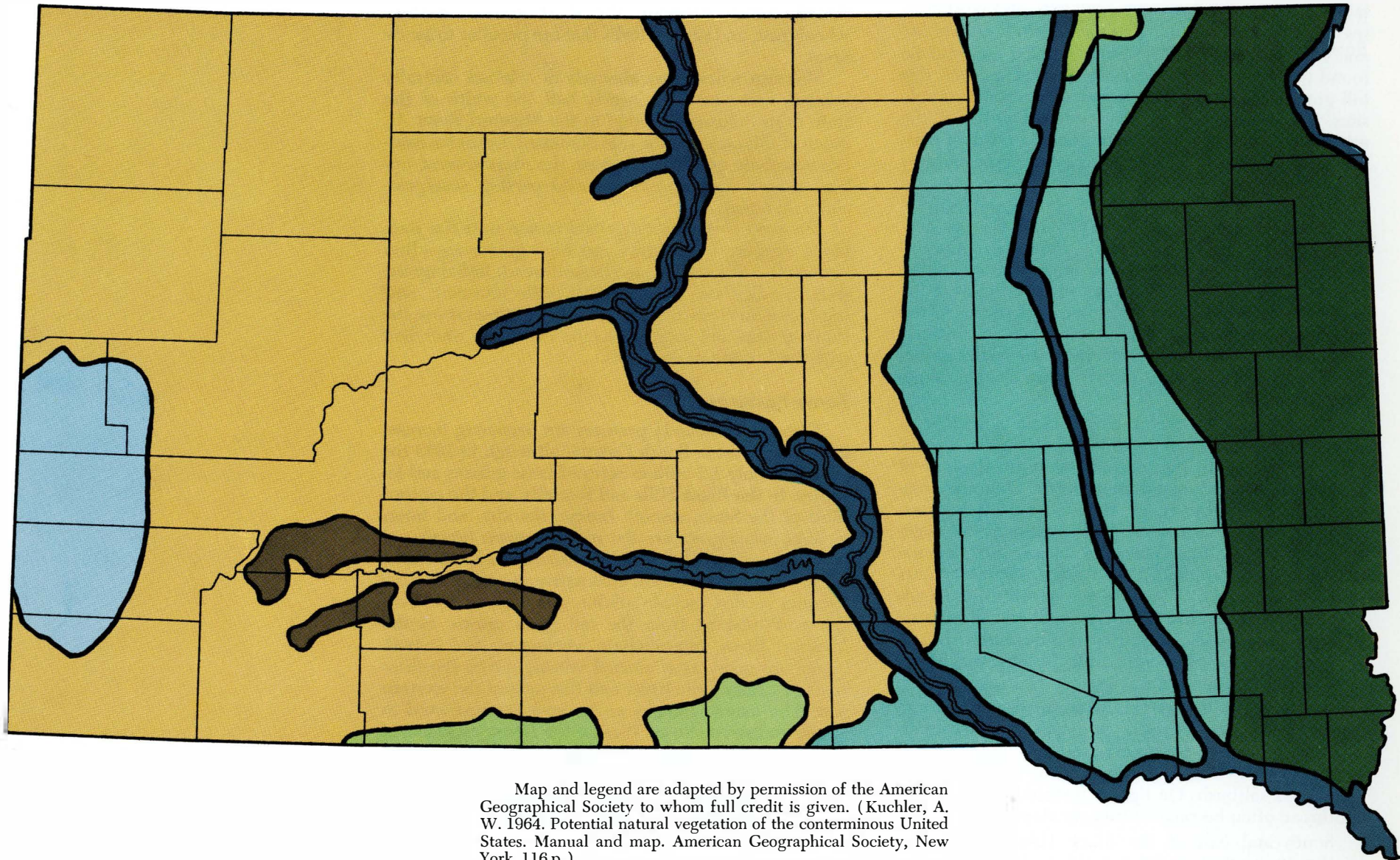


Ponderosa pine



Cottonwood
Black willow
American elm

Predominant Major Vegetation Types of South Dakota



Map and legend are adapted by permission of the American Geographical Society to whom full credit is given. (Kuchler, A. W. 1964. Potential natural vegetation of the conterminous United States. Manual and map. American Geographical Society, New York. 116 p.)

Mixed Grass Prairie

The mixed grass prairie of the western two-thirds of South Dakota displays considerable uniformity, yet variation. Along the eastern edge both mid- and short grasses can be found intermingled with the tall grasses. As one goes westward, tall grass vegetation can still be found to the western edge of the State. However, this tall grass vegetation clings to only the most favorable sites. Throughout most of the western two-thirds, the environment is suited for midgrasses. As a result of periods of stress created by drought, or more especially by overgrazing, many localized areas of the region are dominated by short grasses—blue grama, and buffalograss. Western wheatgrass in particular and green needlegrass are found throughout the State, becoming increasingly abundant westward where they often are the sole dominants. Threadleaf sedge and needleleaf sedge are often important components in most of the mixed grass area. Many forbs occur, although only in scattered amounts. Some of the more common are scarlet globe-mallow, American vetch, prickly pear, fringed sage-wort, and scurfpeas.

The Black Hills themselves contain a variety of grassland types in open meadows and as understory of the pine forests. In the foothills many expressions of the true prairie and mixed prairie exist. Midgrass dominants from place to place include prairie junegrass, needleandthread, and western wheatgrass. Other vegetation includes little bluestem, green needlegrass, threadleaf sedge, and needleleaf sedge. Shrubby plants found near the Hills include the sagebrushes, lead-plant, rabbitbrush, broom snakeweed, and in isolated places, greasewood. In many areas rabbitbrush and broom snakeweed characteristically become very abundant with range deterioration.

North of the Black Hills western wheatgrass and Montana wheatgrass are the principal midgrass dominants with some areas having scattered understory of blue grama and buffalograss as well as various sedges, sages, and saltbush. On lighter textured soils, needleandthread often becomes extremely abundant.

South and east of the Black Hills, buffalograss reaches its greatest abundance along with blue grama.

Sandy soils are present in southwestern and southcentral South Dakota, and here sand sage is locally abundant, as well as big bluestem, little bluestem, sand bluestem, sideoats grama, prairie sandreed, needleandthread, indian ricegrass, the short grasses, western wheatgrass, and several forbs that are peculiar to sandy areas.

Western wheatgrass abounds in a broad centrally located, east-west belt, nearly half the width of the State from the western edge to the Missouri River. In much of this area it is the sole dominant. Common associates include green needlegrass, the short grasses, upland sedges, American vetch, wild parsley, scurfpeas, and wild onion.

On good condition rangeland in and near the Badlands, western wheatgrass and blue grama are often dominant, with sedges, needleandthread, buffalograss, green needlegrass, red threeawn, little bluestem, and big bluestem coexisting. In areas of continuous use the short grasses and sedges become extremely abundant with few bluestems and forbs.

Tame Pastures

Tame (introduced) pastures are becoming increasingly important in South Dakota, although in 1953 the State had only 1.2 million acres of tame grasses and legumes. In the Black Hills and foothills, and the eastern third of the State, smooth brome, timothy, and intermediate wheatgrass are the most common introduced pasture grasses with switchgrass and indiangrass showing good promise as cultivated native grasses. Common legumes seeded include alfalfa, sweetclover, and red-clover. Westward from the tall grass prairie to the Missouri River, intermediate wheatgrass and smooth brome are good, as is crested wheatgrass in the drier areas just east of the River and throughout the western part. The major legumes in the area are restricted to alfalfa and sweetclover. West of the River, exclusive of the Black Hills, western wheatgrass, and green needlegrass are favored native grasses for planting. Also westward, the introduced grasses most commonly used are crested wheatgrass and less commonly intermediate wheatgrass. Again alfalfa and sweetclover are favored legumes for seeding.

Grasses and Sedges

Crested wheatgrass

Agropyron cristatum

Crested wheatgrass, a cool-season bunchgrass, is the wheatgrass easiest to identify because of its definitely flattened seed head. The moderately coarse leaves are mostly basal, flat when growing, and tend to roll inward when dry. Normal plant height is 1½-3 feet. The most common commercial strain is Fairway crested wheatgrass.

Two closely related species are also commonly called crested wheatgrass. One of these is desert wheatgrass, *A. desertorum*, the most common strains being Standard and Nordan desert wheatgrass. Desert wheatgrass has a narrower seedhead than crested wheatgrass, but uses and adaptation of both are very similar. The second related species is Transbaikial wheatgrass, *A. michnoi*, which has long, branching rhizomes, making it easy to distinguish from the other two. Many intergrades exist among this group of related species, but further division of the complex appears unnecessary for field use.

Crested wheatgrass is a late 1800 introduction from Siberia. It gained favor during the 1930's as a soil holder when it was recognized as being highly drought tolerant, and has been widely planted in areas receiving 8-20 inches of precipitation. In these areas, more acreages of crested wheatgrass have been planted for forage and soil stabilization than any other introduced grass. In South Dakota, the abundance of crested wheatgrass decreases from west to east with the eastern third having very little.

The fibrous roots fill the upper soil surfaces and in favorable soils may penetrate to 6 feet making it a very strong competitor, particularly suitable for seeding weedy farm lands or deteriorated range lands having only scattered desirable grasses remaining. This latter practice has been applied in the 11 Western States much



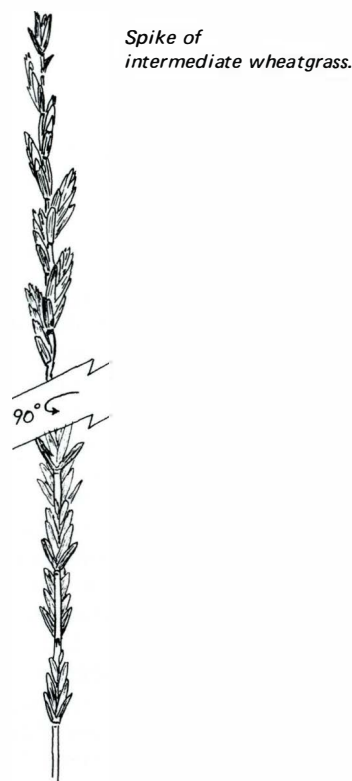
more frequently than in South Dakota. As it greens up before most native vegetation, it is valuable for early spring grazing. Crested wheatgrass is palatable and nutritious in the spring as well as in the fall if moisture is adequate for regrowth. Palatability decreases as plants mature. Crested wheatgrass has good production, excellent persistence, and grows well with alfalfa. Responses to fertilization are good. Productivity of old stands that have become decadent can be improved markedly by nitrogen fertilization. This group of grasses does not tolerate salty soil or prolonged flooding.

Intermediate wheatgrass

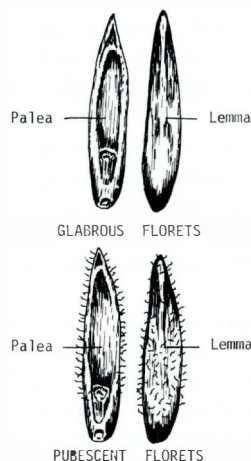
Agropyron intermedium



*Intermediate wheatgrass (top);
pubescent wheatgrass (below).*



*Spike of
intermediate wheatgrass.*



Intermediate wheatgrass, an introduced, perennial, cool season, sod forming grass grows from 2-4 feet tall. The inflorescence is a spike 4-8 inches long with slightly overlapping spikelets set close to the flowering stems (see sketch). Leaves are flat, ribbed, broad at the base, and taper to a point.

Introduced from Russia in the 1930's, intermediate wheatgrass has become an important hay and pasture grass. It is best adapted to areas of the western United States with 15-25 inches of precipitation annually. In South Dakota its most extensive use is in the eastern half of the State. Drought tolerance is higher than for smooth brome but less so than crested wheatgrass. Although adapted to a wide range of soils, it will not withstand wet, salty or alkali soils.

This grass is easily established, and fall seedings are generally more successful than spring seedings. It produces excellent hay and pasture either alone or in combinations with alfalfa. Application of nitrogen fertilizer is necessary to maintain high productiveness when not seeded with a legume. Grazing readiness is about two weeks later than crested wheatgrass.

Oahe is an improved variety released by South Dakota State University. It is a good forage and seed producer and widely planted in the State. Oahe appears to have greater longevity than others in South Dakota.

Pubescent wheatgrass, *A. trichophorum*, which is similar in appearance to intermediate wheatgrass, can be distinguished by the presence of short, stiff hairs on the heads and seeds. Compared to intermediate wheatgrass, there is some evidence that pubescent wheatgrass is more drought tolerant, persistent, and better adapted to low fertility soils of 10-14 inch rainfall areas than intermediate wheatgrass, but it forms a more open sod. Mandan 759, a North Dakota selection, is considered a superior variety for forage and seed yields.

Western wheatgrass is a native, cool-season, sod forming grass with very strong rhizomes. Leaves are stiff, flat when green, rolled when dry, mostly glabrous, strongly ribbed on the upper surface, and feel rough to the touch. Stems and leaves are generally blue-green giving rise to a less-preferred name, bluestem wheatgrass. There is considerable variation in the spike (seed head), with spikelets having 6-10 stiff florets.

Western wheatgrass is found in most of the United States except in the area from Maine to Florida to Mississippi. It is a major range grass in the Northern and Central Great Plains, frequently occurring in nearly pure stands. Western wheatgrass is moderately alkali tolerant and grows on soils ranging from sands to clays, but is most important on fine-textured soils. On very fine clays it often shares dominance with green needlegrass, but frequently occurs in nearly pure stands. It is the most important grass in the wetter regions of the Mixed Prairie, in areas transitional to True Prairie, and in drainageways of the drier portions of the Mixed Prairie. Western wheatgrass was designated the State Grass of South Dakota in 1970 by action of the state legislature.

This grass is palatable and nutritious when green in the spring, and moderately so during other times of the year. It is commonly used as a hay crop during high precipitation years or when supplemental water is available. Vigorous rhizomes make western wheatgrass one of the more tolerant of the desirable and abundant grasses to grazing pressure and drought. Grazing abuse, however, especially in May and June, will decrease its abundance. When growing conditions improve, following drought and/or overgrazing, it may rapidly recolonize areas previously occupied. Western wheatgrass is considered a decreaser in areas having less than about 15 inches of annual precipitation, but it can temporarily invade areas previously occupied by tall grasses, when they are forced out by severe conditions. Seedings of this grass are common, but establishment may be slow due to poor seedling vigor.

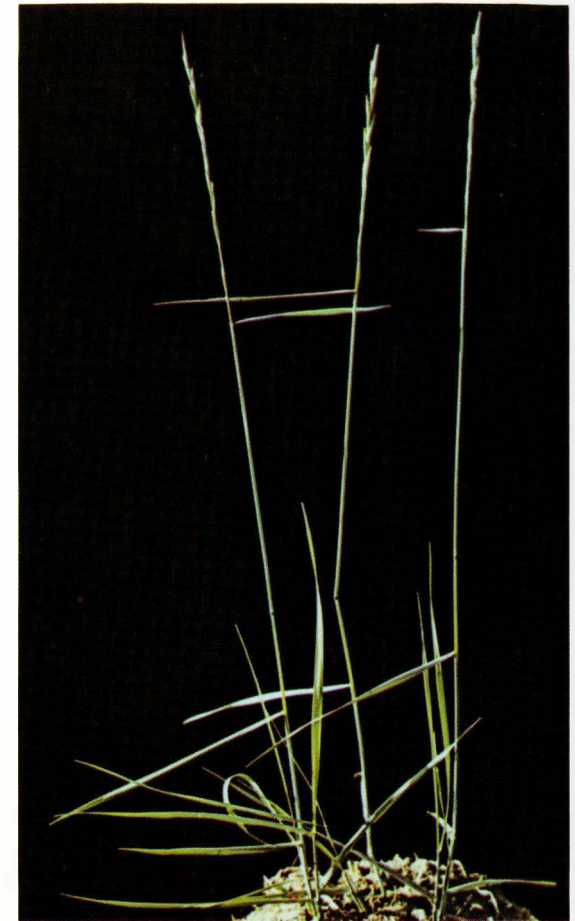
Montana wheatgrass, *A. albicans*, is a closely related species found in northwestern South Dakota on very fine textured upland soils. Its abundance in localized

Western wheatgrass

Agropyron smithii



Spike of
western
wheatgrass



areas makes it an important range grass. In appearance it is quite variable, but resembles western wheatgrass. Short rhizomes make the plants tufted in appearance. The leaves are softer than those of western wheatgrass. Short, half-inch awns are common and may curve outward from the seed head. When present, the awns make Montana wheatgrass easy to distinguish from western wheatgrass.

Slender wheatgrass

Agropyron trachycaulum



Spike of slender wheatgrass.

Slender wheatgrass, a cool season, native bunchgrass, from 2-4 feet tall, takes its name from the inflorescence which is narrower than those of other common wheatgrasses. Glumes are almost as long as the florets. Both glumes and lemmas are generally awnless and without hair. Leaf blades are flat and usually glabrous. Leaves and stems are often purplish tinted.

Slender wheatgrass occurs in all but the southeastern states, but is important primarily in the semi-desert portions of the Intermountain and Northern Great Plains regions. It is alkali tolerant, short-lived, and low in drought resistance. In South Dakota slender wheatgrass normally is found as scattered plants in drainage-ways of Mixed Prairie communities and mountain meadows of the Black Hills. It may not be present naturally in the eastern part of the State having more than 20 inches of precipitation.

Good seedling development contributed to its early use for reseeding. Since it is short-lived, it is seldom planted in pure stands. In localized areas, slender wheatgrass is sufficiently abundant to be very important. Although considered to be a decreaser, reports are conflicting on palatability. In some areas it is relished by livestock and wildlife, particularly when compared to other wheatgrasses.

Bearded wheatgrass, *A. subsecundum*, also a native bunchgrass, is similar to slender wheatgrass in appearance and habitat. Seed heads are somewhat wider, sometimes slightly nodding, and the stem (rachis) between the spikelets normally has fine stiff hairs. Because glumes are tipped with a short awn that tapers to a point, bearded wheatgrass is fairly easy to distinguish from slender wheatgrass. Other identifying characteristics between the two are similar.

Bearded wheatgrass occupies a wide variety of habitats from Alaska throughout the northern to southwestern United States. It is a common component of open woods and meadows. In South Dakota it is found scattered throughout the State most commonly in woods, valleys, and meadows. Bearded wheatgrass rarely is abundant, probably because it decreases with grazing pressure. It is a favored forage for livestock.

Big bluestem

Andropogon gerardii

Big bluestem, or turkey foot, is so named because of large size, bluish color, and seed heads which frequently branch into three parts resembling a turkey's foot. This warm season, perennial, tall grass has short scaly rhizomes. Coarse seed stalks reach 3-8 feet in height, with numerous large leaves $\frac{1}{4}$ - $\frac{1}{2}$ inch wide, often covered with hairs. Plants remain green throughout the summer turning red or purple after frost.

Big bluestem, a native of North America, is found naturally in most states, except in five far western states. Its primary range is the Central and Southern Great Plains, where it often grows in nearly pure stands, typifying the lowland tall grass communities. It is found primarily in the eastern part of South Dakota on level, well drained, lowlands. It occurs in the western portion as small patches in protected areas having more than normal supplies of soil moisture. Throughout the eastern portion of the State, only remnant stands of this once extensive grass remain.

Big bluestem is among the best of the prairie grasses in quality and quantity of forage produced, and is probably the most palatable grass in South Dakota when it is actually growing. Quality declines with curing. Abundance will quickly decrease with frequent mowing or with heavy grazing pressure.

Sand bluestem, *A. hallii*, is a close relative of big bluestem. It can be distinguished most easily by the dense white hairs on the seed heads. Leaves and stems tend to be more dust colored than those of big bluestem. Sand bluestem is not as palatable as big bluestem, but does provide excellent grazing. In South Dakota it is found most abundantly on sandy soil, but is seldom a major component of the vegetation where overgrazing has been common.



Little bluestem

Andropogon scoparius



Little bluestem is a warm season, tufted, leafy, perennial bunchgrass 1-4 feet tall. Basal portions of stems and leaf sheaths are somewhat flattened and leaves are slightly folded. This feature helps distinguish little bluestem from big bluestem. In addition, little bluestem lacks hairiness on sheaths and lower portions of leaves. Visible growth usually begins in late April or early May, with seed stalks appearing in August. Leaves become bluish-green to reddish-brown at maturity. Seeds are fuzzy and fluffy white at maturity. Little bluestem often exists in nearly pure stands. Even in pure stands little bluestem maintains its bunch appearance with openness of cover between plants.

This native mid-grass is broadly distributed and found naturally in all but the four most western states. Primary abundance is in the Central Lowlands and the eastern edge of the Southern Great Plains, and it is the dominant of many upland plant communities of the True Prairie. In South Dakota it is most important in the True Prairie and in the Black Hills. In the Mixed Prairie of the State it occurs mainly on sandy soils or on weakly developed soils especially along ridges or steep slopes. Little bluestem is an increaser in the True Prairie and a decreaser in the Mixed Prairie.

Livestock prefer to graze new shoots arising around the outside of older little bluestem plants. Such selective grazing, under moderate or light use, may cause the casual observer to conclude that little bluestem is not grazed. Little bluestem is extremely nutritious and relished by livestock when green but it does not cure well. Grazing and farming have restricted its abundance to limited upland sites, with soils ranging from deep to shallow and rocky, and sandy to fine textured. Little bluestem makes fine hay, but consecutive years of haying is certain to reduce its abundance.

Threeawn
Aristida spp.

Threeawn showing seed and three attached awns. (Actual length of seed and upright awn is 1 3/4 inches.)



The threeawns common in South Dakota are all easily identified by the three, long, straight awns which arise from each seed. Plant heights range from 8 inches to 2 feet tall.

Fendler threeawn, *A. fendleriana*, is a short-lived perennial bunchgrass, with numerous short, fine, curly, leaf blades at the base. The fine, straight awns are from $\frac{3}{8}$ -2 inches long. Seed heads turn purplish with maturity.

Red threeawn, *A. longiseta*, (see photograph) is a short-lived perennial bunchgrass. Some leaves reach as high as the panicle. Awns are straight and from $2\frac{1}{3}$ -3 $\frac{1}{4}$ inches long. Red threeawn also turns purplish at maturity.

Prairie threeawn, *A. oligantha*, is a tufted annual with shallow, fine, fibrous, roots. Leaves of prairie threeawn are mostly basal. Awns are somewhat spirally curved at the base, and from $1\frac{1}{2}$ -2 $\frac{1}{4}$ inches long.

Although some 40 native threeawns occur in North and Central America, they are seldom of importance as range plants except in the Southwest where several are grazed by livestock before development of the seed heads. In South Dakota and elsewhere in the Great Plains, prairie threeawn is more abundant eastward, while Fendler and red threeawns are more common



westward. All three occupy the drier upland soils, frequently on hillsides.

In the Great Plains the threeawns are poor to worthless as forage, often increasing or invading rangelands. The fact that they are seldom eaten, accounts in part for their ability to increase on poor condition ranges. Mature awns can cause injury if grazed or eaten in contaminated hay.

Sideoats grama
Bouteloua curtipendula



Sideoats grama takes its name from the oat-like florets which appear to hang from the seed stalk along one side. Flower stalks seldom exceed 3 feet tall. Leaves normally are flat, with stiff hairs along the leaf blade edges. With curing, basal leaves curl and turn white. The entire plant may take on a light reddish appearance late in the summer and fall, similar to the somewhat darker red bluestems.

This native, warm season, perennial, midgrass, is found throughout the United States, except in extremes of the Northwest and Southwest. Sideoats grama is a sod forming grass, but the short, scaly rhizomes often give sideoats grama a bunchy appearance. It is a major component of ranges of the Central and Southern Great Plains, commonly growing in association with the bluestems. Elsewhere it is found with ponderosa pine and pinyon-juniper as well as semi-desert and desert shrub communities. In South Dakota sideoats grama may be found in many upland plant communities, but is most common on weakly developed soils of steeper slopes or on recent alluvium along streams.

Sideoats grama is relished by all classes of livestock. Where it grows in association with little bluestem, sideoats grama usually increases with heavy grazing pressure, but with prolonged heavy grazing it may give way to blue grama and/or increasing or invading forbs. It is not as drought tolerant as blue grama. Several selections of sideoats grama have been made including Pierre sideoats grama which is well adapted to South Dakota conditions. In the Central and Southern Great Plains it is commonly seeded in mixtures with other warm season grasses.

Blue grama

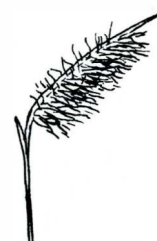
Bouteloua gracilis

Blue grama, one of several grama grasses, is easily identified by seed heads which resemble a human eyebrow. In the Northern Great Plains, it can be confused with hairy grama (*B. hirsuta*), but differs by not having a needle-like projection beyond the florets. Also, blue grama does not have the stiff hairs on the leaf blade margin common to hairy grama and sideoats grama. Seed heads are from 10-20 inches above the ground. Leaves are mostly basal, curling greatly as the plant cures. Blue grama is a bunchgrass which spreads outward slowly from parent plants by tillering, frequently creating a sod appearance, especially when heavily grazed.

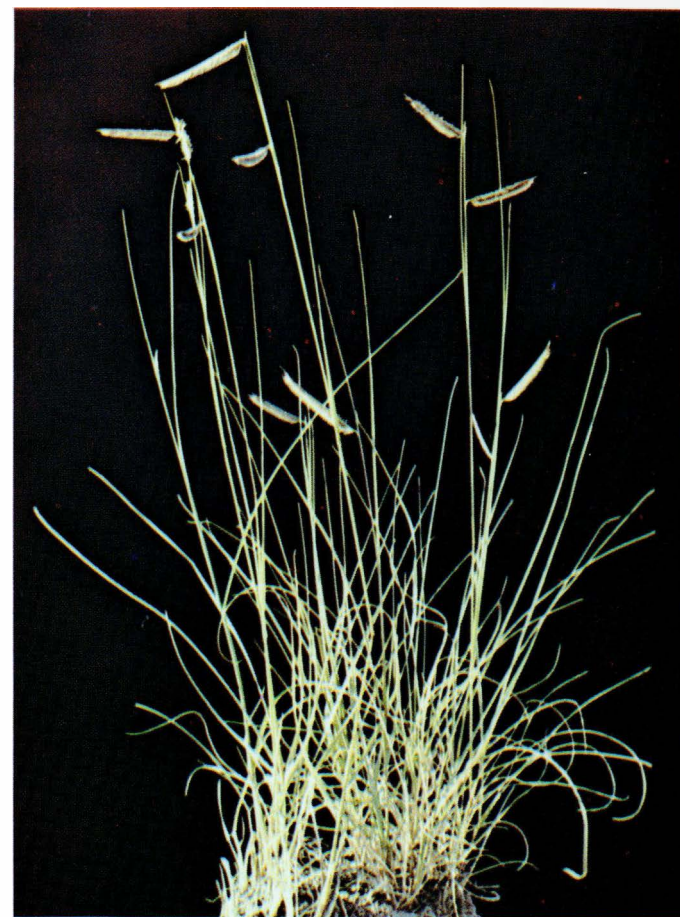
This perennial, warm season, short grass, is native throughout the Great Plains and the Southwest. In areas of its adaptation, it does best on the drier sites. It is a common associate of buffalograss, sideoats grama, and western wheatgrass. In short grass sods it frequently is the primary dominant. Elsewhere it is found with various tree and shrub communities. Blue grama is found on many soil types in South Dakota, but is best adapted to medium and fine textured, relatively deep soils of rolling uplands.

Blue grama increases with grazing pressure in the Great Plains, frequently replacing more productive mid- and tall grasses, often eventually giving way to buffalograss. Although normally low in productivity, it is nutritious, and palatable to all classes of livestock even during winter. In the Southern Great Plains blue grama is used extensively in mixtures for roadside revegetation, for re-establishment of native ranges, and seeding of abandoned cropland.

Although its close relative, hairy grama, has wide distribution, ranging from British Columbia through Mexico, this native short grass is seldom abundant



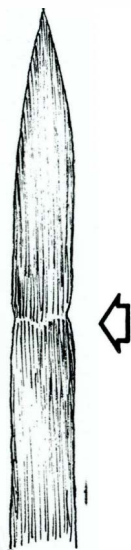
Blue grama seed head (above) and hairy grama (below) showing the projection beyond the florets. (Actual length of seed head about 1 inch.)



enough to be a primary forage, except in Mexico and adjoining states. In northern states, hairy grama normally has a tufted appearance, but may form sods from short rhizomes. It is an occupant of dry, sandy, and sandy loamy soils. Like blue grama, it is a palatable grass, and appears to be even more resistant to grazing and drought.

Smooth brome

Bromus inermis



Smooth brome leaf blade showing the characteristic M-shaped constriction (arrow).

Smooth brome is a perennial sod grass with vigorous rhizomes. Panicles may reach 2-4 feet tall, with many basal leaves which are flat, veined, but smooth and shiny. An M-shaped constriction about two-thirds up the leaf blade is a key identifying characteristic.

A native of the Old World, presumably of Hungarian origin, smooth brome is now naturalized in the northern two-thirds of the United States. Many selections are drought resistant and winter hardy. Two distinct types are recognized: "northern," which is well adapted north from the Northern Great Plains, and "southern" which does best further south. The "southern" type is more aggressive, and where adapted is a better producer than the "northern" strains. Both do well throughout South Dakota, particularly in the eastern and central part of the State where it is the most common of the introduced pasture and hay grasses.

Smooth brome is the most widely cultivated of the brome grasses, with many varieties available. It is palatable, of good quality, and is used as hay, silage, and pasture, in both pure and mixed stands. Smooth brome requires high nitrogen levels to remain productive and to prevent or to correct "sod binding." Planting with alfalfa or other compatible legumes reduces or eliminates the need for nitrogen fertilizer. Smooth brome grows well on most good soils but is best adapted in areas having at least 20 inches of annual precipitation. Regrowth of this cool season grass is not good, but summer dormancy may be delayed by use prior to the boot stage of development.

Japanese brome

Bromus japonicus

Spikelet and enlarged floret of Japanese brome showing blunt lemma and awn attachment point. (Actual length of spikelet is 3/4 inch.)



Japanese brome, less commonly called Japanese chess, wintergrass, and junegrass, is sometimes confused with its better known relative, downy brome. It is a shallow rooted, introduced annual, reproducing only by seed. Numerous seeds are produced on nodding erect or spreading stems up to 30 inches tall. Seeds are formed on an open panicle. Spikelets are about half an inch long with 6-13 florets (seeds) each with awns $\frac{1}{4}$ - $\frac{3}{4}$ inch long. Awns are attached to the back of the blunt lemmas.

Japanese brome is an Old World introduction, now naturalized in North America as far north as Alberta and in most of the United States. Japanese brome has not been reported for several southeastern states and a few elsewhere. This weedy grass is a common occupant of dry soils in waste or disturbed areas. On drier rangelands of the West, it frequently invades depleted ranges, or if certain climatic conditions prevail, it may also invade hay fields and top condition ranges, becoming especially abundant on those in low condition. It is also a nuisance in tame pastures and croplands. In South Dakota its abundance is greatest in the southwestern part, but movement northward and eastward has been observed. Growth habit is similar to that of winter wheat, with seed germination normally occurring in the autumn, young plants overwintering with a basal rosette of leaves, then growing rapidly in the spring, and maturing by June.



This invader is palatable only as a green plant in the autumn and in the spring before seeds dry. Maintaining a good cover of vigorous, perennial, desirable grasses seems to be the best way to control Japanese brome in pasture and rangelands, although it commonly is present on good condition ranges.

Downy brome

Bromus tectorum



Downy brome spikelet and enlarged floret showing lemma tapering to a long awn. (Actual spikelet length is $\frac{3}{4}$ inch.)

Downy brome is variously known as downy chess, junegrass and cheatgrass. It grows from heights of 4 inches to about 2 feet. Like Japanese brome it is normally a winter annual. The panicles are large, often open, drooping with the spikelets on very thin branches. The florets are about $\frac{1}{2}$ inch long with lemmas tapering to slender straight awns about $\frac{1}{2}$ inch long. Seed heads are frequently filled with smut making them black. Typical-

ly soft, white, fine, hairs cover leaves and florets giving rise to the common name, "downy."

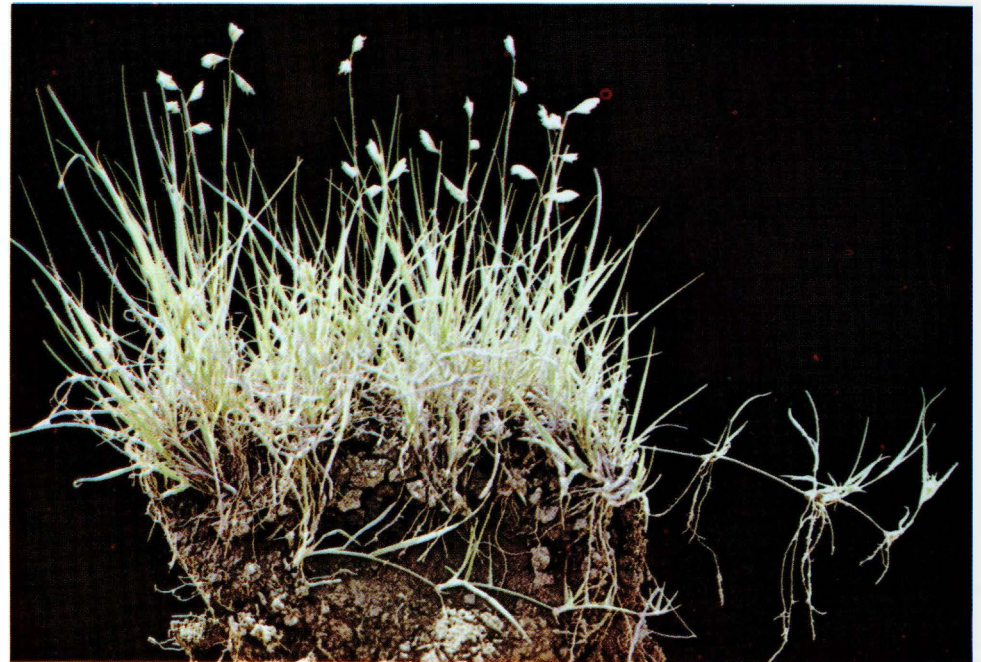
A native of Europe, downy brome is found in great abundance in most of the 11 western states, occupying plains, foothills, and Intermountain valleys. In South Dakota it is an occupant of Mixed Prairie communities as well as disturbed areas. Like Japanese brome, the movement of downy brome in South Dakota appears to be northward and eastward. Abundance may increase on ranges depleted by overgrazing, but downy brome will not normally expel native species nor prevent their return.

Downy brome is considered an invader, with undesirable forage qualities. On certain Intermountain ranges, however, it has become the primary green forage, relished by all livestock. During other times of the year, downy brome is of little value, except in the fall when rain can make it palatable. Downy brome has become a nuisance of considerable magnitude on cultivated lands and disturbed areas. In grain crops and seeded pastures it can become so competitive that the desired crop suffers greatly. When in extremely dense stands, downy brome may form a short carpet of soft grass. If moisture is in short supply, it may never mature when in thick stands, dying when only a few inches tall.

Buffalograss
Buchloe dactyloides

Buffalograss is the only grass in the genus, *Buchloe*, and is one of the few grasses which reproduces by above ground stems, or stolons. It is also unusual in that male and female flowers are not produced on the same plant. Female plants produce seed burs on short stems close to the ground and directly above a few leaves. Male flowers appear on thin stalks above the leaf area and look somewhat similar to the seed heads of blue grama.

This native, warm season, perennial, shortgrass is an important constituent of the Mixed Prairie on medium and fine textured soils. In the Central and Southern Great Plains and in the Southwest it can produce an abundant portion of the forage, but throughout the Northern Great Plains, including western South Dakota, it provides very little production. It does not extend into the Canadian Provinces and although present in the more arid portions of the Great Plains it does not contribute much to overall productivity. Throughout its range, buffalograss increases under heavy grazing pressure, and is an invader in the True Prairie. Buffalograss is grazed by all classes of livestock at all seasons. Buffalograss and blue grama are very common associates, increasing with overgrazing on moderately fine soils, replacing western wheatgrass and other midgrasses. With continued overgrazing, buffalograss will re-



place blue grama. Once established, it creates a tight sod. Due to its good soil cover, and drought resistance, buffalograss is frequently favored for erosion control on soils containing very little sand. In addition, this low-growing grass has been used successfully to seed lawns, picnic areas, and airport runways.

Prairie sandreed
Calamovilfa longifolia



Prairie sandreed rhizomes.



Prairie sandreed floret showing seed with basal ring of hairs that are half the length of the lemma. The floret has been parted with the enclosing glumes shown below the main part of the floret.

Prairie sandreed or prairie sandgrass has stems which arise singly from strong scaly rootstocks, attaining heights of 2-6 feet. Each culm has 10-12 leaves, with flat to inrolled blades, 15-24 inches long, and tapering to a fine point. The flower head is a panicle, pale green or tan, smooth, 6-18 inches long, narrow, with erect or ascending branches. Seeds have a basal ring of white hairs half the length of the lemma (see sketch). The rhizomes aid greatly in identification. They are extensive, horizontally creeping, pale whitish, stout, scaly, shiny, with the tips sharp pointed much like a rooster's spur.

Prairie sandreed is a warm season grass found primarily on sands from Ontario to Alberta to New Mexico, Kansas and Indiana. Its abundance is not extensive, since it is restricted to sands, sandy soils, and aggregated shales. Because of its numerous rhizomes and drought resistance it is an effective soil stabilizer. In western South Dakota it commonly occurs in large patches on coarse textured soils and on some shales. Prairie sandreed is not particularly palatable during the growing season, but it cures well on the ground, and makes good winter feed for cattle. Prairie sandreed is usually considered to be a decreaser, but will increase for a time with heavy grazing pressure or where it occurs with sand bluestem and big bluestem.

Sedges

Carex spp.

Sedges are similar in many respects to grasses and are frequently called grass-like. They may generally be distinguished from grasses by their triangular solid stems in addition to leaves that are attached to the stems on all three sides. Many kinds of sedges occur from dry uplands to marshes.

In South Dakota two upland sedges, both having rhizomes, but sometimes bunchy in appearance, are common and easily confused. Both have very narrow dark green leaves and brown to black seed heads. Needleleaf sedge is more common especially on clay soils and in drier areas. This sedge occurs as single culms which may be more or less clumped. Seed heads are on stems 2-8 inches high. Normally, there are 1-4 leaves to a culm; the narrow leaves are erect or curve outward and downward. Plant bases are dark brown. Sun sedge, *C. heliophila*, has stems 4-10 inches high growing singly or in loose bunches. Leaves are more or less erect with 5-10 on a fertile culm. Stem bases are light reddish-brown with a distinct shredded appearance.

These native sedges occur in parts or all of the plains from Manitoba to New Mexico. In South Dakota they occur throughout the State. Needleleaf sedge is probably more abundant westward. As a result of heavy grazing or drought, it tends to increase in abundance. Sun sedge favors medium to coarse textured soils that are not droughty. In South Dakota its abundance is greatest eastward where it normally decreases in abundance, but may increase with heavy grazing, especially on pastures which have been fertilized with nitrogen. Although widely distributed, they seldom are dominant

Needleleaf sedge

Carex eleocharis

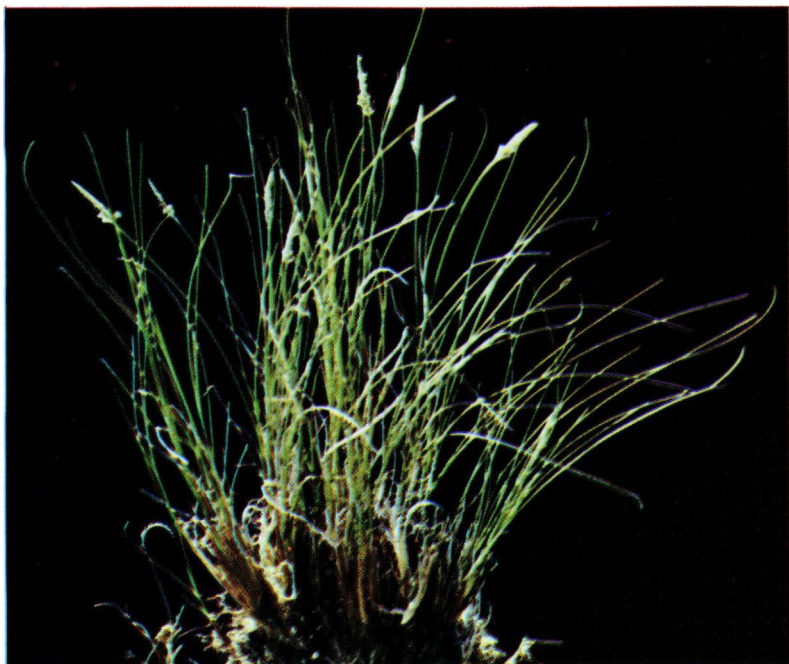


or gain the abundance of another sedge, threadleaf, although they may form small dense patches.

Needleleaf sedge and sun sedge are among the first of upland plants to green in the spring. At that time they afford good forage, and have been observed being heavily grazed by cattle.

Threadleaf sedge

Carex filifolia



Threadleaf sedge, also known as blackroot, is a bunch sedge. Stems and leaves are densely bunched with flower stalks often extending beyond the leaves, reaching a height of 3-10 inches. The flower head is a brown, chaffy spike about half an inch long. Leaves are light green, very fine, and rolled. Basal leaf sheaths are brown and papery. The fibrous roots are dark brown to black and very wiry, often persisting for years under cultivation when grasslands are broken. As with other sedges, this grass-like plant is a perennial.

This native sedge occurs naturally from the Yukon to Texas. It is most prominent in the Mixed Prairies of the five states north of Colorado. In South Dakota it is common in the uplands of the western portion of the State. It makes its best growth on sandy soils where it may occur in nearly pure stands. It is also an important plant on medium textured soils in association with short grasses. Importance diminishes on fine textured soils, with occurrence mainly on weakly developed soils along ridges. This sedge is very drought tolerant.

When abundant, threadleaf sedge can be very valuable as an early green forage, since it begins to green in April. During this time it is highly palatable, becoming tough and dry by late June. On medium to coarse textured soils, threadleaf sedge increases with heavy grazing pressure by cattle, but decreases with similar pressure by sheep. On fine textured soils, abundance decreases with use by either kind of livestock.

Sandbur

Cenchrus pauciflorus

*Field sandbur showing
a closeup of one of
the burs. (Actual
length is 3/8 inch.)*



Sandbur, also known as mat sandbur or grassbur, is a warm season, native, weedy annual or short-lived perennial. Identification is easy because of the unusual appearance of sharply spined burs which enclose 2 seeds each. When touched, the burs cling tightly to clothing or prick the skin painfully. Six to 20 burs are on each fruiting stem and some may be partially enclosed in the last leaf. Stems are normally 10-20 inches long.

Sandbur is found in sandy soils from Ontario to southern South America. In North America its original distribution was confined to the far west but it is now scattered through almost all of the United States. In the Great Plains it is most commonly found on sandy banks, floodplains, lawns, fields, ranges, and pasture lands. It is sometimes found on soils with high clay contents.

This undesirable plant is of some grazing value before seed set in July, but after maturity it is of no forage value because of the burs. In addition to being a painful nuisance to humans, sandbur can decrease the value of sheep fleeces infested with burs. Sandbur reaches its greatest abundance on overgrazed rangelands or otherwise disturbed areas.



Orchardgrass

Dactylis glomerata



Orchardgrass is a long-lived perennial bunchgrass that commonly forms large tussocks by tillering. Leaves are very soft, flat, except V-shaped near the base. Seed are borne in a moderately compact to open panicle 4-10 inches long on a stalk 2-4 feet tall.

Orchardgrass is an introduction of the late 1700's from Central or Western Europe where it occurs naturally. It is naturalized in the humid regions of North America from Alaska to Florida. In this country, its greatest abundance is in the Pacific Northwest and the northeastern states. Orchardgrass does best in the northern states when irrigated or where precipitation exceeds 25 inches. Although orchardgrass is winter hardy and long-lived in its primary range, in South Dakota a lack of autumn moisture almost assuredly results in severe stand loss. Autumn irrigation can retard loss.

Orchardgrass does not begin growth as early as many other perennial cultivated grasses, but with adequate summer moisture, regrowth is superior to most other introduced grasses. This makes it excellent pasture throughout the growing season. When planted with an adapted legume, such as alfalfa, its fertilizer requirements are greatly reduced. Latar and Chinook orchardgrasses are selections which appear well suited to irrigation in western South Dakota.

Inland saltgrass

Distichlis stricta

Inland saltgrass, desert saltgrass, or alkali grass, is a native, warm season perennial sod grass. Rhizomes are vigorous and scaly. Leaf blades are stiff, sharp pointed, and folded or inrolled near the bottom half. Panicles are somewhat congested, but individual spikelets are easily seen. Flowers are borne on stems reaching 6-12 inches high. Male and female flowers occur on different plants.

This native is found in all states and prairie provinces west of the Mississippi River. It is a common occupant of salty or alkaline seep areas or along marsh edges. While frequently occurring as nearly pure stands, in the Great Plains it is commonly associated with alkali sacaton, switchgrass, prairie cordgrass, foxtail barley, and western wheatgrass.

Inland saltgrass is not particularly palatable, but as other forages dry up, livestock may make considerable use of it. Intensive use will normally weaken associated perennial grasses allowing inland saltgrass to increase and eventually replace other grasses. With continued deterioration in wet areas, foxtail barley may dominate.



Barnyardgrass

Echinochloa crusgalli



Barnyardgrass showing a single spikelet, bristly coated (above), and extracted glossy seed (below). (Actual size of spikelet, excluding awns, is 1/8 inch.)



Barnyardgrass is a weedy, warm season, annual, growing up to 4 feet tall. Panicles, 3-8 inches long are unusual (see photograph). Flowering stems may be nearly horizontal when few plants are present. The nearly round seeds are shiny, and enclosed by hard, bristly coats tipped with a straight awn up to $\frac{1}{2}$ inch long. Reportedly, as many as 40,000 seeds have been produced on a single plant. Leaves are 4-12 inches long, lax, mostly glabrous, and about $\frac{1}{8}$ inch wide. The absence of a ligule is an easily recognized distinguishing characteristic.

A native of Europe, barnyardgrass is now found locally in wet areas or wetter regions of the United States and adjacent parts of Canada. It occupies fertile soils of moist open places, ditches, gardens, cultivated fields, waste places, feed grounds, and corrals. It is common locally in the Great Plains but not on undisturbed upland sites.

Barnyardgrass is a serious competitor in new seedlings, sometimes to the point of causing failure. It produces fair forage if pastured when young, or cut for hay before maturity, but yields are unreliable. Although related species are cultivated in parts of Asia and Africa, this grass is little more than a nuisance in North America.

Canada wildrye

Elymus canadensis

Canada wildrye is a native, cool season, short-lived, rhizomatous grass with drooping seedheads having long, curved awns on glumes and lemmas. Several few-seeded florets may arise at a single node. Seedstalks may be 2-5 feet tall. Leaves are broad and 4-10 inches long. Heads and then leaves turn russet to tan as the plant cures in the summer.

Distribution is extensive, excluding only a few southeastern states. In more humid regions it can be found on uplands, whereas in semi-arid regions it is confined to shaded or otherwise relatively wet areas. Thus, in eastern South Dakota it is found on uplands, in the western parts it is confined mainly to draws and the Black Hills area. When moisture conditions are favorable, Canada wildrye will grow throughout the summer, or regrow in the autumn after summer dryness. Although other wildryes occur in the State, this one is most abundant. It is best adapted to medium textured soils, but will grow in most soils of both prairie and forest.

Pure seedlings of Canada wildrye are seldom used because it is short-lived, however it is desirable in mixtures for rapid establishment of protective cover. In naturally occurring grasslands, it seldom is abundant enough to produce a major portion of the forage. With increased utilization, abundance of Canada wildrye decreases.



Russian wildrye

Elymus junceus



Russian wildrye, a cool season, introduced bunchgrass, grows 2-4 feet tall. Bunches can become quite large and remain distinct. Plants produce an abundance of basal leaves, while the upright seed producing stalks have few leaves. Seed heads are a compacted spike with no awns.

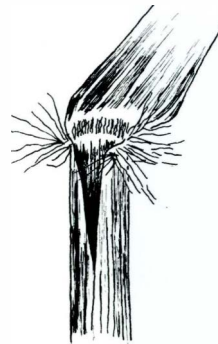
Russian wildrye grows naturally on dry, somewhat saline soils of the steppes and steppe slopes throughout much of the U.S.S.R. After introduction to the United States in 1927 it was released in 1941 and 1942 by the Northern Great Plains Field Station at Mandan, North Dakota, for general use. In the past decade extensive acreages have been seeded, largely in the Northern Great Plains. Its range of adaptation appears similar to that of crested wheatgrass, restricting its primary use in South Dakota to the western half. There is some indication that Russian wildrye is suitable as an irrigated forage.

This wildrye is a strong competitor, and when seeded in pure stands where adapted it will nearly exclude other vegetation for a great number of years. Its main assets are its early growth, high nutritive qualities over a long season, late summer regrowth, and good drought tolerance. It is valuable, therefore, for grazing from early spring through early winter. Tests at Mandan have shown that Russian wildrye produced the best grazing of all grasses tested, including natives. It is a fine complement to native rangelands. The most common improved selection is Vinall.

Stinkgrass

Eragrostis cilianensis

Stinkgrass showing base of leaf blade with dense ring of hairs forming a ligule and the two tufts of silky hairs at the ends of the ligule. (Actual length of portion shown is 3/8 inch.)



Stinkgrass or stinking lovegrass is a warm season, tufted, annual. Flowering stems are 4-8 inches long, many branched, spreading outward from the base of the plant, sometimes prostrate. Leaf blades are light green to gray-green, smooth, about 7 inches long, and from 1/10-1/4 inch wide. The ligule is a dense ring of short hairs. Seed heads are a somewhat compacted gray-green panicle producing an abundance of seed. When green, stinkgrass has a disagreeable odor giving rise to the common name.

Originally an Old World native, stinkgrass is now found throughout the United States, Central America, and parts of South America. Throughout its range, stinkgrass is found on a variety of soils, and is most abundant in disturbed areas including roadsides, cultivated fields, and waste areas. It can be common on some deteriorated ranges.

This rangeland and pasture invader does not produce an abundance of foliage. It is seldom a nuisance on lands with healthy perennial forage because it is a poor competitor. Some evidence indicates that stinkgrass can be poisonous, especially when eaten in large quantities by horses. However, its disagreeable odor usually discourages consumption by animals unless other forage is lacking.



Sixweeks fescue

Festuca octoflora



Sixweeks fescue is a cool season, winter annual. This erect, delicate, slender grass grows up to 15 inches tall. Seed heads are very narrow, but may be up to 6 inches long. The common name is appropriate, because the plant remains green for a relatively short period, after which it becomes inconspicuous.

Sixweeks fescue is native throughout much of the United States on a wide variety of soils. In the Great Plains, sixweeks fescue is common on drier upland soils. In South Dakota it is associated with grassland communities of the west and also on drier cultivated soils. In the State, sixweeks fescue is most pronounced on overgrazed ranges where depauperate plants, 2-4 inches tall are common. Abundance of sixweeks fescue on rangelands is seldom great, but extremely variable, probably depending on yearly temperature and moisture conditions. Small size, scattered abundance, and ease with which it pulls up makes sixweeks fescue undesirable as forage. In addition, after sixweeks fescue matures, livestock tend to avoid the plants as well as any area where the fescue is especially prevalent.

Foxtail barley
Hordeum jubatum

Foxtail barley, also known as foxtail or squirreltail barley, is a pesky short-lived perennial 8-30 inches high, growing in well defined tufts. Identification is easy due to the characteristic drooping seed heads covered with numerous fine, long, rather soft and straight spreading awns. At maturity the seed heads break apart when tugged. Foxtail barley can be distinguished from bottle-brush squirreltail by comparing the appropriate photographs.

Foxtail barley is native to western grasslands from Alaska to Mexico, later spreading to the eastern part of the continent. Today it is found in all but nine southeastern states. Foxtail barley is an opportunist, occupying disturbed ground, meadows, and waste places. In South Dakota it is found throughout, commonly in association with alkali sacaton and inland saltgrass in areas that are saline or alkaline and wet with run-in or seep water. It is also found on dry soils along roadsides, and in grain and hay fields.

When young, the palatability of foxtail barley is rated as fair for cattle, horses, and sheep. After the seed heads develop, plants are seldom grazed except during winter. Awns from the seeds, whether grazed or eaten in hay, can cause mouth sores and occasionally death by mechanical injury. In the western states, game animals, including antelope, deer, and elk have suffered injury and death. Control of foxtail barley is difficult. On rangeland, conservative grazing sometimes is successful if sufficient desirable natives can assume dominance. Otherwise aggressive desirable forage may need to be seeded.



Prairie junegrass

Koeleria cristata



Prairie junegrass or junegrass is a short-lived perennial bunchgrass occurring as small tufts normally about 2 inches in diameter. Roots are fibrous. The dense, contracted spike-type panicles are 2-5 inches long, and somewhat symmetrical. Leaves extend to 12 inches, and seedstalks are normally 8-24 inches long, depending on conditions. Leaves are rather stiff, dark green, and rough on the upper surface. Growth is completed by mid-June with plants becoming dormant until autumn or the following spring.

This native midgrass occurs in all but the southeastern states. It is also present in temperate regions of the Old World. Prairie junegrass is an important range plant in the Central and Northern Great Plains, although plants are usually scattered, seldom providing more than 3% of the cover. In the Great Plains it is common to communities of short grass, little bluestem, and prairie dropseed. Elsewhere it grows in communities of ponderosa pine, pinyon-juniper, oak lands, desert and semidesert shrubs, and chaparral. Prairie junegrass occurs throughout South Dakota.

When green it is good forage and palatable to all livestock as well as deer and elk, becoming less preferred with maturity. Prairie junegrass is easily overgrazed because it greens earlier than most other native grasses. As grazing pressures increase, abundance decreases.

Stonyhills muhly
Muhlenbergia cuspidata

Stonyhills muhly, or plains muhly, is a warm season bunchgrass that grows in dense tufts to 16 inches tall. Stems are erect, leafy, and arise from a hard bulb-like scaly base. Two stem branches commonly originate from one node and are exerted from a single sheath. The inflorescence is a very narrow, uneven, panicle 2-5 inches long. The tiny spikelets contain only one floret (seed). Fully developed seeds are round, firm, and conspicuous on the slender rachis. Leaf blades are hairless, erect, narrow, and often folded.

Stonyhills muhly occurs naturally within an area bounded by Alberta, south to New Mexico, east to Kentucky, north to Michigan and Wisconsin. It is a prairie occupant, and as the name implies is found most readily on stony or gravelly slopes. In South Dakota it is found mainly on the weakly developed soils along ridges and steep slopes of prairies and plains, frequently intermixed with little bluestem and sideoats grama.

Stonyhills muhly is a fair to good forage plant throughout the State, and decreases with grazing pressure. As a decreaser, it is found principally on ranges in good and excellent condition. Although stands are usually somewhat scattered, they may be thick enough to furnish considerable forage.

This large genus of grasses includes numerous perennials and a few annuals. They are especially typical of the Mexican plateau and the southwestern states. In South Dakota 11 species have been reported, a few of which can be found throughout. They contrast greatly in appearance. An example of one which is common throughout South Dakota on moist sandy soils is green muhly (*M. racemosa*) or marsh muhly. In contrast to stonyhills muhly, green muhly is a rhizomatous grass that grows upright to 30 inches tall, or may even grow



prostrate. Few, fairly closely grouped, stems are found together. Stems are usually branched. Panicles are about as long as those of stonyhills muhly, but are wider and much more compact, resembling those of prairie junegrass. Palatability of green muhly is fair to good before maturity, and it is an increaser on favorable sites.

Indian ricegrass
Oryzopsis hymenoides



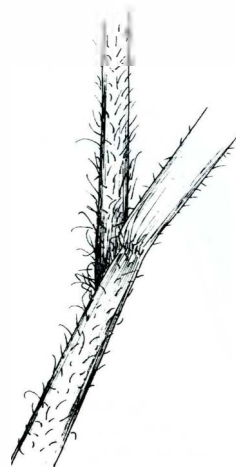
Indian ricegrass, also known as Indian millet, sandgrass, sandrice, and silkygrass is a native cool season, densely tufted bunchgrass, 1-2 feet tall. Flower heads are 6-12 inches long, very loose, with single seeds supported on a zig zag or wavy rachis (flower stalk). Leaves are slender, flat to inrolled, stiff, somewhat harsh to touch, very numerous and 6-12 inches long.

Indian ricegrass is widely distributed on sands and sandy soils from Manitoba to British Columbia, and in all states west of the Missouri River. It is one of the most important range forages in the western deserts and semidesert ranges. This grass is characteristically found with pinyon, juniper, sagebrush, winterfat, saltbush, blue grama, wheatgrasses, needlegrasses, and three-awns. Abundance has been greatly decreased due to overuse, particularly in the Intermountain and Southwestern ranges. In South Dakota it occurs as scattered plants confined to sandy, gravelly, or stony soils of the western portion. Greatest abundance is in the southwestern corner of the State.

Although Indian ricegrass is not a principal forage in South Dakota, its appearance is so striking to the field observer that it can scarcely be ignored. It is an excellent forage with both leaves and seeds relished by livestock throughout the year. Indians of the Southwest made considerable use of its seeds, grinding them into flour, hence its name, Indian ricegrass. The seed is also favored by small wildlife including birds and animals.

Witchgrass
Panicum capillare

Witchgrass showing hairy leaf sheath and stem and few hairs along leaf blade.



Witchgrass, also known as ticklegrass and tumblegrass, is a warm season, weedy, annual, up to 30 inches tall. Inflorescence is an open spreading panicle, normally half as tall as the overall height of the plant. Seeds are small, rounded, shiny, and located at the ends of short panicle branches. Most of the plant is covered with dense, stiff hairs.

A native grass, witchgrass, is common to many soils on the plains and prairies in the eastern two-thirds of the United States. It is found less abundantly farther west. In the Great Plains, and throughout South Dakota, witchgrass is found on cultivated land, waste places, depleted hayland and ranges in poor condition.

Witchgrass becomes the greatest nuisance on cultivated land, where it may compete so strongly with new seedlings that establishment of a desired crop may fail. It does not compete seriously with healthy perennial grass, and as such cannot be considered a serious problem on high condition ranges. As a forage, witchgrass is somewhat palatable before the seed heads develop, but nearly worthless as mature standing forage, and damaging to hay quality.

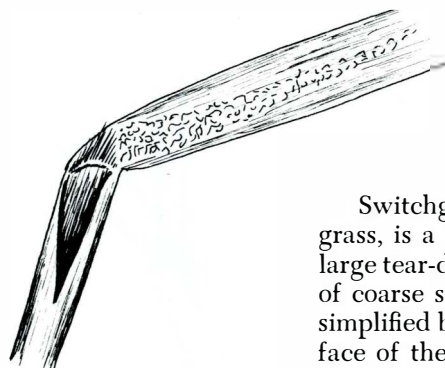


Switchgrass

Panicum virgatum



Switchgrass with dense tuft of straight hairs forming a ligule, and V-shaped wedge of wavy hair along upper surface of leaf blade base.



Switchgrass, a native, warm season, sod forming grass, is a frequent dominant of lowlands. The rather large tear-drop shaped seeds are borne on open panicles of coarse stems reaching 3-6 feet tall. Identification is simplified by a V-shaped patch of hair on the upper surface of the leaf blade near the stem. Numerous scaly creeping rhizomes enable this plant to form dense colonies.

Switchgrass is found in eastern Canadian provinces and in all states except five in the far west and north-west. It reaches its greatest abundance throughout the bluestem belt of the Central Lowlands of the Great Plains. In addition to the bottomland strains, an upland strain is also recognized. Unlike prairie cordgrass, which grows in nearly pure communities, switchgrass may have an understory of Kentucky bluegrass and sedges. In South Dakota, switchgrass is primarily found in the east, but is present in western ravines, and in the southwestern sandhills. Farming and grazing practices have greatly reduced its previous abundance. In recent years varieties of switchgrass have been favored for seeding warm season upland pastures in areas previously occupied by true prairie communities. When seeded, blue-stems, Indiangrass, and sideoats grama are frequently included in the mixture. Varieties of switchgrass most common to South Dakota are summer switchgrass, a late maturing variety developed by South Dakota State University, and Nebraska 28 which is finer stemmed, earlier maturing, and somewhat less productive.

Although not as palatable as some grasses, switchgrass is consumed by livestock as long as the stems remain green. Even after maturity, leaves and seed heads are readily eaten. In wet lowlands, switchgrass makes excellent yields of good quality hay and often can be harvested twice a summer.

Reed canarygrass

Phalaris arundinacea

Reed canarygrass is a broad-leaved, coarse, sod grass which grows 2-8 feet tall. Many leaves are basal, but some are located along the flowering stalks. Seed heads are a compacted panicle 3-6 inches long and green to lavender in color. Short rhizomes form a dense sod.

Reed canarygrass is native of temperate central Europe and North America. It naturally occupies wet lowlands where it can form dense colonies, but is adapted to some uplands in areas of high precipitation. It is extremely valuable for seeding in poor drainage areas subject to flooding and inundation. The most extensive acreages of reed canarygrass occur in the northwestern and northcentral United States. In the drier Northern Great Plains and South Dakota it is frequently used with irrigation or in naturally wet areas.

Although reed canarygrass furnishes high yields of good quality hay or silage, it is used mainly for pastures and waterway conservation. When used for grazing, old plant residue must be removed to maintain palatability. The earliness of reed canarygrass, its good regrowth, and high nutritive value make it a valuable perennial forage. The selections, Ioreed from Iowa and Frontier from Ontario, are among the most popular in the Northern Great Plains.



Timothy
Phleum pratense



*Florets of timothy (above)
and creeping foxtail (below).*

Timothy is a short-lived, cool season, perennial bunchgrass which attains heights of 2-3 feet. The spike-like panicle is cylindrical, very compact, and crowded with numerous slightly bristly florets. Leaves are flat, $\frac{1}{4}$ inch wide, 4 to 12 inches long, and taper to a thin point. Each plant arises from a swollen or bulblike base, a feature which aids immensely in identification.

Timothy, an Old World native, is now the most widely cultivated introduced hay grass in North America. It grows best in more humid regions of the States, primarily in cooler portions, and is frequently planted with legumes. In South Dakota, timothy is primarily used in the eastern part of the State and in the Black Hills. It maintains itself in wet areas, and responds well to irrigation and fertilizer. Regrowth is fair. It is adapted to most moist soils, including moderately alkaline conditions.

Creeping foxtail (*Alopecurus arundinaceus*) closely resembles timothy in appearance, origin, and use. In contrast to timothy, creeping foxtail panicles turn black upon maturity, and florets are soft, fuzzy, and fluffy. Also, it has strong rhizomes, forms dense sod, and is well adapted to soils that are normally too wet to cultivate. With irrigation and fertilizer, production and regrowth are excellent. Increasing use is being made of creeping foxtail in South Dakota. Garrison creeping foxtail is from a collection made near Max, North Dakota.

Canada bluegrass

Poa compressa

Canada bluegrass is a cool season, sod forming grass with a slight to much compressed panicle arising from solitary or weakly grouped culms which are strongly flattened, wiry, and 5-27 inches tall. Leaves are short, erect, and keel-tipped. Leaves are few. Canada bluegrass can be easily distinguished from Kentucky bluegrass by the flattened culms of the former. If the base of a culm is firmly grasped between thumb and forefinger, rolling the culm is difficult.

Canada bluegrass is a late 1700's introduction from western Eurasia where it is native. In North America it reproduces naturally in the same areas where Kentucky bluegrass is found. In South Dakota, then, it is found in the eastern part of the State, in valleys of the western part, and in the Black Hills. Although it may grow with Kentucky bluegrass, it achieves dominance only on soils that are too acid, droughty, or nutrient-deficient for Kentucky bluegrass dominance. Even in nearly pure stands of Canada bluegrass, there may be much openness of cover. It is an early colonizer on disturbed soils.

Canada bluegrass is later maturing than Kentucky bluegrass, and has little regrowth. In South Dakota it is seldom abundant enough to be a principal forage, but is important because of its wide distribution.



Kentucky bluegrass

Poa pratensis



A single floret of Kentucky bluegrass removed from the glumes to show the silky tuft or web of fine hairs that is attached to the base. (Floret length is 1/8 inch.)

Kentucky bluegrass is a cool season, sod forming grass, with numerous basal leaves and open pyramid-shaped panicles attaining heights up to 2 feet. The narrow leaves are keel-tipped, flat or folded, and dark green. From 3-5 flowering branches arise from each location on the panicle. Florets, when separated from the glumes, are seen to be based with a tuft of fine, silky, hairs. This feature is not prominent with Canada bluegrass.

Apparently a native of the Old World, Kentucky bluegrass has been described as having the broadest distribution of any plant in the temperate portions of the northern hemisphere. But one of many grasses in the same genus, it is naturalized in most states and is seeded extensively for lawns and pasture. Where precipitation exceeds about 16 inches, Kentucky bluegrass may invade pasture, hay, and rangeland. It is well adapted to sites previously occupied by big bluestem and other tall prairie grasses. In South Dakota, extensive areas of prairie in the eastern and central portion have been replaced by bluegrass sod. As a result, eastern South Dakota is one of the leading areas in Kentucky bluegrass seed harvesting. Kentucky bluegrass sods are also common in park and meadow areas of the Black Hills. As a turf, Kentucky bluegrass is unexcelled in hardiness and appearance. As a pasture grass, it forms good cover, and provides many months of green forage, although its total production is usually less than other adapted grasses. Satisfactory yield increases are obtained with fertilization. It also responds well to irrigation, especially when fertilized.

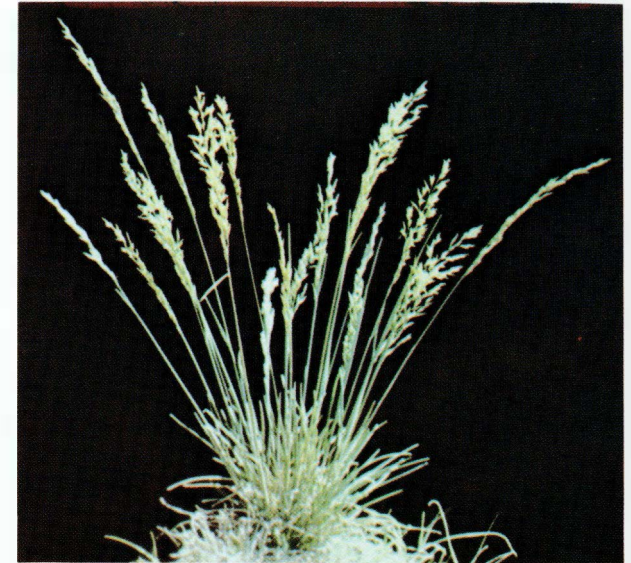
Sandberg bluegrass

Poa secunda

Sandberg bluegrass or little bluegrass is a native bunchgrass, about 2-12 inches across the base, and 9-24 inches tall. Leaves are short and basal; leaf blades are soft and flat to rolled with keel shaped tips. Flower stalks are few to many, erect, and are naked except for two short leaves. Flowers are in a narrow panicle about 1-4 inches long.

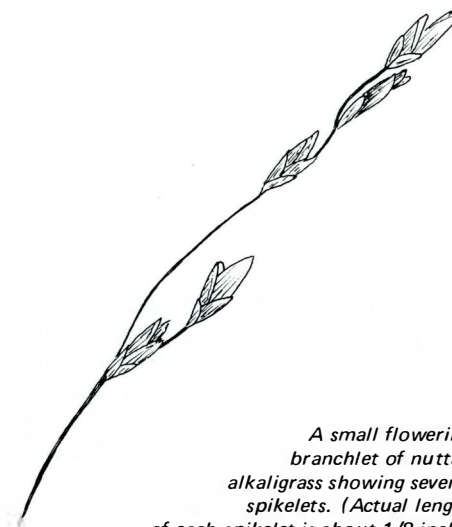
Sandberg bluegrass is found in most states west from the Dakotas, north to the Yukon, and south to California as well as in Chile. It grows from elevations as low as 1,000 feet to as high as 12,000 feet. Sandberg bluegrass is among the six most important range grasses in Colorado, Oregon, and Washington. Habitats include semi-deserts, mountain foothills, and open timber. It grows well on medium textured soils and is common on scablands, ridge tops, and dry stony or sandy soil. This bluegrass grows with many other grasses as well as with sagebrush and rabbitbrush. It is common to the Northern Mixed Prairie, including that portion in South Dakota, where it is conspicuous in short grass sods in early spring because it is one of the first grasses to green up.

During early spring to early summer, sandberg bluegrass is palatable to all classes of livestock, becoming somewhat less preferred in the summer when cured. By autumn it is frequently selected by all livestock again.



Nuttall alkaligrass

Puccinellia airoides



A small flowering branchlet of nuttall alkaligrass showing several spikelets. (Actual length of each spikelet is about 1/8 inch.)

Nuttall alkaligrass is a native, perennial, bunch-grass 1-2 feet tall. Leaves are quite rigid, ascending, and mostly less than half the height of the plant. Seeds are borne in open, spreading, pyramid shaped, panicles which are quite large in relation to the rest of the plant.

An occupant of wet, usually alkaline or saline soils, nuttall alkaligrass is found in states and provinces west to southwest of Wisconsin. It may occur as scattered plants or in nearly pure stands on wet lands in western South Dakota. This grass usually grows in association with alkali cordgrass, prairie cordgrass, western wheatgrass, alkali sacaton, and others. Although not normally abundant, nuttall alkaligrass is grazed by livestock, and may furnish considerable forage. It behaves as a decreaser under heavy grazing pressure. A selection of nuttall alkaligrass has been cultivated in Montana.

Tumblegrass

Schedonnardus paniculatus



Tumblegrass, or ticklegrass, is a warm season, short-lived perennial bunchgrass. This shallow rooted weedy grass has flattened leaf sheaths. Leaf blades are 1-2 inches long, flat, folded, translucent margined, and corkscrew curled, especially when dry. Unusual panicles arise from stems 8-20 inches long, and are frequently prostrate. Upon maturity the flowering stems break and roll giving rise to the common name, tumblegrass. The less used common name, ticklegrass, is derived from the sensation when the panicles "crawl" up a trouser leg.

Tumblegrass is found on the plains in an area bounded by Louisiana, Illinois, Saskatchewan, Montana, and Arizona, as well as in Argentina. It is a common component of the Great Plains, although it is seldom abundant. Establishment is rapid, thus it is frequent in disturbed places. In the Great Plains it is most commonly a component of upland vegetation. Tumblegrass is found scattered throughout South Dakota. Overuse is indicated when present in abundance on rangelands. Similarly its presence in pastures indicates low vigor of the desired perennial forage. Forage quality of tumblegrass is ranked as poor.

Foxtail (bristlegrass)

Setaria spp.



The foxtails, also known as bristlegrasses, are introduced, warm season, tufted annuals. The seed heads give rise to the common names of this weedy grass. Plants grow 6 to 36 inches tall with culms erect to prostrate, normally branching at the base. The bristly panicles 1-3½ inches long, are dense and cylindrical. The three most common foxtails are similar in general appearance but they can be distinguished by close observation of the following characteristics:

Green bristlegrass, or green foxtail, *S. viridis*, (see photograph) has from one to three bristles below each spikelet. In contrast to hooked bristlegrass, however, the bristles are not noticeably barbed.

Yellow bristlegrass or yellow foxtail, *S. lutescens*, has at least five bristles below each spikelet. Unlike the other two, the stems are somewhat flattened at the base and the sheaths are compressed, forming a keel.

Hooked bristlegrass or bristly foxtail, *S. verticillata*, has a single barbed bristle below each spikelet which will readily catch on clothing.

All three foxtails are natives of Europe. They represent a few of the many species which are scattered widely in southern Canada and the United States, particularly in wetter cultivated soils and waste places. In South Dakota, yellow bristlegrass and hooked bristlegrass are found throughout, being more common in the east. Green bristlegrass is also found throughout the State, but more abundant in the west. Hooked bristlegrass is not as abundant as yellow or green bristlegrass.

When present in considerable amounts on pasture or rangelands, foxtails are indicators of deteriorated conditions. In crop or grass seedings, they can be so competitive as to make seedings fail. All are somewhat palatable to livestock in early stages of growth but they are not considered desirable grasses.

Bottlebrush squirreltail

Sitanion hystrix

Bottlebrush squirreltail, also known as bristlegrass, bushtail, or foxtail, is a bright green, bristly headed, perennial bunchgrass. Plant heights range from 4 to 18 inches. Flowering stems are stiff and erect; leaves are frequently hairless with blades flat to rolled, and stiffly ascending to spreading. When seed heads cure they turn tan colored, and are easily pulled apart with only slight pressure. The ease with which the heads pull apart helps to distinguish this grass from foxtail barley. In addition, there are considerably fewer seeds in each spike, and the stiff awns are curved, spreading outward, and frequently downward.

Bottlebrush squirreltail is a native found from eastern Washington, to South Dakota, Missouri, Kansas, Texas, and California. It normally occurs scattered, but may be abundant in local patches. This grass grows chiefly in dry, gravelly soils, or saline and alkaline flats. It may be associated with many upland vegetation types from grass to brush. In South Dakota it is seldom abundant, even in the southwestern corner where it is most common.

Before seed heads develop, bottlebrush squirreltail may be fair to fairly good forage for cattle and sheep. By midsummer the bristly awns make bottlebrush squirreltail objectionable to livestock, to the point it is seldom grazed. Autumn rains allow the plants to green up, making them again somewhat palatable.

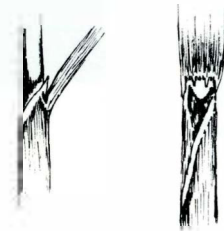


Indiangrass

Sorghastrum nutans



Two indiangrass fertile florets. Notice twisted awns and both pairs of sterile florets attached at the base of each fertile floret. (Actual length of parts shown is about 7/8 inch.)



Indiangrass leaf blade and sheath showing double split ligule.

Indiangrass or yellow indiangrass, is a native, warm season, tall grass which spreads by seed and short rhizomes. Golden-yellowish, lance-shaped, rather dense panicles are 4-12 inches long on erect stems 4-8 feet tall. Leaves are rather stiff and straight, arising from the stems at 45° angles. Prominent vertical projections are located on both sides of the sheath throat. Leaves are lighter green than those of big bluestem, a common associate.

Indiangrass is found in eastern Canadian provinces and in all but six far western states. It is most commonly associated with bluestem grasses, particularly in the Central Lowlands and eastern portions of the Great Plains. It is seldom a dominant, but may be found in nearly pure stands in lowlands. In South Dakota it occurs in the eastern part and in the southwestern sand hills.

This grass, relished by livestock, produces excellent hay if cut before the flower stalks develop, producing almost as much as big bluestem. In recent years it has been seeded in mixtures with other native tall grasses in the true prairie region.

Prairie cordgrass

Spartina pectinata

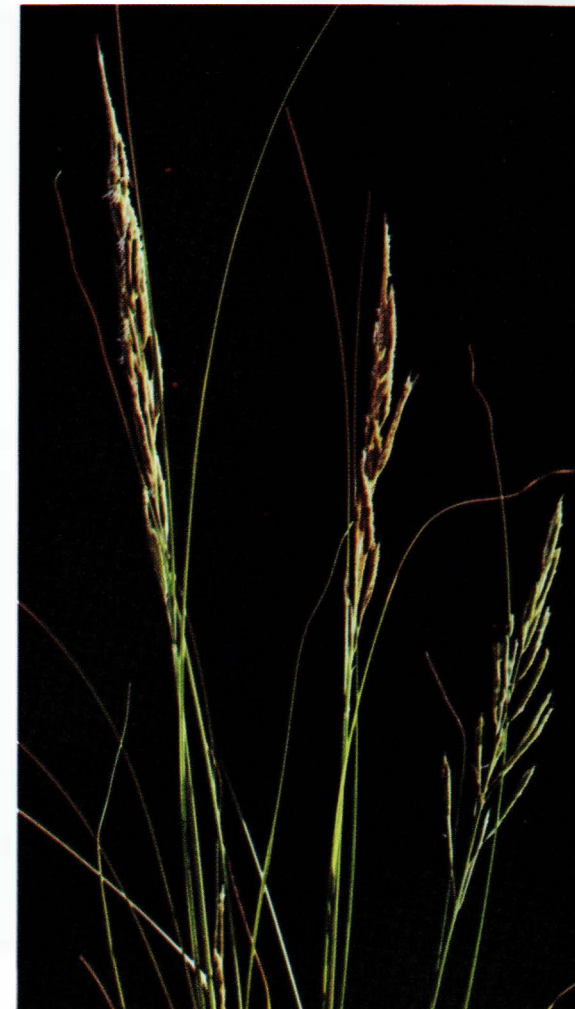
Prairie cordgrass, also known as cordgrass, sloughgrass, or tall marshgrass, is one of the tallest grasses that is native to North America. It grows 4-10 feet tall. The name cordgrass probably was suggested by the toughness of the long coarse leaves and thick, tough stems. Leaf blades may be up to 30 inches long with sharp teeth or points on the margin. As many as 10-30 spikes may be on each flowering stem. Spikes, although much larger, closely resemble those of blue grama. Soil beneath stands of prairie cordgrass is filled in the upper inches with a mat of coarse, thick, woody, many branched rhizomes.

This warm season, somewhat alkali tolerant, grass occupies wet soils of the prairie provinces of Canada and is native in all but eight states of the southwest and southeast. In South Dakota it is more abundant in the eastern part, but is present in drainageways of the western portion of the State as well. Vigorous rhizomes and dense shade produced allows cordgrass to grow in pure stands near sloughs. With drought or draining of lowlands, prairie cordgrass gives way to big bluestem and western wheatgrass. On the water side of cordgrass communities, tall sedges, rushes, and marshgrasses are common. On the drier side, switchgrass or Canada wildrye communities are common. Prairie cordgrass communities are seldom plowed because of their marshy location. Because of coarse stems, and very rough edged leaves, cordgrass is not readily eaten by livestock except in the spring or when other forage is dry. Prairie cordgrass decreases with heavy grazing pressure. Cordgrass is commonly used for hay with two or three cuttings a year being a desirable practice to prevent coarseness.

Alkali cordgrass, *S. gracilis*, is similar in appearance to prairie cordgrass, but is shorter, 2-3 feet tall, and more common on wet alkali and saline meadow areas. In addition to the shorter height, the spikes are smoother. It is found locally throughout South Dakota.



Typical dense stand of prairie cordgrass in a wet swale.



Leaves and stems of prairie cordgrass, and possibly alkali cordgrass, were used by pioneers for thatching roofs and covering haystacks. Prior to that, Indians thatched lodges with cordgrass before covering the grass mat with soil.

Alkali sacaton

Sporobolus airoides



Alkali sacaton showing stiff, straight hairs at the leaf base.

Alkali sacaton is also known as bigplume bunchgrass, firetop saltgrass, and hairygrass dropseed. This midgrass is a robust, warm season, perennial bunchgrass with erect seed stalks 1-3 feet tall. Seed head panicles are spreading, pyramidal-shaped, and 4-16 inches long. Leaf blades are wide at the base, tapering to long slender points. A few hairs are common at the base of the leaf blade. Roots are coarse and fibrous.

Alkali sacaton is native in all states northwestward to southwestward from Missouri. In its northern range, including South Dakota, it is scattered and found primarily on areas where salty soil conditions limit other grasses. In the Southwest it is sufficiently abundant to be of considerable importance as forage. It most commonly occupies slightly moist alkaline flats, but is also found on open plains, valleys and meadows. In South Dakota alkali sacaton is most prevalent in the southwest, occurring sparingly in the northern half of the State. This grass provides fair to good forage for cattle and horses except as it dries in the summer. Abundance decreases with heavy grazing. It cures well and makes a good winter forage.

Sand dropseed

Sporobolus cryptandrus

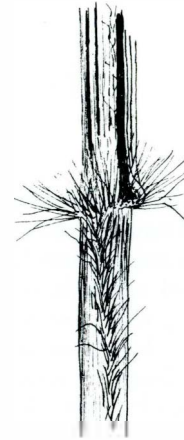
Sand dropseed showing hairs at leaf collar and along split of sheath.

This native bunchgrass grows 1-3½ feet tall, with outer stems often spreading nearly horizontally. Flower panicles may be pyramidal, 3-14 inches long, open near the top and spreading, with the lower part of some panicles enclosed in the leaf sheaths. Short, wide, sharply pointed leaves are rough on the surface and mostly confined to the lower half of mature plants. A conspicuous dense tuft of white hair at the leaf blade base is an easily recognized identifying characteristic. Flowering occurs in late summer. Upper leaves become frayed and white when dry, and whip in the wind creating a flagging effect.

Sand dropseed is a native of most of the United States and Mexico. It is not present in a few far western states or in the Southwest. It is associated with a great variety of vegetation types, primarily on sandy soil having openness of cover. In the Great Plains, including South Dakota, it is frequently associated with short- and midgrasses. It often occurs in large amounts on abandoned cropland.

Sand dropseed is a prolific seed producer and has high drought tolerance. These features may account for its rapid return on overgrazed and drought-injured ranges. Although livestock prefer it to a lesser extent than many other grasses, it is readily grazed prior to maturity.

A close relative of sand dropseed is tall dropseed, *S. asper*, which in most respects, is similar in appearance to sand dropseed. However, tall dropseed can be distinguished from sand dropseed by the former having narrow panicles, often taller and coarser growth, and long, narrow leaves. Basal leaves of tall dropseed are up to 20 inches long, while those of sand dropseed are 2-8 inches long. In addition, the tuft of hairs at the leaf



blade base in tall dropseed is not as conspicuous as it is in sand dropseed.

Tall dropseed is a component of the Mixed Prairie and lowland prairie communities. It is very drought resistant, but seldom is abundant, except during periods of drought. Its occurrence is rare in South Dakota. It reportedly decreases with increasing grazing pressure. Forage value is fair to good.

Needleandthread

Stipa comata



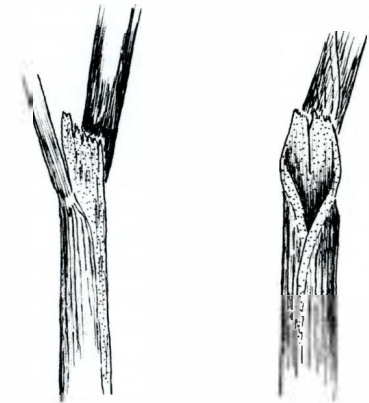
Needleandthread or speargrass is a cool season, perennial bunchgrass with seed stalks reaching 1-3 feet, but with leaves mostly basal. It flowers in early June. Sharp-pointed seeds have twisted, flexible awns 4-5 inches long, giving rise to the common names. The leaves, usually less than an eighth of an inch wide and 8-12 inches long, are rough on the upper surface with the tips commonly dying back for about an inch. On drying, leaves may roll inward. This grass has a conspicuous, split, or frayed, membranous ligule, which aids in its identification.

Needleandthread is a native midgrass, found from the Yukon to California and Texas to Illinois. It is an important constituent of the upland prairies throughout the West, common on coarse and medium textured soils. In the Northern Great Plains its primary abundance is in the Mixed Prairie. In South Dakota it is principally associated with western wheatgrass, blue grama, and threadleaf sedge in the central and western portion.

The grass provides from fair to good forage, especially when green. If grazed during the time the awns are prominent, physical injury may result to eyes, mouth, and flesh of sheep. Larger livestock seldom are bothered. Because it is an increaser, its abundance is difficult to reduce by grazing management. Injury to livestock can be greatly reduced if ranges containing needleandthread are grazed before awns appear and/or after they drop. It is seldom planted because of the undesirable awns.

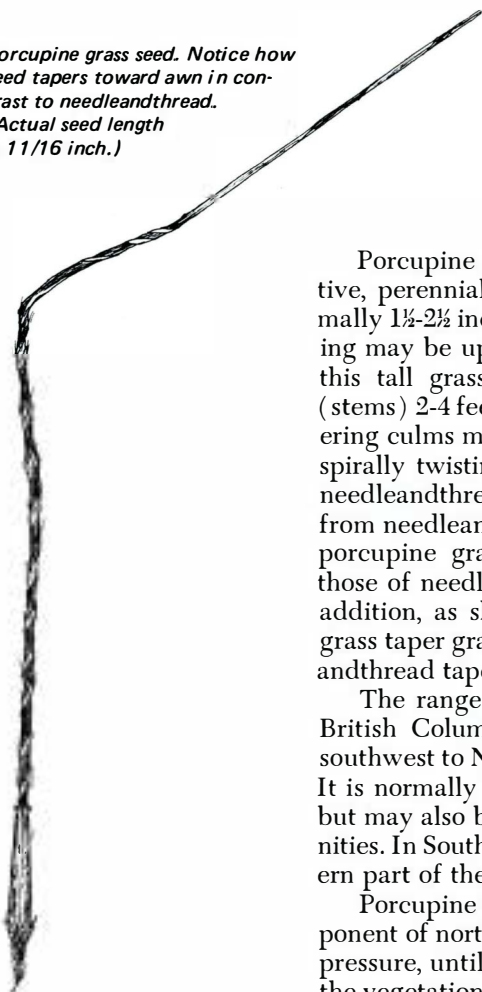


Needleandthread showing stipe (awn) and uniform width of seed. Compare with tapering seed of porcupine grass. (Actual seed length 5/16 inch.)



Needleandthread showing frayed and split ligule.

Porcupine grass seed. Notice how seed tapers toward awn in contrast to needleandthread. (Actual seed length is $1\frac{1}{16}$ inch.)



Porcupine grass, or needlegrass, is a cool season, native, perennial bunchgrass. Circular bunches are normally $1\frac{1}{2}$ -2 $\frac{1}{2}$ inches in diameter but with excessive tillering may be up to 4 inches in width. Foliage height of this tall grass is 15-36 inches, and flowering culms (stems) 2-4 feet tall. As few as one or as many as 18 flowering culms may occur in each bunch. Seeds have long spirally twisting, tough awns, very similar to those of needleandthread. Porcupine grass can be separated from needleandthread by the glume length. Glumes of porcupine grass range from $\frac{1}{8}$ -1 $\frac{1}{8}$ inches long while those of needleandthread are from $\frac{1}{2}$ - $\frac{3}{4}$ inches long. In addition, as shown in the sketch, seeds of porcupine grass taper gradually toward the awn. Those of needleandthread taper more abruptly.

The range of porcupine grass is in the prairies of British Columbia to Ontario, south to Pennsylvania, southwest to New Mexico, and north through Montana. It is normally found growing in the Tall Grass Prairie but may also be found in wetter Mixed Prairie communities. In South Dakota it is mostly abundant in the eastern part of the State and in the Black Hills.

Porcupine grass in times past was an abundant component of northern prairies. It decreased under grazing pressure, until today it seldom is a major component of the vegetation except in isolated tracts. As with needleandthread, porcupine grass should not be grazed during June and July when the seeds are present, because awns can cause mechanical injury to an animal by sticking in its mouth. Sheep carcass values can be greatly lowered by seeds working through the fleece into the flesh. Porcupine grass is very nutritious and relished by all livestock.

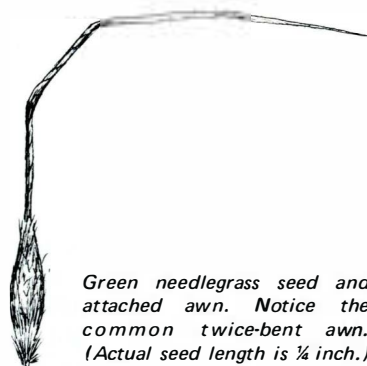
Porcupine grass

Stipa spartea

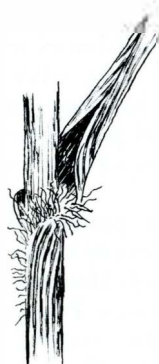


Green needlegrass

Stipa viridula



Green needlegrass seed and attached awn. Notice the common twice-bent awn. (Actual seed length is $\frac{1}{4}$ inch.)



Green needlegrass showing hairs along collar margin. (Actual length of portion shown is $\frac{3}{4}$ inch.)

Green needlegrass, also called feather bunchgrass, is a cool season, perennial, bunchgrass, varying in height from 18-36 inches. The panicle is somewhat compacted. Awns are curved, sharply bent in the middle, and about 1 inch long. Leaves are often rolled, thread-like, 4-12 inches long, glabrous, with prominent veins above. The ligule is a ring of hairs, and the sheath is hairy at the margins. Green needlegrass can remain green late into the season.

This midgrass is an important native of the Northern Great Plains, and is found as far south as Arizona. Green needlegrass grows on medium to fine-textured soils in both the True Prairie and the Mixed Prairie. In South Dakota it reaches its greatest importance in the transition zone between the True and Mixed Prairies, and in the wetter portions of the Mixed Prairie. On medium textured soils, green needlegrass grows with western wheatgrass, needleandthread, and blue grama. On finer textured soils, needleandthread drops out, and on even finer soils blue grama decreases leaving green needlegrass and western wheatgrass as dominants.

Green needlegrass is nutritious, palatable, and decreases under grazing use. Awns are not troublesome to livestock as with some other needlegrasses. Green needlegrass is frequently included in seedings of mixed midgrasses, but due partly to its hard seed coat, it may be slow to germinate and become established.

Forbs and Shrubs

Western yarrow

Achillea millefolium

Western yarrow, or milfoil, is a perennial native forb very common to western North America. Plant height is normally about 10 inches, but may reach 30 inches tall. The few to numerous erect stems are capped with a cluster of small flowers which blossom throughout the summer. Leaves are finely dissected, giving them a fern-like appearance. Fine silvery hairs cover leaves and stems, imparting a grayish hue. Numerous, vigorous, rootstalks enable the establishment of dense colonies under favorable conditions. Basal rosettes of leaves may remain green throughout the winter.

Western yarrow is one of the most abundant, characteristic, and widely distributed of several native yarrows. Furthermore, western yarrow is one of the most widely distributed and abundant of all native forbs in the western states. It is found from Manitoba to British Columbia to northern Mexico. Western yarrow occurs on grasslands and shrubby plains to the subalpine zone in many regions, usually occupying rather dry, open sites. In undisturbed areas, yarrow is seldom abundant, becoming most prominent in disturbed areas or overgrazed rangelands as small patches. Western yarrow is found throughout South Dakota, in practically all plant communities, probably more common westward.

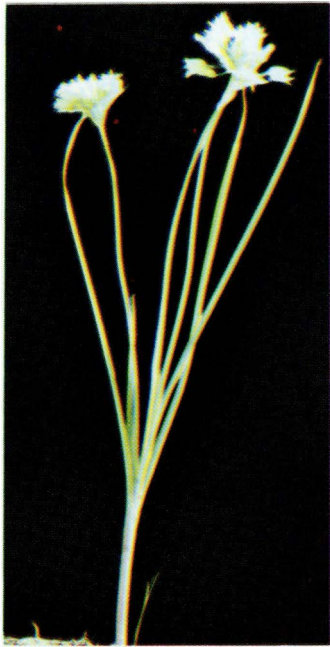
Regionally, the palatability of western yarrow varies considerably. In some localities cattle may graze it moderately throughout the growing season, while sheep may relish the flower heads. When eaten by dairy cattle, western yarrow imparts a disagreeable flavor to milk. Deer reportedly occasionally utilize yarrow, but horses seldom show a preference for it. In South Dakota west-



ern yarrow is generally considered as having little forage value for livestock. Western yarrow or related species are said to have been used by the Greeks to cure wounds, and by the Indians as a mild laxative. Even in recent years yarrow has been on the pharmacist's list of preferred medicinal plants as a stimulant and tonic. Yarrow is one of many plants used as summer and winter bouquets. When cut fresh as a bouquet and kept in water, it flavors the air with an aromatic spiciness.

Wild onion

Allium spp.



Wild onions are well known perennial members of the lily family with about 76 species native to western North America. Stems and leaves arise from underground bulbs. Bulbs have the same appearance as small domestic onions, but may be covered with brown fibers. Leaves are usually long, narrow, tubular, and may be either hollow or solid. Depending on the species, plant height is quite variable, ranging from 2 inches to 40 inches tall. White to purple flowers are borne on leafless stalks in solitary, slightly rounded clusters at the stem tip. At the flower cluster base, 2-3 papery bracts are attached which tightly enfold the flower buds before they open. Onions can be confused with poisonous deathcamas. Crushed bulbs of onions smell like garlic or onion, contrasted to deathcamas bulbs which are nearly odorless. In addition flower clusters have different appearances.

Onions are found throughout North America as well as in many other regions of the world. In western North America they occupy a wide variety of habitats including plains, foothills, meadows, thickets, and woodlands. In the Northern Great Plains onions can form a conspicuous portion of early spring vegetation, greening before most other plants. The photograph shows textile onion, (*A. textile*), a low growing species, which is common in western South Dakota.

This genus furnishes green, succulent herbage in early spring when wild onions are readily grazed by cattle and sheep. Grazing at this time, however, can be detrimental to the more productive associated vegetation, which is just starting to emerge. Lactating dairy cattle grazing onion produce milk having a distasteful flavor.

Western ragweed

Ambrosia psilostachya

Western ragweed is a native, perennial forb 1-2 feet tall. Reproduction is by seed and rhizomes, and because of the latter form of reproduction, plants spread very rapidly when growing conditions are ideal. Small green flowers are produced from June to October. The flower type is unique. Male flowers occur as small clusters on the upper part of flowering stalks, whereas female flowers are near the base of flowering stalks at the point of attachment of the upper leaves. Most leaves are rough-surfaced, and deeply lobed in an irregular pattern.

Principal distribution is on the plains and prairies of midwestern North America, but western ragweed is found throughout much of the continent, inhabiting a variety of soils, becoming abundant in waste places, on crop lands, and sometimes invading poorer native grasslands and tame pastures. It is common in South Dakota, but seldom abundant.

Although generally unpalatable to livestock, cattle may graze it in early spring and late summer. Milk produced when cows graze western ragweed has a bitter taste. Western ragweed is one of few plants that some people can come close to identifying without smelling, touching, or seeing it. This phenomenon is made possible because pollen from western ragweed is a primary hay fever producing agent.



Leadplant

Amorpha canescens



Leadplant, or prairie shoestring, is a native, shrubby, perennial legume that may take the appearance of a large forb when mowed annually or grazed heavily. When not disturbed, the stems are woody and persistent. Normal plant height in its northern range is about 2 feet but may exceed 4 feet farther south. From June to August numerous, tiny, violet-blue flowers, accented with golden-yellow, make leadplant a striking example of prairie beauty. The unique flowers have only a single petal and are compactly arranged on the flower stalk, giving a spike-like appearance. Leaf arrangement is typical of many legumes, having many small leaflets attached on opposite sides of stems. Leaves are covered with dense short hairs, imparting a gray-green appearance. Leadplant is deep-rooted, drawing most of its moisture from depths greater than 4 feet, therefore not competing excessively with associated grasses.

Leadplant is associated almost exclusively with the bluestems (*Andropogon* spp.). Its distribution is within the area bounded by Manitoba, Michigan, Louisiana, New Mexico, and Montana. It can be found throughout South Dakota, but grazing has greatly reduced its primary abundance to better condition ranges in the eastern third and prairie foothills of the Black Hills.

A close relative of leadplant is dwarf indigo (*A. nana*). This smaller plant is less common and is confined largely to the western part of South Dakota. Dwarf indigo is seldom over a foot high and has much greener foliage than leadplant due to the lack of hairiness.

Leadplant is an excellent forage of high nutritive quality and palatability, accounting for decreased abundance with intensive use. In addition to its forage value, this handsome plant is frequently cultivated as an ornamental. Of historical interest, American Indians used the dried leaves for smoking and for tea. In addition, local superstitions have held that leadplant is an indicator of lead ore, but the common name refers to the lead-color of dense leadplant colonies.

Pasqueflower

Anemone patens

Pasqueflower, wild crocus, windflower, or mayflower, is a native, perennial forb 4-6 inches tall. The tulip-like flowers are 1-1½ inches across and vary in color from white to purple. Leaves are silky, mostly basal, and dissected into narrow linear divisions. As the seeds ripen, attached appendages persist becoming long and feathery. Stems elongate after flowers blossom.

Pasqueflower ranges from Alaska south to Utah and Texas, northeast to Illinois and Wisconsin and westward to Alberta. In South Dakota, pasqueflower is found on grassy hillsides across the State, as well as in wooded areas.

This plains beauty, the State Flower of South Dakota "... elected queen of flower land by the legislature of South Dakota, need never fear to stand in any flower company, however distinguished, however beautiful, however charming . . ." Soon after the snow melts, pasqueflower charms the prairies with large downy buds, then hardy, short-lived blossoms.

Pasqueflower palatability is fair but because it produces very little forage and dries by midsummer, it is unimportant for grazing. Pasqueflower has been suspected of being poisonous to livestock and apparently has caused mechanical blockage in the digestive tracts of sheep. The Indians used crushed leaves of pasqueflower as a counter-irritant for treatment of rheumatism and other painful ailments.



Field pussytoes
Antennaria neglecta



Field pussytoes or field catsfoot is a native, perennial forb that spreads by stolons and seed. Nearly oval, woolly leaves form a nearly prostrate rosette. Leaves are gray-green above, and silvery beneath. The most conspicuous features are the rounded flower clusters which are produced on erect slender stems with a few narrow leaves and the mat-forming basal rosettes of leaves. As the nearly white flowers develop in early spring, the clusters appear as little furry balls, giving rise to the common names. Male and female flower clusters are similar in appearance and occur on different plants.

Field pussytoes grows commonly in southeastern Canada and the northeastern United States, but extends westward at least as far as Kansas and Montana. Many additional *Antennaria* species occur in North America as far north as Hudson Bay and others south to Louisiana. In South Dakota alone, at least eight different, but similar appearing pussytoes have been reported. In the State, field pussytoes is most abundant in the eastern third, but it also occurs near the Black Hills. This delicate forb, and close relatives, are natural components of relatively moist hillside vegetation in the bluestem and Mixed Grass Prairie. Because of vigorous stolon development, they frequently form large patches.

Except that flower heads are sometimes eaten by sheep, pussytoes are rather worthless as forage. On ranges that have been seriously depleted by overgrazing, pussytoes is likely to increase in abundance.

Intermediate pricklepoppy

Argemone polyanthemus

Intermediate pricklepoppy, or simply prickly poppy, is an attractive, native, annual with a deep taproot and stout, upright prickly stems, 2 feet tall or more. From June to August this striking beauty presents large, white, flowers with golden centers. This plant is unusual in that its stems contain yellow sap. Leaves clasp the stems and are spiny-toothed on the margin.

Distribution of intermediate pricklepoppy is from South Dakota to Colorado, Texas, New Mexico, northern Mexico, Arizona, and Wyoming. It has been introduced and naturalized elsewhere in the country. Occurrence is on deserts, mesas, foothills, and woodlands. In South Dakota intermediate pricklepoppy is confined to hillsides and plains west of the Missouri River.

Although seldom abundant, it can be an indicator of overgrazing. This forb is almost never grazed due to spines. Ingestion of large amounts of seed by most animals would prove toxic. Birds, however are known to feed on the seeds without ill effects. The prickles are highly irritating to the skin of some people.



Green Sagewort
Wormwood sagewort
Artemisia campestris
Falsetarragon sagewort
Artemisia dracunculoides



Wormwood sagewort and falsetarragon sagewort are collectively called green sagewort. These two and a few other closely related species are native, perennial, or infrequently, biennial forbs which often take on a small shrubby appearance. The few to several closely grouped stems normally reach heights of 20-40 inches. The plants, generally scattered, are conspicuous because of size and deep green color. Numerous, summer flowering, inconspicuous, yellow blossoms are borne in cup-shape groups along upper ends of the stems. Previous season's growth turns gray and may remain standing during the following green period.

Wormwood sagewort and falsetarragon sagewort are both well represented in South Dakota and can be distinguished on the basis of leaf form. Leaves of wormwood sagewort are small, deeply dissected 2-3 times, with the lobes narrowly linear (see photograph). Leaves of falsetarragon sagewort are narrowly or broadly linear with a few of the basal ones sometimes shallowly lobed.

Various species of green sageworts are found on the plains and prairies throughout North and Central America. Wormwood sagewort is distributed northward, occurring in the southern Canadian provinces and northern states. False tarragon sagewort is found from Manitoba to British Columbia, south to Texas. In South Dakota both are found throughout, particularly in upland grasslands. In all likelihood, both were components of the original True and Mixed Prairie.

Throughout the Great Plains, the occurrence of the green sageworts is normally scattered, increasing with deteriorating range condition. In the Great Plains the green sageworts are considered practically worthless as forage. In other regions, however, this is not necessarily true. For example, in parts of Idaho and Utah, some species of the green sageworts are highly valued as sheep forage with palatability considered fairly good.

Silver sagebrush

Artemisia cana

Silver sagebrush, also known as gray, hoary, and white sage(brush), is an erect, native shrub normally 3-5 feet tall. Silver sagebrush is grayish-hued, with linear, single leaves, $\frac{3}{4}$ - $3\frac{1}{4}$ inches long and up to $\frac{7}{8}$ inch wide (see sketch). Inconspicuous flowers appear in September with seeds ripening in October to November. Plants often spread by root sprouting and underground stems, particularly after mowing or fire. Confusion with other large sagebrushes can be avoided by careful observation of the various leaf forms.

Habitats of silver sagebrush are deep loam to sandy soils of river valley terraces and uplands from southern Alberta and Saskatchewan through Montana and Wyoming into northern Colorado as well as in the western portions of the Dakotas and Nebraska. From this primary range, silver sagebrush is scattered west and south to Oregon, California, and New Mexico. Plant associates commonly include other sagebrushes, yarrow, rabbitbrush, blue grama, buffalograss, prairie junegrass, needlegrasses, and wheatgrasses.

Although silver sagebrush is generally of little value for summer grazing, it furnishes good to excellent browse in fall and winter for all classes of livestock and game animals, especially in parts of Montana, Wyoming, and Utah. Silver sagebrush is perhaps the best of the sagebrushes for forage, being particularly useful when snow cover is deep. In South Dakota, silver sagebrush increases with cattle grazing and decreases with sheep grazing.

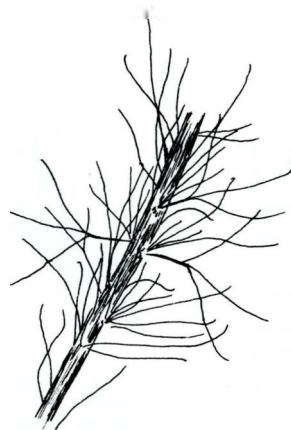


Silver sagebrush showing branch tip and leaf form. (Actual length of plant part shown is 2 3/4 inches.)



Sand sagebrush

Artemisia filifolia



Sand sagebrush stem showing fine, thin leaves. (Actual length of plant portion shown is 3 inches.)

Sand sagebrush, sometimes called threadleaf sagebrush, is a native, deciduous, erect, shrub, 16-26 inches high and 1-2 feet wide. This shrub is fine stemmed, fine leaved, and light green in color. Sometimes the thread-like leaves are deeply three-parted (see sketch). The late appearing flowers are small, numerous, and crowded into narrow, leafy, panicles.

Distribution of sand sagebrush is from South Dakota, to Nevada, Texas, Arizona, and Mexico. It is confined to sands and sandy soils, and in South Dakota is found primarily in the southern and southwestern part of the State, frequently occupying extensive acreages in conjunction with a grassy understory.

Sand sagebrush is well adapted to sands because of its extensive root system. In South Dakota it is not particularly palatable to livestock, thereby increasing with grazing pressure. Elsewhere, particularly in southern Utah, this small shrub is one of the good local forage plants.

Fringed sagewort

Artemisia frigida

Fringed sagewort, pasture sagebrush, or wormwood, is a perennial native forb having the characteristic sage smell of this genus. Most of the many divided, soft, silky-gray leaves are clustered near the ground, around erect fruiting stems 4-24 inches tall. Reproduction is by seed as well as by the spreading woody root-stalks.

Distribution of fringed sagewort is extremely wide, ranging from Mexico throughout the western states and Canada, into Alaska, and across parts of Asia into northern Europe. It is found on dry plains and hills in association with a wide variety of plant communities. In South Dakota and other portions of the Northern Great Plains, it reaches its greatest abundance on mixed and short grass plains, probably favoring lighter dry, porous soils. It is resistant to drought and overgrazing.

Forage value of fringed sagewort ranges from poor to good, with differences in palatability related in part to geography. In the Southwest it is frequently regarded as one of the best native forage species for sheep and cattle. In parts of Wyoming it is valuable as elk feed. In the Northern Great Plains it is seldom grazed by cattle, but furnishes fair to good forage for sheep from late fall through early spring. Fringed sagewort frequently increases rapidly with overgrazing under certain climatic conditions. In the Northern Great Plains, ranges seriously overstocked for several years may become dominated by this sage. Fringed sagewort is often extremely abundant on old fields a few years after abandonment.



Cudweed sagewort

Artemisia ludoviciana



Cudweed sagewort is a herbaceous, perennial, native forb. Several closely related species also occur, but their similarity enables them to be grouped together in name and general description. As with most of the common plants in the genus, *Artemisia*, cudweed sagewort is aromatic and gray colored due to its fine silky hairs. Reproduction is by seed and creeping root stalks. Few to many stems may be clustered, frequently among thick stands of grass. Leaves are linear, but may be slightly to deeply three-lobed. Erect, flowering stalks 12-30 inches tall may be freely branched.

Cudweed sagewort is a very common component of the foothills, plains, and prairies of western North America from Mexico to the prairie provinces of Canada. It grows best on rocky, sandy, or gravelly loam soils as a frequent associate of big sagebrush, fringed sagewort, needlegrasses, blue grama, muhly grass, and wheatgrasses, as well as some low elevation forests. It is present throughout South Dakota, but rare in the eastern part. Cudweed sagewort is seldom abundant, but it is most common on deteriorated ranges in drainageways.

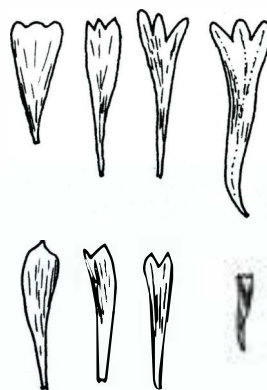
Palatability of cudweed sagewort is variable, in general decreasing from south to north. In New Mexico, its rating ranges from fair to good for sheep, fair for cattle, and poor for deer and elk. In the Northern Great Plains and adjacent mountains, the palatability of cudweed sagewort is worthless to fair for sheep, poor for cattle, and somewhat palatable to elk and deer. Some Indians of North America used cudweed sagewort for medicinal purposes and religious ceremonies.

Big sagebrush
Artemisia tridentata

Big sagebrush is a stout, native shrub, normally 3-5 feet tall, although it may be as low as 8 inches and as tall as 10 feet. Gray-green leaves are $\frac{3}{4}$ inches long, and mostly three-lobed at the leaf tips (see sketch). As with sand sagebrush and silver sagebrush, numerous, inconspicuous, flowers appear in late summer.

Distribution and abundance of big sagebrush is probably the greatest of all woody plants in this genus. Its primary range is in the Great Basin, but big sagebrush is found in all 11 far western states as well as in the Dakotas and Nebraska. In South Dakota, big sagebrush is confined primarily to the extreme western portion on the valley floors and upland plains. Isolated patches are found along the Missouri River. South of the Black Hills, big sagebrush grows to 3 feet tall, but north in Butte and Harding counties, it is seldom over 18 inches tall. This lower growing form is considered a variety of its big brother.

Although lack of abundance of big sagebrush in South Dakota limits its value as forage, this shrub is of considerable importance on many western ranges. In much of the West, particularly farther south, during fall, winter, and early spring, cattle and sheep regularly browse big sagebrush, whereas horses eat it to a limited extent. Nutritive value is frequently exceptionally high, but because of bitter resins it is often low in palatability. Some upland native birds, particularly sage grouse, and many large game animals, noticeably antelope, depend heavily on big sagebrush forage. Moose, mule deer, and elk also make much use of big sagebrush. Since the advent of livestock, sagebrush densities have increased with the more palatable associated plants waning in abundance. Such changes have precipitated extensive sagebrush control projects that have been criticized by many for possible adverse affects on wildlife.



Big sagebrush leaves depicting variation in shape and size. (Actual leaf lengths shown range from $\frac{3}{8}$ to 1 inch.)



Big sagebrush has the bitter-aromatic "sage" smell associated with many sagebrushes. This shrub, the State Flower of Nevada, has been important to the Indians as medicine, a source of yellow dye, and fuel for fire. Early settlers in the West recognized the value of healthy growing big sagebrush as an indicator of select farmland.

Milkweed

Asclepias spp.



Low milkweed

Asclepias pumila



Showy milkweed

Asclepias speciosa

At least 40 species of milkweed occur naturally in the western United States and Canada. They are perennial, summer or fall blooming herbs that usually contain milky juices. Stems are more or less erect with opposite or whorled leaf arrangements. Flowers are clustered, and have two, five-parted whorls of petals. The inner whorl projects upward and the outer whorl recurves downward. The fruit is an elongated pod filled with numerous seeds, each having a tuft of long silky hairs.

Milkweeds may be divided into two broad, rather distinct groups. One is the narrow-leaved milkweeds having linear or narrowly linear leaves. In South Dakota two species well represent this group. They are whorled milkweed (*Asclepias verticillata*) found throughout the State and low milkweed, (*A. pumila*), (see photograph) confined mostly to the western part. The appearance of these two is very similar, differing

mainly in size, with whorled milkweed 12-30 inches tall, and low milkweed 4-10 inches tall and looking somewhat like a pine tree seeding. Both are common in dry meadows, pastures, and waste places, frequently forming colonies.

The second group is the broad-leaved milkweeds. These usually have leaves at least 1½ inches wide throughout much of their length. In South Dakota this group is well represented by several similar species including common milkweed, *Asclepias syriaca*, and showy milkweed, *A. speciosa*, (see photograph). Common milkweed is seen on prairies, along fence rows, waste lands, and cultivated fields. It is often a serious crop pest. Showy milkweed is more common to lowlands and ditch banks or other moist areas.

Green milkweed (*Asclepias viridiflora*), another

broad-leaf type, is common to upland prairies and plains of South Dakota. Broad leaves of green milkweed are crinkly and pointed as shown in the photograph. Green milkweed becomes most abundant on dry sandy soils where overgrazing has weakened the grasses. It is apparently unpalatable to cattle, but seldom abundant enough to be of much concern.

Many, and perhaps all, milkweeds are capable of producing poisonous symptoms and even death in grazing animals. Such plants are seldom a problem, however, because all species are distasteful to livestock. Death has resulted from feeding hay infested with whorled milkweed when the livestock were poorly nourished and hungry. Sheep have been killed by eating 1-3 ounces of green leaves of the more toxic species. Although milkweeds are poisonous, they have been used as medicines for centuries.



Green milkweed
Asclepias viridiflora

Many-flowered aster

Aster ericoides



Many-flowered aster, or heath aster, is a native, herbaceous, perennial forb. It can be represented by a single nearly prostrate stem or it may take on a bush-like appearance up to 18 inches across and 12-20 inches high. Linear leaves and stems may become practically obscured by a multitude of flowers in late summer, thus the common name. The generic name, *Aster*, means star and refers to the flowers which have radiating white petals.

Many-flowered aster is found in most states and provinces east of the Rocky Mountains and south into

Mexico. It is most common in the True Prairie and in the transition to the Mixed Prairie, but is seldom abundant except in overgrazed conditions. Its increase on poor condition ranges is partly due to prolific seed production, extensive rhizome development, and fairly low palatability. Once established, eradication is difficult. Many-flowered aster does have fair palatability for livestock when green, but is poor when mature. In prairie hay, many-flowered aster is totally unpalatable to all livestock.

This extensive genus of the pea family has some 2,000 species with nearly 550 occurring in North America. The diverse species of this typically western genus are chiefly perennial herbs, having erect or prostrate stems, with leaves and blossoms resembling those of sweet peas. Positive identification of species relies heavily on the appearance of mature pods which differ greatly in shape and structure.

Economically, *Astragalus* (and its close relative, *Oxytropis*) is among the most important of the legumes, both positively and negatively. Positively because legumes fix soil nitrogen for associated plant use, and some are highly palatable and abundant enough to rank as important forage plants. Negatively because some species of *Astragalus* cause locoism (a type of livestock poisoning), while others can cause selenium poisoning.

Common names have been suggested for different species of *Astragalus* and *Oxytropis*. These names are useful because they group the species by genera and tell whether the species are non-poisonous, loco causers, or selenium poisoners. The common names used here are defined and discussed below.

MILKVETCH is the name used for those species of the genus, *Astragalus*, which are nonpoisonous and frequently furnish good forage. South Dakota examples include groundplum milkvetch (*A. crassicaarpus*) and tufted milkvetch (*A. spatulatus*).

POISONVETCH is used to name those species of *Astragalus* which accumulate selenium from the soils and can cause livestock poisoning. In South Dakota the most common selenium accumulators of this genus are twogrooved poisonvetch. (*A. bisulcatus*) and racemed poisonvetch (*A. racemosus*).

LOCOWEED is the best known common name of the genus, *Astragalus*, and should be reserved for plants of this genus that can cause locoism. Woolly locoweed (*A. mollissimus*) is perhaps the best example in South Dakota, although its abundance is limited. No photograph is shown for woolly locoweed, but its similarity to lambert crazyweed is discussed later under *Oxytropis lambertii*.

Locoweed, Milkvetch, and Poisonvetch

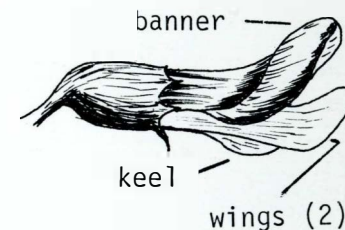
Astragalus spp.

POINTVETCH is used to name plants of the genus, *Oxytropis*, not known to be poisonous. If any of this group occur in South Dakota, their abundance and distribution is not great and none are shown in this publication.

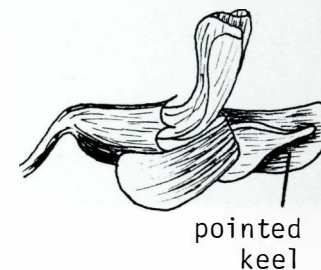
CRAZYWEED is the other name used for plants of the genus, *Oxytropis*. The crazyweeds are known to be able to produce locoism, with symptoms the same as for those produced by locoweeds. Examples in South Dakota include lambert crazyweed (*O. lambertii*) and white point crazyweed (*O. sericea*), both of which are described later.

Identification and separation of the many milkvetches, poisonvetches, locoweeds, pointvetches, and crazyweeds is difficult even for trained botanists. The genus, *Astragalus*, (milkvetches, poisonvetches, and locoweeds) can be separated by flower differences from *Oxytropis* (pointvetches and crazyweeds). In species of *Oxytropis* the keel (lowermost petal) is prolonged into a distinct point. The keel petal of *Astragalus* is blunt. These differences are illustrated in the accompanying sketch. In addition, in South Dakota most species of *Astragalus* have leafy stems while species of *Oxytropis* have leaves crowded on stem tips.

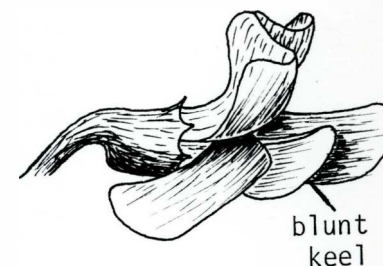
For field determination, milkvetches and pointvetches can frequently be separated from the other three, because these two are often readily grazed and provide good forage; the others are not normally eaten when other forage is available. Poisonvetch can be separated from locoweeds and crazyweeds by differences in poisoning symptoms between the groups. Admittedly, observing affected livestock to identify poisonous plants is an unenlightened and costly approach, but the technique is successful.



TYPICAL PEA FAMILY BLOSSOM



Oxytropis



Astragalus

Twogrooved poisonvetch

Astragalus bisulcatus



Twogrooved poisonvetch, less properly called twogrooved loco, is a large, perennial, native forb of the pea family. Recognition is fairly easy because of its size, with flowering stems at least a foot tall and sometimes exceeding 2 feet. A single plant may be a foot across at the base. A reliable identifying feature consists of the seed pods which have two, nearly parallel and raised ribs running the length of each pod. In addition, twogrooved poisonvetch is often found in association with prince's plume and racemed poisonvetch. Particularly on humid days, plants such as twogrooved poisonvetch which accumulate selenium, have a pungent odor characteristic of selenium and resembling that of urine or old mice nests.

Twogrooved poisonvetch is found on soils high in selenium. It occurs on plains, hills, and valleys from

Manitoba to Oklahoma and New Mexico, north to Idaho and Alberta. In South Dakota twogrooved poisonvetch is confined to the prairie and foothills in the western part on soils that are high in selenium.

Not only is twogrooved poisonvetch an indicator of seleniferous soils, but as mentioned it also accumulates selenium in the plant parts. On most South Dakota ranges, twogrooved poisonvetch is not readily grazed, therefore seldom affecting grazing animals. When they must eat twogrooved poisonvetch, livestock may suffer or die. By contrast, this plant is sometimes grazed by preference in Montana and elsewhere without noticeable harm to livestock. Poisoning is produced by single massive doses. Symptoms appear rapidly, are variable, and may include blindness, wandering, excitement, and depression. Animals may lapse into a coma before respiratory failure and death.

Groundplum milkvetch

Astragalus crassicaarpus



Groundplum milkvetch, or buffalo bean, is a native, perennial, herbaceous plant of the pea or legume family. It is easily characterized by large fleshy fruits which closely resemble a small plum. Upon maturity, the fruit surface exposed to the sun becomes purple while the surface next to the ground remains green. Each fruit contains numerous seeds and is divided by a cell wall. Purple to violet flowers blossom in May or June in South Dakota, and April-May farther south. Branches are prostrate, rarely exceeding 8 inches in length but may cover an area over 2 feet in diameter because of root-stalk branching well beneath the soil surface.

Groundplum milkvetch is found throughout the Great Plains from Manitoba to Missouri, Texas to Montana. Throughout South Dakota, occupancy is on upland soils. It is freely grazed by livestock and decreases in abundance with increased grazing pressure. Groundplum milkvetch is not poisonous and its abundance has been greatly reduced since the introduction of livestock.

Racemed poisonvetch

Astragalus racemosus



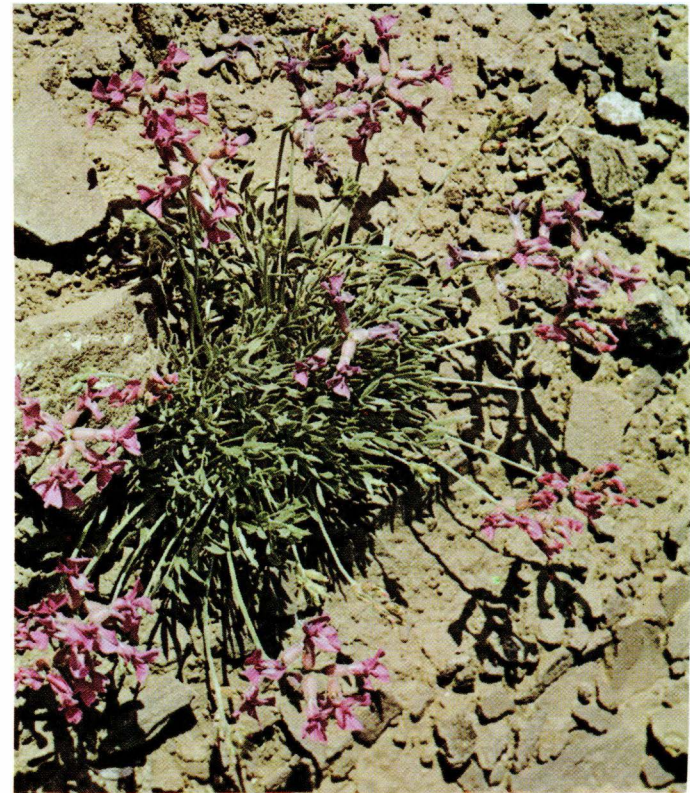
Racemed poisonvetch, improperly called racemed loco, is a large, perennial, native forb of the pea family. Its flowering stalks are 1-2 feet tall or taller. Plants are not generally quite as robust as its associate, twogrooved poisonvetch. The unpleasant order described for twogrooved milkvetch is characteristic of both plants. A second commonly associated plant is prince's plume.

Distribution in South Dakota is similar to twogrooved poisonvetch. Its range elsewhere is bounded by Alberta, North Dakota, Texas, New Mexico, Utah, and Montana, with a report of its occurrence in Minnesota.

This attractive beauty is potentially just as dangerous as twogrooved poisonvetch with symptoms of selenium poisoning being the same. It too is an indicator of selenium soils.

Tufted milkvetch

Astragalus spatulatus



Tufted milkvetch is a perennial, native, herb of the pea family. It is one of the smaller milkvetches. Tufted milkvetch is stemless, with violet to purple flowers on stalks well above the nearly prostrate leaves. Distribution of tufted milkvetch lies within the area bounded by Saskatchewan, Nebraska, Colorado, Utah, and Montana. It is an occupant of dry hills and plains, with distribution in South Dakota limited to the hillsides in the western part. Lack of abundance makes this milkvetch relatively unimportant as a forage, but an attractive early spring plains flower.

Nuttall saltbush

Atriplex nuttallii



Nuttall saltbush is a native, perennial, shrub normally growing 1-3 feet tall, but nearly prostrate when closely grazed. A second closely related and similar appearing plant of the same genus, fourwing saltbush (*A. canescens*), is easily confused with nuttall saltbush. Both are gray-green colored, prolific seed producers, and have light colored woody, brittle, branches. Seeds of nuttall saltbush are "warty" in appearance, while those of fourwing saltbush are four-winged with rounded wings that are papery, thin, and net-veined.

Saltbushes are found in many semiarid and arid regions of the West; regionally, either may form extensive, almost pure communities. In South Dakota, however, they are generally scattered in association with mixed prairie vegetation. Both are found west of the

Missouri River in the Badlands, on upland clay to sandy soils, and on lowland alkali or saline soils where greasewood may also be present. Major abundance is along the western edge of the State. They exist most commonly as scattered individuals in communities of western wheatgrass and Montana wheatgrass. Nuttall saltbush is by far more abundant than fourwing saltbush in South Dakota. Abundance and distribution in the State have been greatly restricted by livestock grazing, particularly sheep use.

Throughout the West, the saltbush group is an important livestock browse, with leaves, seeds, and sometimes stems eaten with relish by all livestock classes. The nutritive value of the group is high, even into the winter months, largely because of evergreen habit.

Mariposa lily

Calochortus gunnisonii



Mariposa lily, or segolily, is an early blooming, native, perennial, forb about 4-15 inches tall. Its appearance is unique, almost never being confused with other plants when in blossom. Prior to blossoming, however, it can be mistaken for poisonous deathcamas. Distinction is made by examining cross sections of leaves. In mariposa lily leaf cross sections are U-shaped and in deathcamas they are V-shaped. The two plants are similar underground as well, with both having an onion-shaped bulb.

Some 40-50 species of mariposa occur as natives in the western United States, Canada, and Mexico. They range from dry, open prairies, through foothills, and into alpine woods and meadows. In South Dakota they are found west of the Missouri River, never extremely abundant, but present on dry hillsides and in the Black Hills. The photographed specimen is *C. gunnisonii* and is one of two species in South Dakota. Both are similar in appearance.

Mariposa lilies flower in spring, then become dry and unpalatable early. As a rule, when green, they have good palatability for sheep and fair for cattle. Their lack of abundance in South Dakota makes them relatively unimportant as forage. However, as a spring flower of much beauty, and a plant of historic value, they are noteworthy. In the middle 1800's when members of the Mormon church were faced with famine in Utah, corms (enlarged underground stembase) of the mariposa lily provided valuable food. Because of their usefulness and charm, one of the mariposa lilies (*C. nuttallii*) was named the State Flower of Utah. Many mariposa lilies are used as ornamentals.

Downy paintbush

Castilleja sessiliflora

Downy paintbrush, or yellow indian paintbrush, is a soft, perennial, native forb 4-12 inches high. This striking June flowering plant abounds with yellow color. The color itself, however, is not from the petals but rather from bracts (leaf-like appendages) that cluster around the flowers. Distribution is on dry hills and plains within the area bounded by Manitoba, Illinois, Missouri, Texas, Arizona, and Saskatchewan. Downy paintbrush is found throughout South Dakota on plains and prairies, occurring most commonly on rocky hillsides.

Throughout the West, perhaps 50 species of paintbrush exist, many having bracts tinged with scarlet or crimson. One scarlet colored species is the State Flower of Wyoming. Many paintbrushes are partially parasitic, taking some of their nutrients from roots of other plants. With few exceptions the paintbrushes are rather poor forage, but locally some provide substantial amounts of feed for sheep, deer, and elk. The common name, paintbrush, is appropriate as these plants do look as though they have been dipped in a bucket of paint.



Hairy goldaster

Chrysopsis villosa



Hairy goldaster is a native, perennial forb 5-24 inches high with few to several rather erect stems arising from a woody crown. Stems and leaves are covered with short, soft or coarse, hairs which give the plant a gray-green appearance. Leaves are alternately arranged. Flower heads are typical of the aster family and have golden-yellow petals. Seeds are soft hairy tipped giving a broom appearance to seed heads or to seeds themselves.

Hairy goldaster is found westward to the coast from Manitoba and southward to Texas and California. Hairy goldaster characterizes the appearance of plants in this rather small genus and has about as broad a distribution as any of them. It is drought resistant with normal occurrence on dry, sandy or rocky soils of plains and prairies. In South Dakota it is found on dry soils throughout, but probably is more abundant to the West.

Leaves and stems are rather stiff and harsh making it low in palatability. It is usually practically worthless as forage, but on desert ranges it has fair palatability for sheep.

Rubber rabbitbrush
Chrysothamnus nauseosus

Rabbitbrushes are native shrubs normally 1-2 feet tall but occasionally up to 4 feet. Dark green, linear, leaves and abundant autumn blooming, yellow flowers generally make rabbitbrushes easy to identify. In many areas, including South Dakota, rabbitbrush may be confused with broom snakeweeds. They differ in that broom snakeweed dies completely back to the ground each year, while rabbitbrush does not. In addition, stems of broom snakeweed do not branch freely while those of rubber rabbitbrush do. Stems of rubber rabbitbrush are whitish due to a dense covering of fine hairs. Also, a "nauseous" odor arises from rubber rabbitbrush.

At least 70 species of rabbitbrush occur in North America with most confined to the West. The northern limit of this genus is southwestern Canada and the southern limit is lower California. In South Dakota, the rabbitbrushes are confined to the western part where they are associated with wheatgrasses, sagebrushes, and greasewood. They grow especially well on dry soils and will tolerate soils having moderate amounts of alkali.

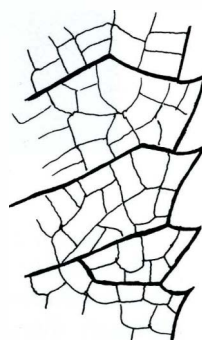


In South Dakota, and elsewhere, dense stands of rubber rabbitbrush are an indicator of abusive land use. Most rabbitbrushes rate from no to low palatability, although sheep occasionally crop the foliage. Rabbitbrushes are eaten by antelope, jackrabbits, mountain sheep, mule deer and elk.

Rubber rabbitbrush and other rabbitbrushes have been used by various Indian tribes as chewing gum (made from pulverizing the wood and bark), for yellow dye, for tea, and for coughs and chest pains. In recent years, rubber has been extracted to determine feasibility as a commercial source.

Waterhemlock

Cicuta maculata



Waterhemlock showing small portion of leaf edge with veins ending in notches along the edge. (Actual length of leaf part shown is 3/8 inch.)

Waterhemlock, also known as spotted waterhemlock, is a native, perennial herb 2-6 feet tall. Although the general appearance is striking because of size, positive identification is difficult. Of the plants growing in South Dakota with which water hemlock can be easily confused, no others have netted veins in the leaves which terminate in the V-shaped notches of the saw-

toothed leaf edges (see sketch). Root stalks have segmented compartments, but it is inadvisable to examine rootstalks because they are highly poisonous. The tiny, five-petaled, white flowers appear from June to July in umbrella-shaped groups.

There are eight waterhemlocks listed in reference literature, with three known to occur in South Dakota. All are extremely poisonous. Waterhemlock and poisonhemlock are the two most poisonous genera in North America. Waterhemlocks grow in marshy meadows and pastures and along wet margins of streams and ditches. They are found throughout South Dakota.

All animals, including humans, can be poisoned by waterhemlock. Roots and seeds appear to be most dangerous. Feeding trials show that mature leaves and stems are not poisonous to livestock. People have been killed by eating waterhemlock roots that were mistaken for wild parsnips. Even a small piece of waterhemlock root can cause fatal poisoning in less than an hour.

Symptoms of waterhemlock poisoning in man include nausea, pupil dilation, laborious breathing and perhaps vomiting, diarrhea, frothing at the mouth, and violent convulsions. In cattle, mouth frothing is followed by violent convulsions and rigidly extended legs. Heads may be thrown back, accompanied with bellows or groans. There is no known effective treatment for poisoning as the toxic substances act so rapidly that affected animals can seldom be saved.

Although waterhemlock is extremely poisonous, livestock seldom graze it, and thus are not normally affected. Poisoning is most likely to occur when cattle chew roots that have been exposed by plowing, trampling, or water erosion. Under ordinary conditions, stock may graze without loss in areas where waterhemlock is abundant. Control of this plant is desirable and can be successful if weed sprays are used when the plants are growing rapidly. Grubbing by hand and burning piled plants is also effective.

Wavyleaf thistle

Cirsium undulatum

Wavyleaf thistle is a native, biennial forb. Plants may occur singly or in small colonies. In the first year of growth a basal rosette of leaves develops. A conspicuous flowering stalk, 1-3 feet high, and tipped with large, purple flower heads, forms in the second year. Rarely more than 2-3 heads occur per plant. Largest leaves remain near the ground in a rosette. Wavy margined leaves are tipped with numerous rather long spines. A dense hairy covering gives them a grayish-green appearance.

Wavyleaf thistle is a common component of the prairie provinces of Canada, and south to Texas. It is most common, but seldom abundant, on upland mixed and short-grass prairies, particularly those deteriorated by drought or overgrazing. This thistle, as with most thistles found in South Dakota and elsewhere, is practically worthless as forage and is considered an invader. The seed heads of some thistles, including wavyleaf thistle, are frequently eaten by horses, even when an abundance of other forage is available.



Bee spiderflower

Cleome serrulata



Bee spiderflower is also commonly known as bee-plant and stinkflower. This native, much-branched, annual, grows 2-7 feet tall with pink to white flowers appearing from July to the end of summer. Leaves are three-parted giving the appearance of three leaves attached at the same point. Bee spiderflower looks similar to and can be confused with roughseed clammyweed (described later) which differs in having erect seed pods and sticky leaves. In addition, bee spiderflower has a distinctive disagreeable smell.

Bee spiderflower is distributed from Saskatchewan, south to Kansas, New Mexico, California, and north to Washington. It is present on sandy soils throughout South Dakota. Plants frequent dry, sandy, situations along drainages and in waste places, often abundant, but more commonly occurring as scattered plants.

Bees frequent the nectar-rich blossoms of bee spiderflower. The common name alludes to this practice and to the spider-leg appearance of some blossom parts. Indians made use of this plant by eating boiled leaves and flowers. This showy and long-blooming plant is a common garden ornamental.

Poisonhemlock

Conium maculatum



Poisonhemlock is an introduced biennial (sometimes perennial) forb of the parsley family. Plant height is 2-8 feet. Large leaves are composed of many small leaflets. Small white flowers which appear from June to July are grouped in an umbrella-like manner. Because of finely dissected leaves (see photograph) poisonhemlock can be recognized more easily than waterhemlock. In addition, the rather smooth, pale green, hollow stems of poisonhemlock are purple spotted.

Unlike waterhemlock, poisonhemlock prefers drier sites, or wet sites that tend to be dry during part of the summer. It grows on rich soils in neglected areas, along roadsides, fence lines, gardens, and ditchbanks. In South Dakota poisonhemlock is found primarily in the eastern part, but occurrence is throughout the State. Distribution in North America is from coast to coast.

Poisonhemlock has a disagreeable odor and taste, and is not normally eaten by livestock except under drought conditions. All plant parts are poisonous, and are especially dangerous in early spring when the poison seems to be concentrated in the young leaves. Symptoms of poisoning differ from those of waterhemlock in that pain is not apparent. Early symptoms include grad-



ual muscular weakening and numbness, impaired sight, and lung paralysis. Thus, when the Athenians put Socrates to death by giving him a cup of extract from poisonhemlock he died quietly and painlessly.

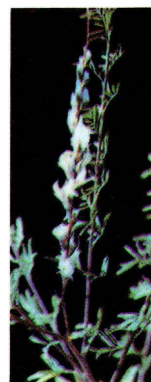
Identification and eradication of poisonhemlock is desirable for animal and human safety. Chemical weed control measures are successful.

Miner's candle

Cryptantha bradburiana



Miner's candle is a biennial, native forb having a stiff, hairy stem 4-12 inches tall, usually branching only near the top to form a narrow oblong flower cluster. The entire plant takes on a gray and rough appearance because of numerous coarse hairs. This white flowering erect herb is one of the conspicuous early spring flowers of dry hillsides. Distribution is from the Central and Northern Great Plains and westward, possibly as far as Idaho. In South Dakota it is found, perhaps exclusively, west of the Missouri River. It is not abundant enough to be of importance as range forage, and it is questionable if livestock graze it.



Bigtop dalea or plume dalea is a perennial, native legume 12-40 inches tall. The slender, reddish stem branches above the middle terminating with thin, loose-flowering spikes that give a plume-like effect from June to August. Leaves are small, with 5-11 linear leaflets per leaf. The woody taproot is bright yellow when buried, becoming orange shortly after exposure to the sun.

Bigtop dalea is found within the area bounded by North Dakota, Iowa, Missouri, Texas, and Colorado. In South Dakota it is most common to the upland plains and prairies of the central portion where it prefers ridge tops and hillsides.

Forage quality of this summer flowering prairie beauty is rated as good. With prolonged overgrazing, bigtop dalea abundance declines.

Bigtop dalea

Dalea enneandra



Plains larkspur
Delphinium virescens

Plains larkspur is a native, perennial, erect forb 16-36 inches tall. One to several stems arise from a single plant. Leaves are divided into many slender lobes. Late May-July flowers are white to pale blue and often have dark spots on the sepals. Flower shape is a distinctive characteristic of larkspurs; one of five sepals protrudes backward in a "spur" fashion. Plains larkspur is widely distributed in open prairies from Manitoba to Texas and Colorado. In South Dakota it is the most common larkspur with increasing abundance eastward.

Larkspur are divided into two groups based on plant height. Plains larkspur is representative of the tall type, while low larkspur (*D. bicolor*), which is 8-20 inches tall, characterizes the low type. Low larkspur is also in South Dakota, but distribution in the State is confined to the Black Hills and adjacent foothills. Overall shape is similar to that of plains larkspur, but the spring appearing flowers of low larkspur are dark blue to purple, with the inner portion white to yellow and blue veined, hence the name **bicolor**, or two colors.

As a group, larkspurs are second only to the locoweeds in causing livestock losses in the western United States. In the Midwest, including South Dakota, and eastward, only occasional losses have been reported. Different species are not uniformly toxic nor is identification easy, therefore all are considered potentially dangerous. Some species are known to be extremely poisonous to cattle. A 1,000-pound animal may die from larkspur poisoning within an hour after consuming 5 pounds of young larkspur. Poisoning symptoms for cattle include staggering, nausea, excessive salivation, frequent swallowing, quivering, bloating, and paralysis of respiratory centers. Sheep and horses are not extremely susceptible to larkspur poisoning and in most instances can safely graze larkspur infested ranges. In fact, intensive use of larkspur by sheep has been recommended to reduce abundance of the plant, thereby decreasing the danger for cattle. Toxicity decreases with plant maturity except for seeds which remain poisonous. Chemical sprays and grubbing are effective means of control.



Black sampson
Echinacea angustifolia



Black sampson or purple coneflower is a native, warm season perennial forb growing to heights of 1-2½ feet from a large taproot. Long lance-shaped leaves are mostly clustered at the base. Seed heads are on 2-5 stems extended 6-10 inches above the leaves. Both leaves and stems are covered with short stiff hairs. This showy plant has light purple petals during July and August. After petals fall, the black central cone of the flower remains conspicuous.

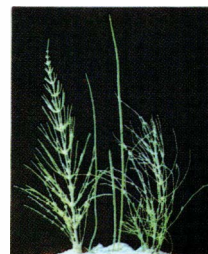
Black sampson is found in the prairies of Saskatchewan and Manitoba, and south to Texas. It grows abundantly in the prairies of South Dakota with a preference for rocky sidehills and weakly developed soils.

This colorful forb is palatable and nutritious to all livestock and where abundant is an indicator of good range condition. In addition to its forage value and showiness, black sampson also has an interesting history in relation to uses by man. Indians used the roots for a variety of purposes. They chewed pieces of rootstalk to relieve toothache pain. Juices from the plant were used to treat burns, mumps, and for distemper treatment in horses. Modern medicine still uses extracts from the roots of black sampson for healing wounds and curing sore throat.

Horsetail

Equisetum spp.

E. arvense showing the branched vegetative stalks (at left and right) contrasted with unbranched vegetative stalks of *E. laevigatum*.



Horsetails or scouringrushes are native, herbaceous, perennial, rush-like plants that reproduce by extensive underground rootstalks and by spores. Above-ground stems from ½-3 feet tall, are erect, jointed, hollow, and harsh to touch because of strong longitudinal ribs. Leaves are reduced to papery scale-like structures at each stem joint. In spring, unbranched, spore-bearing, stalks appear. These are conspicuously jointed and can be pulled apart at the joints. Vegetative, or nonspore bearing stalks appear later, and persist throughout the summer. The vegetative stalks are branched giving the plants a pine tree seedling appearance.

Distribution of *Equisetum* is circumpolar in the Northern Hemisphere. They generally prefer moist sandy soils along streams, lake shores, ponds and on flood plains. At least 25 species of horsetail are known, with eight reported for wet areas throughout South Dakota. General appearance of these eight is very similar.

Horsetail, as a rule, is not generally regarded as an important range forage. In wild hay, if in excessive quantities, horsetail is known to cause scours, paralysis, and occasionally death. Hay containing one-fifth or more of horsetail can produce poisoning symptoms in horses. Symptoms appear in 2-5 weeks beginning with unthriftiness, weight loss, loss of muscular control, followed by falling, exhaustion, and possibly death. Cattle, sheep, and goats are rarely affected.



E. laevigatum showing simple spore-producing stalks.

Daisy fleabane

Erigeron strigosus



Daisy fleabane is a native annual or biennial forb. Plants have 1-5 stems reaching 8-24 inches high. The few-leaved stems branch freely well above the ground. The number of flower heads per plant ranges from few to as many as 100. Rather small daisy-like blossoms have yellow centers with white outer petals. Flowering can occur as early as late May, but may continue late in the summer.

Daisy fleabane is found throughout the drier temperate regions of the United States and southern Canada. In the Great Plains it is considered an invader but good grazing management and improved vigorous grass cover will readily result in decreased abundance. Daisy fleabane may temporarily become extremely abundant in disturbed areas or even in stands of fairly vigorous prairie. It is common throughout the prairies of South Dakota. The forage value of this common forb is unknown, but livestock do utilize it during its early stages of growth.

Western wallflower, or plains erysimum, is a biennial native forb. Unbranched to few branched stems reach 8-24 inches in height. Flowers have four yellow petals each and appear from May to August. From each flower, a long, slender, conspicuous seed pod forms. Numerous pods radiate around the upper stem, presenting a unique appearance.

Western wallflower is confined to the plains within the area bounded by Quebec, Manitoba, Montana, New Mexico, and Oklahoma. In South Dakota it is found throughout the upland grasslands. Although it responds to grazing pressure as an increaser, it is seldom a nuisance. Forage value is negligible to slight, but it is grazed to some extent by all classes of livestock. The main interest in western wallflower likely centers around its attractiveness as a prairie flower, rather than its importance as livestock forage.

Western wallflower

Erysimum asperum



Leafy spurge

Euphorbia esula

Leafy spurge is a perennial, introduced forb that reproduces by vigorous rootstalks and numerous seeds. Upon maturity, seeds are expelled up to 15 feet. Plants 1-3 feet tall, generally form dense, small or extremely large patches. The pale green color of the June and July flowers is imparted by a pair of bracts which have the appearance of petals. Stems contain a milky juice.

This native of Europe is now found locally in much of temperate North America. In the northern rangeland regions of western North America, it is increasing in distribution and abundance. Leafy spurge is especially prevalent in Idaho and Montana. Where adapted, leafy spurge will invade deteriorated native ranges or tame pastures, and can remain in great abundance even after disturbance or overgrazing ceases. In South Dakota, leafy spurge is most common in fields and pastures to the east, but isolated patches have been found near the Black Hills as well. Although this weedy pest may first become established in moist places, it is well suited to rather dry upland sites.

Potentially leafy spurge is the worst noxious weed threat to South Dakota grasslands because of wide habitat suitability, prolific reproduction capabilities, strong competitive ability, unpalatability, and control difficulty. Not only is leafy spurge a useless forage but it is reported to have caused considerable irritation to feet of horses walking on freshly mowed standing stubble. In Alberta, sheep deaths have been attributed to leafy spurge.



Snow-on-the-mountain

Euphorbia marginata



Snow-on-the-mountain is a warm season, native annual 1-3 feet tall. Somewhat thickened, waxy leaves are oval shaped. Upper leaves are conspicuously edged with a white border. White trimmed leaves and milky sap are much more useful in identification than the small, white, inconspicuous flowers which appear from May to October.

This native of midwestern prairies, plains, and river valleys is found throughout South Dakota. It reaches greatest abundance on abused rangelands and waste areas. Because of striking beauty and ease of establishment, snow-on-the-mountain is cultivated as an ornamental in much of North America.

Although poisonous, snow-on-the-mountain is seldom harmful to livestock because it is not readily grazed. When fed in hay, however, livestock may in rare cases be poisoned, resulting in severe scours and emaciation or even death. Milky juices of snow-on-the-mountain can cause skin inflammation in man. Honey produced from its nectar has been reported to be evil tasting and poisonous. Of further interest, is the fact that juices of this plant have been successfully used for branding cattle in lieu of hot irons. A colorful relative, poinsettia, is our most common Christmas plant.

Winterfat
Eurotia lanata

Winterfat, sometimes called white sage or sweet-sage is a many-branched, shrubby perennial forb 1-3 feet tall. Plants arise from a stout woody root. Stems and leaves are covered with woolly, soft hairs which give the plant a whitish to gray-green appearance. Narrow leaves are $\frac{1}{4}$ -1 inch long with edges rolled under. Flowers are in dense clusters along the stems. Winterfat is frequently confused with species of *Artemisia*, particularly fringed sage, but is easily distinguished by inrolled linear leaves of winterfat and the individual seeds which are loosely enclosed in a densely hairy seed coat. The tiny, coiled embryo (living part of the seed) is pale green indicating the presence of chlorophyll, which is unusual.

Distribution of winterfat is from Saskatchewan and Manitoba to western Nebraska, Colorado, western Texas, California, and Washington. It occurs on drier soils of lower foothills, plains, and valleys, frequently associated with saltbushes, greasewoods, semidesert bunchgrasses, rabbitbrushes, sagebrushes, wheatgrasses, and blue grama. In South Dakota, distribution is west of the Missouri River, occurring mostly as scattered plants in the extreme western part. Abundance and distribution have been greatly restricted by livestock use.

Winterfat is an excellent forage of high quality. Total crude protein percent has been shown to be exceptionally high. It is grazed with relish by all classes of livestock and is an important feed for deer and elk. Winter ranges with an abundance of this plant are said to make livestock "winterfat." Winterfat is drought resistant and responsive to regulated grazing. Had it not been for these traits, it would surely have been eliminated from a great many more western ranges.



Scarlet gaura

Gaura coccinea



Scarlet gaura, also known as butterfly weed, is a small, perennial native forb. The stems tend to lay prostrate with branches that are upright. Total length is 4-20 inches. Petal colors range from scarlet to pink to white. Flowers narrow towards the base into spur-like structures. Reproduction is by underground roots as well as by seed.

The range of scarlet gaura is confined to central prairie provinces of Canada, through the states directly to the south, and into Mexico. In South Dakota it is found on the drier soils throughout the State, but is seldom abundant, and frequently is obscured by grass.

Scarlet gaura increases with grazing pressure. This forb is little grazed by livestock, and its forage value is considered poor.

Prairiesmoke

Geum triflorum

Prairiesmoke, also known as torch flower, oldman's whiskers, and purple avens, is a native perennial forb that reproduces by seed and rootstalk. The russet-pink colored flowers, frequently three on a stem, droop and are suspended 6-24 inches above the ground. Leaves are hairy, mostly basal, and fernlike in appearance. Prairiesmoke is one of the earliest spring flowers, blooming in late April or early May and continuing into June.

Distribution of prairiesmoke is from New York along the northern states and southern provinces to British Columbia, then south to mountains of California and New Mexico. It inhabits medium-dry plains, hillsides, ridges, and mountains. Prairie-smoke is found locally throughout South Dakota but is likely most common to the foothills of the Black Hills.

Forage value is generally rated as poor. In South Dakota abundance is local, forming small colonies, but it draws much attention because prairiesmoke greens and sparkles with beauty before most associated vegetation shows much life. Prairiesmoke is another in the long list of plants used by Indians. The roots are said to have been boiled to make a beverage resembling weak sassafras tea.



American licorice
Glycyrrhiza lepidota



American or wild licorice is a herbaceous, perennial, native legume which spreads by woody branched rhizomes as well as by seed. Upright stems reach heights of 18-36 inches. The 7-9 pairs of lance shaped or oblong leaflets are alternately arranged on the leaf stalk, terminating with a single leaflet. Leaflets are tipped with a tiny, sharp point. Yellowish-white blossoms appearing from June through August give way to oblong fruit capsules which turn brown at maturity and contain few seeds. The capsules appear similar to those of cockleburs, having many hooked prickles.

American licorice is native to the Pacific Coast States and is now present south to Mexico, north to Ontario, and east to New York. In South Dakota and elsewhere it is common to waste places, draws, and woods as well as depressions in prairies and pastures.

Conflicting reports have been made regarding forage value of American licorice. Apparently in the Great Plains it is eaten with relish by livestock, and may be excluded in heavily grazed areas. Farther west it reportedly withstands excessive use, presenting problems to the woolgrower who stands to suffer heavy dockage when burs become lodged in the wool.

Curlycup gumweed

Grindelia squarrosa

Curlycup gumweed, tarweed, or resinweed is a warm season, biennial native forb. This weedy plant grows 1-3 feet tall with many pale branches terminating in flower heads. The "cups" which support the flower heads have small curved bracts that secrete a sticky resinous substance, thus the name "curlycup gumweed." Blossoms appear from July through August, are aster-like with yellow petals, and have darker yellow centers. Alternately arranged, smooth, stiff, serrate edged leaves clasp the stems. Leaves are gland-dotted and also exude a sticky substance.

Curlycup gumweed is native to much of the area west of a line from Manitoba to Texas and east of the three Pacific Coast States. It has invaded areas adjacent to that mentioned, and today is even found in eastern North America. Curlycup gumweed is highly drought resistant, becoming abundant after periods of dryness. It favors dry areas, but will grow on most soil types that are depleted of more desirable vegetation. In South Dakota, as well as other areas, curlycup gumweed is most common to waste places, road edges, depleted rangelands, and abandoned croplands, often forming nearly pure stands.

This invader has little forage value and is unpalatable to livestock, although sheep will occasionally crop flower heads in absence of other forage. Gumweeds have been used extensively by early and present day man. Indians used gumweed extracts to treat asthma, bronchitis, colic, and skin rash. Today medical uses include treatment of bronchial spasm, whooping cough, asthma, and rashes caused by poison-ivy.



Broom snakeweed

Gutierrezia sarothrae



Broom snakeweed is also known as broomweed, matchweed, turpentine-weed, and yellow top. It is a perennial half-shrub, dying back to near the ground each year. Old tops may persist well into the next season. It is bushy, up to 24 inches tall, and has fine brittle stems referred to as broom-like. Its heavy taproot has many branches at lower depths. The numerous small yellow flowers are clustered near stem ends.

Broom snakeweed is found throughout the arid and semiarid portions of western North America. It is the most widely distributed and abundant of several snake-weeds. Broom snakeweed is common on most normal soils of the plains, semidesert valleys, low foothills, and mountain slopes. In the Great Plains its main distribution is along the western edge. It is common to western South Dakota in plant communities of western wheatgrass, big sagebrush, and shortgrasses. It can become rapidly abundant on ranges depleted by overgrazing or drought. Once established, removal is difficult, with chemical control often most effective. There has been hope that control may eventually be possible through use of insects which favor snakeweed.

In general, broom snakeweed is considered poor forage for livestock and on rare occasions may be toxic when spring shoots are eaten by cattle, sheep, goats, or horses. In winter and spring, livestock and wildlife may utilize snakeweed when other forage is not readily available.

Cutleaf goldenweed

Haplopappus spinulosus

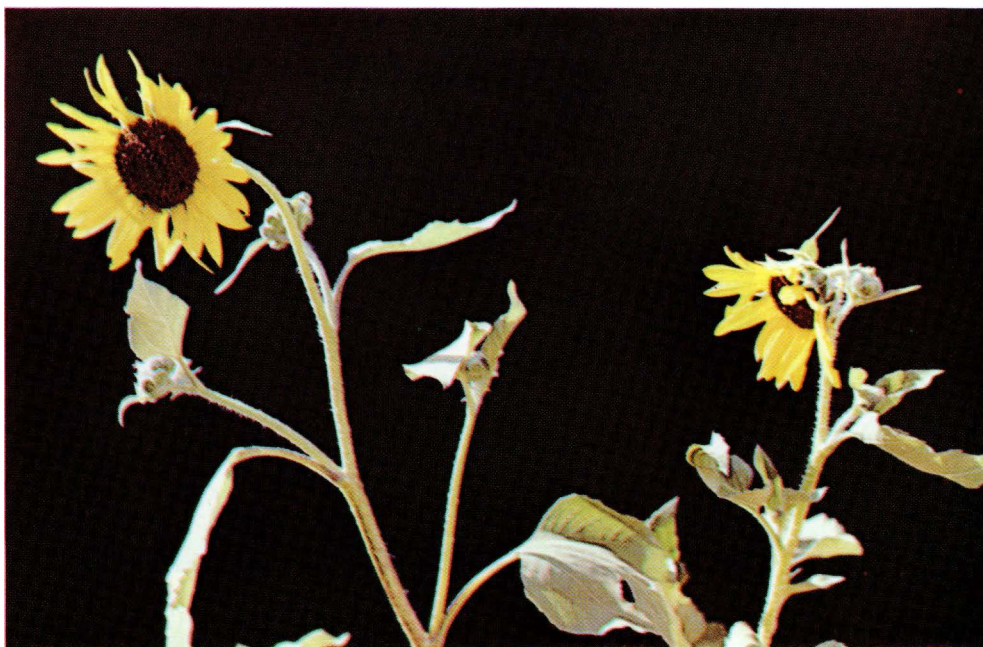
Cutleaf goldenweed, ironplant goldenweed, or spiny sideranthus, is a native perennial forb. Heights of 8-24 inches are attained by numerous, erect or ascending stems which arise from a strong woody taproot. Daisy-shaped yellow flowers are abundant and showy. Leaves are alternately attached on stems and are finely dissected with spiny tips on the leaf edge.

Cutleaf goldenweed represents a rather large and variable genus occurring mostly on drier hills and plains of western North America. It is found as far north as Manitoba and south to northern Mexico. In South Dakota it is present throughout the prairies and plains. In most plant communities cutleaf goldenweed is seldom a major forb, but it can form dense societies. This forb has little or no forage value for cattle, but is sometimes grazed by sheep. With heavy use, abundance on ranges tends to increase. This is one of the hardiest plants of the plains, maintaining itself even through prolonged drought.



Common sunflower

Helianthus annuus



Common sunflower is, as the name implies, one of the most common annual sunflowers. Depending on conditions, it may grow up to 15 feet tall. The shorter (less than 4 feet) and closely related prairie sunflower (*H. petiolaris*) differs by having smaller, narrower leaf blades, less than 4 inches long, compared with common sunflower which has at least some leaf blades longer than 4 inches. In addition, prairie sunflower has a light colored circular spot in the center of the flower head.

Annual sunflowers are found throughout the Great Plains, frequently in great abundance in fields of cultivated crops, on go-back land, along roadsides, in deteriorated rangelands, and in waste places. One or the other of these species can generally be found throughout the plains and prairies of North America. Both are prevalent in South Dakota, with common sunflower probably more abundant.

On rangelands, annual sunflowers are considered to be invaders. As range forages, they are highly palatable early in the season with reduced palatability as they mature. As plants approach maturity, cattle, horses, and sheep readily graze the flower heads.

Common sunflower is the State Flower of Kansas. This versatile plant was used extensively by the Indians. Oil from seeds was used on hair and for cooking. Meal from crushed seed was used for making bread, or thickening soups. More recent exploitations include: cooking flower buds as a vegetable; using the stalk pith in life preservers; extracting oil for soap making and burning; making silage from entire plants; and using residue from the oil extraction process for livestock feed.

Maxmilian sunflower

Helianthus maximiliani

Maxmilian sunflower is a native, perennial, warm season forb. It grows upright, singly or in tight colonies, spreading by seed and heavy rootstalks. Stem heights reach 3-6 feet with conspicuous yellow flowers arising on short flower stalks from the leaf axils (base). This sunflower can be distinguished from others by the distinctive leaves, 4-6 inches long, rough on the upper surface, somewhat wavy margined, trough-shaped, curved downward, and tapering from the middle to both ends. Flowers may be present from July through September.

Maxmilian sunflower is found on the plains from Saskatchewan and Manitoba south to Missouri and Texas, and in some eastern states. This associate of the bluestem communities prefers moist sites on heavier soils. Although it is more abundant in eastern South Dakota than western, it is found along streams, near springs and wet areas in the west.

This sunflower is a palatable livestock forage of good quality, and unlike its annual cousins its presence is an indicator of high condition range. Maxmilian sunflower is very showy, towering over grasses, and remaining green when many of the other prairie forbs have matured and lost their beauty.



Stiff sunflower

Helianthus rigidus



Stiff sunflower is a native, stout, erect, perennial forb. Because of numerous rhizomes, it is frequently found in rather dense colonies, mostly in excellent stands of native grass. Flower heads have yellow outer petals and brown to purplish centers. The mostly basal, rough, stiff, leathery leaves are generally lance-shaped and have three prominent ribs. Stems are stiff, rough, and commonly purple tinged. Depending on conditions,

Stemless hymenoxys is an early spring flowering, native, perennial forb, arising from a taproot. As the common name implies this plant is stemless, with all leaves basal. Silky-silvery leaves, less than 2 inches long, are linear in outline. Flowers are displayed well above leaves on upright stalks about 4 inches long. Outer flower petals are yellow with orange veins, are "squared" on the tip with three lobes, and attached intermit-

plant height varies from 1-5 feet, with blossoming in late summer.

Stiff sunflower grows throughout the Great Plains; at one time it was found extensively on the uplands and frequently on the lowlands. As a native upland forb, it ranked with leadplant in abundance, occupying the same sites with little bluestem even on poor, dry soil. In South Dakota, its abundance is greatest in the eastern part of the State and prairie areas of the Black Hills. Stiff sunflower is so readily eaten by livestock that it is rarely found on lands that have been long overgrazed.

Stemless hymenoxys

Hymenoxys acaulis



tently around the perimeter of the flower head. Distribution is from North Dakota to Texas, New Mexico, Idaho, and Montana. It is an occupant of rocky hillsides, limited in South Dakota to the western part. Although seldom abundant enough or of sufficient stature to be considered a forage plant, it is often a conspicuous part of the early spring hillside flora.

Bush morningglory

Ipomoea leptophylla



Bush morningglory is a native, perennial, half-shrub up to 4 feet tall. Large hemispherical-shaped tops often cover many square feet of soil. This plant has typical morningglory blossoms ranging from pink to purple in color and shaped much like a trumpet or funnel. Many-branched stems arise from an enormous taproot (up to 8 inches in diameter) which serves extremely well as a reservoir for food and water. In addition, roots penetrate for many feet downward and outward making this plant exceedingly drought resistant.

The range of bush morningglory is from South Dakota, to Texas, New Mexico, and Montana. It grows on sandy soils and is a reliable indicator of such soils. In South Dakota bush morningglory is found primarily in the southwestern part of the State. Although this plant is not of appreciable economic value, its conspicuous large size and numerous purple blossoms draw much attention.

Kochia
Kochia scoparia



Kochia is variously known as fireweed, summer-cypress, burning bush, and belvedere. This bushy, introduced, many-branched annual grows up to 7 feet tall. Kochia is dark green when young, turning brownish-red with maturity. The numerous leaves are alternate, hairy, 1-2 inches long, narrow, pointed, and stalkless. Many inconspicuous flowers are green and attached at the base of the leaves or in terminal panicles. The tiny seeds are dull grayish-black, rough, flat, and oval-shaped.

Kochia escaped from cultivation as an ornamental, until today it is found practically throughout North America. Although it is most common in open, dry, waste places, kochia also grows well on neglected fertile soil. Thus it invades feed lots, ditch banks, and cultivated fields. Although kochia has almost always been considered a weed of negligible forage value, South Dakota feeding trials during the 1940's showed that kochia compared favorably with alfalfa in nutritive value and palatability. Furthermore, it was selected by sheep in preference to smooth brome and western wheatgrass. In seven trials when kochia was seeded as a crop, it produced an average of 1.8 tons of hay an acre. With all things considered, it is no surprise that this weedy annual is sought after by sheep in the Northern Great Plains.

False boneset

Kuhnia eupatorioides

False boneset is a native, perennial forb. Abundance, size, and growth forms are quite variable. The few to many stems are 2-3 feet tall and arise from an enlarged crown on the deep, woody taproot. When numerous stems are present it takes on a bush-like appearance. Leaves are alternately attached on the stems. A second characteristic is the prominent raised veins on undersides of the lance-shaped leaves. Plants begin growing in May, but it is not until autumn that numerous, small, yellow-white flowers appear in clusters at the branch tips. As the fruits mature, hair-like structures attached to the seeds become conspicuous. Reproduction of false boneset is by seed.

False boneset is found on the dry prairies and plains from New Jersey to Georgia and Texas, and north to Montana. It is seldom abundant, occurring mostly as scattered plants on well drained upland prairie soils. In South Dakota it is common to the prairies of the eastern part as well as on drier soils of the west. Although false boneset is not a major forage, it is readily grazed in spring and early summer and decreases in abundance with increased grazing pressure.



Common starlily
Leucocrinum montanum



Common starlily, sandlily, mountainlily, or sage-lily is a low, stemless, native perennial forb of the lily family. Starlily can scarcely be confused with any other Great Plains forb. The white flowers are starlike, about an inch across, and have a slender, elongated basal tube. Leaves are long and slender and radiate from a common location near the ground.

Starlily is found within the area bounded by Montana, western South Dakota, northern New Mexico, and Oregon. It is most common on sandy soils and clay banks, often associated with sagebrush, but also present in mid-grass communities.

Common starlily may be locally abundant, but because of small size its forage value is negligible. Cattle and sheep may occasionally graze starlily. Indians have used the roots for food. Starlily is frequently overlooked because it is small, and blossoms for a short time during late April through early June. In the spring, starlily adds much to the prairie beauty for the careful observer.

Dotted gayfeather

Liatris punctata

Dotted gayfeather, or blazing star, is a native perennial forb, which arises from a thick extensive root system. Few to numerous stems reach 6-24 inches high. Leaves are narrow, 2-6 inches long, harsh, and covered with numerous dots or glands. Blossoms are crowded against stems, each separated from the other by a small leaf or bract. Flowering occurs in late summer or fall with a gorgeous display of lavender.

Dotted gayfeather is found in the drier plains and hills of Manitoba and Saskatchewan, south to Texas and Arizona. It is drought resistant and well adapted to a variety of upland prairies. It is found throughout South Dakota, frequently becoming abundant and providing an impressive and showy display of prairie beauty. Livestock, particularly sheep, regularly graze dotted gayfeather especially when it is young. This nutritious forb is classed as a decreaser, soon disappearing under continuous overuse.

Indians were reported to use the bulb-like, carrot flavored root for food. Today, dotted gayfeather is a common floral decoration.



Rush skeletonplant

Lygodesmia juncea



Rush skeletonplant, or prairie pink, is a native, perennial forb growing 4-18 inches tall. The rather small, pink blossoms are not as important in identification as is the foliage. The pictured specimen is unusually healthy, having numerous stems. Key identifying characteristics include the rush-like (skeleton-like) nearly leafless stems, the almost always present round insect galls on the stems, and the milky exudate from broken or crushed stems. Roots often exceed 20 feet in depth making skeletonplant very drought hardy.

Range of rush skeletonplant is from Manitoba to western Texas, Nevada, Idaho, and Saskatchewan. Occurrence is mostly on dry soils of plains and prairies but occasionally up to altitudes of 12,000 feet in the Rocky Mountains. Skeletonplant, most abundant in grainfields and waste places, is also present as scattered plants in grasslands. On South Dakota prairies, skeletonplant can most readily be found on hill crests.

Skeletonplant normally has rather low palatability, with herbage being distasteful. In arid regions this plant is commonly grazed by sheep. In some areas, it has been suspected of being poisonous. A closely related species, not reported in South Dakota, has slightly larger leaves that were used by plains Indians for cooking with meat.

Ball cactus
Mammillaria vivipara

This cactus, variously called ball cactus, pincushion cactus, or nipple cactus, is one of many dry prairie plants having quite descriptive common names. This fleshy plant with globular stems is covered with spirally arranged fleshy projections tipped with numerous spines. Round stems from which the name, ball cactus, is derived are 2-3 inches in diameter, frequently occurring in groups of 3-12. This cactus, as with others, is drought resistant. Stems are capable of storing large volumes of water and surface roots are able to take up even the scantiest of precipitation. This occupant of the upland prairies is most common on stony soils. It is found throughout South Dakota, but is much more abundant westward. Distribution of this native ranges from Manitoba and Alberta south to Colorado and Kansas. Another ball cactus (*M. missouriensis*) occurs in western South Dakota, but differs in having yellowish flowers. Obviously this plant is of no forage value, but is unique and attractive when it flowers in June and July.



Alfalfa

Medicago sativa



Alfalfa, sometimes called lucerne, is an introduced, herbaceous, perennial legume. Flowers range in color from purple to yellow to white, and are borne in clusters. Leaves are numerous, arranged alternately on the stem, with three leaflets per leaf. Unlike sweetclover, leaf edges are tooth edged (serrate) only near the tip. The 5-25 stems per plant are erect, spreading, and normally 2-3 feet tall.

Although alfalfa is a native of Asia, it now is distributed world wide. It has been planted for forage at least since 490 B.C. in Greece. A recent study showed that some 30 million acres of alfalfa are cultivated in North America. As an indication of its regional importance, in 1956 five states harvested over 2 million acres each of alfalfa hay. These states included Wisconsin, Iowa, Minnesota, South Dakota, and Nebraska. Strains of alfalfa are adapted and vitally important as forage in southern Canada and in all but the southeastern United States. Alfalfa has survived temperatures to -80° F. in Alaska and 130° F. in California. It is best adapted to well drained loam soils high in lime and soils that are not acid.

Alfalfa is the most important forage crop in the United States. It has extremely high feed value and is used for pasturing, hay, silage, and alfalfa meal. It grows well with grasses, supplying nitrogen for them. As hay or silage alfalfa works well to complement and simplify balancing rations. The regrowth potential of alfalfa is supreme with the number of crops per year restricted in most areas by drought or freezing temperatures.

Many selections are commercially available. In South Dakota, Vernal, Teton, Ladak, and Ranger are among the most common hay varieties. Rambler, Rhizoma, and Travois have been developed for primary use as pasture varieties because of their tendency to spread vegetatively and withstand grazing better than hay varieties.

Sweetclover

Melilotus spp.

Biennial sweetclovers are members of the pea family. These introduced legumes can be very short when growing conditions are poor, but normally reach 3-9 feet in height. Stems, arising from a taproot are many-branched. Leaves are on alternate sides of stems with three leaflets attached to each leafstalk. In contrast to alfalfa, leaflets are commonly toothed around the entire edge. Numerous flowers are small, fragrant, and borne on lax racemes up to about 6 inches in length. During the first year of growth, plants are normally small, and seldom flower until the second year. White sweetclover, *M. alba*, is somewhat coarser and later maturing than yellow sweetclover, *M. officinalis*. The two are easily distinguished by their flower colors which correspond to their respective common names.

Both white and yellow sweetclover are natives of Europe. Today they are widely planted and distributed throughout North America, becoming most common in the Great Plains. Although other species do occur, these two are by far the most common. Sweetclover has spread naturally and grows wild along roadsides, on rangeland, and in cultivated fields. In South Dakota and other regions of similar climate, sweetclover may yellow the land in "sweetclover years." Sweetclover is an opportunist, becoming prominent only when conditions are favorable. Due to numerous hard seeds, sweetclover may become abundant several years after the last seed was produced.

Greatest use of sweetclovers has been in short rotations on farmland. Some use is also made of sweetclover as hay, silage, or standing forage. If molding occurs in hay or silage, a toxic substance, dicoumarol, is formed which may cause internal bleeding and death to livestock. As standing forage, the possibility of legume bloat exists with sweetclover. In pure stands, sweetclover can add up to 70 pounds of nitrogen to an acre of soil in its second year of growth. In addition, its abundant foliage makes an excellent green manure crop. On rangelands,



sweetclover can benefit associated grasses by providing nitrogen that results in increased grass vigor and production. Judicious use of sweetclover for grazing when it is green will seldom result in livestock ailments.



Ten-petaled blazingstar

Mentzelia decapetala

Ten-petaled blazingstar, eveningstar, or chalklily, is a biennial, or short-lived perennial, native forb 1-4 feet tall. Stems are stout and buff colored. As the name implies, this plant commonly has 10 petal-like structures which open in late afternoon and close by the middle of the following morning. Flowers are creamy white and appear from mid- to late-summer. Leaves of this plant are rough and deeply incised.

Distribution includes the area bounded by Man-

itoba, Iowa, Texas, Mexico, Nevada, Idaho, and Alberta. In South Dakota it can be found on dry hillsides throughout the State. Preferred sites are shale banks or those where soil is rocky, or sandy, or has been disturbed as along roadsides. Little economic importance is attached to ten-petaled blazingstar, but its distribution, showiness, and unique flowering habit make it a plant of interest.



Bluebell

Mertensia linearis

Bluebell, variously known as lungwort, wild forget-me-not, and chiming bells, is a perennial, native forb 4-8 inches high. The somewhat waxy, oblong to lance-shaped leaves are nearly stemless and slightly clasp the stem. This very attractive, early spring flower has drooping bell-shaped blue blossoms. Bluebells are sometimes confused with penstemons, but bluebell petals are all alike while those of penstemon are not. Distribution is from southwestern Canada to Idaho, northern New Mexico, and Nebraska. In South Dakota it is found throughout the State, on the plains and in the valleys. Although seldom abundant in the Northern Great Plains, it is an excellent sheep forage, becoming important on some higher altitude ranges in the southern Rocky Mountains.

Horsemint

Monarda fistulosa

Horsemint, wild bergamot, or beebalm, is a native, perennial forb of the mint family. Plants of this family have square stems and opposite leaves. Horsemint is readily distinguished from most other western members of this genus by flowers borne in solitary, terminal heads instead of spikes or clusters along stems in leaf axils. Stems are sparingly hairy, 2-4 feet tall and arise from branched rhizomes. Leaves are oval to lance shaped and sharply serrate.

Distribution of horsemint is largely from Maine to Manitoba, south to Kansas and Texas, and eastward to Florida. Across South Dakota, as elsewhere, horsemint is found in woods, thickets, and moist to medium dry valleys, occurring as small colonies or patches.

Palatability of horsemint is usually rated as fair for cattle and game and somewhat better for sheep and goats. Horses make only incidental use of this plant. With grazing, the abundance of horsemint generally decreases. Horsemint has values other than for forage. The abundance of persistent purple flowers, lasting from July to August, adds pleasantly to the prairie scene as does the fragrance of the herbage. Indians used horsemint tea to treat intestinal ailments and skin eruptions. Even today some people make a refreshing tea drink from the leaves. Modern medicine uses an anti-septic drug derived from this genus. Flowers and herbage have been used to scent clothes closets, bureau drawers, and pillows.



Wild parsley

Musineon divaricatum



Wild parsley or false carrot is a low growing perennial, native forb of the carrot family, with some characteristics resembling the common garden carrot. Spreading branches, 2-4 inches long, arise from a thick root. Leaves are smooth, thick, waxy, with many narrow leaflets and lobes, appearing like parsley or carrot leaves (see photograph). Numerous small yellow flowers arise from a common point at the end of the elongated main flowerstalk, thus forming an umbel or umbrella-shaped flower head.

A related genus, *Lomatium*, commonly called biscuitroots, is similar in general appearance, often growing in the same habitats, and represented in South Dakota by 5 species. The biscuitroots have either white, yellow, or purplish flowers and frequently are covered with dense fine hairs, thus not appearing waxy as is the case with wild parsley.

Both wild parsley and biscuitroots are widely distributed in the central and western part of North America from the prairie provinces of Canada, south to Kansas and Colorado. In South Dakota, wild parsley is most common to the prairies and plains west of the Missouri River. Biscuitroots have a wider distribution, being common to dry soils throughout the State. Both are found growing together in western localities of the State.

These plants are among the earliest of the native plants to green and flower. Along with wild onion they may furnish considerable forage in early spring before the grasses are ready for grazing. Forage quality is rated high during early spring, but drying occurs early and plants become obscure. Palatability is rated as fair to good for cattle and sheep, but poor for horses. Deer, elk, and antelope are known to relish biscuitroots and supposedly wild parsley. Historically, biscuitroots were important food for Indians who ate the enlarged roots.

Gumbo lily
Oenothera caespitosa

Gumbo lily, a perennial native forb, is not a lily as the name suggests, but rather a member of the evening primrose family. This stemless plant has basal leaves which are 4-8 inches long, wavy toothed on the margin and taper towards the base. Flowers are usually 1½-3 inches across, four-petaled, and appear from June to August. Fruit is a four-angled, woody capsule with rounded projections on the angles. Distribution of gumbo lily is within the area bounded by Manitoba, Nebraska, New Mexico, Utah, and Montana. In South Dakota it is found primarily west of the Missouri River, mostly on nearly barren clay banks. As a forage plant, gumbo lily is of little value.



Tooth-leaved eveningprimrose

Oenothera serrulata



Tooth-leaved eveningprimrose, or halfshrub sun-drop, is a warm season perennial, native forb that becomes more branched with age and resembles a small shrub. Plants are up to 2 feet tall, woody at the base, and arise from a long tough taproot. Leaves are narrow, finely hairy, trough shaped, alternately arranged and sharply serrate on the margins. Plants bloom over a long period of time, forming new flower buds as stems elongate. Yellow petals have rounded teeth on the margin. Fruit is a cylindrical capsule, slightly grooved longitudinally.

Tooth-leaved eveningprimrose grows naturally from Manitoba, to Missouri, Texas, Arizona, and Alberta. It is found throughout South Dakota in a variety of soils and plant communities. It is extremely drought resistant and is most frequent on gravelly or shallow soils, probably with more regularity westward in Mixed Prairie.

This species is highly nutritious and palatable to all classes of livestock. Overgrazing readily reduces its abundance. This desirable plant can seldom be considered an important forage due to lack of abundance.

Sainfoin

Onobrychis viciaefolia



Sainfoin is an introduced, perennial legume with showy salmon pink to lavender blossoms and leaves which resemble vetch. Plant height is 3-4 feet. The bean-shaped seeds are loosely encased in an oyster-shaped cover that has many raised ribs.

Sainfoin, a native of Europe, is being extensively tested in Montana and adjacent areas for use as hay or pasture. When compared to alfalfa, one main objection to sainfoin is its lack of appreciable regrowth after harvesting. Its advantages for specialized uses, however, have created renewed interest. Sainfoin is highly palatable to livestock, suitable to relatively low rainfall areas, does not cause bloat, is not susceptible to alfalfa weevil, and is easy to establish. Since most strains are fairly short-lived, sainfoin may be most widely used in rotations.

Prickly pear
Opuntia polyacantha

Prickly pear is a fleshy perennial with flat, jointed, spiny, pale green, prostrate stems. The pads, which appear to be large fleshy leaves, are actually stems. This plant does not have true leaves, except for the large spines which are modified leaves. Reproduction is by seed or by rooting of the pads. Large flowers are bright yellow and appear in June and July.

Prickly pear occurs on plains and prairies in the area bordered by Saskatchewan, Manitoba, Wisconsin, Missouri, New Mexico, and British Columbia. In South Dakota it is limited to the western half, mostly on upland soils high in clay content. *O. polyacantha* is the most common of several kinds of prickly pear found in South Dakota.



Abundance of prickly pear increases greatly with drought and/or overgrazing. Sharp spines prevent utilization by livestock. The extensive lateral spreading root system and water-storing capability of the stems makes this plant extremely drought tolerant. During periods of extreme drought, prickly pear has in some instances become so abundant that livestock can scarcely lie down without contacting it. Prickly pear spreads readily when rodents and rabbits disseminate the seeds by storing them in caches or by passing the seed after eating the fruits. In periods of drought and overgrazing, prickly pear may serve a useful function by protecting desirable plants from destructive grazing.

Fruits of several cacti, including some prickly pear, have been used by man. In Mexico and the Southwest, candy, liquor, and perfume are flavored with various cacti fruit.

Lambert crazyweed

Oxytropis lambertii



Lambert crazyweed is a native, perennial forb with branches so short the plant appears stemless. One to several clustered crowns arise from a single woody taproot. Leaves have 5-19 hairy, linear to egg-shaped, leaflets attached to opposite sides of a common stem. Leaves are spreading and up to 6 inches long while the erect flower stalks are commonly 12 inches tall. Flower color varies considerably ranging from the common bluish-purple to white. In June, 10-25 flowers appear on each stalk. Hairy, pointed seed pods, $\frac{1}{2}$ - $\frac{3}{4}$ inch long, rattle when shaken. The keel petal is sharp pointed (see sketch under *Astragalus*).

Distribution of Lambert crazyweed is unclear because of plant variation and difficulty in identification. Its range likely includes the area from British Columbia to Saskatchewan, south to Montana and Minnesota,

then to Arizona and Texas. Habitats are diverse, including a wide range of elevations from plains to mountains. Lambert crazyweed is found throughout South Dakota in drier upland prairies and plains. Although seldom a major component of the vegetation, abundance can be quite great.

Lambert crazyweed may be confused with woolly locoweed, (*Astragalus mollissimus*), which is not shown due to similarity in appearance. The two can be distinguished by the difference in flower shape as shown in the sketch under *Astragalus*. In South Dakota woolly locoweed is confined largely to the southwestern part in grassy valleys with sandy soils.

All crazyweeds and locoweeds are attractive spring beauties, but capable of causing loco disease in horses, cattle, sheep, and goats. While generally not palatable, a lack of good forage can force livestock to them. Relatively large amounts of the plants must be eaten to be dangerous, but this is possible because once animals start eating the plants a craving develops for more. The entire plant is poisonous, either green or dry. Death is slow in all livestock, with symptoms in early stages of poisoning most dramatic in horses. Horses seem to be crazy (loco), spooking easily, and running into objects as if their vision is faulty. Depression, trembling, and paralysis are common to all livestock. Final stages are characterized by inability to eat or drink and by a lack of coordination.

White point crazyweed

Oxytropis sericea

White point crazyweed is a native, spring blooming, perennial forb with flowering stalks 8-12 inches tall. Leaves are composed of 10-20 silky hairy leaflets, much like those of lambert crazyweed. From 6-27 flowers are crowded on the upper end of each flower stalk. Flowers range in color from white to yellowish or sometimes purple-tinted, often with a purple spot on the keel. As with other *Oxytropis*, the keel is pointed. Some taxonomists consider white point crazyweed simply a white variety of lambert crazyweed.

White point crazyweed is found north from Colorado and Nebraska into the Northern Great Plains. In South Dakota it is confined to the hills of the western part and the Black Hills. As with lambert crazyweed, white point crazyweed is poisonous, both causing locoism. Locoism is described under "lambert crazyweed."



Shell-leaf penstemon

Penstemon grandiflorus



Shell-leaf penstemon, or pink beard-tongue, is a native perennial forb. It is a showy plant blossoming from May to July with large pink to lavender “two-lipped” bell-shaped flowers scattered along the upper portion of stiff stems up to 20 inches tall. Gray, waxy, smooth leaves are without stalks and conspicuously clasp the stems.

Penstemons are a rather large group of plants, confined chiefly to North America. They are found from sea level to the highest elevations of plant growth. Shell-leaf penstemon is found in the prairies and plains from Wisconsin to Oklahoma and Wyoming. In South Dakota it frequents sandy soils and hillsides over the entire State. Although seldom found in great abundance, its size and beauty make it one of the finest native flowers.

As a group, penstemons rate from worthless to fair as forage. Shell-leaf penstemon is considered only fair forage, probably best liked by sheep. With grazing use, abundance of shell-leaf penstemon declines.



White prairieclover

Petalostemon candidus



Purple prairieclover

Petalostemon purpureum

The prairieclovers (white and purple) are natives of and confined to North America. These perennial legumes are forbs, mostly 1-2½ feet tall. Few to several upright stems arise from a woody base with a much branched root. Fine glandular dotted leaflets are numerous, and pinnately arranged. Small flowers are crowded into dense spike-like heads.

Prairieclovers, although a common component of grassland vegetation from Saskatchewan south to Texas and Arizona, are most abundant in uplands of the Tall Grass Prairie. In addition to color differences of blossoms, purple prairieclover has narrower, smaller leaf-

lets than white prairieclover. Both are found in South Dakota on nearly all soil types, most prevalent on thinner soils of ridges and steep slopes. White prairieclover is probably more abundant in the eastern part.

Both white and purple prairieclover are palatable and nutritious to livestock, often decreasing with grazing pressure. When abundant, these prairieclovers are considered a valuable constituent of prairie hay. In addition to their value as forage, prairieclovers fix nitrogen, making it available for associated grasses. They are considered one of the most important groups of legumes in native grasslands of the Great Plains.

Hood's phlox

Phlox hoodii



Hood's phlox, or moss phlox, is a small, perennial, native forb growing close to the ground in moss-like tufts generally 2-12 inches across. In early spring, small, white funnel-shaped flowers with five lobes appear singularly on the tips of short branches. The awl-shaped, normally woolly leaves scarcely exceed an inch in length and could be thought of as spiny.

Numerous species of phlox are found throughout North America; those of the West occupy dry, and

Spiny indianwheat and a close cousin, woolly indianwheat, *P. purshii*, are small, native, annual forbs up to 10 inches tall. Both are covered with a dense mat of silky, grayish-white, hairs giving them their silvery appearance, especially when mature. Tiny yellowish-white flowers are arranged in a dense woolly, cylindrical spike which resembles a seedhead of wheat in general outline. Woolly indianwheat differs from spiny indianwheat by the absence of bracts on the flower heads.

Distribution of spiny indianwheat is on plains and prairies from Alberta to Minnesota and Texas. In South Dakota spiny indianwheat is more common to the western edge. Woolly indianwheat has a much broader distribution ranging from Ontario to British Columbia and throughout the states west of Missouri, except in California. As with spiny indianwheat, woolly indianwheat likes open sunlight and is found on dry, open foothills, mesas and plains. Both seem to do well on most soils but prefer loams. As annuals, they are opportunists, frequently becoming abundant. In South Dakota, wool-

Spiny indianwheat

Plantago spinulosa



ly indianwheat is found on the upland plains throughout, frequently becoming quite conspicuous in short-grass sods of the western part before other plants green.

An abundance of these indianwheats in the Great Plains is an indicator of deteriorated conditions as they tend to invade when competition from perennials is reduced. Here their forage value is considered poor. In the Southwest, however, they are spring opportunists, that are looked upon with favor as forage.

often gravelly or rocky soils, where openness of cover and sunlight prevail. At least seven species are reported for South Dakota, mostly in the western part. The mat forming type, such as hood's phlox, is sometimes grazed by sheep. Flowers are preferred, and because of the spiny leaves the foliage is generally avoided. With deteriorated range condition, most phloxes increase in abundance, but never occupy extensive areas. Profuse early spring flowering makes the phloxes attractive.



Roughseed clammyweed

Polanisia trachysperma

Roughseed clammyweed, or clammyweed, is a much-branched, native, annual forb 1-3 feet tall. Leaves are three-parted, and sticky (clammy) to the touch. Yellowish-white blossoms are present summer long. Roughseed clammyweed can be confused with bee spiderflower, but the latter has drooping seed pods and the plant is not sticky. Pods of roughseed clammyweed are characteristically pointed upward.

Distribution of this showy plant lies within the area bounded by Saskatchewan, Iowa, Missouri, Texas, Arizona, and British Columbia. Roughseed clammyweed is common on open sandy soils across South Dakota. Plants often form rather large colonies, but also occur as singles. Preferred habitats are sandy or gravelly

soils, along roadways, around anthills, on hillsides, and near lake edges of the prairies and plains. Economically, roughseed clammyweed is unimportant, except that where plentiful it is a valuable source of nectar for bees.

White milkwort

Polygala alba



White milkwort, or white polygala, is a showy, native, perennial forb 4-16 inches tall. Flowering of this easily recognized plant occurs in June and July. Unbranched stems arise as tufts from a woody rootstalk and deep slender taproot. Leaves are linear and rolled under along the margins. White flowers are elevated on spike-like racemes, 1-2 inches long. Distribution is confined to the Great Plains south from Montana and into Arizona and Mexico. Site preferences are upland short-grass and mixed grass prairies and plains. White milkwort is found throughout South Dakota with greater abundance westward. Plants occur as scattered individuals but may be abundant on hillsides. White milkwort and some related species are economically important for medical purposes. A substance extracted from the roots of the milkworts has been used to treat respiratory ailments. Previously, Indians and later settlers used the extract as an antidote for snakebite.

Gland cinquefoil

Potentilla glandulosa



Gland cinquefoil is a native, perennial forb 1-2 feet tall. New plants arise from short, scaly, dark rootstalks. The entire plant is covered with shiny, straight, soft hair. Soft leaves are mostly attached to the plant base, and pinnately divided with 5-7 pairs of leaflets having deeply serrate edges. Flowers, clustered near the tip of the stiff fruiting stalk, each have five pale yellow petals, subtended by several small, green leaf-like bracts. Flowering occurs in late spring or early summer.

Distribution of gland cinquefoil is listed for the area bounded by South Dakota, New Mexico, California, and British Columbia. Although normally considered a component of mountain and foothill vegetation, in South Dakota it is found on many of the hillsides west of the Missouri River. The genus, *Potentilla*, is large with at least 27 species present in South Dakota. Most of those occurring in the State are at least somewhat similar in appearance to gland cinquefoil.

Forage value of the herbaceous cinquefoils, like gland cinquefoil, is rather low, ranging from poor to fair for sheep, and generally poor for cattle and horses. In much of the West, deer use considerable amounts of the foliage, but elk graze it only lightly. Flowering tops of cinquefoil are considered the most palatable, with leaves and stems less so because of the acrid taste, presumably caused by tannic acids.

American plum

Prunus americana



American plum is a large native shrub or, farther south, a small tree. White, early spring blossoms are produced before leaves develop. Leaves are serrate on the margins and alternately attached to the stem. Some branches are sharp pointed, creating a thorned effect. Plant height in South Dakota ranges from 3-10 feet, but southward heights may exceed 30 feet. Fruits ripen in the autumn, are yellow or red, and contain a single, large, hard pit.

American plum is distributed from Massachusetts to Montana, south to New Mexico and Texas, and east to Florida. In South Dakota, plants usually form small thickets along drainage ways or in sheltered depressions on plains and prairies. They are found locally across the State.

American plum apparently is not valued as a livestock forage, but as a rangeland plant of some stature it can provide shelter for livestock and wildlife. Considerable use is made of American plum thickets for nesting by birds and for providing protection to small animals. American Indians utilized the fruits for food, either fresh, cooked or dried. In regions near the southern limits of distribution, American plum is a successful shelterbelt species.



Common chokecherry

Prunus virginiana



Common chokecherry is a native, woody shrub or small tree normally 5-10 feet tall. Bark is characteristically gray. Leaves are thin, glossy, somewhat egg-shaped in outline, but pointed at both ends, with serrate edges. Unlike many flowering shrubs, chokecherry leaves appear before flowering in May or June. Numerous cream to white blossoms produce an abundance of dark red to red-purple, glossy fruits containing a single hard pit.

Distribution of common chokecherry is broad, primarily from central to eastern North America. It forms thickets along fence rows or valley bottoms, and occurs as scattered understory in open woods. Chokecherry is found locally throughout South Dakota, but possibly is more abundant eastward.

As range forage, common chokecherry is rated from poor to fair for both cattle and sheep, although losses by poisoning sometimes occur. Livestock normally do not eat fatal quantities except when other forage is scarce. Losses can occur when a quarter of a pound of leaves are consumed by a sheep in a single feeding. Proportionately larger amounts will occasionally prove fatal to cattle. Ordinarily, symptoms occur right after feeding, but may be delayed until the animal drinks water. Symptoms include nervousness, abnormal breathing, trembling of muscles, blue discoloration of mouth membranes, spasms or convulsions, terminating in rapid death by respiratory failure.

Chokecherries are well known because their fruits are used to make wine and jelly. Indians ate the fruit fresh or preserved it by drying. In addition they combined it with venison and buffalo meat to make mincemeat. The fruit is also eaten by many kinds of birds and animals.

Silverleaf scurfpea

Psoralea argophylla



Silverleaf scurfpea, or silverleaf psoralea, is a perennial native forb of the legume family arising from a thick taproot, commonly as a single stem and branching into a bushy top. Leaves consist of three palmately arranged leaflets densely covered with white, silky hairs. Mature plant height seldom exceeds 2 feet and crown diameter ranges from 5-10 inches. Plants are conspicuous because of rather large size and silvery foliage rather than the numerous, tiny blue flowers. In late summer an abscission layer forms in the stem near the ground allowing the plant to break away, tumble with the wind, and scatter seed.

Distribution lies within the area bounded by Alberta, Saskatchewan, Wisconsin, Missouri, New Mexico and Colorado. Silverleaf scurfpea is frequently abundant in the Northern Great Plains and is found throughout South Dakota. It grows best on lower hillsides and steep slopes. It is also present on level lands that are well drained but moist. It is a common associate of, but not exclusive to, little bluestem-big bluestem communities when little bluestem is dominant.

Silverleaf scurfpea has poor nutritive value, is not readily eaten by livestock, and increases with grazing pressure. A child in the early 1900's reportedly died from eating seeds of silverleaf scurfpea.

Common breadroot scurfpea

Psoralea esculenta



Common breadroot scurfpea, Indian breadroot or prairie turnip, is a native forb with one or more hairy upright stems 8-20 inches tall. Main stems arise from an underground egg- to spindle-shaped tuberous root up to 2 inches in diameter and enclosed in a thick, brown, leathery skin. Foliage of the plant, including the underside of the five-parted leaves is densely hairy. The short, dense, flower spike has blue flowers that fade with age. Soon after the plant matures, frequently in July, an abscission layer forms causing the stem to break off near the ground.

Range of Indian breadroot is from Manitoba south to Montana, Wisconsin, and Texas. Major abundance occurs in the drier portions of the Central and Northern Great Plains. Although frequently abundant, plants are never in pure stands. It is most common to open upland grassland prairies, seldom occurring on lowlands. This scurfpea is found throughout the native grassland areas of South Dakota.

Palatability is rated as poor for all classes of livestock except for sheep which may make considerable use of it shortly after growth begins. Although palatability is poor, Indian breadroot scurfpea decreases with grazing pressure. It has been suspected of being poisonous to livestock under certain conditions, but proof is lacking. This plant is of interest primarily because of appearance and historical value. The plains Indians used the starchy, tuberous rootstalks as a staple part of their diet, hence the common names.

Tall breadroot scurfpea (*P. cuspidata*) is similar in most respects to common breadroot scurfpea, differing primarily in having somewhat taller growth form, being more leafy and branched, and having sharp pointed lower calyx teeth. Its distribution in South Dakota is in the western part, primarily in the south. From South Dakota it occurs naturally to Texas and Arkansas.

Slimflower scurfpea

Psoralea tenuiflora

Slimflower scurfpea, slender scurfpea, or wild alfalfa, is a herbaceous, perennial legume 2-3 feet tall arising from a stout taproot which is much branched at lower depths. Leaflets are most commonly three divided and linear to oblong with glandular dots. Tiny flowers are inconspicuous, blue to purple and arranged in loose racemes. Seed pods are egg-shaped, rough, gland dotted and about a third of an inch long. This herbaceous legume has slender stems that are much branched well above the ground and overtop associated grasses. An abscission layer at the stem base allows the stem to break by late summer freeing the plants to tumble.

The northern limit of slimflower scurfpea is Montana, South Dakota, and Illinois, while the southern limit is Texas, Arizona and northern Mexico. Slimflower scurfpea is found throughout the Great Plains and the Southwest. It persists well during drought, growing on dry hillsides, plains, semidesert grasslands and in open pine woods. In South Dakota it is found throughout the state, mainly on the upland grasslands as scattered individuals or sometimes in fairly dense stands. It is common in bluestem ranges but is not restricted to this type.

Slimflower scurfpea has low palatability for livestock except when plants are young. It reportedly is poisonous to horses and cattle but seldom is a problem because of low palatability. On most ranges it acts as an increaser to grazing pressure but on certain sites may be classified as a decreaser.

Lemon scurfpea or lance-leaf psoralea (*P. lanceolata*) is similar in general appearance to slimflower scurfpea which is shown in the photograph. Notable differences are that lemon scurfpea has white flowers with purple tinged keels, spherical shaped pods, and elongated rootstalk from which new shoots can arise. It is most frequently found on sandy soils, and is com-



monly an early colonizer on shifting sand dunes in many areas of western North America. In South Dakota it is most common to the sandy soils of the southwest, although it may be present on these soils in other areas. Elsewhere lemon scurfpea is found from Saskatchewan to Alberta, Washington to Iowa, and Arizona to Missouri. Primary value is in stabilization of sandy erosive soils. Palatability is low and abundance tends to increase with grazing pressure.

Prairie coneflower

Ratibida columnifera



Prairie coneflower is a native, perennial forb of the aster family. When in blossom during mid-summer, identification is rather easy due to the unique flower. Yellow, drooping outer petals, number 4-10, are located around the central disc flowers which appear as a slender brown-thimble (cone) $\frac{1}{2}$ -1 $\frac{1}{2}$ inches long. Stems are usually clustered, branched, 1-4 feet tall, with deeply dissected leaves mostly clustered about the middle of the stems. Except for cacti, prairie coneflower is among the most shallow rooted native perennial forbs in the Great Plains.

Prairie coneflower is found in the western prairie provinces of Canada, south to Tennessee, Mexico, and Arizona. Within this area, it may be found on most normal soils of the foothills, prairies and plains. Prairie coneflower is common, although not normally abundant, throughout South Dakota.

This prairie forb is palatable to all classes of livestock, especially when plants are young. Depending on local conditions, prairie coneflower may decrease or increase with increased grazing pressure. At one time Indians made tea from the cones and leaves. Today the plant stands in the prairie as an example of grassland beauty.

Skunkbrush

Rhus trilobata

Skunkbrush, or skunkbrush sumac, also called squawbrush and lemonade sumac, is a deciduous, native shrub, growing 2-7 feet high. Shiny green leaves are divided into three shallowly lobed leaflets. Brilliant red berry-like fruit clusters, which persist throughout the winter, make skunkbrush easy to recognize. In addition, bruised leaves are ill-scented.

Skunkbrush is widely distributed from Alberta to Missouri, northern Mexico, California, and southern Oregon. It abounds on plains on dry rocky hillsides at mid-elevations, also to some extent along creeks, and as scattered plants in open forests. In South Dakota, skunkbrush is scattered on many hillsides across the State, frequently occurring in large numbers.

Over most of its range, skunkbrush has low palatability for domestic livestock. In some southwest areas it rates as valuable forage locally for cattle and sheep.

Indians used roots of skunkbrush in basket making and mixed dried fruits into a lotion for treatment of smallpox. Ripe fruits are now used for wreaths and Christmas decorations.



Wild rose

Rosa spp.



Wild roses are members of the large rose family (*Rosaceae*) with many members distributed over most of the world. This family includes such well knowns as roses, strawberries, apples, cherries, plums, raspberries and many more. Wild roses common to South Dakota are limited to less than 10 species which are not easily distinguished from one another but can be readily recognized as members of the genus *Rosa*. Most of the species common to the grassland region are less than 2 feet tall, whereas those found in thickets, woods and along drainages are generally taller.

Wild roses are woody perennials with spiny or bristly covered stems. Leaves are alternate; the 5-11 oblong leaflets have serrate margins. Flower petals are usually five, rose colored often fading to pink or white and falling off readily. Flower centers are normally yellow. The persistent fruit is called a hip and is a fleshy, bright red receptacle with numerous hard seeds. Wild roses may be found in a variety of habitats from grasslands to wooded areas throughout the temperate region of the Northern Hemisphere. Wild roses are common to upland prairies of eastern South Dakota, whereas farther westward, grassy lowlands or uplands with more than normal soil moisture are preferred sites.

In addition to their beauty, wild roses often provide food for livestock and wildlife. In general, wild roses are considered fair to fairly good livestock forage, particularly for sheep. Deer and elk browse heavily on certain species. Numerous small mammals and birds utilize rose hips for food. Man is not excluded, as early Indians and Europeans made varied uses of the hips. Today the exotic cultivated rose beauties are almost universal favorites. In some species, extracts from the flower petals are used for perfume, medicine and flavoring.

Curled dock

Rumex crispus

Curled dock or yellowdock is an introduced perennial forb that reproduces by seed. Leaves are mostly basal, 6-12 inches long, smooth, green, wavy, turning rust colored in the autumn or when a lack of moisture causes the plant to cure. The upright stems, 1-3 feet tall, have numerous racemes that produce an abundance of small green flowers. The three-angled winged fruit becomes rust colored when mature. The entire plant turns rust colored in the autumn and persists throughout the winter.

Since its introduction from Europe, curled dock is found throughout the United States and Canada. In South Dakota and the Great Plains, it is common to waste areas, also invading alfalfa fields and deteriorated lowland native grasslands.

Curled dock has poor forage value and in many localities is considered a noxious weed. Curled dock, as with most plants, does have some value. Leaves have occasionally been used for tea or eaten as greens. Roots have been used medically for a laxative and tonic. Much use is made of curled dock in winter bouquets.



Greasewood

Sarcobatus vermiculatus



Greasewood, or black greasewood, is a deciduous native shrub at least 2-5 feet tall. Bark of young branches is white and smooth, turning blackish with age. Stems are rigid with many twigs spiny tipped. Leaves are narrow, linear, fleshy and pale green. Inconspicuous male and female flowers occur on different plants or at separate locations of the same plant.

Greasewood is found in southwestern Canada and in every state west of the 100th meridian. It is characteristic of saline or saline alkaline plains, frequently becoming the sole dominant. Such soils are common to flood plains and along dry gullies, with soil texture ranging from sandy to clay. Greasewood is among the most alkali resistant of the native shrubs. Associated vegetation commonly includes saltbushes and saltgrasses. In South Dakota it is found along the western

edge near Edgemont, north of Belle Fourche, and scattered in the Badlands. Although distribution is restricted in the State, local abundance can be great, making it important in the areas mentioned above.

Greasewood is an important range browse in vast areas of the West, making otherwise poor land particularly valuable for winter use by sheep, cattle, and occasionally by horses. Herbage has high alkaline content, making it advisable to augment greasewood with other forage and to provide adequate water. Greasewood has been known to produce bloating or poisoning and death if eaten without other feed. In one case, more than 1,000 sheep were lost when hungry animals were turned into an almost pure stand. Lethal doses for sheep can be as low as 2 pounds of green leaves if taken in a short time without other feed. Poisoning symptoms appear from 3-5 hours after toxic amounts of greasewood are eaten. Symptoms include listlessness, reluctance to follow the band, depression, weakness, mouth frothing, nasal discharge, prostration, coma and death in 12-20 hours. Affected animals usually die. Cattle are rarely poisoned. In limited areas of South Dakota, greasewood is valuable forage, particularly as winter browse. It usually grows with an abundance of associated vegetation and does not normally constitute a poison hazard.



Lambstongue groundsel is a native, spring blooming, perennial forb consisting of a single upright hollow stem 8-30 inches tall, becoming branched near the top. Somewhat fleshy, smooth edged, leaves are oblong to lanceolate with the blades 1-5 inches long, decreasing in size towards the top. From 5-30 yellow flower heads, $\frac{1}{4}$ - $\frac{1}{2}$ inch across, are congested at the end of the stems.

Lambstongue groundsel occurs from British Columbia to Saskatchewan, south to Iowa, Colorado and California. Habitats range from medium dry to moist soils of open areas in draws, prairies and mountains. Although lambstongue groundsel is found in most places across South Dakota, it may not be the most abundant of the 16 species of *Senecio* known to occur in the State. Plants normally occur as scattered individuals.

The genus *Senecio* probably has more species than any other genus of flowering plants in the world. Understandably, then, the variation in economic impor-

Lambstongue groundsel

Senecio integerrimus

Prairie ragwort is a spring flowering, erect, forb 6-36 inches tall. Leaves are green, thick, mostly basal, with some leaves cottony hairy, serrate edged and up to 3 inches long. Several yellow, aster-shaped flower heads are clustered at the stem end.

Distribution of prairie ragwort ranges from Saskatchewan to Vermont, Montana to Indiana, and south to Virginia, Louisiana, and Texas. Plants may be found across South Dakota in the prairies and valleys, often on drier rocky ground. Although scattered in South Dakota, prairie ragwort is one of the commonest species of the genus, *Senecio*. During June when foliage is green and flowers are in bloom, this rather tall forb is easily located.

This ragwort, like lambstongue groundsel, is also potentially dangerous, but poisoning rarely occurs. Forage value would be considered at least fair, with heavy grazing probably causing decreased abundance.

tance is wide. Some more succulent species including lambstongue groundsel, may rate from fair to good as forage for livestock even though several, again including lambstongue groundsel, contain toxic substances. Cases of poisoning are rare because fatal quantities are seldom consumed.

Prairie ragwort

Senecio plattensis



Silver buffaloberry

Shepherdia argentea



Silver buffaloberry is a deciduous, native, large shrub or small tree 6-20 feet high. Branches are whitish and somewhat spine tipped. Leaves are oblong, with rounded ends, and are silvery-scaly on both sides. Numerous small, brown flowers appear in spring. Fruits are small, round, and reddish or golden-yellow. A related species, russet buffaloberry (*S. canadensis*), occurs in the Black Hills, but can be distinguished by the absence of spiny branches.

Distribution of silver buffaloberry lies within the area bounded by Alberta, Saskatchewan, and Manitoba; south to Iowa, Kansas, and New Mexico; then north to Nevada and Montana. Its occurrence is scattered to frequent along streams, on moist hillsides, and in bottomlands. In South Dakota, silver buffaloberry is found throughout, although only rarely in the eastern part.

This shrub is nearly worthless as livestock forage, primarily because of its thornlike twigs. In some areas of Utah, cattle and sheep make limited use of silver buffaloberry. Silver buffaloberry fruits are eaten by birds and small animals. Indians and pioneers preserved the fruits for eating by drying. Excellent pies, jams, and jellies are also made from the fruits.

Blue-eyed grass

Sisyrinchium spp.

Blue-eyed grass is a native, perennial forb having fibrous roots and growing 8-10 inches tall. As the common name implies, the slender foliage of this forb has a grass-like appearance. The "blue-eyes" refer to the flowers which seem to be unnaturally attached to the stems near the tips. Blossoming occurs from June through August. Although normally blue, a few species are white-flowered.

Distribution of the several blue-eyed grasses varies considerably. At least one species can be found wherever suitable habitats prevail in virtually all the southern Canadian provinces as well as the entire United States. Most habitats are fairly wet grasslands including plains, prairies, and mountain meadows. In South Dakota, at least five species occur in meadows, prairies, and occasionally on drier grasslands. The specimen pictured is *S. idahoensis*, which is rare in South Dakota but closely resembles the other blue flowered species. As a forage plant, their value is negligible, partly because of lack of abundance, but for aesthetical reasons and diversion from the ordinary, these forbs rank high.



Buffalo bur

Solanum rostratum



Buffalo bur, prickly nightshade, or Texas sandbur, is an easily identified native annual. Plant heights range from 6-24 inches or more. Almost all plant parts are covered with long, shiny, sharp, stiff, yellow spines. Leaves are 2-5 inches long and deeply lobed. Brilliant yellow blossoms occur summer-long. The fruit is densely covered with long sharp spines.

Distribution ranges from North Dakota to Wyoming, and Mexico and scattered eastward to New Hampshire and Florida. It is common to waste places, plains, prairies, and river valleys, with an affinity for sandy soils, but growing well on most soils. Buffalo bur is found throughout South Dakota from feed lots to poor rangelands. As a pest, this drought resistant plant rates high, even to the point of being a prime food for the ever present Colorado potato beetle. It is virtually worthless as forage.

Missouri goldenrod

Solidago missouriensis

Missouri goldenrod is a warm-season, native, perennial forb that reproduces by seed and vigorous rhizomes. Upright, unbranched smooth stems 8-36 inches tall are capped by a series of recurved panicles supporting a multitude of tiny yellow flowers, under whose weight the stems tend to bend. Leaves on stems are without stalks, rather stiff, triple ribbed, sparingly serrate on the margin, and linear-lance shaped. Basal leaves have stalks frequently 6 inches long.

Missouri goldenrod and closely related species are found in mountains, hills, plains, and prairies west and south of Manitoba to Arizona. In South Dakota and most of the Great Plains, Missouri goldenrod is the most abundant goldenrod, frequently forming dense colonies in both uplands and lowlands. Abundance is also quite great in the Black Hills.

Missouri goldenrod is grazed to some extent in the spring and early summer but is generally considered poor forage. Increased grazing pressure results in increased abundance to the point it may become a nuisance. From the time Missouri goldenrod blossoms in July, this plant remains a conspicuous part of the prairie flora well into the autumn.



Stiff goldenrod

Solidago rigida



Stiff goldenrod is a native, warm-season perennial forb which reproduces by thick woody rootstalks and seed. Normally, the few stiff, straight stems are clustered, branched only at the top, and covered with rough pubescence. Plant heights range from 1-4 feet, with branch tips capped by dome-shaped clusters of tiny yellow flowers. Leaves are thick, rigid, and rough on both surfaces. The lower oblong leaves are 3-12 inches long.

Distribution of stiff goldenrod is principally east and south of Saskatchewan to Georgia. It is a very common forb of the upland Tall Grass Prairie. In South Dakota it is found throughout in the prairies and valleys, becoming more abundant eastward where it is prevalent on drier, rocky, open ground.

Stiff goldenrod is considered poor to fair forage, and increases with grazing pressure to the point it can become a nuisance by competing with grasses for moisture. This plant is one of several goldenrods which flower and add beauty to the prairies in the late summer and autumn when most other vegetation begins to lose summer color.

Scarlet globemallow

Sphaeralcea coccinea



Scarlet globemallow or red falsemallow is a low-growing, native, perennial forb 4-12 inches tall, arising from a woody taproot. Plants are densely covered with silvery hairs. Leaves are gray-green, and palmately parted. Salmon colored to brick red flowers appear from May to August, in dense, short racemes.

Scarlet globemallow occurs naturally from Alberta to Manitoba, south to Arizona, Mexico, and Texas. It is found throughout South Dakota, becoming more abundant westward. It is fond of dry sites, thus it is most common to uplands. In western South Dakota it frequently grows in great abundance along roadsides. This plant is rated as one of the most drought resistant forbs of the Great Plains due to its ability to lose its leaves during drought.

During drought and overgrazing, scarlet globemallow increases in abundance. Its palatability is rated from none to fair, depending on season, class of livestock and locality. In the Central Great Plains it is commonly eaten by livestock. In certain arid regions of the Southwest it is considered important forage.

Prince's plume

Stanleya pinnata



Prince's plume or alkali prince's plume is a coarse, herbaceous, perennial native of the mustard family. Plants may grow 1-4 feet in height, commonly occurring as several spreading stems from a woody crown. When in flower during June or July, prince's plume is easily recognized by brilliant plumes of sulphur-yellow blossoms which occur on an elongated, many flowered raceme. Numerous, long twisted, seed pods develop on the lower portion of the flowering stalk as the upper portion continues to bloom. Leaves are pale green, somewhat fleshy and often lobed or parted.

Distribution is on drier prairie soils from North Dakota to Texas and California. In South Dakota it is confined to the western part of the State, occurring only in localized areas. As with racemed and twogrooved poisonvetches, prince's plume is regarded as a selenium indicator and accumulator. It does not concentrate as much selenium as the poisonvetches, and is not potentially as dangerous. In fact, there is some question whether prince's plume is toxic to grazing animals since there is no recorded statement of grazing by livestock.

Prince's plume is of more interest as a prairie beauty and selenium soil indicator than as a poisonous plant. Because it is a reasonably reliable indicator of selenium soils, crops grown where prince's plume is known to be adapted, may be high in selenium. These crops when fed to man or livestock may constitute potential health hazard.

Western snowberry
Symphoricarpos occidentalis

Western snowberry, commonly called buckbrush, is a deciduous, native shrub 1-3 feet tall, that increases by offshoots from rootstalks. Branches are light colored and may be upright or somewhat spreading. Pinkish bell shaped flowers appear in July, followed by round, shiny, white fruits that persist throughout the winter. Western snowberry can be confused with a slightly smaller plant, common snowberry (*S. albus*). This smaller member has leaves that are not longer than $\frac{3}{4}$ inch, while those of western snowberry are mostly longer. Before the fruits form, western snowberry can also be mistaken for coralberry (*S. orbiculatus*) which has red (coral) berries.

At least 12 species of snowberry are found in North America. Western snowberry, which is one of the more prevalent, is found within the area bounded by Michigan, Missouri, Colorado, and British Columbia. It is common to hillsides, open woods, river banks, and grassy lowlands. Western snowberry occurs throughout South Dakota in similar habitats, frequently forming large dense stands due to reproduction from rootstalk. Common snowberry is confined to thickets in eastern South Dakota, while coralberry is in both the Black Hills and the eastern part.

Palatability of the more common snowberries is almost identical, varying mostly with locality and plant associates. In the Northern Great Plains on summer range, snowberries are rated at least fair forage for cat-



tle and sheep. These shrubs are also fair to fairly good forage for deer and elk and in the Intermountain region they are valuable for livestock. Because the fruits persist into the winter, snowberries are an important feed for upland birds. Some species are highly regarded as cultivated ornamentals.

Common dandelion

Taraxacum officinale



Common dandelion, or simply dandelion, is an introduced perennial forb with a strong fleshy taproot. Deeply and irregularly dissected lance-shaped leaves, 2-15 inches long, form a basal rosette. Jagged leaf edges are described as resembling lions teeth. Yellow flower heads, about an inch across, are produced on leafless, tubular stalks 2-20 inches long. Flowering is most common in early spring, but may continue as long as conditions are favorable. Tiny seeds with numerous bristles form "puffballs," like those of salsify, and are readily carried by the wind. Plants are filled with a milky, bitter juice.

Dandelion, originally an Eurasian native, is probably the best known and most wide spread plant in the world, virtually occurring in all civilized parts. In North America, dandelion may be found wherever plants grow, as long as there is moisture until midsummer. In South Dakota, and elsewhere, dandelions become most prominent in lawns, pastures, and hay fields although they are present in almost every rather moist location.

Dandelion is frequently a serious pest, spreading easily and crowding out more desirable vegetation. Although generally looked upon with disgust, this tenacious intruder provides good forage on the range, and in certain areas is often regarded as important. It is readily eaten by all livestock, especially sheep. Dandelion is thought to be one of the most important wildlife foods, being utilized regularly by elk, deer, grouse, porcupine, bears, Canada geese and others. In many areas, dandelions are a good honey plant. For centuries man has used dandelion leaves for greens and the flowers for making wine. The bitter root has long been used medicinally as a tonic, liver stimulant, and mild laxative.

Golden pea

Thermopsis rhombifolia

Golden pea, false lupine, yellow bean, or golden banner is a member of the pea (legume) family. Plant heights range from 6-12 inches tall. This showy, perennial, native has many bright yellow flowers in short racemes. Flowering date is variable, from late April to early June. Bean-shaped pods, upon maturity, curve to form a half circle. Leaves are composed of three leaflets, attached at the same point. Two leaf-like bracts are attached on each side of the stem at the point of leaf attachment. Plants spread by seed as well as stout rootstalks.

Although this genus is limited to only a few species, their distribution in western North America is wide. They are found on low grassland plains to forested mountains. Specifically, golden pea is limited in distribution to the Central and Northern Great Plains, and is the only *Thermopsis* reported in South Dakota. In South Dakota it occurs on the drier uplands, sometimes in small patches, in the western three-fifths of the State.

Livestock seldom graze plants of this genus, although sheep may make limited use in early spring. Cattle and horses have been reported to graze golden pea in Montana but it is considered of little forage value. Due to poor palatability and vigorous rootstalks, this legume increases in abundance with grazing pressure, but seldom becomes abundant enough to be a nuisance. Cattle and horses reportedly have been poisoned by grazing this forb but there is little real evidence. Seeds have also been thought toxic when eaten by children.



Fanweed

Thlaspi arvense



Fanweed, or field pennycress, is an introduced, weedy annual forb growing a foot or more tall, commonly much branched above, but also occurring as a single stem. Basal leaves have leaf stalks and are shed early. Upper leaves clasp the stem. Seed pods are flattened, rounded and have the general appearance of a miniature hand fan. This early spring flowering annual of the mustard family is widely distributed throughout North America, finding a home in cultivated fields, waste places, disturbed areas, and on deteriorated rangelands of many types. It occurs throughout South Dakota. In terms of a range forage, its value is considered nil, although sheep and cattle graze it when good forage is lacking. Grazing by sheep is said to cause mutton to have bad flavor and when grazed by cattle the milk becomes disagreeably garlic-flavored. At times, fanweed seed has been used as a substitute for mustard.

Bracted spiderwort

Tradescantia bracteata

Bracted spiderwort, or simply common spiderwort, is a native perennial forb, mostly 4-12 inches tall. Purple to dark lavender flowers, appearing from June to August, are subtended by long leaf-like bracts. Numerous fleshy roots, concentrated at the plant base, have a rubbery appearance. Leaves are long, narrow, grass-like and curved downward. When stems are broken, a mucilaginous, stringy substance appears, resembling that excreted by a spider, hence the common name. Distribution of bracted spiderwort is not great, mostly within the area bounded by Minnesota, Missouri, Kansas, and North Dakota. Preferred habitats are wet meadows, and roadsides. In South Dakota bracted spiderwort is found across the State, commonly on rather sandy soils and probably more abundant eastward. The simple geometry and elegant coloring of the blossoms likely were responsible for inspiring the Indians to salute spiderwort in song.



Salsify

Tragopogon spp.



This group of biennial or perennial introduced plants are commonly known as salsify, goatsbeard, or oysterplant. Leaves are grass-like and clasp the stem. Salsify grows normally to 18 inches tall but may vary greatly from this height. Hollow stems contain a bitter milky substance. Flowering occurs throughout the summer. They are easily recognized when in fruit by the large "puffballs" at the top of each stalk. The puffballs are composed of numerous umbrella-like structures attached to seeds, enabling them to travel great distances with the wind. Three similarly appearing, but different species are known in South Dakota. They include *T. porrifolius* which has purple flowers, in addition to *T. pratensis*, and *T. dubius*, both of which have yellow flowers. *T. dubius* is pictured and has bracts at the base of the flower head that are longer than the ray flowers (yellow petals). The bracts of *T. pratensis* are not longer than the ray flowers.

Salsifys are European introductions, three of which are now present in a variety of plant communities in the United States up to elevations of 7,000 feet. All are found in South Dakota in waste places, cultivated fields and rangelands, frequently becoming very abundant, especially in roadcuts.

As introduced plants, the salsifys are classed as invaders, but are seldom a nuisance and are frequently grazed. Cooked roots of various salsifys are used as food with taste said to resemble parsnips or oysters. Salsify puffballs are commonly used in winter bouquets, being long lasting and attractive when spray painted.

Clover
Trifolium spp.

True clovers are a large group of herbaceous annual to perennial legumes. They characteristically have numerous, rather soft, leafy stems arising from a crown or from creeping stems that root at the nodes and send up shoots. Leaves normally have three leaflets which give rise to the generic name, "tri" meaning three, and "folium" referring to the leaves. In most clovers, the flowers are small and densely clustered in a more or less globular shape at the end of a stem. Flower colors are variable, including white, yellow, pink, red, purple, and then brownish at maturity.

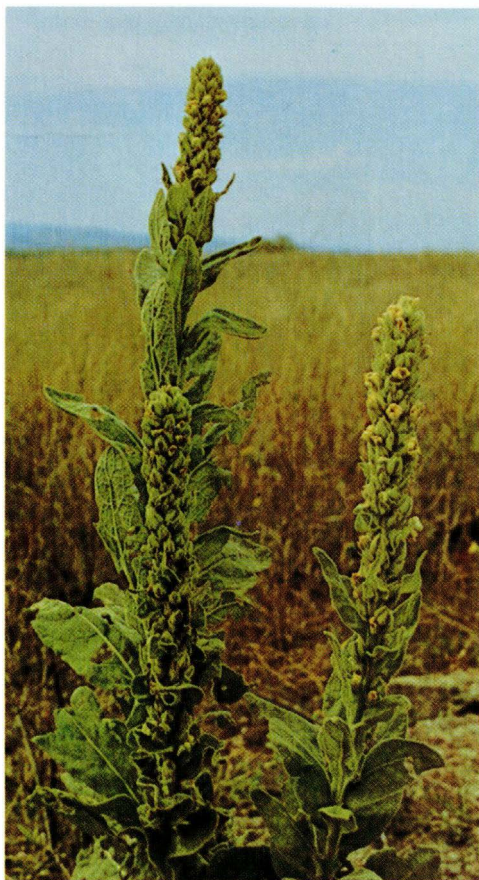
Distribution of clovers is nearly world-wide with most originating in Europe and Asia. In North America clovers are the second most important cultivated forage legume. In general, clovers are best adapted to the humid regions of North America or where supplemental water is available. Thus, in South Dakota, clover is almost exclusively cultivated in the eastern fifth of the State and in the Black Hills. They are, however, found scattered throughout the State. Although red clover *T. pratense*, (see photograph) is the most common clover in North America, its abundance in South Dakota is probably not as great as another European introduction, white clover, *T. repens*. White clover is a common associate of Kentucky bluegrass, and occurs in pastures of the eastern part of the State and the Black Hills, as well as in lawns and waterways state-wide.

Clovers are used extensively on cultivated ground as soil improvers. They do best on loams, silt loams, and clays that are well drained and retain high moisture. Clover can be effective in fixing atmospheric nitrogen. This fact, in addition to high palatability and good nutritive quality makes them especially suitable for pasture mixtures with grasses. Good clover-grass pastures will always outproduce pure grass when both are treated the same, due in part to the nitrogen that is supplied to the grasses by the clover. In South Dakota, white clover will maintain itself naturally where adapted. Red clover normally will not persist to as great an extent and requires reseeding to remain abundant. Many selections of clover are commercially available.



Velvet mullein

Verbascum thapsus



Velvet mullein, also commonly known as flannel mullein and velvet plant, is an introduced biennial forb. The entire plant is covered with dense, wooly hairs. Plant height ranges from 2-8 feet, with the single, upright stalk growing from a taproot. Leaves are 4-10 inches long. In the first year of growth, a velvety rosette of large leaves forms, frequently remaining green over winter. In the second year, from June to late summer, numerous, small, yellow flowers are produced on ex-

Woolly verbena

Verbena stricta

Woolly verbena, sometimes known as tall or hoary vervain, is a perennial, native, warm season forb that reproduces by seed as well as short rootstalks. Stems are stout, leafy, 1-4 feet tall, and densely hairy. Oval-shaped leaves are sharply toothed and covered with short, soft, white hairs. One to several stout spikes at the plant top produce numerous, small, purplish-blue flowers which appear from July through September.

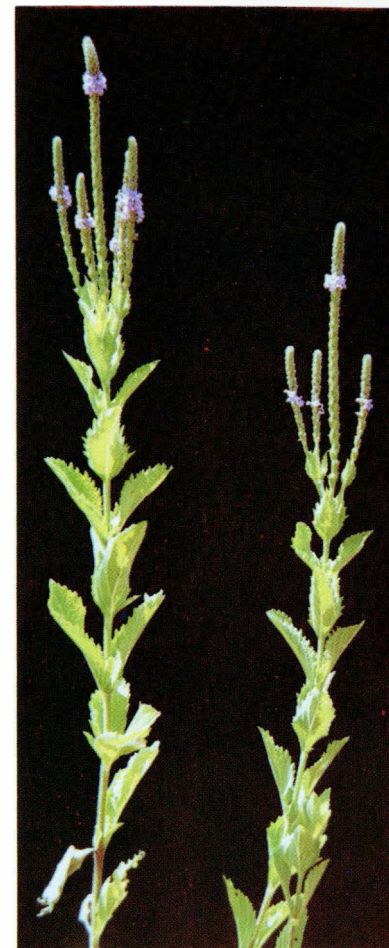
This drought resistant forb is present virtually throughout North America in waste places, prairies, and plains. It will become abundant by invading ranges and pastures that have been abused. Its occurrence in South Dakota is common, sometimes forming dense patches.

Woolly verbena has virtually no forage value, probably because of bitter taste. Lack of use and high drought resistance enhance its spread. Although this native is an undesirable forage, its late-summer flowers are an impressive sight.

tended stalks on a thick spike-like raceme. The stalks remain standing after curing, often persisting the following year.

Since its early introduction from Europe, velvet mullein is found in most of southern Canada and the United States. In South Dakota it is abundant in the eastern part of the State, as well as in and near the Black Hills of the western part. Preferred habitats are stony hills of pasture and rangeland, neglected fields, and waste places. It is especially prevalent and can become extremely abundant on grazing lands that have been misused.

This invader is practically useless as forage, although elk have been observed eating dried leaves when other feed was unavailable. Chipmunks and other small creatures scale the seed stalks in search of food. Europeans have used leaves for medical purposes, including smoking dried leaves for relief of bronchitis. In addition, the yellow flowers have been used to dye hair as early as the 4th and 5th century B.C.





American vetch, or purple vetch, is a perennial native legume. The slender pea-like vines (stems) of American vetch grow 6-24 inches long, trailing or twining by attaching with tendrils at the end of the leaves. Stems are smooth to slightly hairy. Leaves are divided into 8-18 linear to oval leaflets, commonly terminating with a minute awn-like tip. Flowers, numbering 3-9, are blue to purple and attached to racemes that arise from the leaf axils. Upon drying, the straight bean-like seed pods split lengthwise dropping the seeds.

American vetch is typical of this genus and perhaps the most widely distributed of many species in North America. For this reason, the name, *americana*, is appropriate. It is found in most of the southern Canadian provinces and in the United States, except in the Southeast. In western America, it is common in the plains on many soils and also is present in numerous mountain and foothill vegetation types. In South Dakota, American vetch can be found in most plant communities, frequently abundant, but not normally in dense patches.

American vetch is excellent forage, with high palatability for all livestock throughout the season. Because all foliage parts may be readily consumed, it does not withstand grazing pressure well and consequently acts

as a decreaser. In addition to its good forage value, it also fixes nitrogen which may be used by associated plants.

American vetch

Vicia americana

Nuttall violet

Viola nuttallii



Nuttall violet, or yellow prairie violet, is a perennial, native forb that flowers as early as April. Deep yellow blossoms frequently have purple veins near the center. Oblong to lance-shaped leaves are stemmed and arise near the base of the plant. This short growing forb normally does not exceed 10 inches in height and most commonly is much shorter.

Nuttall violet is found in the foothills and plains of southcentral to southwest Canada and adjacent states south to Arizona. In South Dakota nuttall violet is common to the foothills and plains. In all probability, abundance is greatest westward. Several other violets occur in South Dakota with flower color often blue or purple. Many violets are confined to wooded areas, whereas, nuttall violet, is characteristic of open grasslands.

At least 30 species of violets are found in western North America. All are more or less palatable to livestock, but because they occur rather sparingly they are of little importance as forage. Nuttall violet is readily observed in the early spring when much of the associated vegetation is just beginning to show signs of life.

Cocklebur
Xanthium spp.



Cocklebur, also known as sheepbur or clotbur, is a coarse, weedy, native annual 1-3 feet or more in height. Recognition is easy because of spiny, hooked, bur-like fruits attached at the base of the leaves. Confusion with American licorice, which also has spiny bur fruits, can be eliminated because licorice is a perennial with rhizomes. Large coarse leaves of cockleburs are 1-3 inches wide and 2-5 inches long, with wavy or toothed margins. Small male flowers are produced in short terminal branches and non-showy female flowers in clusters located in leaf axils.

Distribution of cockleburs is throughout the North American continent, occurring along roadsides, waste places, feed lots, moist spots, and especially around pond and swamp edges or along stream banks. In South Dakota cockleburs are relatively abundant with at least six species present. Because most are similar in appearance, habitat, and poisonous properties, they may logically be considered together.

Only the young seedlings and burs of cocklebur are poisonous, although burs are seldom consumed because of their hard spiny seed coat. Young cocklebur is poisonous to cattle, sheep, and hogs, especially young pigs. About 12 ounces of seedling leaves can be fatal to a young pig. Symptoms including depression, nausea, vomiting, rapid but weak pulse, and low temperature, appear within a day after the plants have been eaten and continue for only a short time. Aside from their poisonous properties, the burs are a nuisance, becoming lodged in hair and wool of livestock. Young plants are easily killed with chemical sprays, but due to dormant seed, spraying in successive years is generally necessary.

Yucca

Yucca glauca

Yucca, small soapweed, spanish bayonet, or bear grass is a perennial, native, evergreen plant. Stiff bayonet shaped leaves have thready margins and arise from the plant base. Its appearance is so distinctive, confusion with other plants is almost non-existent. Stout flower stalks reach 1-4 feet high during blossoming in June and July. Flowers are large, nodding, greenish-white and are produced in a terminal panicle. Fruit is a large erect capsule with many, winged, black, seeds. Reproduction is by underground stems and seed. Because of vegetative reproduction, colonies of yucca often occur.

There are at least 30 species of yucca mostly native to the arid Southwest and Mexico. One is the State Flower of New Mexico. *Yucca glauca* is the primary species in the Great Plains and the only one reported for South Dakota. It is found within the area bounded by Iowa, Texas, Arizona, and Montana. In South Dakota, it occurs most frequently on dry, sandy, gravelly, or rocky slopes of the mixed prairie, although it is found throughout.

Summer livestock grazing little affects yucca abundance. However, winter use can cause its decline. Young plants are sometimes eaten by cattle and sheep as are the flower clusters. Of historical interest, American Indians used the fibrous leaves for basket weaving, and root juices for producing soap lather. In addition, the leaf points and attached fibers were used in sewing. Of ecological interest, a single insect, the yucca moth, with special structure and instincts, pollinates the yucca flower permitting seed production. In turn, larva of the yucca moth feed, by necessity, on a few of the developing yucca fruits. This intimate relationship is so unique that neither the yucca nor the moth can complete their life cycles without the other.



Deathcamas

Zygadenus spp.



The several species of deathcamas, numbering about 15, are perennial native herbs with mostly basal, grass-like, V-creased leaves and underground enlarged stem bases (bulbs). Depending on species, the upright, single, unbranched, stems reach 8-30 inches tall and produce a terminal cluster of spring flowering, yellowish-white blossoms. This member of the lily family is very important because it is extremely poisonous, plus the fact it is easily confused with harmless wild onions and mariposa lilies. Onion leaves are tubular, or nearly so, either hollow or solid, and have the dependable onion taste and smell, while deathcamas is both odorless and

tasteless. Leaf cross sections of the odorless mariposa lilies are U-shaped in contrast to the V-shape in deathcamas.

Species of deathcamas are broadly distributed from New Brunswick to Alaska, south to Florida and northern Mexico. They grow in most soil types, both dry and wet, in full sunlight or shade, as singles or numerous plants, and are usually mixed with other herbaceous vegetation. In South Dakota at least five species have been identified, and these occur mostly west of the Missouri River. The photograph shows *Z. paniculatus* which typifies the appearance of this group.

Although deathcamas species do vary in degree of toxicity, all are potentially dangerous. All plant parts are poisonous at all times, but livestock poisoning occurs most frequently in the spring before desirable forage is abundant. Sheep are most readily affected, but cattle and horses are occasionally poisoned. Great numbers of sheep from the same band have died on western ranges from deathcamas poisoning. Symptoms of poisoning include rapid breathing, excessive salivation, nausea, weakness and staggering, convulsions and coma. Depending on species, symptoms appear in 2-8 hours with death or recovery in 12-48 hours. Minimum lethal doses result when sheep eat an equivalent of 0.6% to 6.0% of their weight in plant parts at a single feeding.

Livestock losses can be lessened by these practices: (1) keep livestock, particularly sheep, off ranges infested with deathcamas until other forage is available; (2) use supplemental feed; (3) eliminate or reduce abundance of deathcamas by chemical weed control.

GLOSSARY

- A** **ALKALI**—A soluble mineral salt, usually sodium, present in some arid region soils in quantity detrimental to some plant growth.
- ALTERNATE**—Refers to leaf arrangement, meaning not on directly opposite sides of a stem.
- ANNUAL**—A plant that completes its life cycle and dies in one year or less. Also winter annuals which commence growth late one growing season and complete the life cycle the next growing season.
- ANTHER**—Pollen producing organ of a flower.
- APPRESSED**—Lying close or flat.
- AWN**—A bristle-like structure, common to the grasses. that is attached to the lemmas or glumes.
- AXIL**—Just above the base of the leaf where it attaches to the stem.
- B** **BASAL**—Referring to the base of a plant, as “basal” leaves; arising from the base.
- BIENNIAL**—Plants that live for two growing seasons, normally flowering only in the second season.
- BLADE**—The expanded part of a leaf; in grasses the part that is not attached to the stem.
- BRAC(T) (S)**—A reduced leaf or scale-like structure commonly at the base of a flower or flower cluster.
- BULB**—A thickened, globular, underground organ at the base of a plant made up of fleshy scales on a shortened axis; as in wild onion.
- BUNCHGRASS**—A grass which takes on a characteristic growth habit by forming a bunch or tuft; e.g. crested wheatgrass.
- BUR**—A rough prickly seedcase; e.g. cocklebur.
- C** **CALYX**—The outer series of floral parts of a flower; usually green.
- COLONY**—A group of naturally occurring plants of a single species that occupy a limited area.
- CAPSULE**—A ripened fruit, opening at maturity, and containing several seeds.

- COMMUNITY**—See plant community.
- COOL-SEASON PLANT**—A plant that makes most of its growth and flowers during spring, slows growth or becomes dormant during the hot part of the summer, and may resume growth in the fall with the advent of cool temperatures.
- CORM**—Solid, short, thick, erect, underground stem; as in mariposa lily.
- COROLLA**—The petals of a flower in total; usually the showy part.
- CULM**—The jointed stem of grasses and sedges which normally supports the seed head.
- D** **DECIDUOUS**—Used to describe perennial woody plants that lose their leaves in the winter.
- DECREASER**—Plants of the original vegetation that decrease in relative abundance with grazing pressure.
- DISSECTED**—Cut or divided into numerous segments; particularly a leaf.
- DORMANT**—Resting; applied to buds or other parts or the entire plant; especially during winter or drought.
- E** **ECOLOGY**—Study that deals with relations between living organisms and their environment.
- F** **FIBROUS (roots)**—The type of root system which consists of many fine diffuse branches.
- FLORA**—The plant life of a specified area.
- FLORET**—The individual flower of a grass, located between the glumes.
- FLOWER**—An organ in all flowering plants (including grasses and sedges) which, when fertilized, is capable of producing a fruit.
- FOLIAGE**—Green plant parts; particularly leaves.
- FORB**—A herbaceous plant that is not a grass or grass-like plant; e.g. black sampson.
- FRUIT**—A ripened ovary and associated flower parts; e.g. a seed of grass, a sunflower seed, a chokecherry fruit.

G GENUS (GENERA)—A group of related plants (species); e.g. the wheatgrass genus is *Agropyron*; the goldenweed genus is *Solidago*; each are different genera.

GLABROUS—Without hairs; often smooth.

GLAND(ULAR)—A small appendage or “spot” which can secrete, or appears capable of secreting substances.

GLUME(S)—Scale-like structures at the base of a grass spikelet, most commonly two.

GRASS—A plant of the Gramineae (grass) family, with reduced, non-showy flowers, grain type fruit, and narrow, usually long leaves; e.g. wheat, blue grama.

GRASSLANDS—Any land on which grasses are the dominant plants.

H HABITAT—The place where a plant naturally grows; e.g. swamp, forest, prairie.

HALF-SHRUB—A perennial plant that is partly woody, usually at the base, but is also partly herbaceous; e.g. nuttall saltbush.

HERB—A non-woody plant; one whose above ground parts do not survive winter; e.g. black samspon or western wheatgrass.

HERBACEOUS—Having the characteristics of a forb or herb.

I INCREASER—Plants that are present as part of the original vegetation and increase in relative abundance with grazing pressure.

INFLORESCENCE—The entire flowering part of a plant; examples, spikes, panicles, and heads.

INTERGRADE—Not clearly distinct. Similarity between closely related plant species, often causing difficulty in exact identification.

INTRODUCED (plants)—Refers to those that are not part of the original vegetation of an area.

INVADER—Plants that were not present in undisturbed original vegetation and became established with depletion by grazing pressure or disturbance.

K KEEL—The ridge on a surface, such as the central rib of a folded grass leaf blade which resembles the keel of a boat; also the two lower fused petals in blossoms of the pea family.

L LANCE-SHAPED—Broadest near the base; gradually tapering to a point, and several times longer than broad.

LAX—Soft, drooping or loose.

LEAFLET—One of the divisions of a compound leaf, with each division having the appearance of a leaf.

LEGUME—Any plant belonging to the pea family.

LEMMA—The lower of two scale-like structures that encloses a grass flower or seed. Located directly above the glumes.

LIGULE—A small projection on the upper side and at the base of a grass leaf blade where it joins the sheath.

LINEAR—Long and narrow with nearly parallel margins; like a grass leaf blade.

LOBE—A rounded division of a plant organ; e.g. big sagebrush leaves are three-lobed.

LOCOISM—A type of livestock poisoning produced when animals eat certain plants in the legume family. The name is derived from the symptoms of poisoning which make animals appear crazy or “loco.”

M MIDGRASS—Those grasses which normally grow 18-36 inches tall; e.g. western wheatgrass.

MIXED PRAIRIE—A native grassland type of the Central and Western Great Plains, characterized by a mixture of tall, short, and midgrasses.

N NATIVE (plants)—Pertains to those that are part of the original vegetation of an area.

NATURALIZED—Refers to a plant that was not originally a part of the vegetation but is now capable of reproducing and perpetuating itself in the new environment; e.g. Kentucky bluegrass or downy brome in North America.

NODE—The place on a stem where leaves or branches arise; also the joint of a grass culm.

- P** **PAD**—In cacti, the enlarged stems that resemble fleshy leaves on which the spines are borne.
- PANICLE**—A branching flower cluster. It may be loose such as in indian ricegrass or compact such as in prairie junegrass.
- PALATABILITY**—A quality of forage which influences the relish that a grazing animal has for a plant or plant part.
- PALEA**—The upper of two scale-like structures that encloses a grass flower or seed, and located directly above the glumes.
- PALMATE**—Resembling the shape of the palm and outstretched fingers of a hand.
- PASTURE**—Grazing lands under relative intensive management, usually supporting introduced forages and receiving periodic tillage, fertilization, mowing, irrigation, etc.
- PERENNIAL**—Plants which can live for 3 years or more.
- PETAL**—An inner set of flower leaves, often brightly colored and showy.
- PINNATE(LY)**—A leaf consisting of several leaflets attached to each side of a central stem.
- PLAINS**—Extensive tracts of nearly level or gently rolling terrain, originally characterized by grassland vegetation; particularly those dominated by mid- and short grasses.
- PLANT COMMUNITY**—A group of plants living together in a common environment.
- POD**—General term for a dry fruit which opens to release seeds when mature.
- PRAIRIE**—Extensive tracts of nearly level or rolling grasslands, especially those dominated by tall grasses.
- PRICKLE(S)**—A sharp, needle-like projection on a plant part.
- PUBESCENT**—Covered with hairs.
- PYRAMIDAL**—In reference to inflorescence shape, with the outline resembling that of a pyramid; as in witchgrass.
- R** **RACEME**—A type of inflorescence with an elongated axis from which short stalked flowers are borne.
- RACHIS**—The central axis of a spike, raceme or compound leaf.

RANGE—The geographic area in which a plant occurs; also land dominated by native plants suitable for grazing, usually in large tracts, frequently arid or semi-arid, sometimes revegetated, and normally unsuited for cultivation.

RHIZOME—Underground stems, especially in grasses which can produce shoots and roots at the nodes, giving rise to new plants.

ROOTSTALK—An underground stem which gives rise to new plants; a rhizome.

ROSETTE—A cluster of leaves at or near the ground surface.

S **SALINE**—Reference to a soil which is nonalkaline, and contains enough free salts to interfere with growth of most plants.

SCALY—Scale-like appearance of small or rudimentary leaves.

SEDGE—Plants of the sedge (Cyperaceae) family that are “grass-like” but differing from grasses in having solid, triangular stems; e.g. needleleaf sedge.

SELENIUM—An element, essential in nutrition in minute quantities, which occurs in some soils, and when taken up by plants that are later grazed, may produce toxic symptoms known as selenium poisoning.

SEPAL—An outer set of flower parts, usually green.

SERRATE—In reference to a leaf edge which resembles the teeth of a saw.

SHEATH—In grasses and sedges, that part of the leaf which clasps or encloses the stem.

SHORT GRASS—Those grasses which normally are not over 18 inches tall; e.g. buffalograss.

SHORT GRASS PLAINS—Native grasslands which are dominated by short grasses.

SHRUB—A perennial woody plant, differing from a tree by having several stems arising near the base, and normally shorter height; e.g. chokecherry.

SMUT—A fungous disease of plants, especially grasses, which produces black masses of spores where kernels should be.

SOD GRASS—Grasses that form a sod by means of rhizomes or stolons; e.g. Kentucky bluegrass.

SPECIES—A group of related plants which are genetically very similar and are capable of cross-fertilizing to produce fertile offspring. *Andropogon scoparius* and *Andropogon gerardi* are two species of the same genus, *Andropogon*.

SPIKE—A type of inflorescence which has stemless flowers, thereby creating a crowded or compact appearance as in the wheatgrasses.

SPIKELET—A part of the inflorescence in grasses or sedges containing one or more flowers (florets) and associated glume(s).

SPINDLE-SHAPED—Tapering at each end.

SPINE—A sharp woody outgrowth from a stem; a thorn; as on cactus.

STEPPE—Non-forested, usually level, grasslands in southeastern Europe and in west-central Asia.

STOLONS—A horizontal stem above the ground surface that roots at the node and produces new shoots; as in strawberry and buffalograss.

T TALL GRASS—Grasses that normally grow over 36 inches tall; e.g. big bluestem.

TALL GRASS PRAIRIE—Synonymous with true prairie.

TAME PASTURE—See pasture.

TAPROOT—A stout root which grows vertically downward.

TENDRIL—A thread-like spiralling extension on some plants which attaches to objects for support.

TERMINAL—Situated at the end of a branch.

TILLER(ING)—A shoot arising from the base of a plant; or the process of such formation.

TRUE PRAIRIE—The native prairie grassland characterized by tall and midgrasses. Located primarily in the Eastern Great Plains.

TUBER(OUS)—An enlarged, underground portion of a stem that is capable of reproduction; e.g. potato tuber.

TUFT(ED)—Grouped together from a common base; similar to "bunch" as in bunch-grass.

TUSSOCK—A tuft, or bunch; especially referring to bunchgrasses or bunch sedges.

U UNDERSTORY—Plants growing beneath the canopy of other plants; e.g. short grasses beneath tall grasses; shrubs beneath trees.

W WARM-SEASON PLANT—A plant which makes most or all of its growth during the spring and summer, flowering in the summer or autumn.

WINTER ANNUAL—Plants which normally germinate in the autumn; overwinter, usually as a cluster of basal leaves; commence growth in early spring; flower; set seed; and die by late spring or early summer; e.g. japanese brome, and winter wheat.

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