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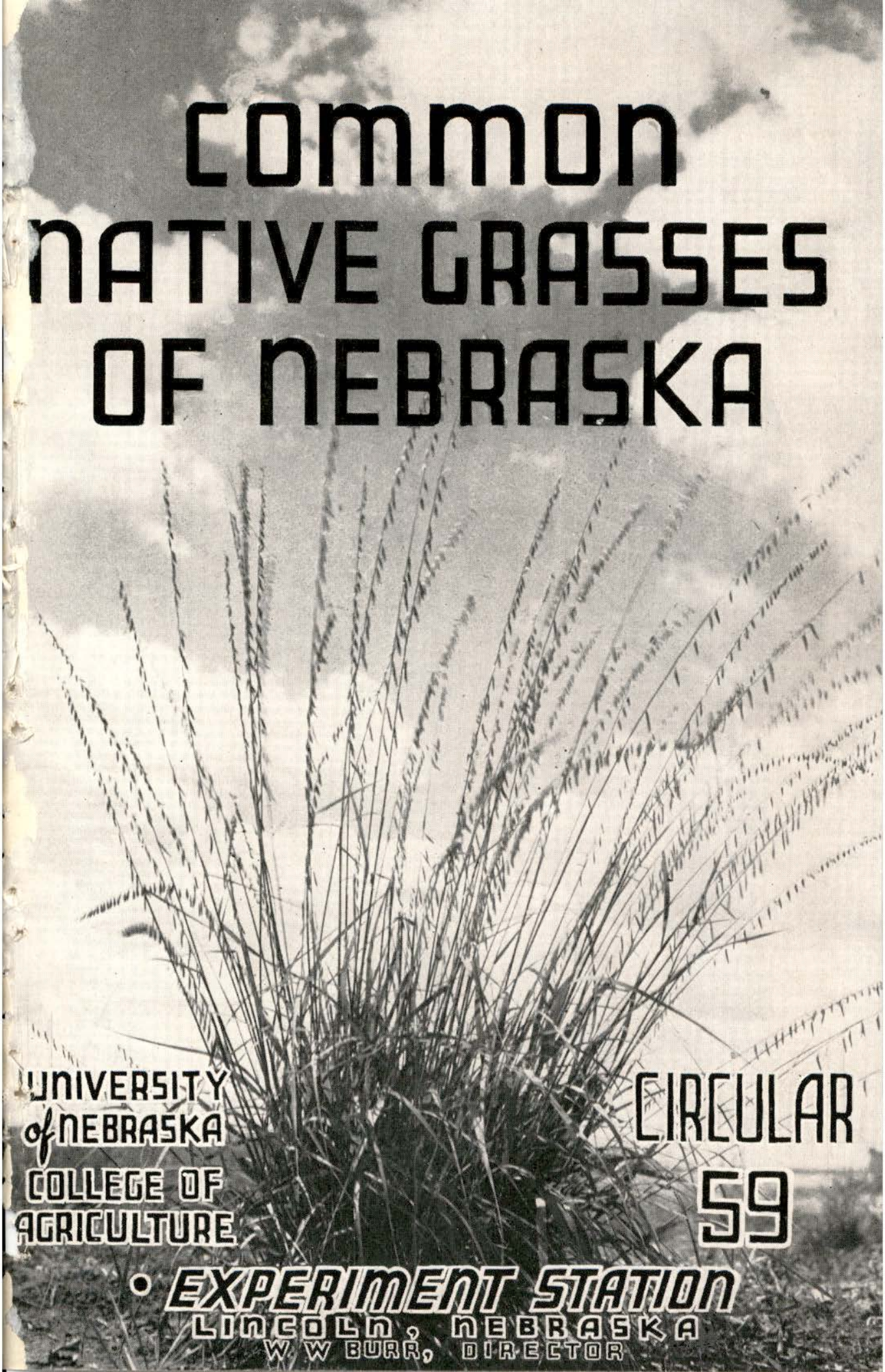

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CONTENTS

[1] Botanically the grass family, *Gramineae*, consists of 14 tribes (subfamilies) of which 10 are represented by native species in Nebraska. Seven of these are represented by one or more important species.

Common Native Grasses of Nebraska

A. L. FROLIK AND F. D. KEIM

GRASSLAND vegetation covered nearly all of the state of Nebraska prior to the settlement by white man. Even today exensive areas of land are still occupied by native grasses. These areas include meadows, pastures, roadsides, and other places where cultivation is unprofitable or impossible. There are a large number of species of grasses which are recognized as being native to the state. These grasses vary decidedly in their relative importance. Some of them are distributed widely and commonly, while others appear sparingly in small, localized areas. Comparatively few species produce a high percentage of the total yield.

Native grasses play an important role, usually indirectly, in the income of Nebraska farmers. About 23 million acres or nearly 50 per cent of the area of the state is in permanent pasture and range lands. The pasture lands are of two principal kinds: (1) the pastures of the eastern one-fourth of the state, once characterized by the tall grasses, into which introduced species, chiefly Kentucky bluegrass, have come, and (2) the pasture and range lands of the western three-fourths of the state made up chiefly of shorter native grasses. Accordingly native grasses furnish some pasturage in the former region and nearly all the pasturage in the latter region. In addition, over 2 million acres of native-grass meadows are harvested annually for their prairie hay. Native grasses are also being used for other purposes such as regrassing land being taken out of cultivation, sodding dams, terrace outlets, and gullies, as "buffer" strips in strip cropping, and for sodding lawns.

During the past few years much attention has been given to the collection of seed of the more important native grasses for seeding marginal cultivated lands and for reseeding damaged pastures and meadows. It has been shown that such seed can be successfully collected in large quantities. Breeding and other types of improvement work are being carried on with several of the more common and desirable species in order to develop strains that are better with respect to adaptation, forage and seed yields, and feed qualities. Big bluestem, switchgrass, side-oats grama, blue grama, buffalo grass, and western wheatgrass are particularly promising.

Twenty-four native grasses that are the most important and most generally distributed in Nebraska are described and illustrated in this circular. Information concerning their distribution and economic value is given.

Anyone interested in learning to identify the common native grasses should be able to do so by comparing plant specimens with the illustrations and descriptions herein presented. The work of identifying grasses may seem technical and limited only to botanists or those with similar training. Nearly anyone, however, can learn to identify many of the native grasses if willing to spend a little time and effort.

SALTGRASS

Distichlis stricta (Torr.) Rydb.

Saltgrass is a low-growing perennial attaining a height of 4 to 12 inches. The individual stems are rather rigid and either erect or decumbent at the base. The leaf blades are numerous, erect, flat to somewhat rolled, and sharp-pointed. The leaf sheaths overlap. There is commonly some hairiness in the vicinity of the collar. The plants have a uniform, dark-green color.

The plants are dioecious, *i.e.,* the staminate or male and pistillate or female organs are in separate flowers and also borne on different plants. The male and female plants may be found close together, but usually in separate and small or extensive patches. The inflorescence is of the panicle type, rather congested, and usually pale or greenish. The spikelets contain from 8 to 15 florets, with the staminate spikelets usually having more florets than the pistillate spikelets. The plants usually head out and flower during July and August. The spikelets are rather persistent, remaining on the plants for a considerable period of time after maturity.

Saltgrass reproduces rapidly by long, prominent, scaly rhizomes. It produces a dense sod. The individual rhizomes elongate rapidly under favorable conditions, thus making this plant an aggressive species wherever competition is not too severe. Saltgrass is a rather poor competitor in habitats where taller species will grow. Saltgrass is also referred to as alkali grass and wiregrass. The latter name is not generally recommended since it is so commonly used with several other species.

Saltgrass grows generally throughout the state on alkaline soils. It is highly alkali tolerant and it grows better on highly alkaline soils than any of the other common native grasses. Its closest competitor in this respect is western wheatgrass. Saltgrass is also found in dry pastures, sandy lands, and other similar areas where other species do not thrive well because of the dry environment.

Saltgrass is not generally palatable as a feed for livestock, but it furnishes pasturage when other feed is scarce and it has quite satisfactory nutritional qualities. It is not usually harvested for hay because of its low yields, its tough resistance to mowing, and low palatability. It may be found to some extent in native-grass pastures, primarily because it occurs there naturally and not because farmers have recognized it as desirable for grazing purposes. It has been noted that saltgrass grows quite well on sandy soils in the sandhills area, and has been utilized in a few instances as a lawn and cover grass in the yards and lawns of the ranchers. It withstands severe drouth and tramping and makes a fairly attractive appearance. It may be propagated vegetatively, as is buffalo grass, and its possibilities for this purpose should not be overlooked.

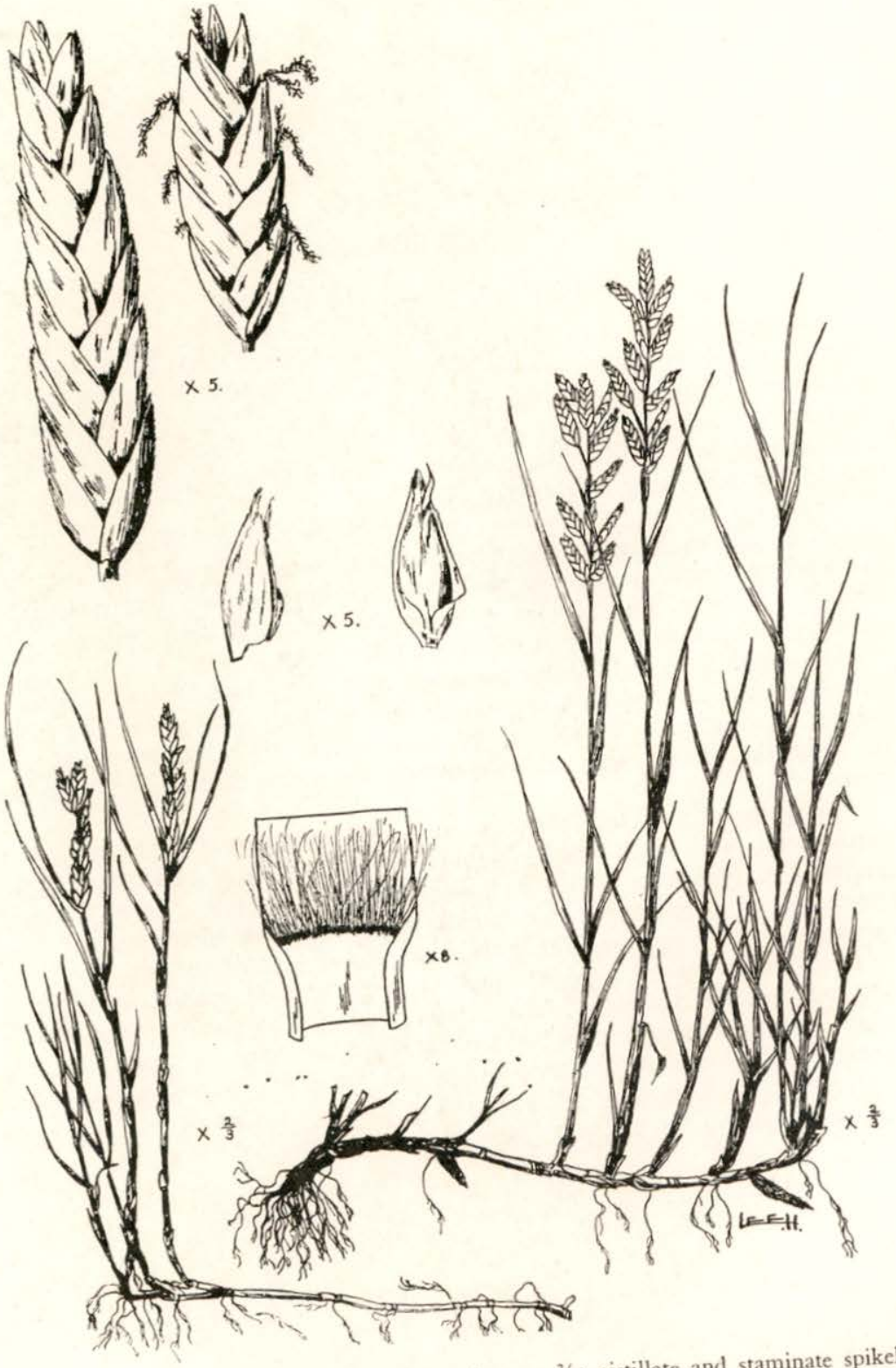

FIG. 1.—Saltgrass. Staminate and pistillate plants x ⅔; pistillate and staminate spikelets x 5; seed x 5; ligule area x 8.

LOVEGRASS

Eragrostis trichodes (Nutt.) Nash

Lovegrass is an erect, tufted perennial growing 1 to 4 feet tall. The stems have short lower internodes and a long uppermost internode. The plant has a medium bright-green color. The blades are flat, elongate, tapering to a slender point, and rough on the upper surface. The sheaths are smooth, longer than the internodes, and are hairy at the collar. The ligule is a dense ring of short hairs.

This species has the panicle type of inflorescence. The panicles are large, usually making up about half of the total height of the plant. The panicles are open, usually purplish, and the branches are fine and usually branched 3 or 4 times. The spikelets are borne on long pedicels. The numerous spikelets bear 4 to 6 florets, and are awnless.

Lovegrass is a bunch-forming grass with fairly large tufts. The characteristic tufts are readily recognizable on the sandy soils where the species grows. Lovegrass is seldom recognized under any other common name in Nebraska, except that in some instances it has been called blow-out grass.

Lovegrass grows chiefly on dry soils. It occurs to a limited extent in southeastern and south-central Nebraska. It is especially common in the sandhills of Nebraska, being well adapted to sandy soils. It grows more commonly on north slopes than on the south slopes of the dune-sand hills, apparently not being too highly tolerant of a dry environment.

It produces forage of good quality and is grazed readily by livestock and will usually disappear under close grazing. While it makes hay of good quality, this species is seldom utilized for this purpose, since the types of soils where it grows in abundance do not produce ample forage to justify harvesting hay. Lovegrass is to be considered as a desirable pasture species in the grazing lands of the sandhills.

FIG. 2.—Lovegrass. Plant x ⅓; seed x 10; ligule area x 3; floret x 8; spikelet x 5.

WESTERN WHEATGRASS (*Agropyron smithii* Rydb.)

Western wheatgrass is an erect, rigid perennial growing from 1 to 4 feet tall. The stems and leaves are often covered with a waxy coating that gives them a blue-green color. The leaf blades are bluish-green to green in color, harsh, rigid, and very rough on the upper surface. The ligule is short, membranous, and slightly toothed. Two prominent claw-like structures called auricles appear at the junction of the leaf blade and sheath and clasp the stem. The auricles are frequently reddish to purplish.

The inflorescence consists of long, slender, erect spikes. The spikelets are large as compared with most other grasses and contain from 7 to 12 florets. One spikelet is borne at each joint of the rachis, but occasionally, under favorable conditions, two spikelets may arise at the same joint. This condition gives the inflorescence a very prolific appearance. The florets are either awnless or awn-pointed. A large percentage of the florets upon maturity commonly do not contain grains.

Wheatgrass reproduces by long, slender rhizomes as well as by seed. It develops a coarse, heavy sod. Under favorable conditions the rhizomes may grow 3 or 4 feet during one growing season. This grass is sometimes referred to as bluestem because of the characteristic bluish color.

Western wheatgrass is highly resistant to drouth and cold. It is one of the most tolerant of the native grasses to alkali. It appears commonly in the western half of the state, being an important species in the panhandle section. This grass is of considerable importance in central Nebraska. It was of minor importance in the eastern end of the state, but it has become increasingly more important there during the recent dry years. It occurs over the entire state on alkali lands where native vegetation grows. Wheatgrass also grows in wet habitats to which it is well adapted.

Wheatgrass furnishes forage of good quality. As a pasture crop, it furnishes excellent feed. Overgrazing should be avoided to prevent killing out of the plants, while too light grazing will cause the plants to become stemmy and less palatable. Hay harvested from western wheatgrass meadows is of fair quality. It is more harsh and less palatable than bluestem hay. In some sections of the United States, wheatgrass is the chief component species of prairie hay and the hay is of such distinctive quality that the Federal Hay Standards provide for a special wheatgrass class. Western wheatgrass is susceptible to the fungus, ergot.

This grass is recognized as one of the best native grasses for western Nebraska, because of its drouth and cold resistance and its ability to gain possession of an area rapidly. It is recommended in mixtures for seeding and reseeding land in the western part of the state. Seed can be obtained by harvesting and threshing and is available commercially. Yields range from 80 to 200 pounds per acre.

Wheatgrass is occasionally recognized as a troublesome weed, because of its persistence and its ability to spread rapidly by means of rhizomes.

It can be readily transplanted by sodding and offers considerable promise for sodding dams and terrace outlets.

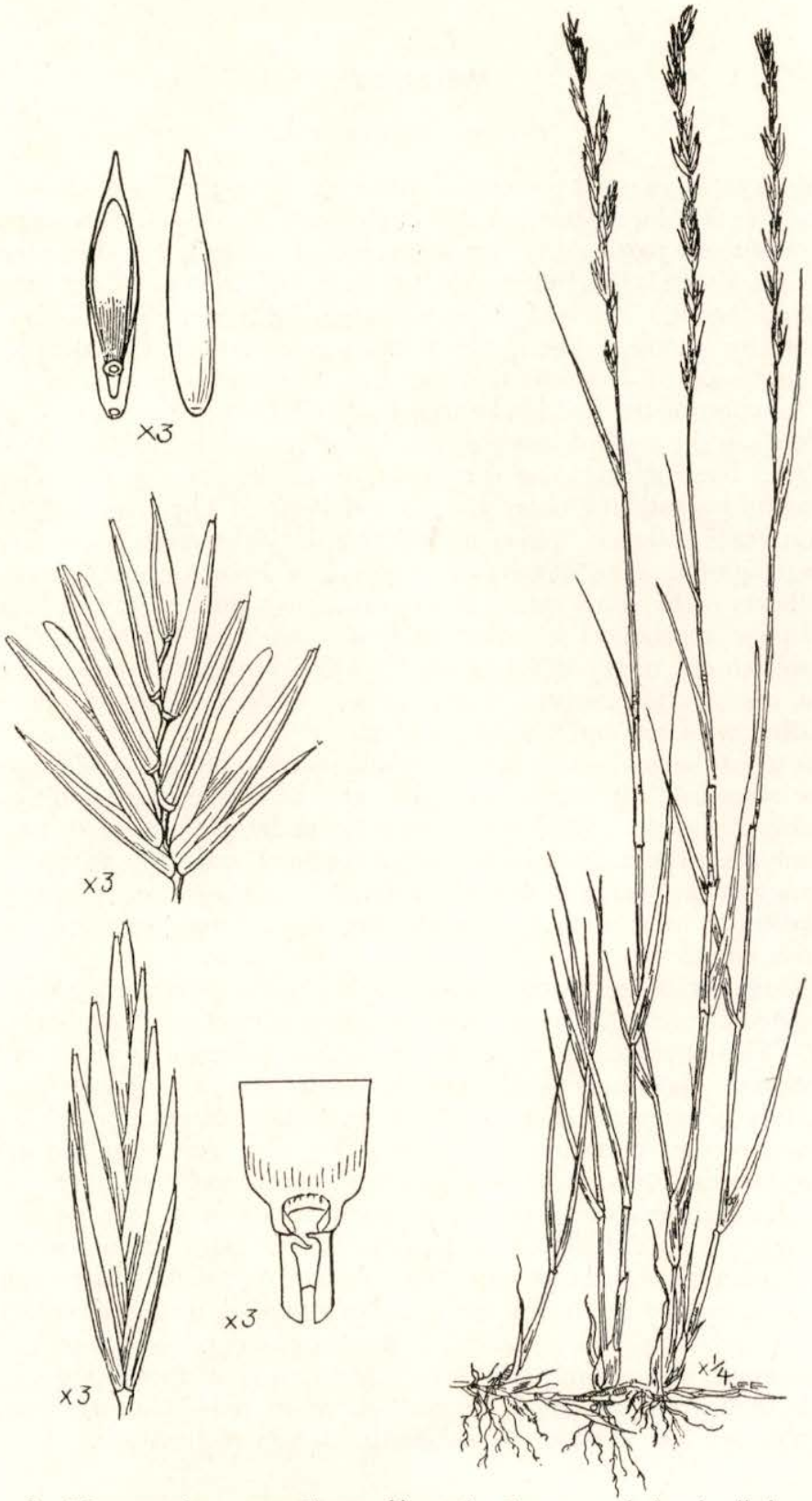

FIG. 3.—Western wheatgrass. Plant x ¼; seed x 3; open and closed spikelets x 3; ligule area x 3.

WILD RYE

Elymus canadensis L.

Wild rye is an erect perennial attaining a height from 2 to 5 feet. Although it is a bunchgrass, it may form pure, dense stands under favorable conditions, particularly on lowlands. It usually produces isolated clumps on upland soil, where soil moisture is limited. The stems are smooth and stout. The leaf blades are large, flat, and rough. The sheaths are generally smooth. The ligule is short, membranous, and fringed with very short hairs. Two prominent claw-like structures called auricles appear at the junction of the leaf blade and sheath and clasp the stem.

It has a spike type of inflorescence. The spikes are from 2 to 8 inches in length. They appear very fuzzy or bristly because of the numerous awns borne by both the outer glumes and florets. There are four or five awns on every spikelet. Upon nearing maturity the erect heads assume a nodding position. The spikelets are borne 2 or 3 abreast and contain from 3 to 5 florets each. This species flowers and seeds during July and August.

Wild rye reproduces by short rhizomes but these are not sufficiently aggressive to aid in the development of a sod but merely aid in the production of the characteristic plant clumps. Wild rye also is referred to as nodding wild rye and Canada wild rye.

This grass thrives best on lowland soils under conditions where moisture is quite abundant. It occurs on higher ground if growing conditions are reasonably favorable. Wild rye appears generally over the state but most commonly in eastern Nebraska, and is confined primarily to the valleys and draws in the western end of the state. It is usually of minor importance within a local area, seldom making up a large percentage of the vegetative cover.

Wild rye produces forage of good quality if harvested sufficiently early. If harvested for hay, the vegetation should be cut before the inflorescences appear. This is especially important with this particular grass in order to avoid stemmy and unpalatable feed. It usually begins to flower early, *i.e.,* during July or early August, but almost invariably makes up such a small percentage of the vegetation in meadows that very little attention need be given to the time of cutting as far as it is concerned. Wild rye is satisfactory as a pasture grass where it occurs in native-grass pastures.

Wild rye is susceptible to the fungus, ergot. This fungus propagates readily under high moisture conditions at the time that wild rye blooms. Ergot in mature or nearly mature rye plants appears as large, dark, horny structures replacing the rye grains. This fungus is poisonous to livestock if fed in appreciable quantities. Hay containing considerable ergot should either be destroyed, discarded, or as a last resort fed in limited quantities with ergot-free hay in order to reduce the danger to livestock.

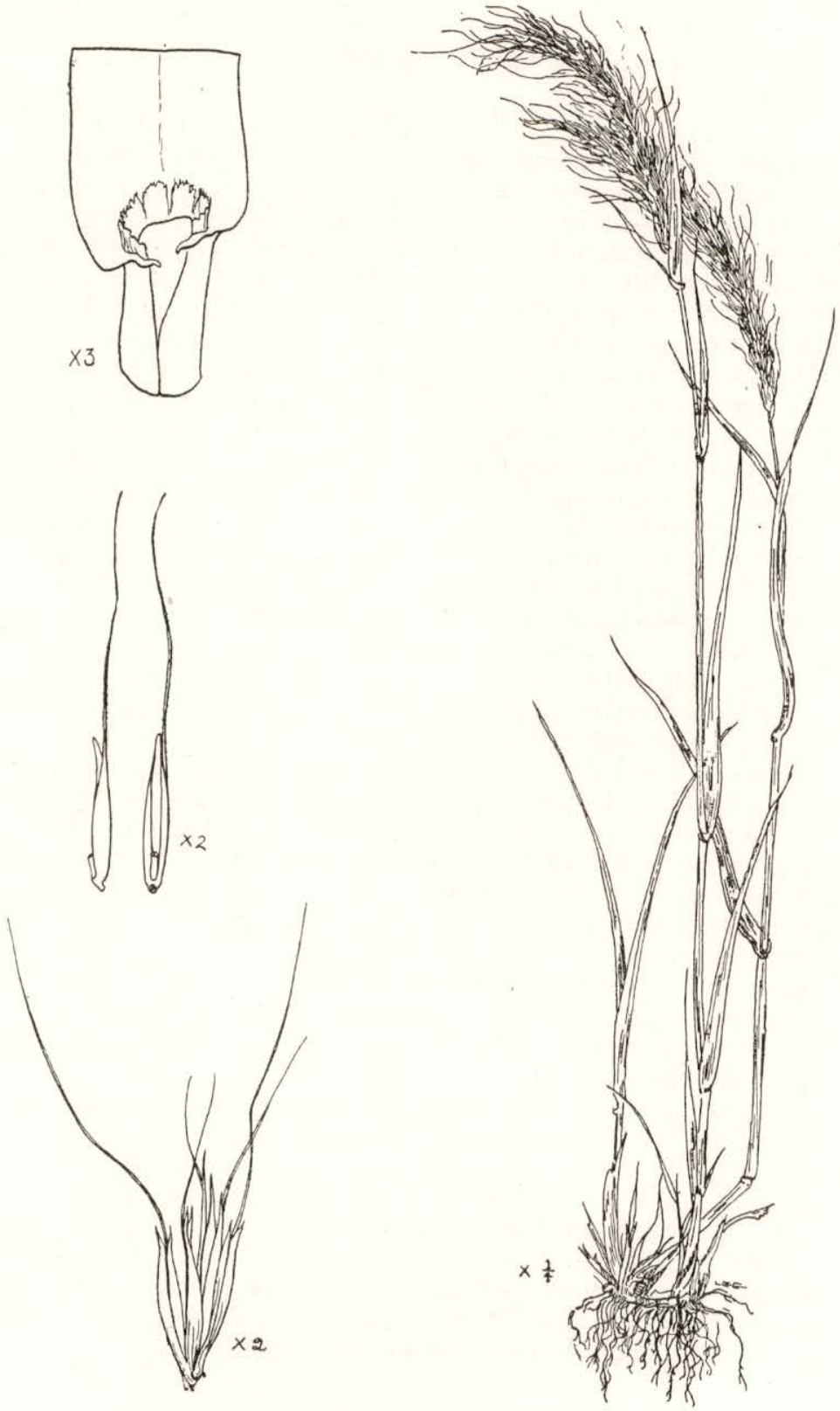

FIG. 4.—Wild rye. Plant x ¼; ligule area x 3; seed x 2; spikelets x 2.

JUNEGRASS

Koeleria cristata (L.) Pers.

Junegrass is a tufted, erect, rigid perennial which grows from 8 inches to 2 feet tall. The plants resume growth early in the spring, grow rapidly, but often languish during dry summer months. The vegetation often appears partially or entirely dried during this time. The leaf blades are usually flat, but curl when drying, are bluntly pointed, often pubescent, and very rough on the upper surface. The sheaths are commonly hairy, at least on the basal portion. The ligule is membranous and very short.

The inflorescence is of the panicle type. It emerges fully out of the sheath, is pale green in color and contracted, appearing as a false spike. While the plants are blossoming, the branches of the panicles become lax and open. After blossoming, the branches become erect and again give the inflorescence a spike-like appearance. The spikelets are borne on short pedicels. Each spikelet bears from 2 to 4 florets, two being most common. The outer glumes are unequal. The florets are awnless or commonly awn-pointed. This species flowers and seeds during May and June.

Junegrass reproduces by means of short, inconspicuous rhizomes. Seed, however, is the chief means of propagation. It never develops a sod, but just scattered tufts. It is also known as Koeler's grass. The name Junegrass is often incorrectly applied to Kentucky bluegrass since the latter also usually flowers during the month of June.

Junegrass is reasonably well adapted to dry hills and plains. It compares very favorably in this respect with little bluestem and the needlegrasses, but is not so tolerant to dry conditions as are the grama and buffalo grasses. Accordingly it commonly associates with the former species and the presence of either, particularly the needlegrass, greatly increases the possibility of the presence of Junegrass. It occurs over the entire state but more generally in the central and eastern parts. It grows in the sandhills region and on dry hills, ridges, and plains, but is not usually successful in establishing itself in the moist valleys and draws because of the severe competition of tall grasses. Junegrass usually makes up only a small percentage of the vegetative cover.

This species produces good forage if harvested before it dries. Since it flowers early in the season and thereafter commonly dries at least partially before harvesting, the yields are low. It makes some growth with the advent of fall rains. The hay is of satisfactory feeding quality. However, areas of native grassland containing large quantities of Junegrass yield poorly, one-half ton or less, and are seldom harvested for hay. It is readily grazed by livestock and produces early spring feed. This factor is disadvantageous to stands of this grass since animals in their hunger for green feed in early spring overgraze the young plants.

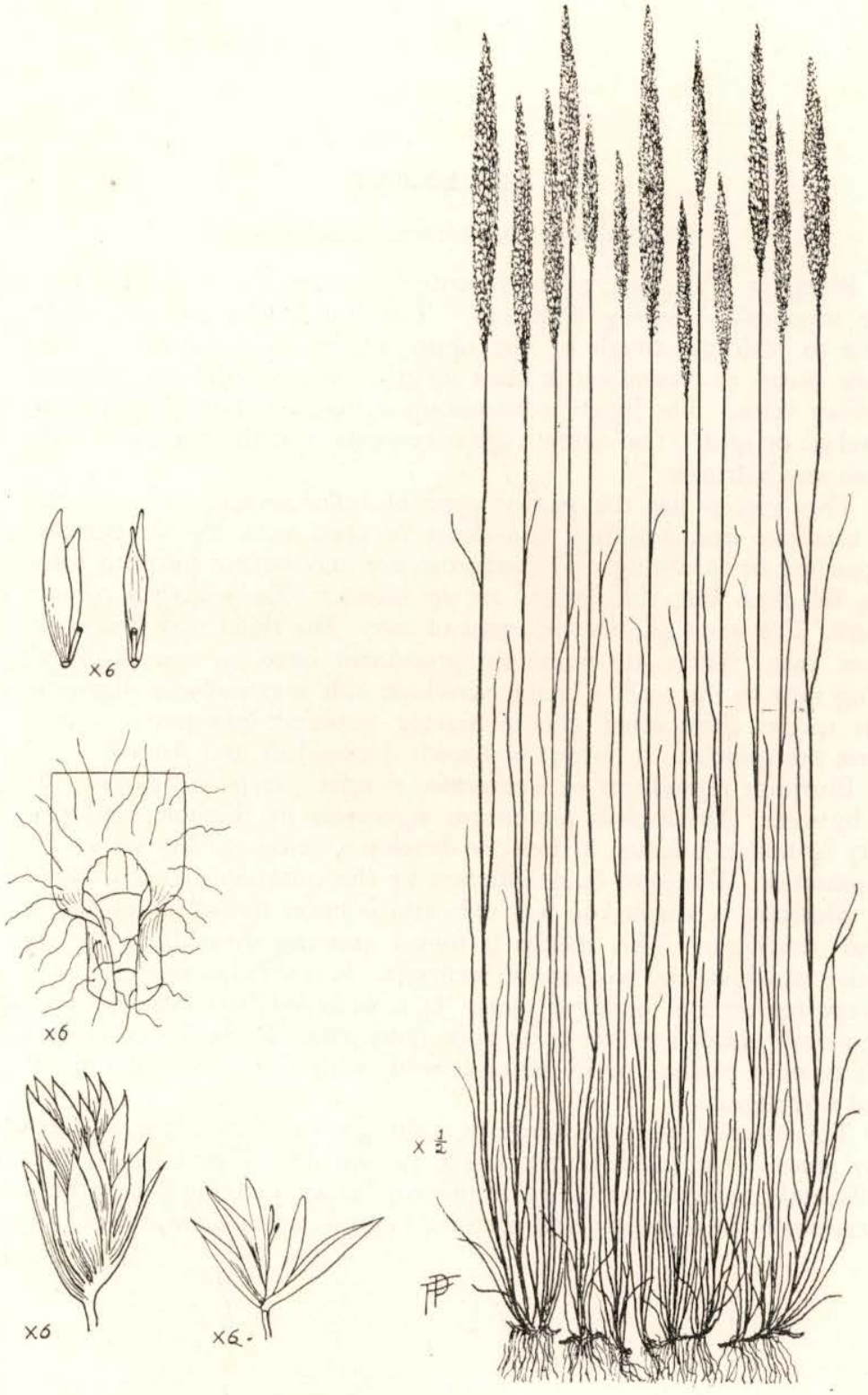

FIG. 5.—Junegrass. Plant x½; seed x 6; ligule area x 6; closed and open spikelets x 6.

BLUEJOINT

Calamagrostis canadensis (Michx.) Beauv.

Bluejoint is an erect, tufted perennial growing 2 to 4 feet tall and bearing numerous creeping rhizomes. The leaf blades are numerous, flat, erect to nodding, rough on the upper surface, and scabrous. They are quite broad in proportion to their length. The sheaths are glabrous with distinct veins. The ligule is membranous, long, and frequently somewhat notched or split. The entire vegetative portion of the plant is usually free from any hairiness.

This species has the panicle type of inflorescence. The panicles are of medium size, nodding, and dense to open with the slender branches ascending or spreading. The inflorescence may have a purplish color during the time that the flowers are in bloom. The spikelets contain one floret. The outer glumes are equal in size. The floret may bear a delicate short awn. There are numerous prominent hairs on one of the glumes lying next to the seed, a character which aids materially in distinguishing this species from other grasses bearing panicled inflorescences with one floret per spikelet. It flowers and seeds during July and August.

Bluejoint reproduces by numerous, slender, creeping rhizomes, as well as by seed. Although it reproduces vigorously by rhizomes and grows in very favorable habitats, it does not develop a dense sod but rather a tufted appearance. Bluejoint is also known by the common name, reedgrass.

Bluejoint is adapted to wet soils and is never found under natural upland conditions. This species is found growing throughout the state in native meadows and pastures on wet soils. It is a rather uncommon species except for certain localized areas. It is included here because it appears frequently enough in wet areas to be noticeable. It usually grows in small, nearly pure patches, or in mixtures with such plants as reed canary grass and sloughgrass.

This species produces forage of fairly good quality. It is an important hay grass in the north central states, particularly on peat lands. It is not sufficiently common to be an important forage plant in Nebraska except occasionally in meadows and pastures located in wet areas.

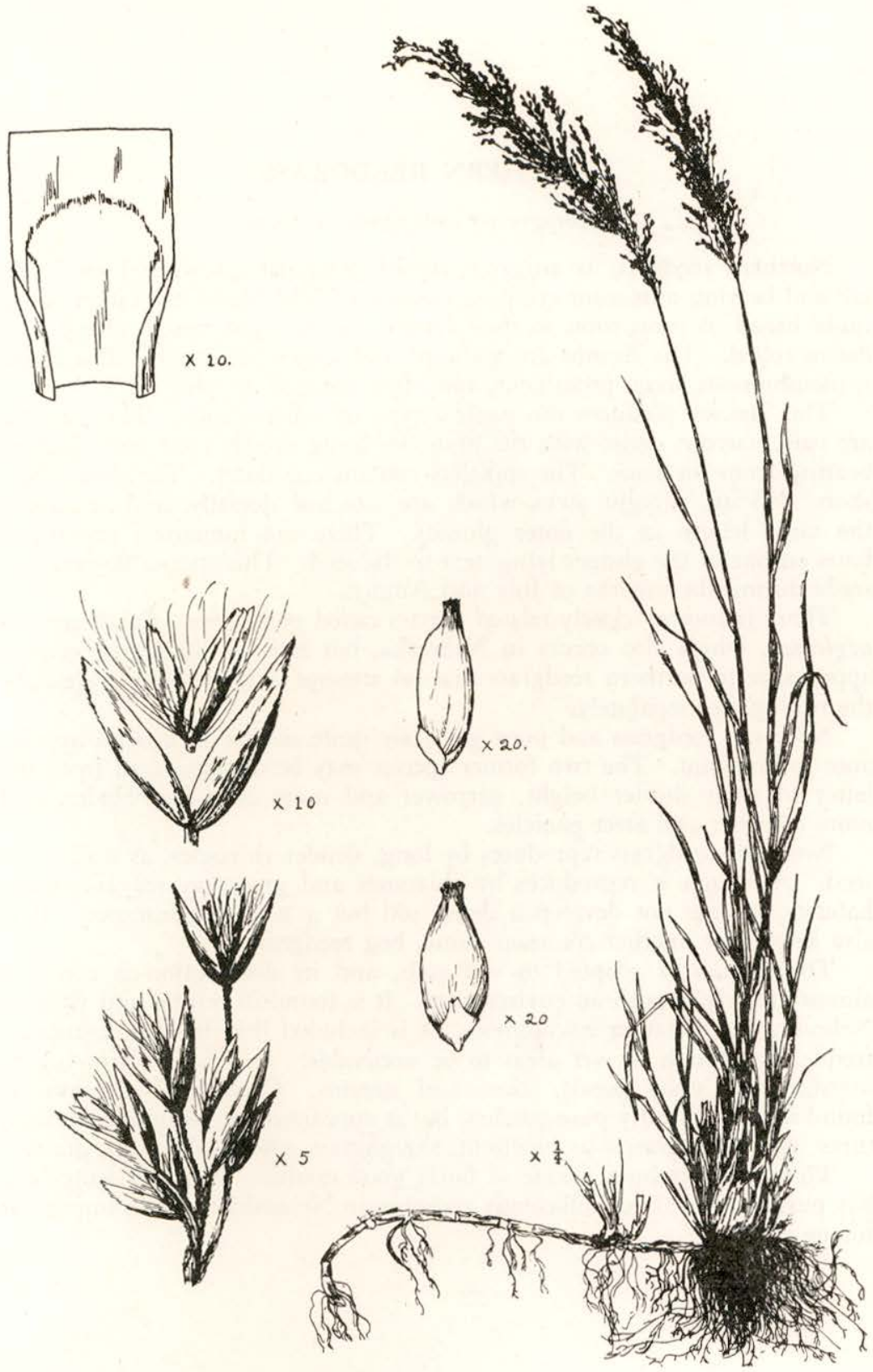

FIG. 6.—Bluejoint. Plant x ¼; ligule area x 10; spikelet x 10; seed x 20; part of inflorescence x 5.

NORTHERN REEDGRASS

Calamagrostis inexpansa A. Gray

Northern reedgrass is an erect, tufted perennial, growing 1 to 3 feet tall and bearing numerous creeping rhizomes. The blades are rather short, quite broad in proportion to their length, rather rigid, rough above, and flat to rolled. The sheaths are glabrous and somewhat rough. The ligule is membranous, long, prominent, and often notched or split.

This species produces the panicle type of inflorescence. The panicles are pale, narrow, dense with the branches being mostly erect and spikelet-bearing from the base. The spikelets contain one floret. The florets bear short, delicate, straight awns which are attached dorsally, and are about the same length as the outer glumes. There are numerous prominent hairs on one of the glumes lying next to the seed. This species flowers and seeds during the months of July and August.

There is another closely related species called pony grass (*Calamagrostis neglecta*), which also occurs in Nebraska, but it is so similar in general appearance to northern reedgrass that no attempt is made here to describe the two species separately.

Northern reedgrass and pony grass are quite similar in general appearance to bluejoint. The two former species may be distinguished from the latter by their shorter height, narrower and more erect leaf blades, and more compact and erect panicles.

Northern reedgrass reproduces by long, slender rhizomes, as well as by seed. Although it reproduces by rhizomes and grows in very favorable habitats, it does not develop a dense sod but a tufted appearance. It is also known by another common name, bog reedgrass.

This species is adapted to wet soils, and its distribution is confined almost entirely to such an environment. It is found in central and western Nebraska but is rather uncommon. It is included here because it appears frequently enough in wet areas to be noticeable. It is found growing in marshes and along ponds, lakes, and streams. Occasionally it may be found in small, nearly pure patches, but it appears more commonly in mixtures with such grasses as bluejoint, sloughgrass, and reed canary grass.

This grass produces forage of fairly good quality. It is best suited for hay purposes but is not sufficiently common in Nebraska to be an important forage plant.

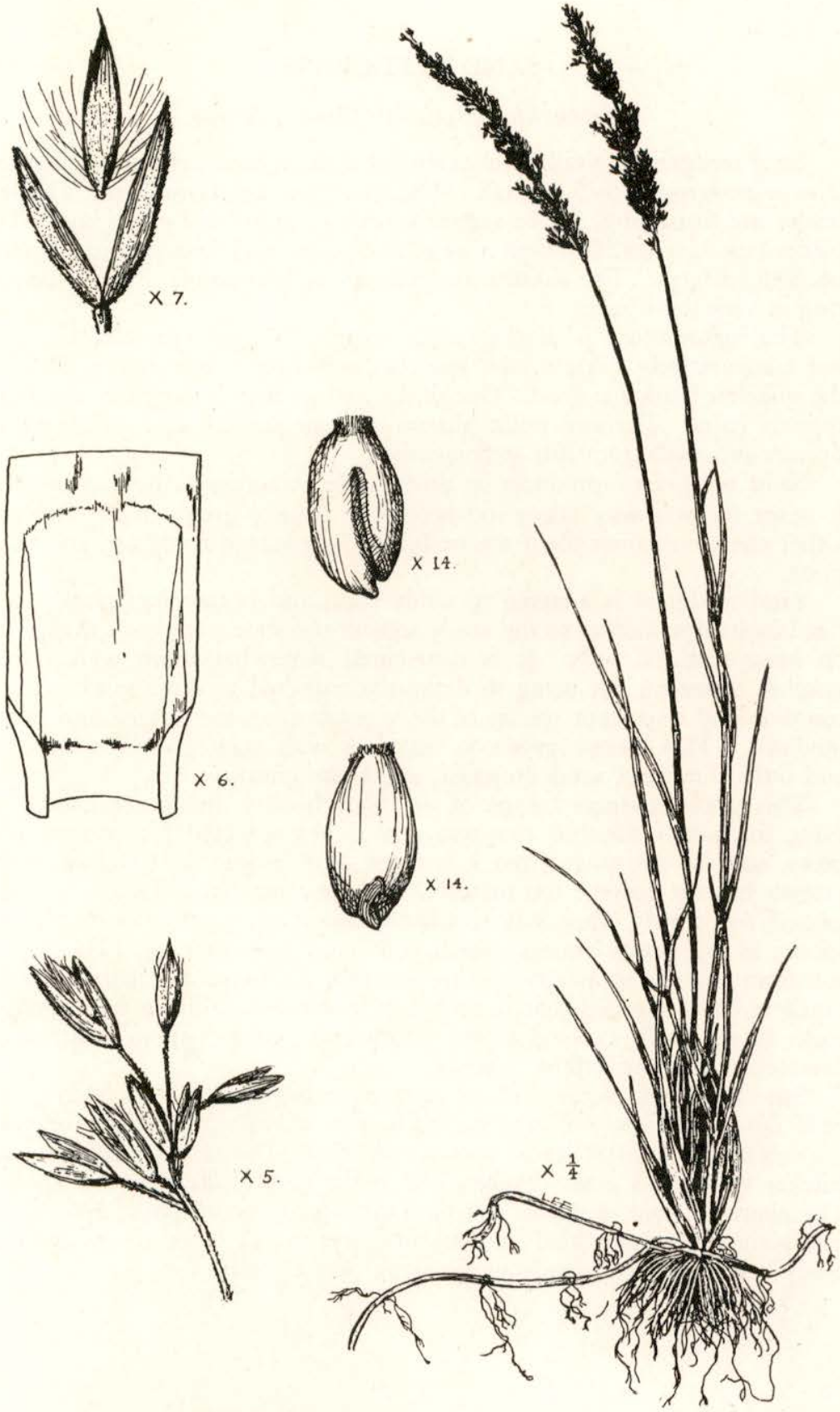

FIG. 7.—Northern reedgrass. Plant x ¼; spikelet x 7; ligule area x 6; seed x 14; part of inflorescence x 5.

SAND REEDGRASS

Calamovilfa longifolia (Hook.) Scribn.

Sand reedgrass is a tall, erect perennial with vigorous, creeping rhizomes. The plants grow 2 to 5 feet tall. The stems are mostly solitary. The leaf blades are firm, long, flat or somewhat rolled, and usually nodding. The blades taper gradually toward a long, fine point, and have prominent veins on both surfaces. The sheaths are glabrous or pubescent. The ligule is a ring of very short hairs.

The inflorescence is of the panicle type. The pale panicles are open but comparatively narrow; the branches are usually ascending. Each of the spikelets bears one floret. One of the glumes surrounding the seed bears copious hairs. The two outer glumes are unequal in size. This species flowers and seeds from July to September.

Sand reedgrass reproduces by thick, scaly rhizomes as well as by seed. It never forms a very heavy sod because it usually grows in dry habitats. Other common names for it are reedgrass, long-leaved reedgrass, and sandgrass.

Sand reedgrass is adapted to sandy soils, and is therefore largely confined in its distribution to the sandy soils of the state. It grows fairly well on heavy-textured soils. It is distributed somewhat more widely than sandhill bluestem, not being so definitely restricted to dune sand. It is a common and important species of the vegetation on the range lands of the sandhills. This species grows in mixtures with such grasses as sandhill and little bluestems, sand dropseed, and hairy grama.

This grass produces forage of only fair quality, being comparable in value to that of sandhill bluestem. It is best adapted for pasture purposes, and the pasturage from it is eaten quite readily by livestock if the growth has not become too mature. On the other hand if the plants are grazed too closely, they will gradually disappear, giving away to such species as the grama grasses, which will stand close grazing. The hay, if cut from mature or nearly mature growth, is coarse and harsh. Some ranchers have reported that if such hay is allowed to lie in windrows or cocks in the field, exposed to the weather, it becomes more palatable to livestock during the winter months.

Sand reedgrass, because of its rhizomatic habit, is well adapted to invade sandhill "blowouts" and accordingly is an excellent species of grass for vegetating and stabilizing such a condition. The characteristic circular patches which this grass develops aid in the identification of this species. The plants of sand reedgrass can be transplanted successfully. Spaced sod transplants have been used in some instances to begin the revegetation of sandy lands and steep sandy slopes along public roads.

FIG. 8.—Sand reedgrass. Plant x ½; ligule area x 5; floret x 5; seed x 5.

ALKALI DROPSEED

Sporobolus airoides (Torr.) Torr.

Alkali dropseed is a perennial which grows in large, tough clumps. The stems grow 1 to 3 feet tall and are erect to spreading in position. The blades are quite long, flat to frequently rolled, often drooping, and the tips are pointed. The sheaths are shorter than the internodes and are usually smooth. The ligule is a ring of very short hairs. There is a conspicuous tuft of hairs at the collar.

This species is characterized by a panicle type of inflorescence. The panicles frequently comprise nearly one-half of the entire height of the plant. The panicles are one-half to two-thirds as wide as long at maturity. The inflorescence has a rather distinct reddish cast when in bloom, and may be confused with redtop, an introduced grass. The awnless spikelets bear one floret. The outer glumes of the spikelet are unequal. The spikelets are borne on pedicels. The flowering period ranges from June to August.

Alkali dropseed reproduces by seeds only and is a bunch-forming grass. It forms rather large well-defined clumps under natural conditions. Alkali dropseed is also known by other common names, *viz.*, alkali sacaton and bunchgrass. The latter name should not be used since it is so frequently used in referring to little bluestem.

Alkali dropseed is confined in its distribution to the western third of the state. It is largely limited to rather wet lowlands, particularly where the soils are alkaline. It appears commonly in the North Platte river valley, and in some of the moist valleys of the panhandle region. In some instances it comprises nearly pure communities of vegetation, but such areas are neither numerous nor large in area. More frequently it is intermixed with such grasses as saltgrass, western wheatgrass, big bluestem, and switchgrass.

This species produces forage of fairly good quality. It is best adapted for pasture purposes and makes a desirable species in native pastures or in alkaline, wet soils in the western part of the state. It is not so desirable for hay since it produces rather low yields. It is about as palatable as western wheatgrass.

This plant seeds prolifically and the seed can be readily harvested with bluegrass stripping machinery and easily cleaned. The seed is very small in size and it is difficult to regulate a drill properly in order not to plant too much seed.

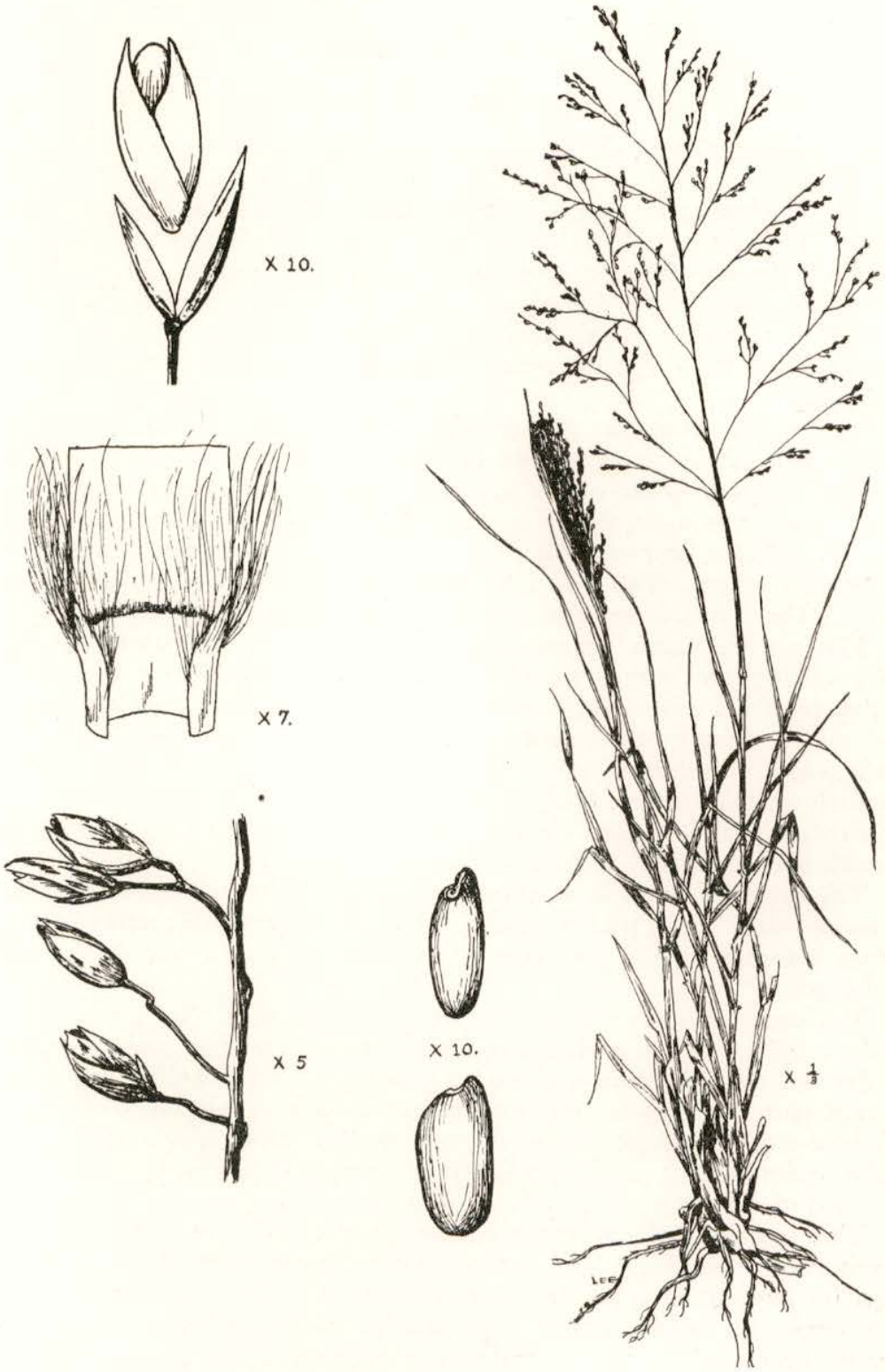

FIG. 9.—Alkali dropseed. Plant x ⅓; spikelet x 10; ligule area x 7; part of inflorescence x 5; seed x 10.

TALL DROPSEED

Sporobolus asper (Michx.) Kunth.

Tall dropseed is an erect perennial with rather stout stems. The stems are either solitary or in small tufts. The plants attain a height of 1 to 4 feet. The blades are elongate, flat, and gradually tapering toward a sharp point. The basal blades are very long, whereas the upper ones are considerably shorter. The margins of the blades are barbed and the blades are rough above. The sheaths have distinct veins and are usually shorter than the internodes. The sheaths are generally smooth. There is a characteristic tuft of hair on the collar. The ligule is membranous, very small, and ciliate.

This species bears the panicle type of inflorescence. The panicles are usually pale, although sometimes purplish and contracted, making the inflorescence appear more or less spikelike. The panicle is usually enclosed partly and sometimes entirely by the inflated uppermost leaf sheath. The awnless spikelets bear one floret each, with the outer glumes of the spikelet being unequal. The seed is free from the glumes and usually shatters easily. The plants flower and seed during August and September.

The mature plants present two rather easily distinguished characteristics during the winter months. These characteristics are the partial enclosure of the contracted panicles by the inflated, uppermost leaf sheath, and the persistence of the rather rigid blade of the uppermost leaf. This blade usually becomes quite shredded. Sand dropseed behaves very similarly in this respect, but can be distinguished by its shorter and finer growth and the more open panicles as compared with the taller and coarser growth and contracted panicles of the tall dropseed.

Tall dropseed bears short rhizomes, but generally gives rise to solitary stems or tufts. It is a prolific seeder and apparently spreads rapidly by seed. Other common names are prairie dropseed, dropseed, and long-leaved rushgrass.

Tall dropseed occurs generally throughout the state. It may be found under a wide range of moisture conditions, anywhere from moist meadows to dry habitats. It is most commonly found on slopes and ridges in the eastern part of the state and is commonly associated with such species as big bluestem, Indian grass, and side-oats grama. Since it is a good seeder, and is quite tolerant of dry conditions, it becomes more conspicuous during a period of dry years.

This species produces forage of fair quality. It is quite palatable and nutritious while young, and accordingly is better adapted for pasturage than for hay. It produces mediocre yields and is not a particularly desirable species for forage purposes. Usually it makes up only a small percentage of the growth in native meadows or pastures, although occasionally it is an important species in small areas.

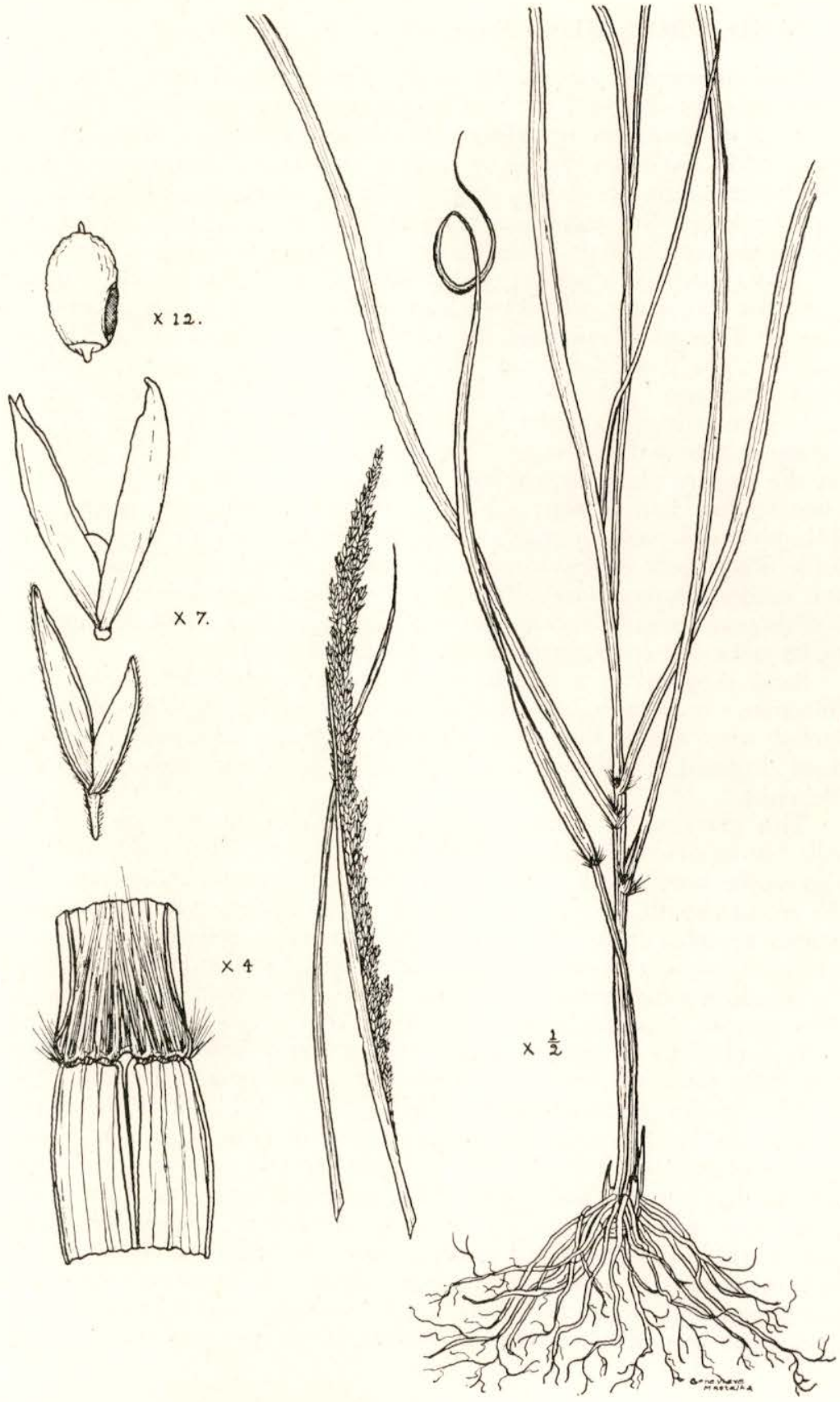

FIG. 10.—Tall dropseed. Plant x ½; seed x 12; floret x 7; ligule area x 4.

SAND DROPSEED (*Sporobolus cryptandrus* (Torr.) A. Gray)

Sand dropseed is a perennial which grows in small tufts. The plants attain a height of 1 to 3 feet and have a medium-green color. The stems are erect or somewhat spreading and are not numerous. The blades are short, wide, rough on the upper surface, and have a sharply pointed tip. The lower sheaths are usually shorter than the internodes, while the upper ones are longer, commonly enclosing the base of the panicle. There is a conspicuous tuft of hair at the collar. The ligule is a ring of short hair.

This species has a panicle type of inflorescence. The panicle is usually open, but frequently partially enclosed at the base by the uppermost leaf sheath. The panicle resembles that of redtop, which is one of the cultivated grasses. The panicle of sand dropseed is frequently somewhat purplish upon emergence. The awnless spikelets bear one floret each, with the outer glumes of the spikelet being unequal. The plants flower and seed during August and September. The shredded appearance of the leaf blades on the mature plants during the winter months lends a rather distinct identification characteristic. This is caused by the whipping of the wind. The prolonged presence and rather rigid appearance of the uppermost leaf blade is also quite characteristic when contrasted with the drooping nature and earlier disappearance of the leaves of most other species of grasses. Tall dropseed behaves very similarly in this respect, but can be distinguished by its taller and coarser growth and contracted panicles.

Sand dropseed is a bunch-forming grass even though it has short rhizomes. It spreads almost entirely by seeds and is a prolific seeder and spreads more rapidly than most other native grasses under field conditions. Sand dropseed is seldom recognized under any other common name in Nebraska.

This grass occurs rather generally throughout the state on the drier soils. It occurs commonly in the sandhills and on other sandy soils and also on the heavier soils. It is much more common and conspicuous since the recent drouth, because it is one of the most aggressive of the native grasses to come back. Being a prolific seeder it behaves as a pioneer species in rapidly reseeding those native meadows and pastures where the stands of native grasses have been thinned by drouth and overgrazing. This species is particularly noticeable in overgrazed pasture lands and along roadsides. In some instances even cultivated lands, such as thinned-out alfalfa meadows, have been invaded by sand dropseed.

This species produces forage of fair quality. While it is not as palatable as the big bluestem, the grama grasses, or buffalo grass, it is eaten quite readily by livestock. It is more palatable and nutritious for pasture than for hay purposes and produces low yields of forage as compared with most other native grasses. It is to be considered a desirable species, particularly in pasture lands, since it possesses the ability of rapidly coming back in overgrazed and drouth-injured pastures. It furnishes considerable pasturage on sandy lands. Under more favorable conditions this pioneer species will be gradually replaced by other slower-spreading native grasses.

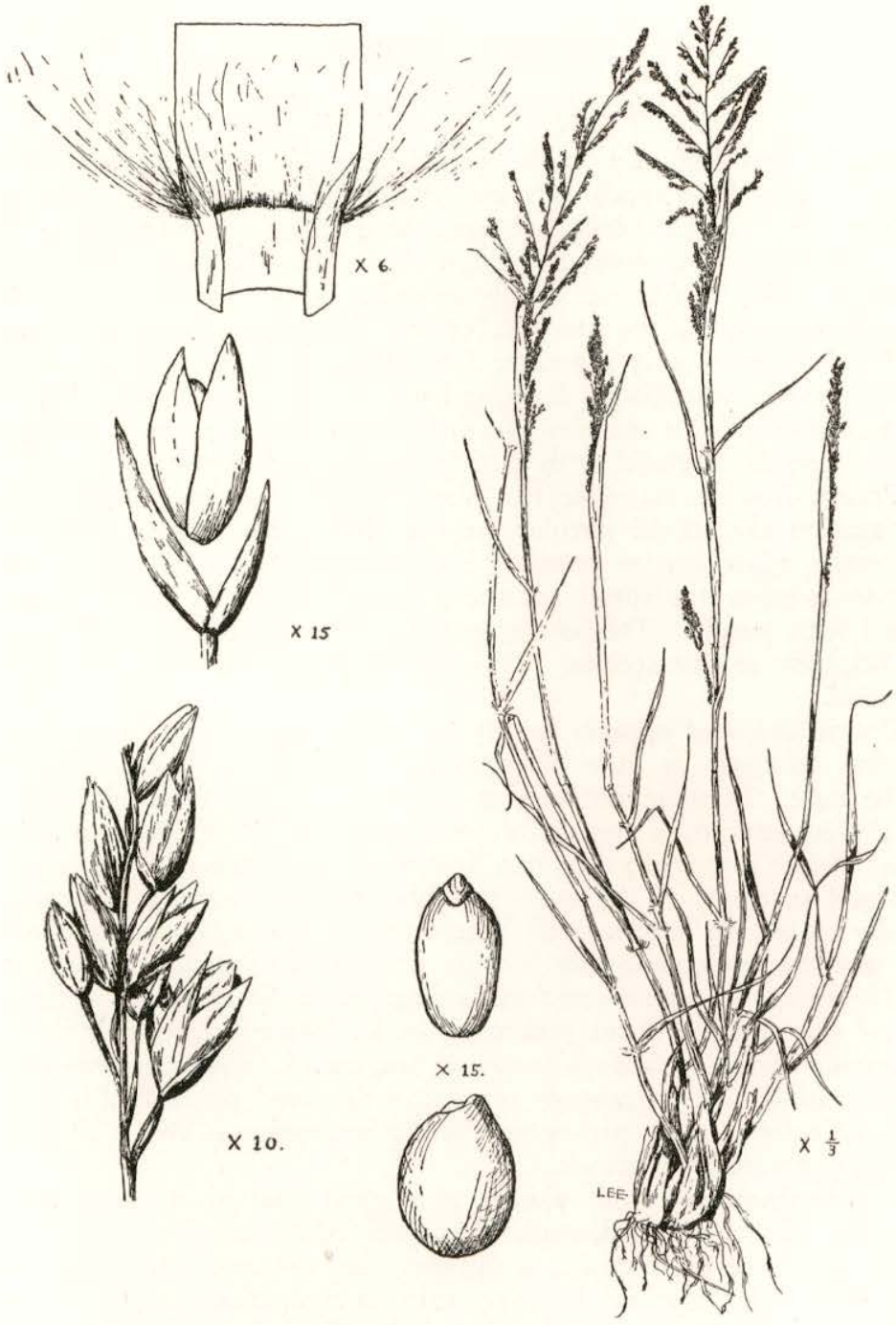

FIG. 11.—Sand dropseed. Plant x ⅓; ligule area x 6; spikelet x 15; part of inflorescence x 10; seed x 15.

PRAIRIE DROPSEED

Sporobolus heterolepis A. Gray

Prairie dropseed is a hardy, tufted perennial growing from 1 to 3 feet tall. The plants appear in scattered circular patches from 3 to 10 inches in diameter. The leaf blades are long, slender, and very numerous. These are a medium green, somewhat rough above, smooth below, and free from hairiness. The sheaths are usually smooth. A characteristic of the leaves is the tuft of hairs at the junction between the leaf blade and the sheath.

The inflorescence is a panicle 3 to 10 inches long with the branches usually widely spreading. Each spikelet contains one floret. The outer bracts of the spikelet are very unequal in size and the florets are awnless. This species flowers and seeds during August and September.

Prairie dropseed reproduces by short, woody rhizomes. This means of propagation aids in the circular growth of the tufts, but the plant is not sufficiently aggressive to permit the development of a sod. The base of each stem below the surface of the ground is enlarged and is frequently tinged with purple. This characteristic aids materially in confirming the identification of this species. This species is also referred to as northern dropseed.

Prairie dropseed appears largely on upland soils and commonly grows in areas occupied by little bluestem and needlegrass in the eastern half of the state. In some instances it invades the more favorable areas and the characteristic tufts appear in communities of big bluestem and Indian grass. Prarie dropseed grows to a limited extent in the valleys of the sandhills and sparingly in the more favorable areas of western Nebraska. It usually makes up only a small percentage of the vegetation in meadows and pastures but occasionally becomes important in localized areas.

The forage of prairie dropseed is palatable to livestock and it furnishes hay of good quality if cut sufficiently early. Since the tufts of this grass commonly consist of a dense mass of fine leaves, those meadows containing a considerable percentage of prairie dropseed are difficult to mow. This difficulty is more pronounced if the vegetation is wet. This species is readily grazed by livestock.

Prairie dropseed is not worthy of a great deal of attention from an economic viewpoint. Although it is quite commonly distributed, particularly over eastern Nebraska, it usually plays a minor role in local areas. It furnishes relatively little hay or pasture in comparison with other species such as the bluestems, switchgrass, and sloughgrass.

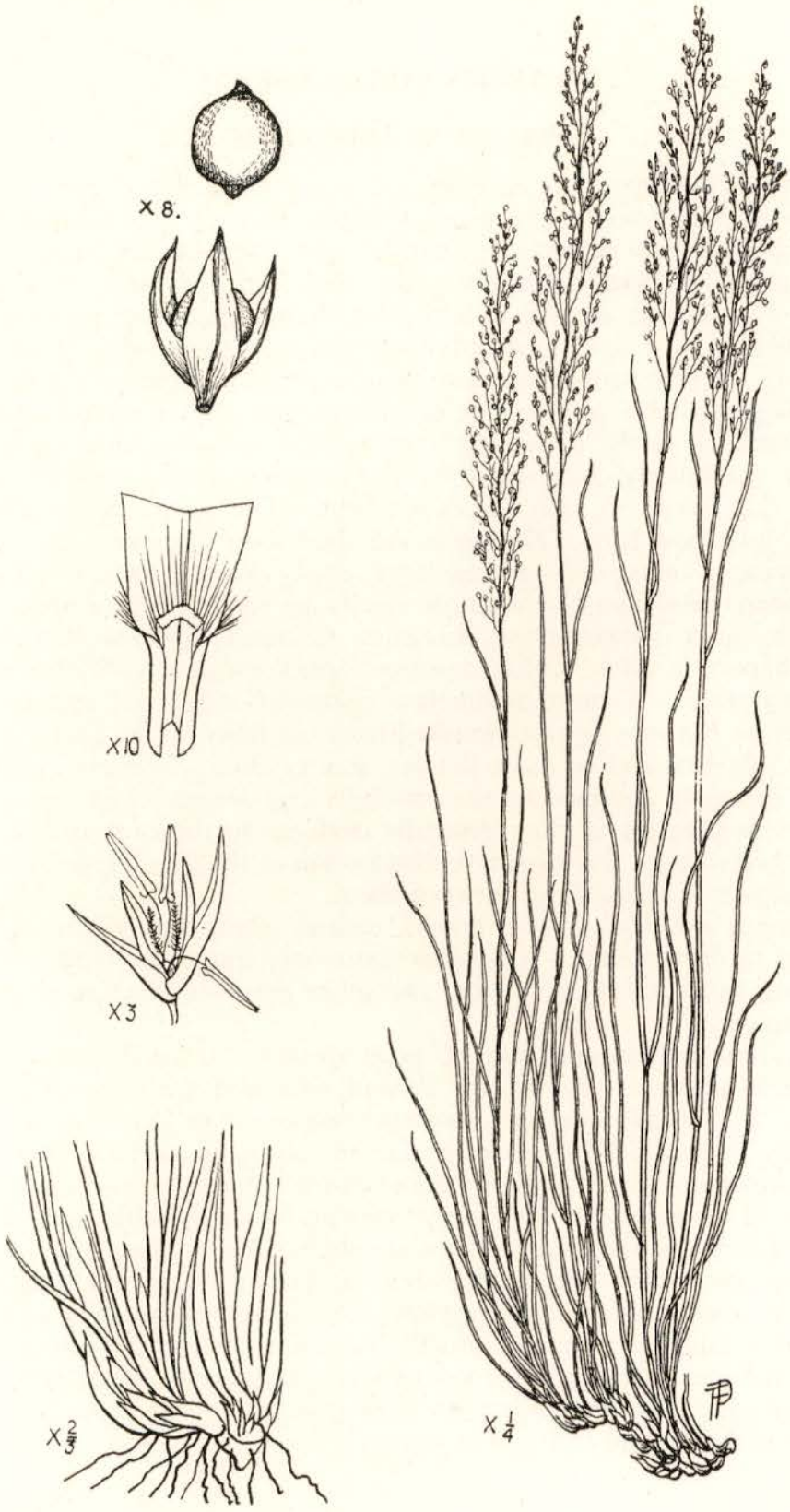

FIG. 12.—Prairie dropseed. Plant x ¼; seed x 8; ligule area x 10; spikelet x 3; part of root system x ⅔.

WESTERN NEEDLEGRASS

Stipa comata Trin. & Rupr.

Western needlegrass is an erect, tufted, perennial bunchgrass attaining a height of 1 to 3 feet. The plants produce relatively few glabrous stems. The leaf blades are rather long, slender, and rough on the upper surface. The tips of the leaves frequently dry back for a distance of about an inch. The sheaths are either longer or shorter than the internodes and are glabrous. The ligule is membranous and very prominent. This species is among the first native grasses to resume growth in the spring.

This grass has a panicle type of inflorescence, rather narrow and often partly enclosed in the uppermost sheath. The spikelets contain one floret and are particularly conspicuous by the presence of long, twisted, flexible awns. The awns are also somewhat bent. The plants flower and seed during June and July. The seeds are shed soon after maturity, leaving the flowering stalks with only the large, chaffy outer glumes.

Western needlegrass reproduces chiefly by seed and to a very limited extent by short, inconspicuous rhizomes. It never develops a sod but the plants appear in tufts. Other common names are needle-and-thread grass and speargrass. Western needlegrass is similar in general appearance to needlegrass, but may be distinguished from the latter by its shorter growth, shorter spikelets, and by more slender, shorter awns. Western needlegrass is also generally confined to the sandhills and western high plains area, whereas needlegrass is more generally confined to the eastern half of the state. Accordingly, the respective distribution of the two species should aid materially in distinguishing between them.

Western needlegrass is a typical upland grass, being especially well adapted to dry habitats. It may be commonly found growing with little bluestem, Junegrass, hairy grama, and other grasses characteristic of a dry environment.

This species produces hay of good quality. It produces low yields because it grows on rather dry upland soils and matures early in the season. It is usually not an important component of hay since it appears generally in low-yielding areas which are normally not harvested. The long, prominent awns may produce serious injury to the mouths and nostrils of livestock. Those areas containing appreciable quantities of matured western needlegrass florets should not be harvested for hay until after the awns have been shed. This ordinarily works out satisfactorily in farm practice since such meadows are harvested during August and September and the awns are usually shed during July. Western needlegrass produces pasturage of good quality. It produces early spring feed and will gradually disappear with close grazing and be replaced by such grasses as the buffalo and grama grasses.

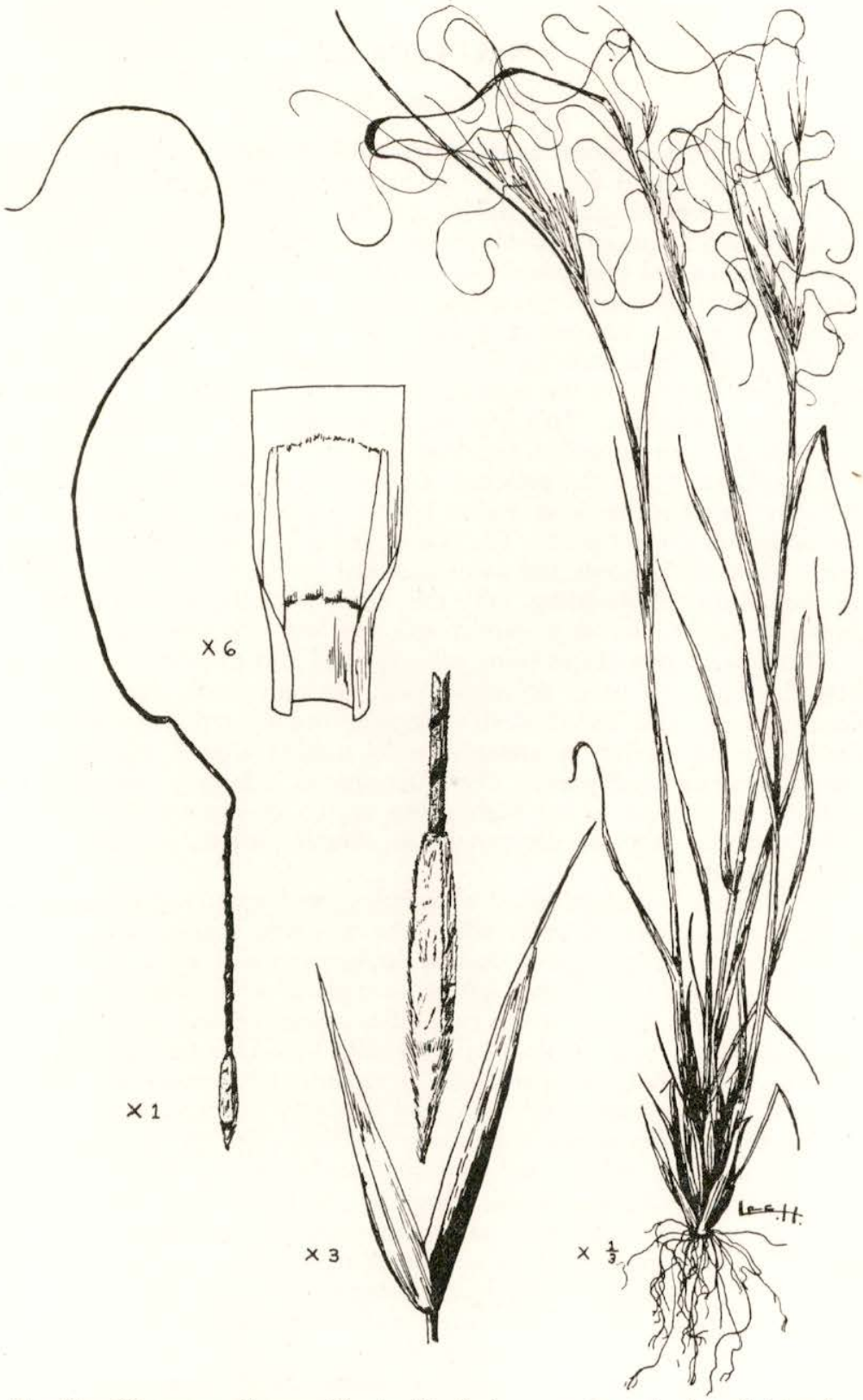

FIG. 13.—Western needlegrass. Plant x ⅓; ligule area x 6; seed x 1; spikelet x 3.

NEEDLEGRASS

Stipa spartea Trin.

Needlegrass is an erect, hardy, perennial bunchgrass. The plants attain a height from 1 to 4 feet. The leaf blades are long, slender, very rough on top, and smooth and glistening on the lower surface. The tips of the leaf blades are usually dried, presenting a dead appearance. The ligule is membranous and very prominent. This species is among the first native grasses to start growth in the spring, making an appreciable growth while other native species are just resuming activity. During a certain period in the spring, the light striking the smooth underside of the leaf blades of the advanced growth of the needlegrass produces a characteristic glistening effect over a meadow. This is especially conspicuous on windy days.

Needlegrass produces lax, nodding panicles. The most striking feature of the inflorescence is the presence of the long, conspicuous awns. These are from 3 to 8 inches long and at least a part of each is tightly twisted. The awns are usually bent. The plants flower and seed during May and June. Most of the seeds and awns are shed by the first of July. Following the process of shedding, only the stems with the large, chaffy outer glumes remain. The long, slender spikelets bear one floret each.

This species reproduces principally by seed and to a limited extent by short rhizomes. It never develops a sod, but only small circular patches. Needlegrass is also called devil's darning needle and porcupine grass. Needlegrass is similar in appearance to another closely related species, namely western needlegrass. The latter species is largely confined to the sandhills region and to the high plains region of western Nebraska. It is distinguished from needlegrass by its shorter growth, shorter spikelets, and shorter awns.

Needlegrass is recognized as a typical upland grass and usually grows on hills, ridges, and in areas where the moisture supply is a decidedly limiting factor. Although it does occur intermingled with big bluestem and Indian grass to a limited extent on upland soils, needlegrass cannot compete successfully with these two taller grasses on moist lowland soils. Needlegrass frequently appears in areas with little bluestem and Junegrass and occurs commonly on upland soils in eastern and central Nebraska, to a limited extent in western Nebraska, and sparingly in the sandhills.

The grass produces hay of mediocre quality. The yields are low since it grows on dry, upland soil and matures early in the season. Hay meadows containing appreciable quantities of needlegrass should not be harvested until after the awns have been shed, which is about the first of July. The awns may produce serious injury to the mouths and nostrils of livestock. Needlegrass produces pasturage of good quality and produces early spring feed. This factor is disadvantageous to stands of this grass, since animals in their hunger for green feed in early spring overgraze the young plants. It produces very little growth during the summer months, but revives and makes some growth during the fall months.

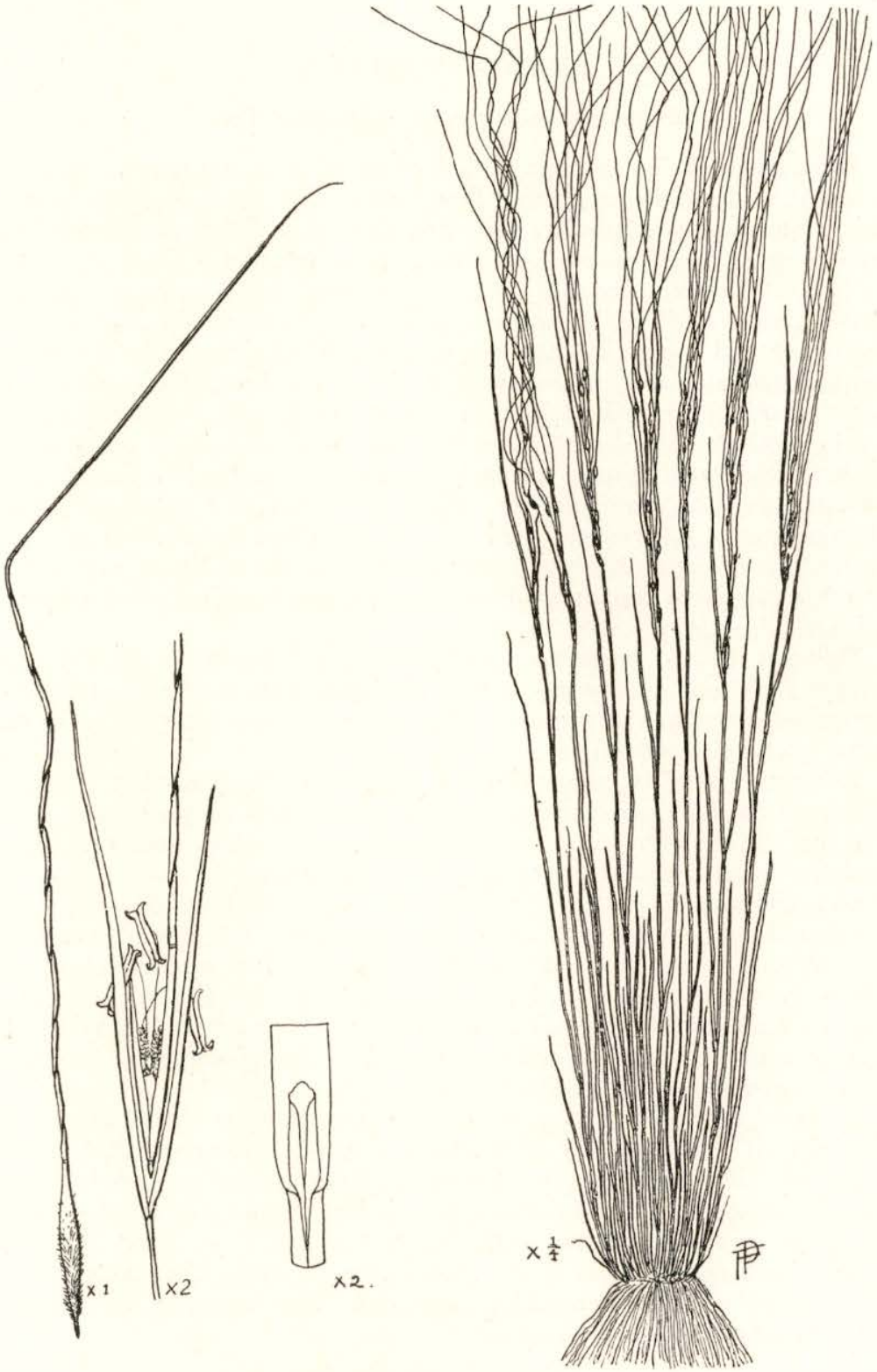

FIG. 14.—Needlegrass. Plant x ¼; seed x 1; spikelet x 2; ligule area x 2.

SIDE-OATS GRAMA

Bouteloua curtipendula (Michx.) Torr.

Side-oats grama is an erect, tufted perennial growing from 1 to 3 feet in height. The blades are rather broad, short, and medium-green in color with conspicuously glandular, hairy margins. The sheaths are hairy. The ligule is short, membranous, and fringed with very short hairs.

The inflorescence consists of 20 to 50 short spikes arranged along a central axis. Each spike upon approaching maturity invariably turns downward and hangs at an angle of about 45 degrees. The spike is a compact structure and consists of from 4 to 10 spikelets. Upon reaching maturity, the entire spike falls from the axis, instead of each spikelet becoming detached separately as is the case with nearly all other native grasses. The outer glumes of each spikelet are unequal in length as is characteristic of all grama grasses. Each floret contains 3 short awns. The side-oats grama inflorescence is easily distinguished from those of other grasses and is readily identified even after all of the spikelets have fallen, for the zigzag axis remaining is very characteristic. This species flowers and seeds during July and August.

Side-oats grama reproduces by short, stout rhizomes. It does not develop a sod but usually grows as small, open tufts scattered among the clumps of other native grasses. The species is also referred to as tall grama grass, mesquite grass, or grama grass.

Side-oats grama is reasonably well adapted to dry soils but is not so tolerant as the blue and hairy grama grasses. It may compete successfully with the tall bluestem grasses under the more favorable conditions where the latter grow. Side-oats grama grows throughout the entire state but is more common in eastern Nebraska. In the eastern third of the state it occurs mostly on the hills and drier plains and to a limited extent in the valleys. In central and western Nebraska this species occurs less commonly on the uplands and more abundantly in valleys and depressions. It comes back rapidly into native meadows and pastures which have been severely injured by drouth and overgrazing when favorable conditions of moisture and judicious grazing again prevail.

Side-oats grama resumes growth late in the spring as do the bluestems. Thereafter it grows rapidly and furnishes palatable forage either as hay or pasture. It compares very favorably in feeding quality with big bluestem. Prior to the drouth, side-oats grama usually constituted only a small percentage of the vegetation in the native grasslands; but with its ability to come back rapidly, it is now a relatively more important species.

The seed can be successfully harvested. Satisfactory stands of this grass can be established by seeding.

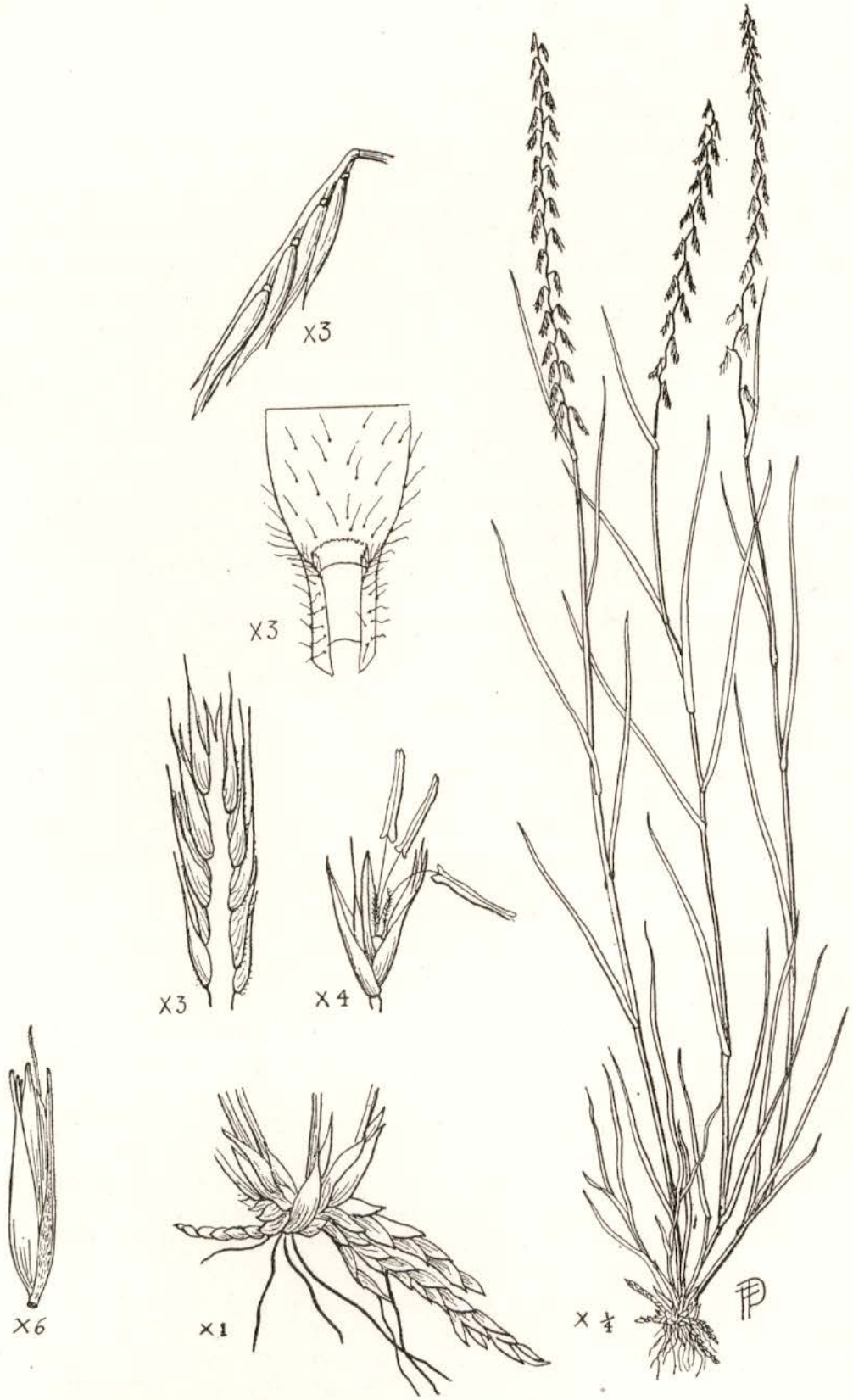

FIG. 15.—Side-oats grama. Plant x ¼; part of spike, side view x 3; ligule area x 3; part of spike, flat view x 3; spikelet x 4; seed x 6; part of root system x 1.

BLUE GRAMA (*Bouteloua gracilis* (H.B.K.) Lag.)

Blue grama is a perennial attaining a height from 6 to 20 inches. The stems are erect. The leaf blades are small and inconspicuous. The blades and sheaths are smooth, with a few hairs along the edges of the collar. The ligule, composed of a fringe of hairs, is very short.

The inflorescence is of the spike type. The spikes appear either singly, in twos, threes, or fours on each stem, two being the most common number. Each spike is from 1 to 2 inches long. The spikelets are numerous, often occurring in numbers as large as 50 or more per spike. The spikelets are compactly arranged in two rows on very short pedicels along one side of the axis which bears them. Each spikelet contains one floret. The florets bear short awns and the outer glumes are awn-pointed. The outer glumes are unequal in size with the larger one slightly hairy. Below each floret is a small structure bearing three awns and known as the rudiment. These awns and those of the florets give the spike a fine-bristle appearance.

Blue grama may be easily confused with hairy grama. The former can be distinguished by its taller growth, failure of the axis of the spike to project beyond the last spikelet, and the absence of black dots on the spikelets.

Blue grama reproduces by short, scaly rhizomes and commonly develops a sod, but this is not very heavy since this species usually grows on dry hills and ridges where conditions are not conducive to luxuriant growth. It is sometimes referred to as mesquite grass.

This grass is largely confined to dry soils and cannot compete successfully with the taller species such as big bluestem and Indian grass where the latter will grow successfully. It occurs over the entire state but is an especially important grass in the central and western parts. Blue grama appears very commonly on the heavier soils in the western half of the state. It is also common throughout the sandhills region, but in this area it is frequently mixed with or replaced by hairy grama.

It produces forage of excellent quality but is not generally used for hay since meadows containing it produce low yields and are often situated on very rolling land. Areas containing appreciable quantities of blue grama are generally utilized for grazing. It is readily grazed during the growing season and the vegetative growth will cure well in the fall and provide palatable, nutritious winter pasturage. Since blue grama furnishes a large percentage of the pasture in the western half of the state, considerable attention should be given to grazing it judiciously.

It is well suited for lawn purposes in the western areas where other lawn grasses are unadapted, and particularly under conditions where artificial watering cannot be carried on. If given some watering, it makes a fairly dense sod, with vegetation of a light-green color.

Seed of blue grama can be harvested by stripping. This species commonly produces two crops of heads, one crop during July and another during August and September. Either one or both may fail to produce seed, but this can be readily ascertained by carefully examining the heads for seed prior to harvesting.

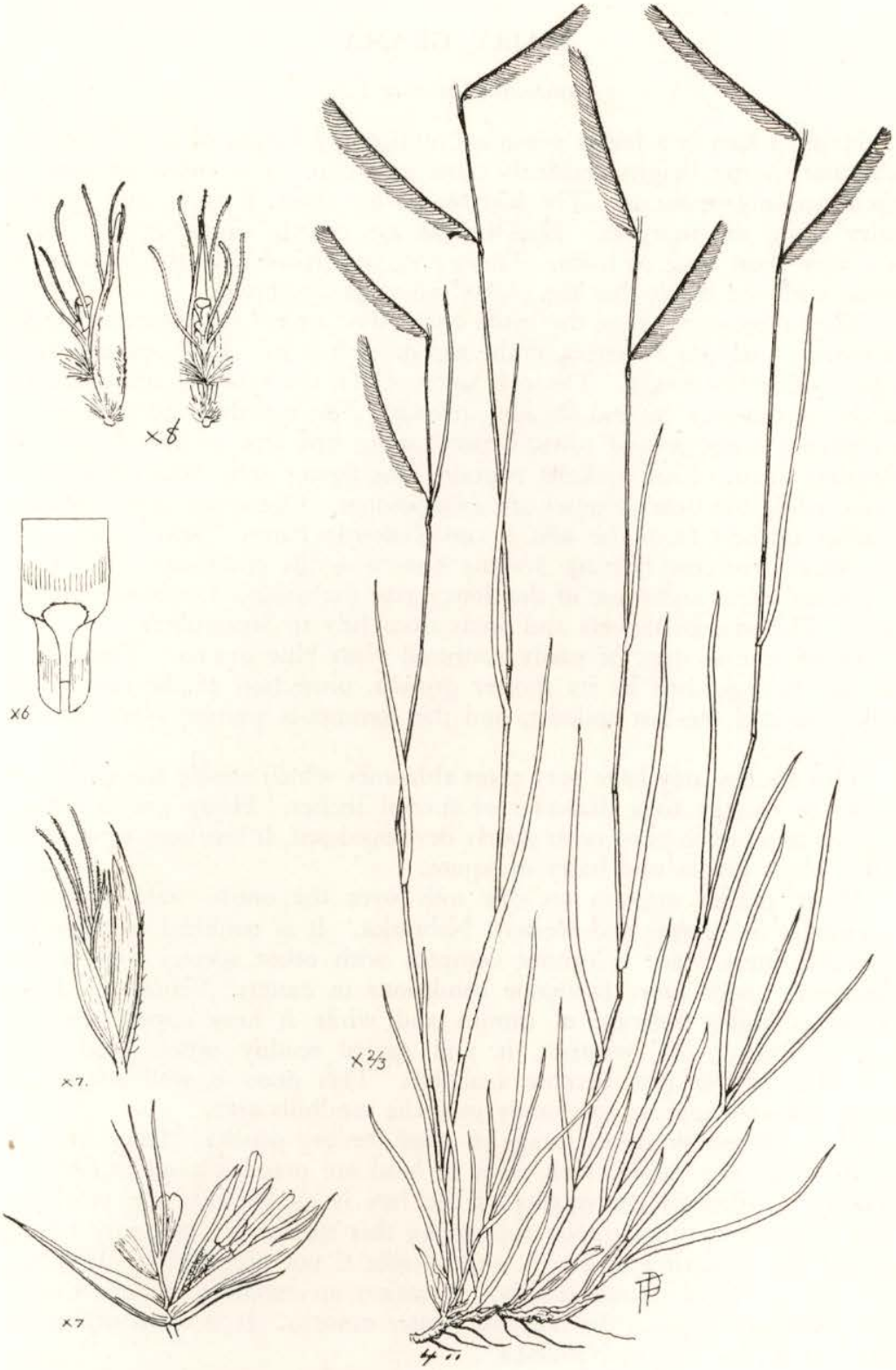

FIG. 16.—Blue grama. Plant x ⅔; seed x 8; ligule area x 6; closed and open spikelets x 7.

HAIRY GRAMA

Bouteloua hirsuta Lag.

Hairy grama is a hardy perennial attaining a height of 6 to 18 inches, with the shorter height decidedly more common. The stems are erect or often partially prostrate. The leaf blades are short, narrow, and sparsely hairy along the margins. The sheaths are usually smooth. The ligule is a very short ring of hairs. The leaves are crowded at the base of the stems with the result that the plants often appear tufted.

The inflorescence is of the spike type. The spikes appear either singly, in twos, or seldom in threes at the top of each stem. Each spike is from 1 to 2 inches in length. The axis upon which the spikelets are borne extends prominently beyond the last spikelet. The spikelets are arranged in a compact mass in two rows, located along one side of the axis which supports them. Each spikelet contains one floret. The florets bear short awns, while the outer glumes are awn-pointed. One outer glume of each spikelet farthest from the axis is conspicuously hairy. Below each floret is a small structure bearing 3 awns known as the rudiment. The awns of the rudiment and those of the florets give the spike a fine-bristle appearance. This species flowers and seeds from July to September.

Hairy grama may be easily confused with blue grama. The former can be distinguished by its shorter growth, projection of the axis of the spikes beyond the last spikelet, and the commonly present black dots on the spikelets.

This species may have very short rhizomes which enable the individual plants to enlarge to a diameter of several inches. Hairy grama usually appears as a bunch grass or as poorly developed sod. It has been erroneously called black grama and hairy mesquite.

Hairy grama appears on dry soils over the entire state but more commonly in central and western Nebraska. It is confined to these less favorable areas since it cannot compete with other species such as the bluestems under more favorable conditions in eastern Nebraska. Hairy grama is highly tolerant of drouth and while it may appear seriously injured during dry weather, it will revive readily when even small quantities of moisture become available. This grass is well adapted to sandy soil and appears commonly over the sandhills area.

Hairy grama produces forage of good feeding quality. Since it grows on dry hills and ridges, such areas of land are practically all utilized for grazing. Although the quality of the hay is satisfactory, the yields are very low and the topography supporting this species is commonly rolling, so that the havesting of hay is unprofitable if not prohibitive. Livestock will pasture hairy grama readily. It makes an excellent pasture feed in the dried form during the fall and winter months. It is often utilized in this manner in western Nebraska.

FIG. 17.—Hairy grama. Plant x ⅔; part of spike x 6; seed x 6; ligule area x 3; closed and open spikelets x 6.

BUFFALO GRASS (*Buchloë dactyloides* (Nutt.) Engelm.)

Buffalo grass is a low-growing, spreading perennial attaining a height of 3 to 10 inches. The plants develop either circular patches or more commonly a continuous sod. The vegetative growth has a characteristic light-green color. The leaves are mostly basal. The blades of the staminate or male plants are commonly shorter than the stems, while those of the pistillate or female plants are usually longer than the stems. The blades are slender, with the margins sparingly to noticeably hairy. The sheaths are loose, with the uppermost one in the pistillate plants partly enclosing the inflorescence. The ligule is a ring of hairs.

Buffalo grass is typically dioecious, *i.e.,* the staminate florets and the pistillate florets are borne on separate plants. A small percentage of the plants are monoecious, *i.e.,* the staminate and pistillate florets are borne in separate spikelets but on the same plant. The staminate inflorescence consists of 2 or 3 sessile spikes on each stem. The spikelets, approximately 10 in number, are arranged along one side of the rachis of each spike. Each of the spikelets bears 2 or 3 awnless florets. The pistillate plants bear spikes very different in appearance from those of the staminate plants. The spikelets appear in clusters of three. These are greatly modified and embedded among the numerous leaves of the plant. Each spikelet bears one floret. The pistillate spikelets are somewhat difficult to locate as a result of their inconspicuous position.

Buffalo grass plants appear in growth from small tufts to a continuous heavy sod, depending on the moisture conditions and disturbing factors such as grazing. They reproduce profusely by prominent creeping aboveground stems, called stolons. These stolons often attain lengths as great as 12 inches and root freely at the nodes to produce additional plants. Each sex propagates its own kind with the result that patches of buffalo grass are usually either male, female, or both if the plants are monoecious.

This grass furnishes roughage of excellent feeding quality. It is one of the important pasture grasses in western Nebraska and localized areas of the central part of the state. Although it does not yield heavily, buffalo grass withstands drouth and heavy grazing well and furnishes excellent winter grazing. It is not satisfactory as a hay crop because of the low yields. It is well adapted as a lawn grass in western Nebraska.

Buffalo grass seeds abundantly but the seed is difficult to harvest with ordinary harvesting machinery. The most satisfactory method, at the present time, is to sweep the "burs" into piles with heavy push brooms in heavily grazed pastures where the foliage has been largely eaten off and the "burs" are lying on the ground. Considerable quantities of seed have been harvested by this method. The seed usually has a fair germination and a light rate of seeding is recommended since the seedling plants will spread rapidly by stolons. This grass can also be readily propagated by sodding. The month of May appears to be the best time for transplanting. Cubes of sod about 3 inches square, set 1 to 3 feet apart, will cover the ground in one or two years if some effort is made to control weeds.

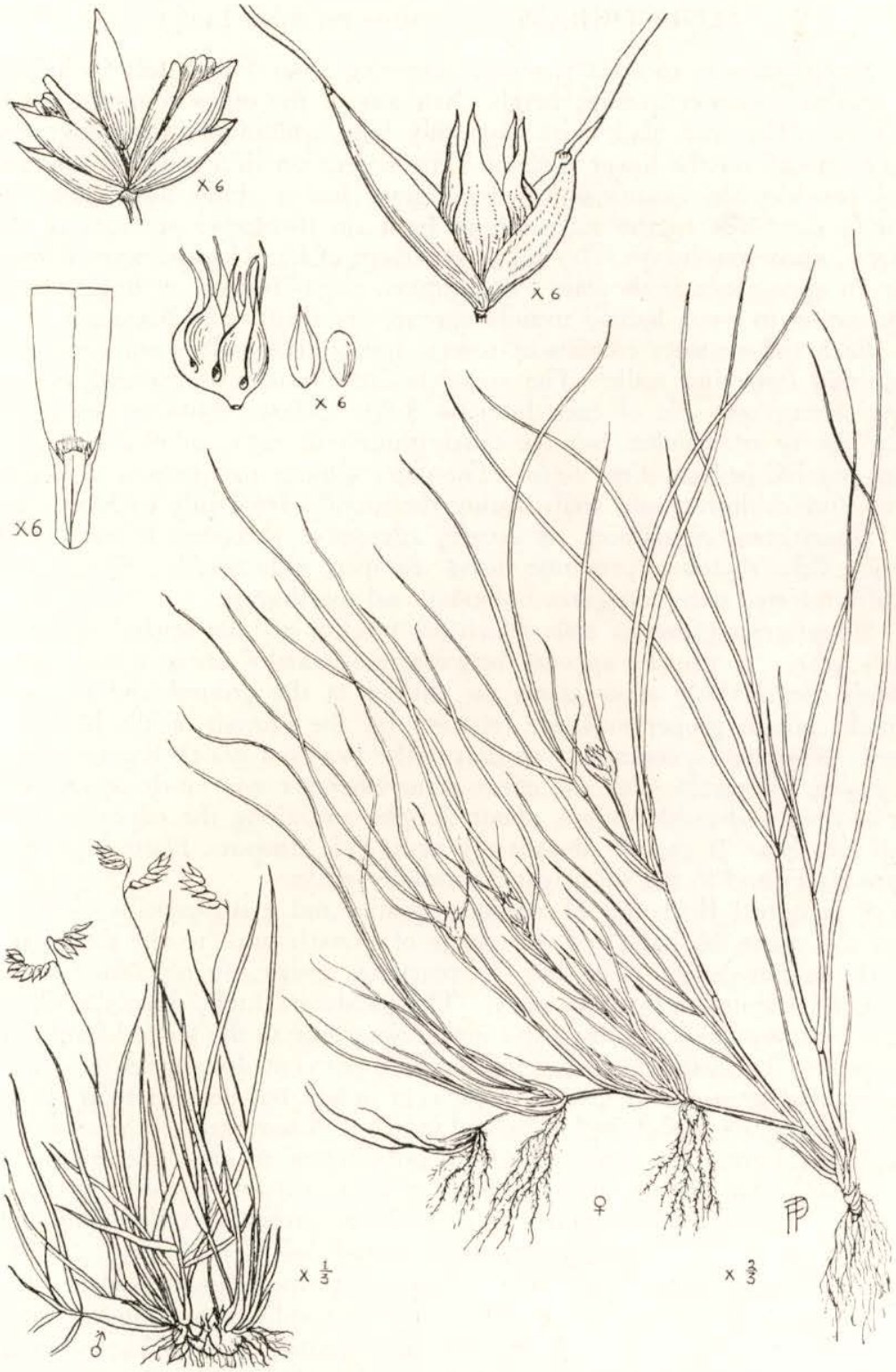

FIG. 18.—Buffalo grass. Staminate plant x ⅓; pistillate plant x ⅔; staminate spikelet x 6; pistillate spikelet x 6; ligule area x 6; seed x 6.

SLOUGHGRASS (*Spartina pectinata* Link)

Sloughgrass is an erect perennial growing from 5 to 8 feet in height. It attains a greater average height than any of the other common native grasses. The leaf blades are especially long, commonly drooping, and very smooth on the lower surface. The vegetation in a meadow containing considerable quantities of sloughgrass has a shiny appearance on windy days due to the reflection of light on the lower surfaces of the coarse, numerous leaves. The ligule is a fringe of hairs becoming membranous in appearance at the base. Sloughgrass plants because of their limited adaptation to a wet habitat usually appear very thrifty and luxuriant.

Each inflorescence consists of several spikes arranged as branches on a common flowering stalk. The spikelets are alternately arranged in two rows along one side of each branch. Each spikelet contains one floret. The florets are awnless but the outer glumes of each spikelet are either awn-pointed or bear short awns. The outer glumes are unequal in length. This species flowers and seeds during the months from July to September.

Sloughgrass reproduces by coarse, aggressive rhizomes covered with scales. The rhizomes penetrate heavy, compact soils readily. Sloughgrass is also referred to as cordgrass, bullgrass, and marshgrass.

Sloughgrass grows in soils which are wet for at least several weeks of each year. It usually appears between the marshy areas where water stands continuously at or above the surface of the ground and the soils which contain proper moisture relations for the growth of the big bluestem. Sloughgrass commonly appears in the swales of prairie hay meadows. It appears generally over the entire state wherever wet lands occur, such as in river and creek valleys, about sloughs and along the edges of lakes and marshes. It grows abundantly along the Missouri, Platte, and Elkhorn rivers and in the subirrigated sandhill valleys.

Sloughgrass yields hay of mediocre quality and it is especially desirable that the plants be harvested in a stage of growth prior to the emergence of the inflorescence. The hay is somewhat coarse, stringy, and tough even if harvested reasonably early. The yields are high, since the plants grow luxuriantly in such favorable areas. According to the federal standards for prairie hay, wild hay containing over 40 per cent sloughgrass is graded as midland prairie, and if it is 40 per cent or less but not less than 10 per cent sloughgrass it is graded as upland-midland mixed prairie. As a pasture crop, sloughgrass is satisfactory if it is not allowed to grow too coarse.

Areas of land which are sufficiently moist to support a good growth of sloughgrass are usually too wet at times to be profitably utilized for cultivated crops. The original sloughgrass lands of Nebraska are for the most part being utilized for haying or pasture purposes today, unless artificial drainage has corrected the excessively wet condition so that cultivated crops may be grown. Sloughgrass does not produce as desirable forage as the bluestems and switchgrass, but it is a desirable species in wet lands.

It can be readily transplanted and offers considerable promise for sodding dams and terrace outlets.

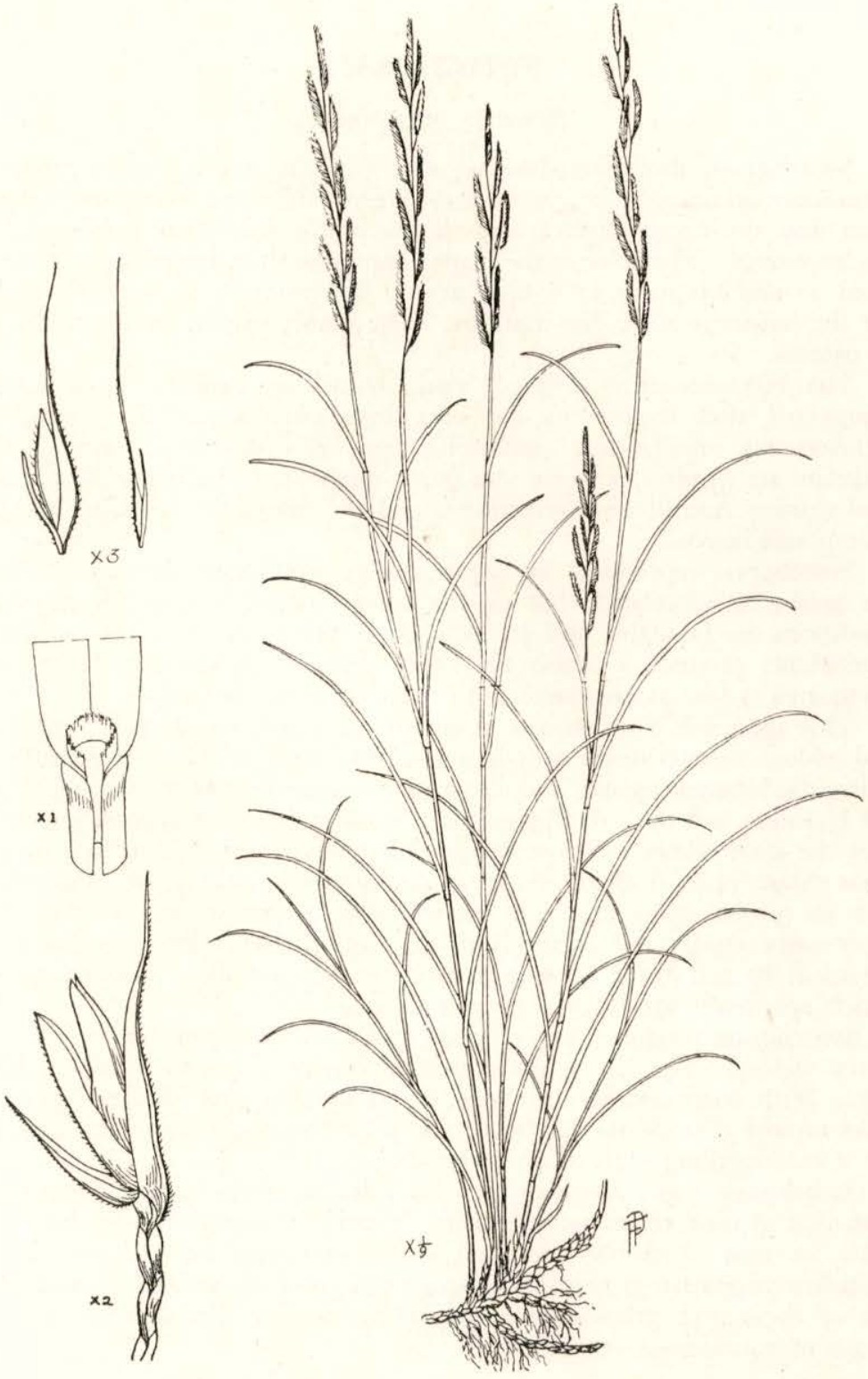

FIG. 19.—Sloughgrass. Plant x 1/9; seed x 3; ligule area x 1; spikelet x 2.

SWITCHGRASS

Panicum virgatum L.

Switchgrass, also referred to as panic grass, is an erect, stout perennial commonly attaining a height of 2 to 5 feet. The leaf blades are usually erect and the upper surface smooth except for the dense pubescence at the lower end. The color of the blades ranges, with intermediae gradations, from a medium-green to a blue-green. The sheaths are smooth except for the hairiness along the margins. The plants usually occur in clumps or patches.

The inflorescence is a large, open, branching panicle. It is readily recognized after its identity has once been established. The numerous spikelets are small, each containing one fully developed floret. The spikelets are awnless, smooth, and ovate in shape. The plants flower and seed during August and September, and the abundant seeds are usually plump and heavy.

Switchgrass reproduces by coarse, scaly, prominent rhizomes. These are produced abundantly but do not spread rapidly unless the moisture conditions are favorable and competition of other species is not too great. The plants produce a coarse sod. The number of stems produced per given area is low as compared with most other native grasses.

This species is best adapted to conditions where moisture is abundant, and seldom appears in the buffalo and grama grass habitats. It does thrive where the bluestems grow, and also appears commonly in areas between the tall bluestem and the sloughgrass plant communities. It appears generally over the state where moisture conditions are favorable but seldom to any great extent in local areas. It grows commonly in valleys, ravines, draws, and in similar areas receiving considerable runoff water. It will also grow satisfactorily on upland soils of eastern Nebraska and occurs in the sandhills and in the western part of the state in valleys and depressions which apparently are favored by runoff water.

Switchgrass produces hay of good quality if harvested early. It is a heavy yielder. The hay is not considered quite as palatable as bluestem hay. With maturity, it also loses its palatability and feeding qualities more rapidly than do the bluestems. It provides good pasture and animals eat it readily along with other native grasses.

Switchgrass seeds abundantly. The plump, heavy seed as compared with that of most other native grasses, is easily harvested and seeded. Because its seed is readily harvested and easily sown and because of its abundant vegetative growth, switchgrass has good possibilities of becoming one of the native grasses more commonly used in establishing artificial stands of native-grass vegetation.

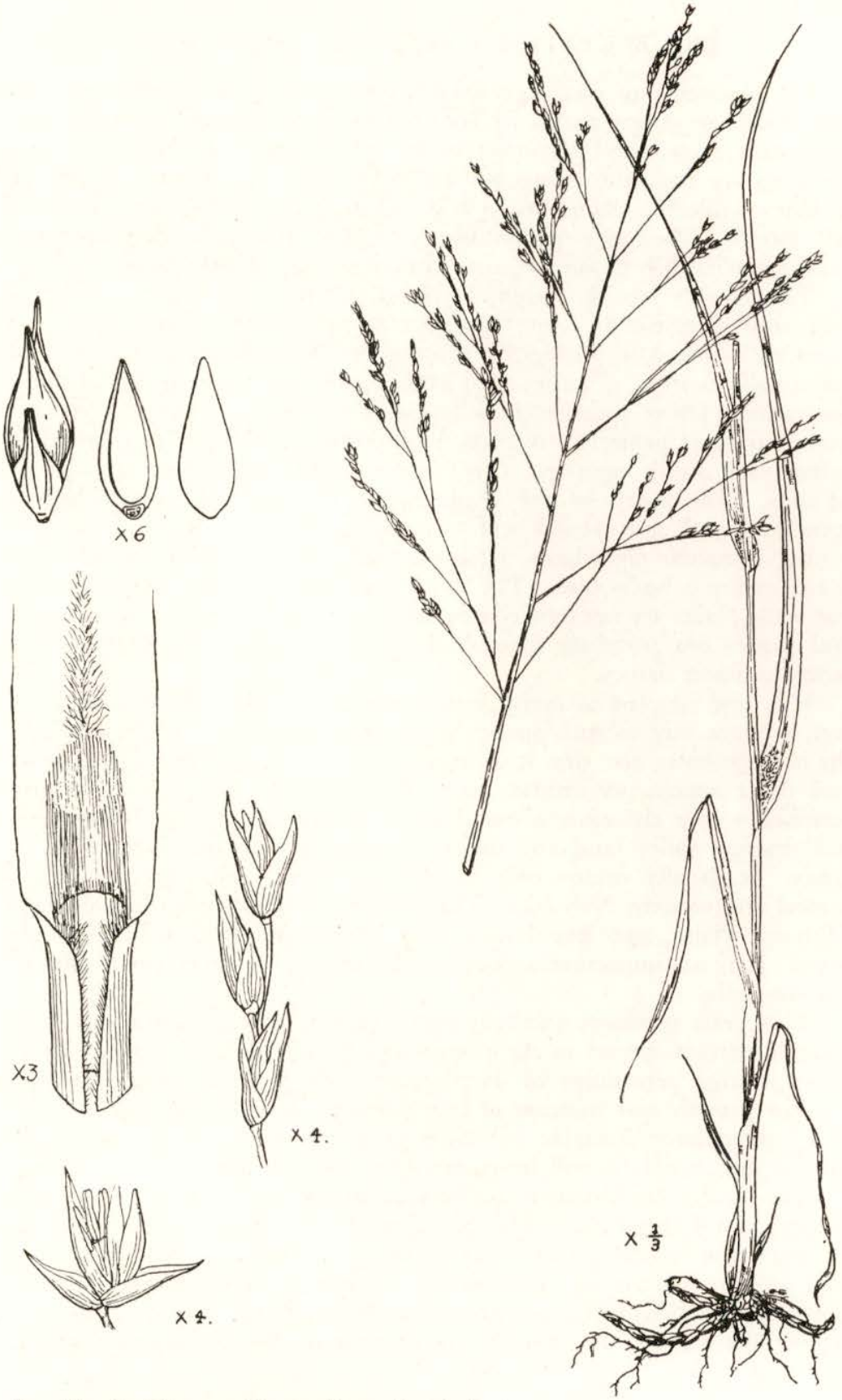

FIG. 20.—Switchgrass. Plant x ⅓; seed x 6; ligule area x 3; branch with spikelets x 4; spikelet x 4.

BIG BLUESTEM (*Andropogon furcatus* Muhl.)

Big bluestem, an erect perennial, grows from 3 to 6 feet high. The leaf blades are large, markedly constricted at the base as contrasted with most other grasses, and generally free from hairiness. The blades, especially the tips, are frequently tinged with red. The leaf sheaths are smooth, or hairy while the plants are young. During the late summer and early fall months when the plants begin to dry, the vegetation commonly develops a reddish to brown cast, similar to that of little bluestem.

This species has the raceme type of inflorescence. The racemes are frequently purplish in color prior to maturity. The spikelets are of two types with respect to position in the raceme. Some of the spikelets, which are usually perfect, *i.e.*, they bear both pistils and stamens, are sessile on the rachis. Other spikelets bearing either perfect or staminate florets are borne on short pedicels. A pedicel supporting a spikelet is attached just below each sessile spikelet. The florets of the pedicellate spikelets are awnless. The florets of the sessile spikelets bear short awns which are spirally twisted and usually bent.

Big bluestem reproduces by short, thick, scaly rhizomes which enable it to develop a heavy sod. The individual stems are not especially dense, but if the plants are not mowed or grazed this species forms a heavy growth and shades out invading species. Turkeyfoot and forked beardgrass are other common names.

It is best adapted to moist, well-drained soils. If the soil becomes too wet, it gives way to such species as sloughgrass and switchgrass, while if the soil becomes too dry it is replaced by little bluestem, blue grama, and other species of similar water requirements. Big bluestem grows commonly over the eastern one-third of Nebraska where it flourishes on well-drained valley land and thrives reasonably well on much of the uplands. It usually occurs only in the moist and subirrigated valleys of central and western Nebraska. The bluestem belt of Nebraska follows the Elkhorn, Platte, and Republican river valleys and their tributaries westward. It is an important species in the extensive subirrigated valleys of the sandhills.

This grass produces excellent feed either as hay or pasture and is the most important species in the prairie hay harvested in Nebraska. It comprises a large percentage of the vegetation of good native-grass pastures.

The growth and increase of big bluestem should be encouraged since it is particularly desirable in native-grass pastures. If bluestem is not grazed judiciously, it will be replaced by inferior species.

The seed of big bluestem can be successfully harvested by combining or stripping and threshing. The first growth is usually harvested for seed although the second growth may produce a reasonably good crop, if the first growth is removed early for hay. Much attention is being given to perfecting methods of harvesting seed and to methods of seeding and growing it on a large scale. Improvement work to develop superior strains is also under way.

FIG. 21.—Big bluestem. Plant x ¼; ligule area x 3; seed x 3; spikelets x 3.

SANDHILL BLUESTEM

Andropogon hallii Hack.

Sandhill bluestem is an erect, robust, perennial growing from 3 to 6 feet tall. This species is quite similar to big bluestem in its general habit of growth and is frequently confused with it. There are, however, intergrades of the two species. The blades of sandhill bluestem are large and usually smooth. They are light-green to bluish in color, whereas the leaves of big bluestem are of a medium to dark green. The sheaths are smooth and of a light-green color. The ligule is membranous and of medium size.

The inflorescence is a raceme and is very similar in appearance to that of big bluestem, *i.e.,* there are 2 to 5 racemes on each stem. The chief difference between the inflorescences of the two species is that the inflorescence of the sandhill bluestem is very hairy or fuzzy as compared with that of big bluestem. The hairs are grayish to golden in color. Sandhill bluestem has two types of spikelets with respect to position in the raceme, with the one kind borne sessile on the rachis and the other kind on short pedicels. The pedicel supporting a spikelet is attached just below each sessile spikelet. The pedicellate spikelets are either staminate or perfect, *i.e.,* they bear both pistils and stamens and are awnless, whereas the sessile spikelets bear the seed and are either awnless or with an awn usually shorter in length than the spikelet. The plants flower and seed during August and September.

Sandhill bluestem reproduces by thick rhizomes as well as by seed. Since it usually grows on sandy soils, this species seldom develops a good sod, but the plants form large, coarse tufts. It apparently is unable to compete with other more aggressive species under favorable conditions. Sandhill bluestem is also referred to as turkeyfoot and Hall's beardgrass.

It is best adapted to sandy soils and more particularly to dune sand. It is seldom found growing on heavy-textured soils, although it will grow successfully on the latter if the competition from other species of grasses is not too severe. This species is generally distributed throughout the sandhills and the outlying region with sandy soils of Nebraska appearing for the most part on dune-sand hills and to a more limited extent in the valleys. It grows in association with such grasses as sand reedgrass, little bluestem, hairy grama, and sand dropseed.

This grass produces forage of only fair quality, and has a palatability rating about half that of big bluestem. It is adapted for grazing purposes only because of the type of land on which it grows. The vegetation on such land is seldom harvested for hay. Sandhill bluestem will readily invade sandhill blowouts and accordingly makes a very desirable species for stabilizing such a condition.

FIG. 22.—Sandhill bluestem. Plant x ½; ligule area x 6; floret x 4; seed x 4.

LITTLE BLUESTEM (*Andropogon scoparius* Michx.)

Little bluestem is an erect perennial attaining a height of 8 to 12 inches on dry, upland soil and a height of 2 to 3 feet under very favorable conditions. The color of the vegetative growth is from medium to light green. The foliage often develops a bluish-green color. This is especially characteristic in drier areas such as in central and western Nebraska. The leaf blades are partially folded, long, slender, free from hairiness, and frequently tinged with red. The leaf sheaths are compressed and usually free from hairiness. During the late summer and early fall months, when the plants begin to dry, the vegetation commonly develops a reddish to brown cast. This color is characteristic of native hay meadows and pastures containing considerable quantities of the little bluestem.

The inflorescence is a raceme. Each stem contains a number of short branches, each of which bears a number of spikelets. Two types of spikelets are produced with respect to position in the raceme. The larger spikelets are sessile and contain the perfect florets, *i.e.,* florets bearing both pistils and stamens. The spikelets borne on pedicels which are somewhat shorter than the pistillate spikelets, are usually reduced to a single glume. A pedicel supporting a spikelet is attached just below each sessile spikelet. The pedicellate spikelets are awnless or short-awned. The florets of the sessile spikelets bear awns, which are partially twisted and bent. The inflorescence appears fuzzy when mature.

Little bluestem reproduces by seed and by short, inconspicuous rhizomes, producing a good sod in areas where moisture is ample but developing characteristic bunches where the moisture supply is limited. It commonly appears as a bunch grass in central and western Nebraska. As a result of this characteristic appearance, little bluestem is usually called "bunchgrass" in the sandhills and in the western end of the state. Other common names used are broomgrass, beardgrass, and broom sedge.

This grass grows generally over the state. It is an important component in the upland prairie-hay meadows and in the native-grass pastures of eastern Nebraska, often constituting from 50 to 75 per cent of the vegetation. It occurs less commonly in the valleys since it does not compete well with the taller species such as big bluetem and sloughgrass under more favorable conditions. Little bluestem appears generally over central and western Nebraska wherever the soil is deep and the topography is not too steep. The sandhills are covered with the characteristic scattered bunches.

If harvested early, little bluestem produces hay of good quality. It also provides good pasture if the growth does not become too old and stemmy. New growth is avoided by livestock if it appears in a heavy growth of the previous year or years. Pastures containing little bluestem should not be grazed too closely or it will be replaced by less desirable species. This grass is late in resuming growth in the spring but furnishes a reasonably uniform amount of feed throughout the growing season.

Seed of this species can be harvested by stripping and threshing. Difficulty is experienced in cleaning the light, chaffy seed. Some attention is being given, experimentally, to the production of superior strains of this species and the development of satisfactory methods of producing seed.

FIG. 23.—Little bluestem. Plant x ⅓; raceme x ⅔; spikelet x 4; seed x 3; ligule area x 3; part of root system x ⅔.

INDIAN GRASS

Sorghastrum nutans (L.) Nash.

Indian grass is a coarse, erect perennial attaining a height of 3 to 5 feet. The leaf blades are large, wide, constricted at the base, and usually free from hairiness. The sheaths are usually glabrous; the lower ones may be hairy. Two prominent projections at the junction of the blade and sheath appear as an upward extension of the sheath. The presence of these structures aids materially in the identification of this species in the vegetative stage. Indian grass prior to the blossoming stage is very similar in appearance to big bluestem but may be distinguished from the latter by the much larger ligule, the presence of the two prominent projections at the junction of the blade and sheath, lighter green color, and the usually coarser leaves.

The panicle type of inflorescence characterizes this species. Although a different generic name is applied to Indian grass, it belongs to the same tribe of grasses as bluestem, and the two are closely related. The panicles are large, open, and bronze in color. All of the spikelets are borne on pedicels as contrasted with the bluestems, where a part of the spikelets are sessile. Each of the florets bears a bent, partially twisted awn. This gives the panicle a bristly appearance. When in full bloom, Indian grass is one of the most beautiful of the native grasses.

This grass reproduces by rhizomes and seed. It may appear in isolated clumps or in extensive areas of sod. The name, Indian grass, is used most commonly but it is also occasionally referred to as wild sorghum.

Indian grass is best adapted to moist, well-drained soils. Its soil adaptations and moisture requirements are nearly identical with those of big bluestem. It occurs commonly in eastern Nebraska and in the moist and subirrigated valleys of the central and western parts of the state. In comparison with big bluestem, Indian grass is less important in eastern Nebraska but relatively more common in the valleys of the western half of the state.

This grass produces excellent feed either as hay or pasture. If utilized as hay, the growth should be harvested comparatively early in order to avoid coarse feed. It is an important constituent of Nebraska's annual prairie-hay crop, particularly in hay harvested in the Elkhorn valley and other subirrigated valleys of the sandhills.

Indian grass is also a valuable species in native-grass pastures. Its growth and propagation for perpetuation should be encouraged wherever it occurs naturally. Judicious grazing of pastures is especially recommended, since it will not withstand continuously close grazing.

The seed of Indian grass can be successfully harvested by stripping and threshing. It produces reasonably good seed yields. Only a limited amount of attention is being given to this species from the standpoint of developing improved strains for commercial use. This is due to the fact that Indian grass and big bluestem are very similar in adaptation, growth habits, and forage value, with the latter having some advantages. Accordingly more attention is being given to big bluestem.

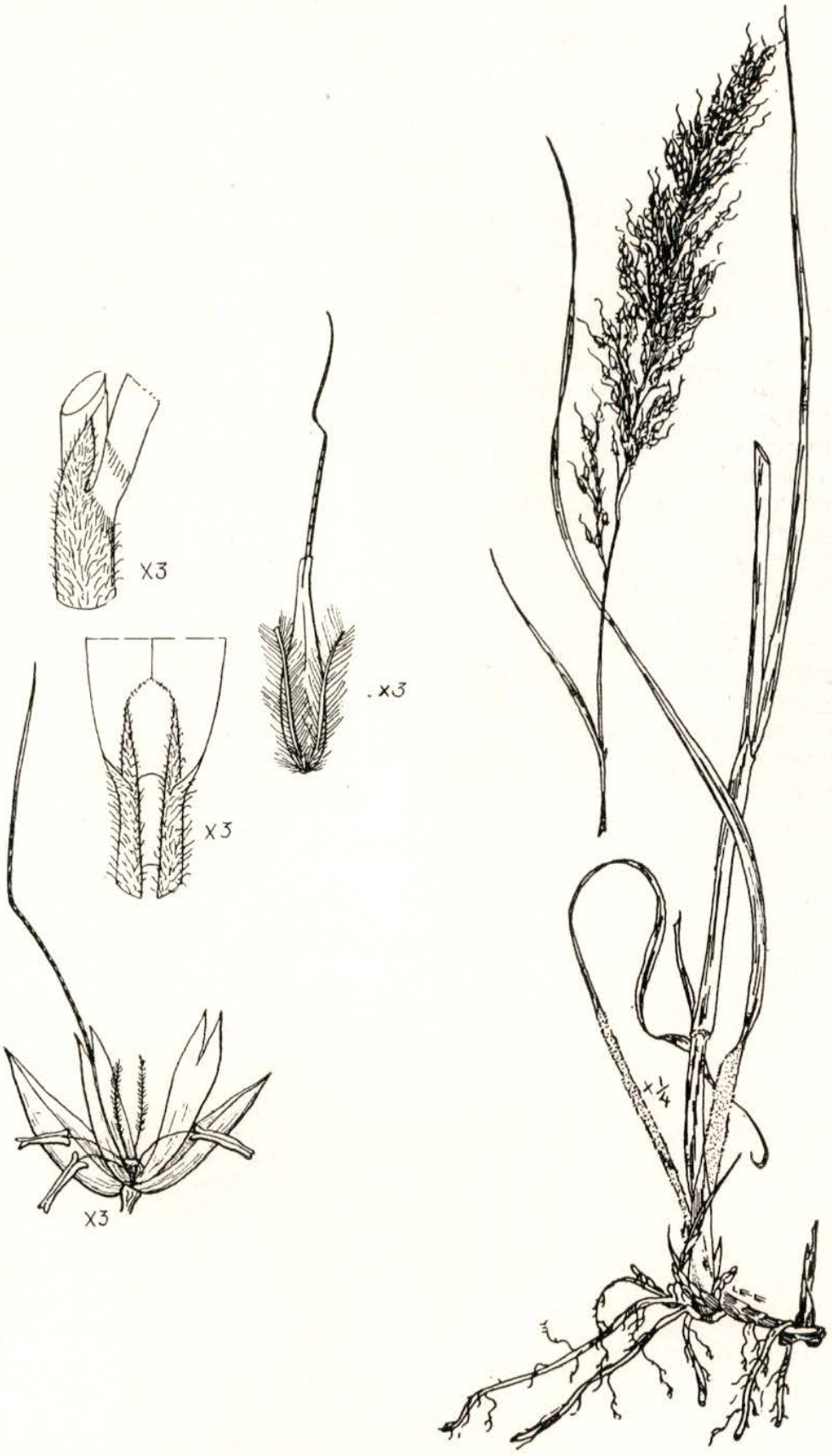

FIG. 24.—Indian grass. Plant x ¼; two views of ligule area x 3; seed x 3; spikelet x 3.

DEFINITION OF BOTANICAL TERMS

For convenience and explanation, certain terms are defined.

AWN—Beard.

AWNLESS—Without beards.

BLADE—That part of the grass leaf which is expanded.

COLLAR—The junction between the leaf blade and sheath.

FLORET—A flower with the two glumes normally surrounding the reproductive organs.

GLABROUS—Without hairs, usually smooth.

INFLORESCENCE—The part of the plant which bears the flowers or reproductive organs.

LIGULE—A small structure, either hairy or membranous in character, located on the inner side of the junction of the leaf blade and the sheath.

OUTER GLUMES—The two outer bracts of a spikelet.

PANICLE—The inflorescence of a grass arranged into a loose head, with the spikelets borne on branches.

PEDICEL—The stalk of a spikelet.

PERENNIAL—Plants that normally live more than two years.

PISTILLATE—Applied to flowers bearing pistils only and to an inflorescence or a plant with pistillate flowers.

RACEME—The inflorescence of a grass in which the spikelets are borne on short pedicels attached directly to the rachis.

RACHIS—The extended portion of the stem, bearing the floral parts.

RHIZOME—Any prostrate underground stem commonly rooting and sending up new shoots at the nodes or tips.

SESSILE—Without a pedicel or stalk.

SHEATH—The lower part of the grass leaf clasping the stem.

SPIKE—The inflorescence of a grass arranged into a compact head, with the spikelets attached directly to the central stem.

SPIKELET—The small bracted structures, each consisting of one or several flowers, making up the grass inflorescence.

STAMINATE—Applied to flowers bearing stamens only and to an inflorescence or a plant with staminate flowers.

[10M December, 1938]