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OF THE
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BOTANICAL DEPARTMENT.

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NATIVE AGRICULTURAL GRASSES OF KANSAS.

The importance of the stock interests in Kansas justifies a careful study of our native grasses. While cultivated forage plants play an important role in stock raising, a role which is destined to become more and more important as the state grows older, it is nevertheless true that for some time to come our wild grasses will be the basis of the industry in the region of the Great Plains.

Our wild grasses may be considered from two points of view, grazing and hay production. Relatively the grazing is more important in the western half of the state and hay-making in the east.

All the grasses mentioned in the list are *perennial* except Barnyard-grass (*Panicum Crus-Galli*).

In the following list are mentioned only such as might be considered important grasses. Many others are eaten by stock or are cut along with their neighbors when hay is made, but are not abundant enough to be worthy of inclusion in the Agricultural Grasses.

Most grasses prefer certain combinations of conditions, and hence are found in certain regions. It is not necessary to discuss here the conditions which govern the distribution of our grasses, but the most important factor undoubtedly is water. Of less im-

portance is the chemical composition of the soil, and the amount of light. For convenience, we may classify these regions of distribution into the following:

- (1) Wooded regions.
 - (2) Sloughs, swales and wet meadows.
 - (3) Bottom-land.
 - (4) Prairies of eastern Kansas.
 - (5) Upland plains of western Kansas.
 - (6) Sandy regions.
 - (7) Stony hills.
 - (8) Salt plains and alkali spots.
- We will now consider these regions more in detail.

WOODED REGIONS.

Many species grow scattered here and there under the shade of the woods, and several are eaten to a considerable extent by stock. None are, however, to be compared in importance with the grasses of open regions. Wild Fescue-grass is the only one included in the list, and this rather from the ornamental standpoint, tho it is said to be relished by stock.

SLOUGHS, SWALES AND WET MEADOWS.

A slough is a small valley or depression in a rolling prairie and is a part of the natural drainage system. After a rain it may be a rushing river, but ordinarily there is no running water and may be a succession of pools, or may be dry for a considerable portion of the season. A swale is a more circular depression in which water tends to collect. Large swales are swamps or marshes. Somewhat similar depressions on the upland plains are called buffalo-wallows.

The commonest grass is usually called slough grass (*Spartina cynosuroides*). In less moist places, such as the area between the Slough-grass and the prairie, will often be found Wild Timothy and Wild Rye. Belonging to this group rather than to the prairie grasses are Chloris, Kentucky Blue-grass and Barn-yard grass (of importance in the buffalo-wallows of the West). The first three are of importance as hay-producers, the last three as grazing grasses. Some of these are often abundant in the next region.

BOTTOM-LAND.

We refer to the land lying in the valleys of the larger streams. In eastern Kansas this region is normally covered with timber, unless too wet, when marsh grasses predominate. On the other hand, the region may be essentially prairie, sometimes very wet in the rainy season, but not subject to overflow. In that case the grasses are the ordinary prairie grasses discussed under that head.

Gama-grass is a grass of the valleys. In the basin of McPherson county a vast area is covered with Reed Canary-grass. In the valleys of the Arkansas and Cimarron the most important grazing grass is Bunch-grass (*Sporobolus airoides*). The valleys of the west, however, usually correspond in their grass flora to the prairies of the more easterly portion. Hence we find that the so-called "tall grasses" spread along the river valleys, while farther east they are common prairie grasses.

PRAIRIES OF EASTERN KANSAS.

It is best to distinguish the prairies of the eastern part of the state from the plains, as the flora is so different. Prairies are open grassy areas, not very moist and devoid of woody plants. The soil is neither sandy, stony nor salty, in a typical prairie. A great variety of plants are found here but grasses predominate and give the general aspect to the region. The prairies furnish excellent hay. For this purpose it is usually cut in August and September if only one cutting is to be made.

The grasses which furnish the bulk of the hay from prairies are: Big Blue-stem, Little Blue-stem, Indian-grass, Switch-grass, Prairie Oats, Purple-top, Prairie-grass.

UPLANDS OF WESTERN KANSAS.

The western half of the state lies in the region known as The Great Plains. The greater part of this region is a high, nearly level plain, broken here and there by streams or erosion valleys. These uplands are often referred to as the "Short grass" region. The greater part of the vegetation consists of two species of grass, Buffalo-grass (*Buchloe dactyloides*) and Tall Grama (*Bouteloua oligostachya*). The short curly growth of these grasses is dotted here and there with bunches of Spear-grass and at wider intervals with a variety of other low-growing plants. Along ravines and draws, Prairie Oats is found in considerable abundance. Hay can rarely be obtained from the uplands, on account of the short growth of the grass. In wet seasons hay is sometimes cut. But in the draws there is usually a sufficient growth of various taller grasses, such as: Prairie Oats, Indian-grass, Big Blue-stem, Little Blue-stem and some others from the eastern prairies that find a home in these moist spots.

SANDY REGIONS.

The grass in regions sandy enough to be called sand-hills, that is where there is a tendency for the sand to drift, is sparse and bunchy. Certain annual grasses, such as Sand-bur, are numerous. Other coarse grasses known as binding grasses are important in

holding the soil in place. These have long, stout, creeping root-stocks which intertwine and prevent the wind from shifting the sand. The availability of the various sand-hill grasses for forage purposes needs further investigation. Sand-grass, found in western Kansas, and Drop-seed grass, very common over the state, are the most important. But usually the sand-hills furnish forage only in the spring.

STONY HILLS.

Like the sand-hills, the sterile, stony hills found especially thru central Kansas, furnish only an inferior pasturage and usually no hay. Often it is only the upper portion of a hill or ridge that is stony. Hence one often sees the mowing machine used around the base and part way up the sides while the top remains untouched. The grasses from the surrounding regions maintain a precarious existence here but the bulk of the grass is likely to be Short Grama and Prairie Oats.

SALT PLAINS AND ALKALI SPOTS.

In a few counties of the state, notably Reno and Stafford, there are extensive tracts of salty land, which are salt marshes in wet seasons and salt plains in dry seasons. The prevailing grass of the distinctly salty portions is Salt-grass (*Distichlis spicata*). But besides these large areas there are scattered thruout the state numerous spots known as alkali spots, gumbo spots, hard-pan and the like, which are often sufficiently salty to drive out other grasses and one there finds the Salt-grass, or another common grass, the Colorado Blue-stem, which latter furnishes considerable hay.

PLATES.

All the more important species of our agricultural grasses are illustrated. A part of the cuts were obtained from the Department of Agriculture, Division of Agrostology, thru the kindness of Mr. F. Lamson-Scribner, the Agrostologist. For all thus obtained credit is given in connection with each plate. Several others were found here in the possession of the College. Prof. W. A. Kellerman informs me that these were used to illustrate his article on the native grasses of Kansas (Quarterly Report Kansas State Board of Agriculture, March, 1889). The introduction to this article states the following in regard to these cuts: "The Grasses and Forage Plants of Nebraska, published in the Report of the State Board of Agriculture, by Dr. Chas. E. Bessey, gives many plants that grow also in Kansas. The twenty plates there given have, by the kindness of the author, been reproduced and an equal number added which were obtained from the United States Department of Agriculture."

The following are of this lot: *Tripsacum dactyloides*, *Phalaris arundinacea*, *Sporobolus cryptandrus*, *Spartina cynosuroides*, *Triodia cuprea*, *Koeleria cristata*, *Uniola latifolia*, *Chloris verticillata*, *Muhlenbergia Mexicana*.

MAPS ILLUSTRATING DISTRIBUTION.

The maps accompanying each species illustrate graphically the distribution. These are based upon specimens in the herbarium. A black dot in a county indicates that we have a specimen of that grass from that county. An unchecked county does not indicate that the grass does not grow in that county, but that we have no specimen to show that it does. Hence one must judge of the range by the general distribution of the dots.

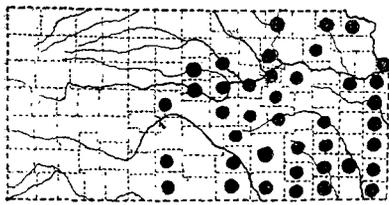
TO CORRESPONDENTS.

We hope that our correspondents in various parts of the state will send in information concerning our grasses. We are anxious to have the opinions of stock raisers concerning our species of grasses. If possible, it is best to accompany notes with specimens in order to insure the identification of the grass. The specimens should always have a flowering portion attached, for identification from the leaves alone is uncertain. The specimens should be sent by mail.

LIST OF AGRICULTURAL GRASSES.

GAMA GRASS (*Tripsacum dactyloides*, L.)

This is the most robust forage grass we have. It grows in large bunches from a mass of stout roots. The stems are numerous and several feet high (three to six feet). The leaves are long and one-half inch in width, the central rib being whitish. It forms a coarse but nutritious hay. In Kansas it is usually not abundant enough to be of much importance. It is of more value, either for grazing or hay, before the flowering stems form, for the latter are very coarse.



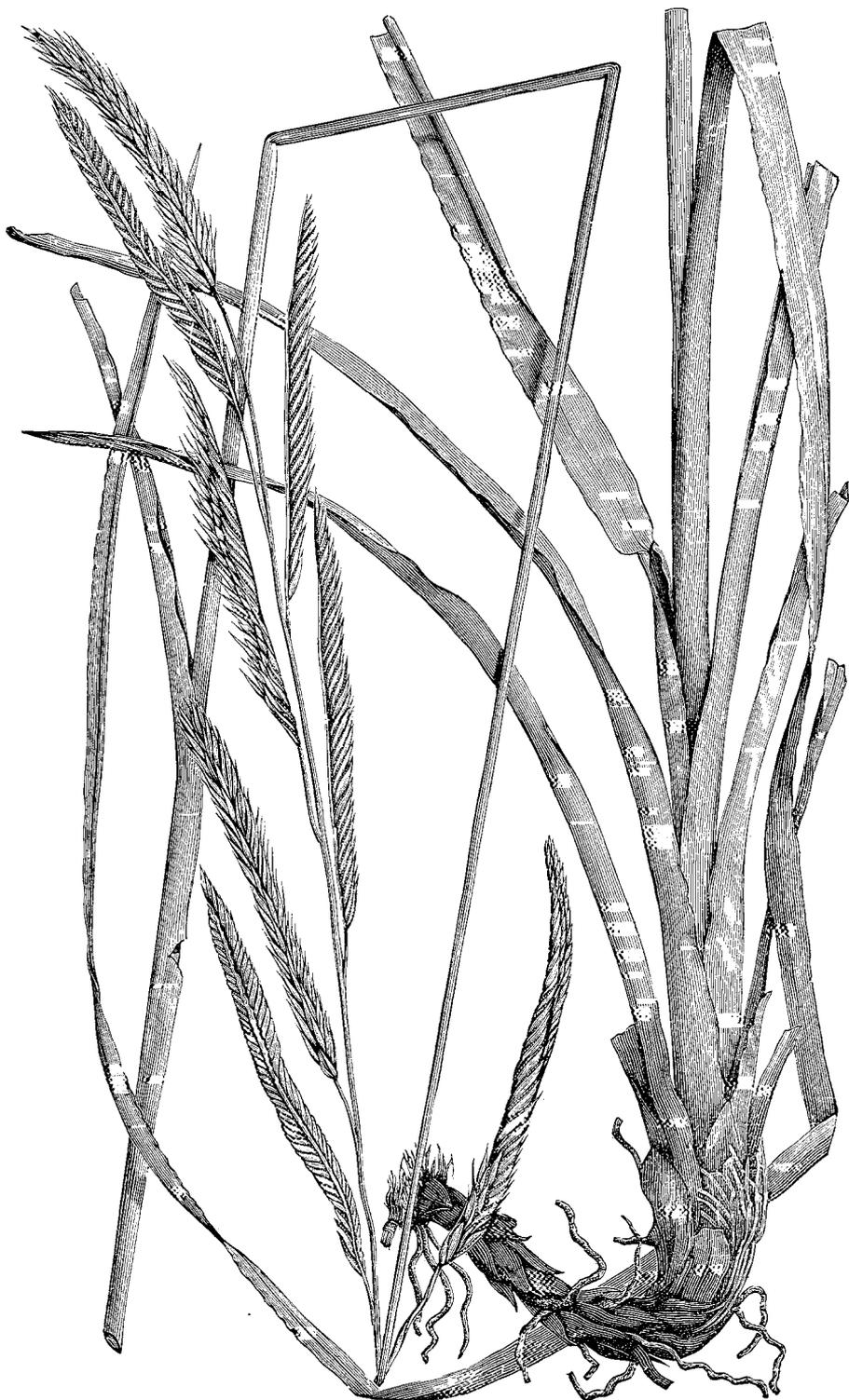
Tripsacum dactyloides
 Gama-grass

In many places thru the Southern States this grass is cultivated for the hay. For this purpose the roots are cut into short pieces and planted about two feet apart each way.

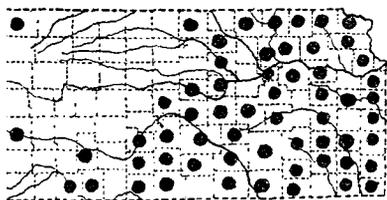
It grows in moist places, such as ditches, sloughs and wet meadows, sparingly thru the eastern part of the state.



GAMA-GRASS.



SLOUGH-GRASS.



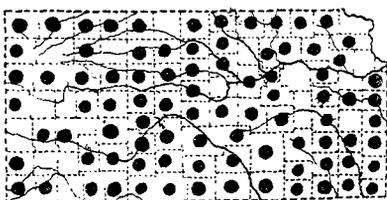
Spartina cynosuroides
 Slough grass

SLOUGH-GRASS (*Spartina cynosuroides*, Willd.)

A tall, coarse grass, growing thruout the eastern half of the state in sloughs and swales. When mature this grass is very coarse and harsh and is used extensively for topping off hay-stacks. However, if cut when young it furnishes an abundance of fairly good hay.

SWITCH-GRASS (*Panicum virgatum*, L.)

A bunchy grass with upright and rather stiff leaves compared with Blue-stem. Occurs more or less thruout the state. In the

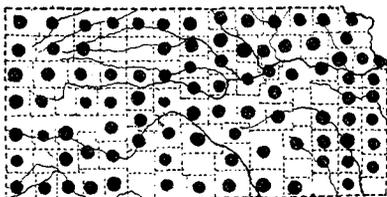


Panicum virgatum
 Switch-grass

eastern part it is an important constituent of the prairie sod. In the west it occurs in bunches in the moister regions. There is a common form found in the west in sandy regions, where it often loses its upright bunchy growth and appears as isolated plants more or less creeping at the base. For hay it should be cut before it is too old, as it then becomes coarse and harsh.

BARN-YARD GRASS (*Panicum Crus-galli*, L.)

One variety of this is common around barn-yards, a somewhat succulent spreading plant which is usually treated as a weed. An-



Panicum Crus-galli
 Barn-yard grass

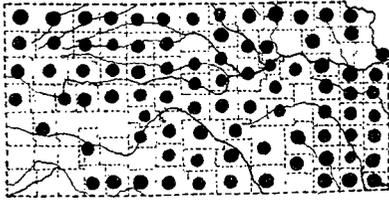
other variety occurs in wet places thru eastern Kansas, especially along streams. This form is more robust, sometimes growing several feet high. The flowers often have long bristles at the end. A third form is common in buffalowallows and other moist places thru western Kansas. This last form is of considerable importance as a forage grass, for it seems to be relished by stock. It is strictly upright, about a foot high and growing quite thickly. In some localities in the South,

Barn-yard grass is utilized for hay, for which purpose it is said to be very excellent. We do not know that it is used for this purpose in Kansas. The grass is an annual but abundantly reseeds itself.

BIG BLUE-STEM (*Andropogon furcatus*, Muhl.)

Also called Blue-stem, Blue-joint, Turkey-foot, Finger-spiked Indian grass.

One of the "tall grasses" of the prairie regions, and one of the most important and valuable grasses of Kansas, both for grazing and for hay. It is so well known



Andropogon furcatus
 Big Blue-stem

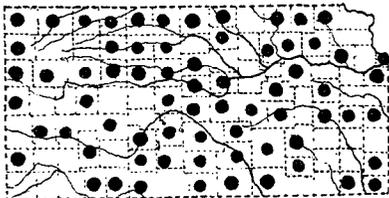
thru the region where it is common that it scarcely needs a description. At flowering time it is quite tall, usually three or four feet or even more. The flowering spikes (two to five in number) are about one or two inches long and clustered at the summit of the stem, whence the names Turkey-grass and Finger-spike. The names Blue-joint and Blue-stem

come from the blue or purple color of the stem. This grass along with the next seems to be replacing the Buffalo-grass and other short grasses.

It occurs more or less commonly thruout the state except the southwestern corner, but is most abundant on the prairies of the eastern half of the state. Thru the western half it is confined to draws and other situations where it can compete successfully with the short grasses. It does not seem to be able to stand the tramping of stock as well as the Buffalo-grass and hence makes more headway in those localities where stock is less abundant.

LITTLE BLUE-STEM (*Andropogon scoparius*, Michx.)

Smaller than Big Blue-stem but growing to the height of two



Andropogon scoparius
 Little Blue-stem

to four feet under favorable conditions. It is often called Bunch-grass thru northwestern Kansas, and comes in the general category of "tall grasses." It is one of the chief constituents of the prairie grass of eastern Kansas. In the western part of the state it is found, like the Big Blue-stem, only in draws or the valleys of streams. At first it appears in



SWITCH-GRASS.

(Division of Agrostology, United States Department of Agriculture.)



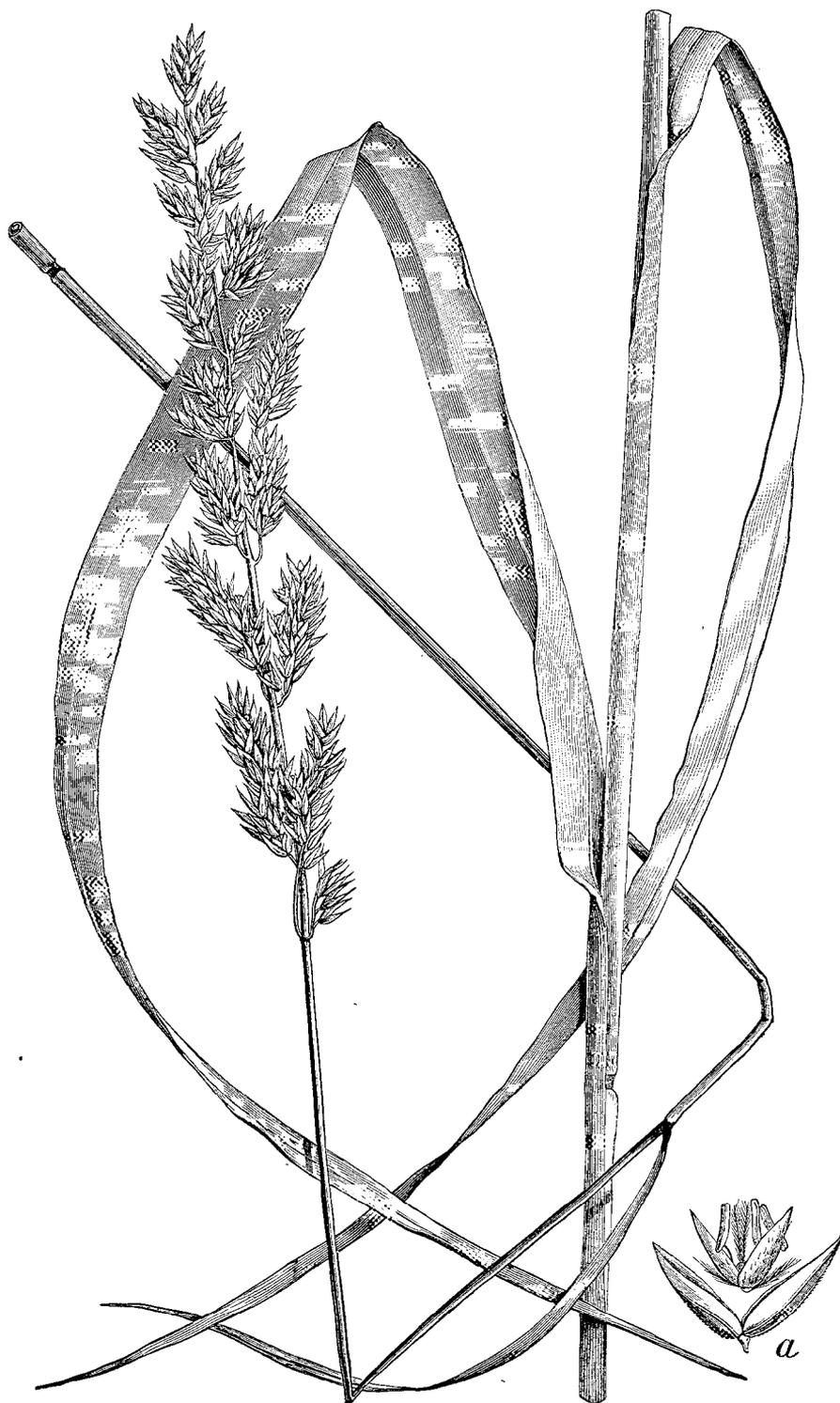
BIG BLUE-STEM.

(Division of Agrostology, United States Department of Agriculture.)

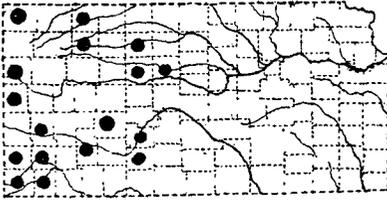


LITTLE BLUE STEM.

(Division of Agrostology, United States Department of Agriculture.)



REED CANARY-GRASS.



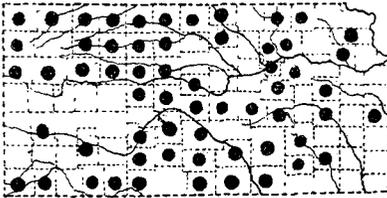
Andropogon Hallii
Sand-grass

bunches among the other grasses, whence the name, but later on it tends to form a more continuous sod. A very excellent grass for hay.

SAND-GRASS (*Andropogon Hallii*, Hackel.)

This resembles the preceding but is larger and prefers the sandy regions. Confined to western Kansas.

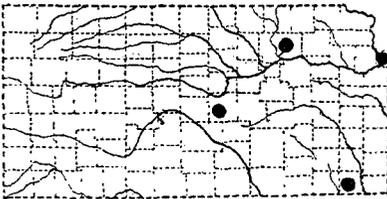
INDIAN-GRASS (*Chrysopogon nutans*, Benth.)



Chrysopogon nutans
Indian grass

One of the "tall grasses," which is found on the prairies of eastern and central Kansas, but is also scattered here and there thruout the western third of the state. Economically, it resembles Little Blue-stem, being a good pasture grass, and nutritious when cut as hay if not allowed to get too ripe and woody.

REED CANARY-GRASS (*Phalaris arundinacea*, L.)



Phalaris arundinacea
Reed Canary-grass

So far as we have observed, this grass grows abundantly in but one locality in the state, viz, McPherson county. In the "basin," a flat wet tract of land several square miles in extent, it grows luxuriantly. It makes excellent hay but is of little value as a pasture grass. In the northern part of the Great Plains region of the United States, as Montana and Dakota, this grass is abundant and of great importance. A variety of this is commonly cultivated as Ribbon-grass.



INDIAN-GRASS.

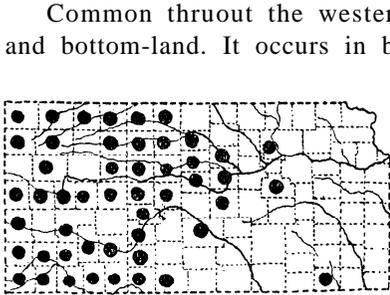
(Division of Agrostology, United States
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FINE-TOP.

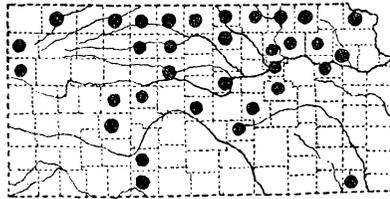
(Division of Agrostology, United States
Department of Agriculture.)

SPEAR-GRASS (*Aristida purpurea*, Nutt.)



Aristida purpurea
Shear-grass

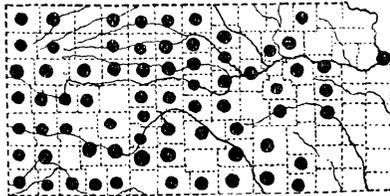
valuable adjunct to winter ranges; sheep, even, are often glad enough to eat it in winter."



Muhlenbergia glomerata
Wild Timothy

sloughs and other moist places, where it flourishes and furnishes considerable pasture and hay.

Another species (*Muhlenbergia Mexicana*, Trin.) is also common.

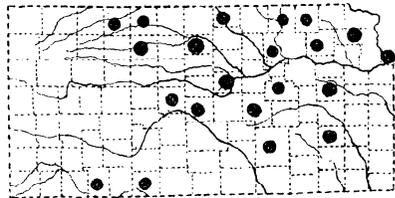


Sporobolus cryptandrus
Drop-seed grass

bears a sharp-pointed seed with three long bristles. The seeds are very troublesome and the grass is not to be compared with the short grasses among which it grows. Yet in certain localities it may furnish considerable forage. Mr. F. W. Anderson, in his report of the grasses of Montana, says of this: "Cattle and horses eat of the green clumps freely, but sheep prefer other grasses. A

WILD TIMOTHY (*Muhlenbergia glomerata*, Trin.)

Altho it is not closely related to Timothy, its general appearance has suggested the name of Wild Timothy. It does not grow freely on prairie but prefers



Muhlenbergia Mexicana
Wild Timothy

DROP-SEED GRASS (*Sporobolus cryptandrus*, Gray.)

A very common grass of sandy regions thruout the state. It is a rather coarse, wiry grass, at least when mature, but when young forms an important constituent of the grasses of the sand-hills.

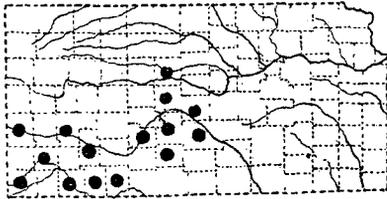


WILD TIMOTHY (*Muhlenbergia Mexicana.*)



DROP-SEED GRASS.

FINE-TOP (*Sporobolus airoides*, Torr.)

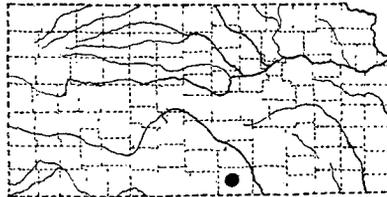


Sporobolus airoides
 Fine-top

Grows in conspicuous bunches, and hence known as "bunch-grass" in the region where it occurs, the valleys of the Arkansas and Cimarron rivers. It is a bottom-land grass and is often found in sandy regions and also in alkali land along with Salt-grass. It is not cut for hay but, thru the region named, is the most important grazing grass of the low-land.

BERMUDA-GRASS (*Cynodon Dactylon*, Pers.)

This very valuable Southern grass should scarcely be included among Kansas grasses, as we have specimens from only one county, Sumner. It would be well worth trying to introduce it in some of our southern counties, as it is well adapted to sandy soil.

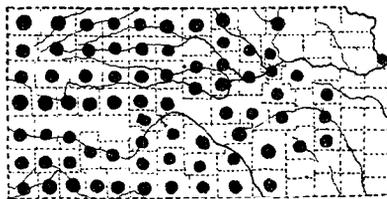


Cynodon Dactylon
 Bermuda-grass

It is propagated by cutting up the roots or sod into small pieces and sowing broadcast, with shallow plowing, or planted a foot or two apart in shallow furrows and then covered. A severe freeze kills it, hence it will not thrive except in the southern counties. It is said to barely thrive in the vicinity of St. Louis.

TALL GRAMA (*Bouteloua oligostachya*, Torr.)

A "short grass" and ranking with Buffalo-grass in its importance as a pasture grass. This is very common over the same range as the Buffalo-grass, and is found mixed with it, but is not so abundant. Like this, it is a "short grass," not usually growing tall enough for hay. It can be easily distinguished by the flower stalks, which are about a foot high, with two (sometimes one or three) little spikes of flowers. These spikes are about an inch long, one being at the end and the other a short distance below. These spikes



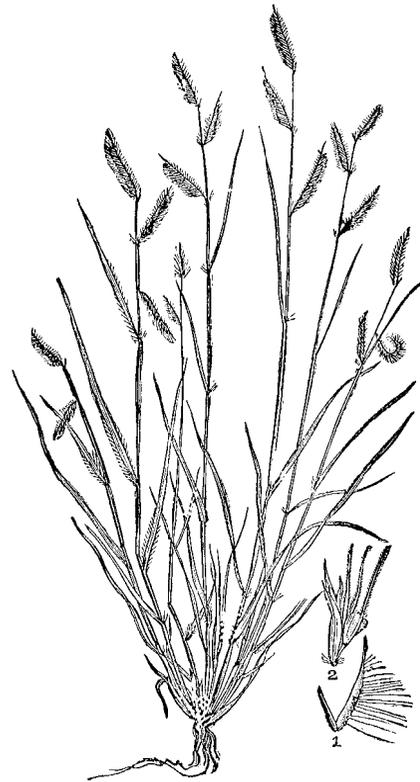
Bouteloua oligostachya
 Tall Grama

are about an inch long, one being at the end and the other a short distance below. These spikes



TALL GRAMA.

(Division of Agrostology, United States
Department of Agriculture.)



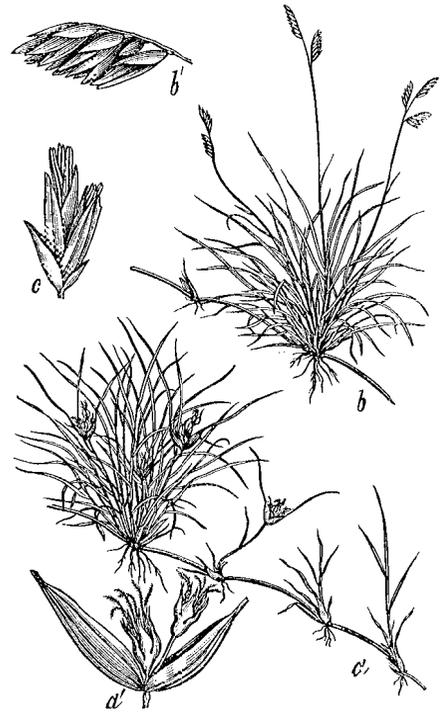
SHORT GRAMA.

(Division of Agrostology, United States
Department of Agriculture.)



PRAIRIE OATS.

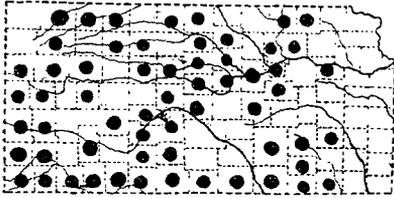
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Department of Agriculture.)



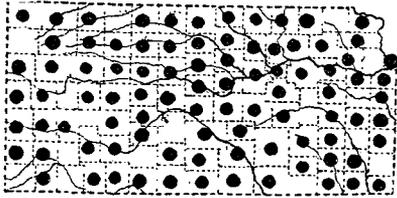
BUFFALO-GRASS.

(Division of Agrostology, United States
Department of Agriculture.)

turn easily with the wind and form miniature weather vanes. This grass is found thruout the western three-fourths of the state, but increases in abundance westward until in extreme western Kansas, especially south of the Arkansas river, it forms at least half of the sod on the uplands. It is a staple grass for grazing purposes, and, like buffalo grass, it cures for winter use.



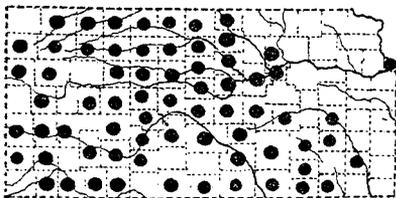
Bouteloua hirsuta
 Short Grama



Bouteloua racemosa
 Prairie Oats

BUFFALO-GRASS (*Buchloe dactyloides*, Engelm.)

This common and well-known grass forms the bulk of the native vegetation on all the uplands of the western half of Kansas. In the eastern part of the state it is less common and is being gradually driven out in many places by other grasses. Buffalo-grass forms a short, compact sod, the plants usually being only a few inches high. The color is gray-green. The male and female flowers occur on different plants, which fact has given rise to the impression that there are two kinds of Buffalo-grass. The male plants produce a flower stalk a few inches high, but the flowers



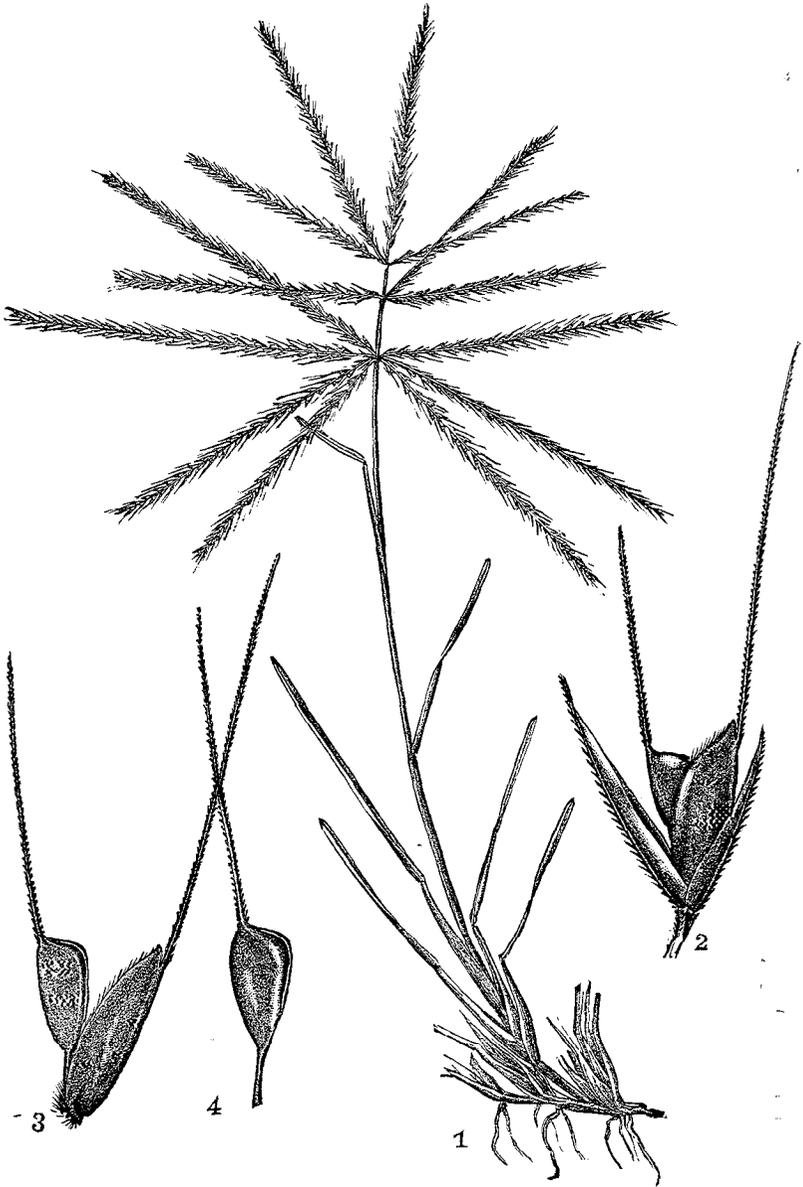
Buchloë dactyloides
 Buffalo-grass

SHORT GRAMA (*Bouteloua hirsuta*, Lag.)

This species of Grama occurs on stony or sterile hills and forms the chief forage in such regions. It is similar to the preceding, but with shorter flower stalks, and occurs usually in bunches. It is sometimes called Black Grama. It ranges thru about the same region as the preceding.

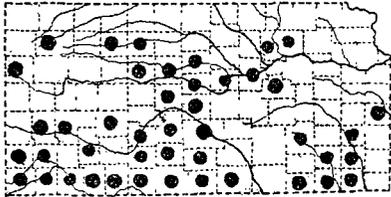
PRAIRIE OATS (*Bouteloua racemosa*, Lag.)

This species has a longer flower stalk with numerous short spikes. It occurs thruout the state, on prairie in the east, but confined to ravines in the west. It does not appear to be so much relished by stock as the other two species.



CHLORIS.

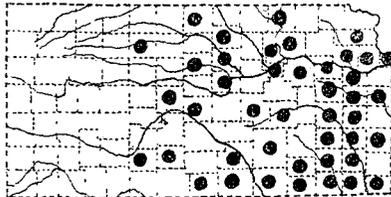
contain only pollen, and no seed is formed. The female flowers are in little clusters close among the leaves, and it is here that the seed is produced. The grass propagates extensively from creeping stems and also from the seed. It is too short to be cut for hay, but it is the staple grazing grass of the plains, for both summer and winter.



Chloris verticillata

Chloris

tarded, along sloughs and old fields. Cattle evidently like it, as it is always cropped close in pastures, yet seems to thrive under this treatment. It seeds abundantly.



Triodia cuprea

Purple-top

CHLORIS (*Chloris verticillata*, Nutt.)

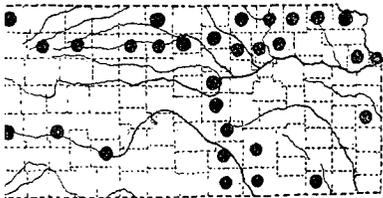
This seems not to have received much attention, but our observations show that it has many points of merit. It grows in open land but chiefly in low places. It acts like an introduced plant, coming in where the native grass has been killed or retarded, along sloughs and old fields. Cattle evidently like it, as it is always cropped close in pastures, yet seems to thrive under this treatment. It seeds abundantly.

PURPLE-TOP (*Triodia cuprea*, Jacq.)

A constituent of prairie sod in eastern Kansas, especially in sandy soil. Resembles Switchgrass. In autumn and winter the dead flowering portion is dark-colored from the accumulation of dust upon the sticky stems.

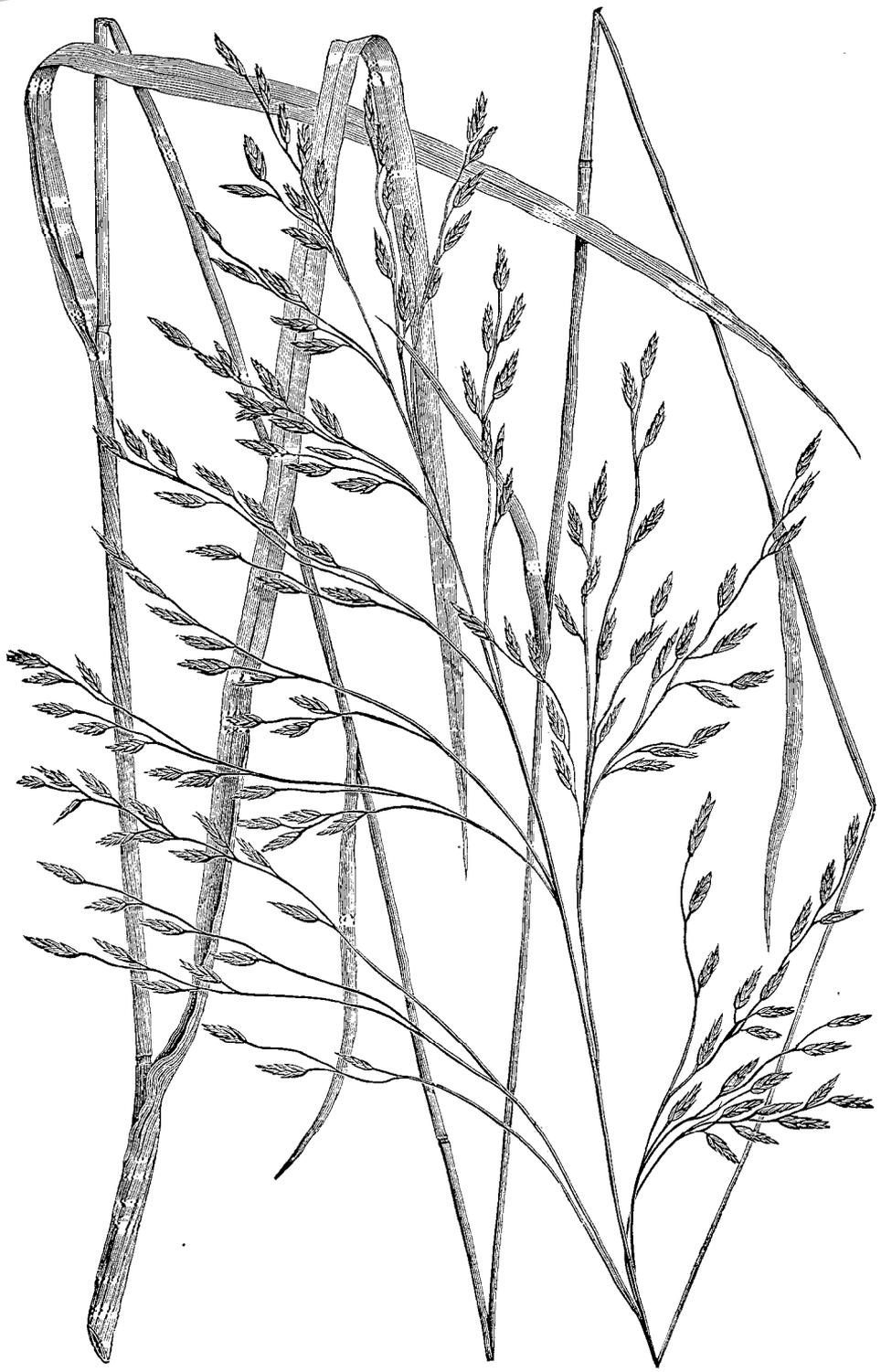
KENTUCKY BLUE-GRASS (*Poa pratensis*, L.)

One of the most valuable of pasture grasses for the eastern fourth of the state. It will not stand drouth but is well suited for moist meadows, where the rainfall is sufficient. In the vicinity of Manhattan it has established itself in many pastures of wild grass. It occupies the soil along draws and in the shade of trees if these be not too thickly set. It thus gives excellent early and late pasture, often remaining green all winter.



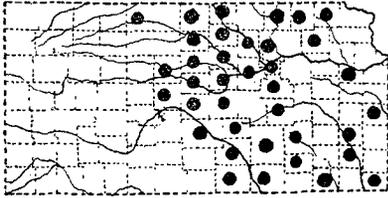
Poa pratensis

Kentucky Blue-grass



PURPLE-TOP.

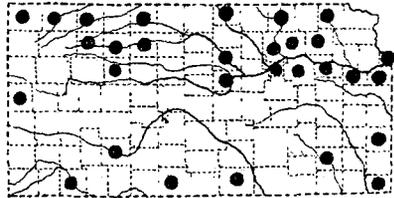
PRAIRIE-GRASS (*Koeleria cristata*, Pers., and *Eatonia obtusata*, Gray.)



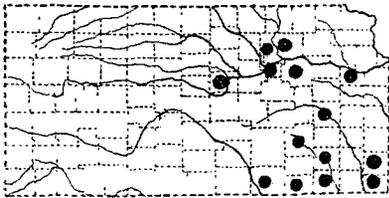
Koeleria cristata
Prairie-grass

about a foot high, but form an appreciable part of the prairie hay from the region where they grow. They are, however, early grasses, ripening in July.

These two grasses resemble each other and may be considered together. They both occur abundantly on the prairies of eastern Kansas, tho the second extends farther west. They are rather inconspicuous grasses, growing



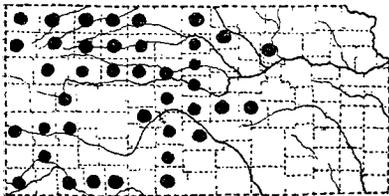
Eatonia obtusata
Prairie-grass



Uniola latifolia
Wild Fescue-grass

WILD FESCUE-GRASS (*Uniola latifolia*, Michx.)

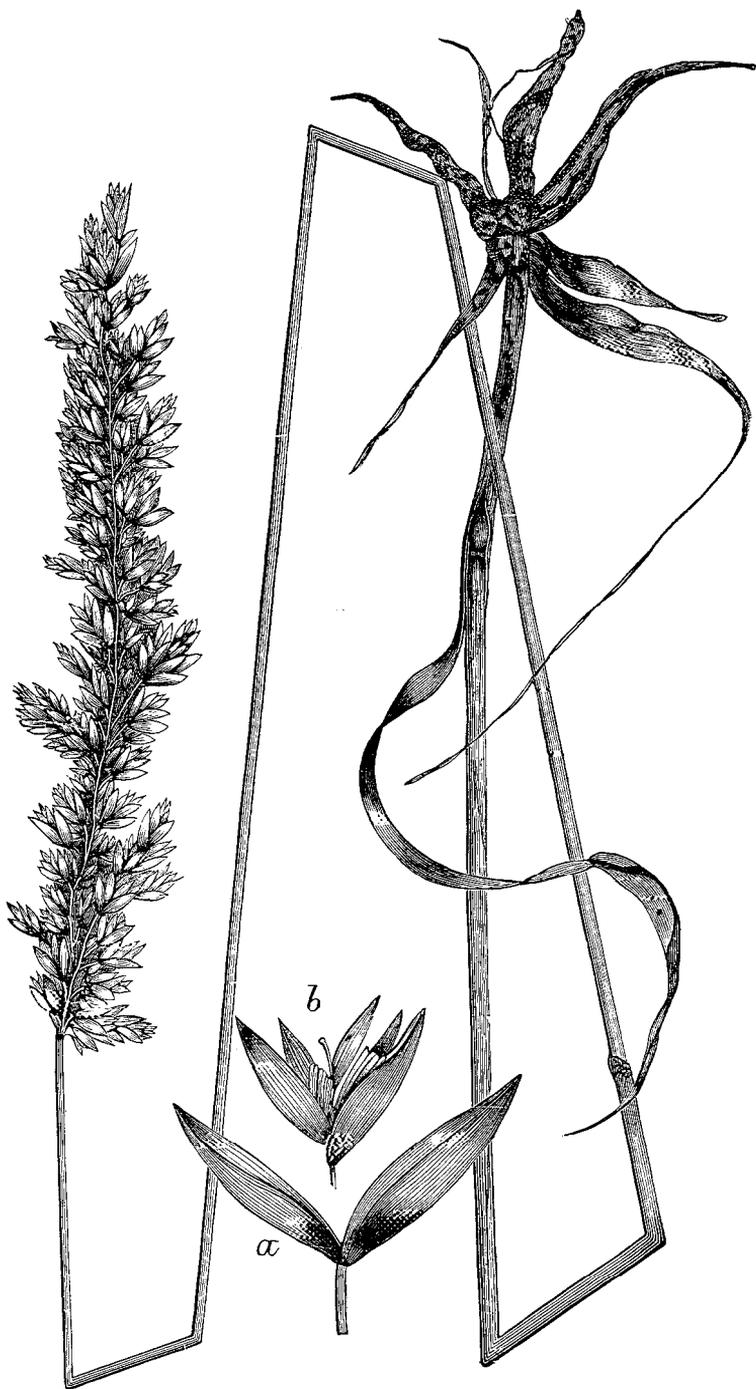
This handsome grass grows in the rich woodlands of eastern Kansas. It is worthy of cultivation as an ornamental species. We do not know that it is of importance as a forage grass, altho stock is said to relish it.



Distichlis maritima
Salt-grass

SALT-GRASS (*Distichlis maritima*, Raf.)

Often called Alkali-grass. It thrives on the salty or "alkali" soil of the western half of the state. The grass is coarse and of inferior quality, yet in some localities, as the salt plains of the interior of the state, it is of considerable importance.



PRAIRIE-GRASS (*Koeleria cristata*).



PRAIRIE-GRASS.

(Division of Agrostology, United States Department of Agriculture.)



COLORADO BLUE-STEM.

(Division of Agrostology, United States Department of Agriculture.)



WILD FESCUE-GRASS.

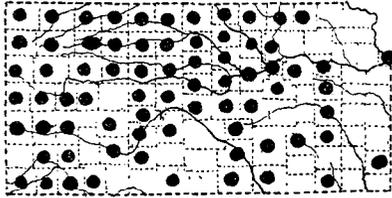


WILD RYE (*Elymus Canadensis*).

(Division of Agrostology, United States Department of Agriculture.)

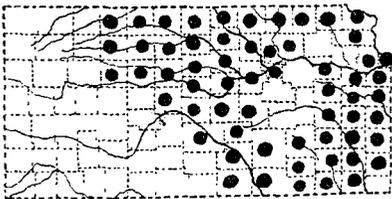
COLORADO BLUE-STEM (*Agropyrum glaucum*, R. and S.)

Also called Gumbo-grass, Alkali-grass, Salt-grass, and June-grass. Prefers alkali soil and is sometimes the chief vegetation of such localities if the soil is moist. It does not form a sod but each plant comes from the soil as a separate stem, the soil often being bare between. The whole aspect—leaves and stem—is stiff and sharp. It grows to the height of two or three feet, bearing finally a slender spike of flowers somewhat resembling beardless wheat. It propagates freely by running underground stems. It is of little



Agropyrum glaucum
 Colorado Blue-stem

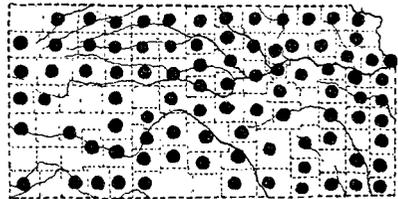
use as a grazing grass even when young, but, especially in central and western Kansas, it is freely cut for hay. In many places it is the most important grass for this purpose. It should be cut early. This grass occurs thruout the state, but is not used much in the eastern third.



Elymus Virginicus
 Wild Rye

WILD RYE (*Elymus Canadensis*, L., and *E. Virginicus*, L.)

Both species are common



Elymus Canadensis
 Wild Rye

in rich soil near streams. The first forms a bushy head, like rye, while the second has a smooth head, more like wheat. They both make fairly good hay if cut early.

