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The University of Maryland
Agricultural Experiment Station

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MARYLAND GRASSES

By J. B. S. Norton

"GRASS IS THE BASIS OF ALL AGRICULTURE."

Introduction

The purpose of this bulletin is to give a list of the true grasses occurring in Maryland, especially the wild species, to record their distribution within the State, and to give notes on their economic importance, with illustrations, keys and brief descriptions to aid students in identifying them.

Investigations on our grasses have been carried on almost since the founding of the Experiment Station. Many botanists, agronomists and others on the Station staff have had a part in this work. The writer has collected grasses throughout the State at various times and places since 1901. P. M. Novik spent a part of the summer of 1908 studying grass distribution in Maryland, and prepared a thesis on that subject. "Plant Life of Maryland," published in 1910 as Vol. 3 of the Maryland Weather Service, gives a very full account of the occurrence of Maryland plants under different soil and water conditions, and includes many valuable notes on some of the grasses. In 1914, S. D. Gray and the author identified most of the grass collection of the Experiment Station and Mr. Gray prepared a key to the species and a treatise on their distribution. In 1920, J. B. Wentz collected most of the economic data herein included. In recent years G. Eppley has added much to the knowledge of our State grasses.

A full botanical account of these grasses is not included, since practically all are well described in the manuals of the flora of this region. Botanists will be chiefly interested in the list of species found within the State, and their distribution. The eco-

nomic notes will be of most interest to farmers, as grasses are not only the most important of cultivated plants, but many wild grasses are used extensively in meadow and pasture and otherwise, while on the other hand the most injurious weeds are also grasses. The illustrations showing the form of flower clusters, and the non-technical descriptions with the common names and places where found will aid those not familiar with the technical characters, to recognize most of the useful species.

The keys have been made as simple as can readily be with a group so difficult to classify without resort to unfamiliar methods. They are for the use of agricultural teachers and others who do not have access to the more complete grass manuals and who need means of identifying the grasses of their locality. At the end is a tentative key to aid in finding the names of grasses without flowers.

Gray's Manual, Seventh Edition, 1908, covering the flora of the northeastern United States, has been followed for names and descriptions of species except in *Panicum, Paspalum, Eragrostis, Elymus* and *Agrostis* where later works have been followed in some cases. Many of the publications of the U. S. Department of Agriculture are valuable for descriptions and illustrations of our grasses. One of the most complete and best general works is: "The Genera of Grasses of the United States" by A. S. Hitchcock, U. S. D. A. Bulletin 772. The sequence of tribes and genera in it has been followed in this bulletin, and its keys have been used as a basis for those herein. The First Book of Grasses, by Agnes Chase, is a fine little manual for beginners of grass study. Standardized Plant Names, the authority for nomenclature of cultivated plants, has been followed for some names of cultivated grasses, not found in the Gray's Manual. The common names that seem most appropriate in this region have been given. Many Maryland grasses have never acquired names in the common speech so that they can only be designated by the scientific names. Where there is no common name the genus name may be used just as it is with many flowers like zinnia, geranium and others, where the scientific name has become the common name in popular use.

The list of grasses and their distribution in the State is based on the collections preserved in the herbarium of this Experiment Station and the grass collections in the U. S. National Herbarium, with a few additional records from "Plant Life of Maryland." The opportunity to consult the national collections and much assistance from the staff in charge are gratefully acknowledged. The counties have been fairly well explored for native grasses. Howard County is least represented by specimens in

our grass collections. A closer study of Worcester County would be expected to show several more coast species in Maryland. We would be glad to have specimens of Maryland grasses from counties from which they are not reported herein.

ILLUSTRATIONS.

The drawings reproduced in Plates I and II were made to show the general outline of various flowering types as they appear to the ordinary observer, rather than to show scientific details, so that the same figure can often be used to indicate the general type of inflorescence in two or more species. These and the vegetative structures in Plate III, except the blue grass leaf tip, are shown a little less than half natural size.

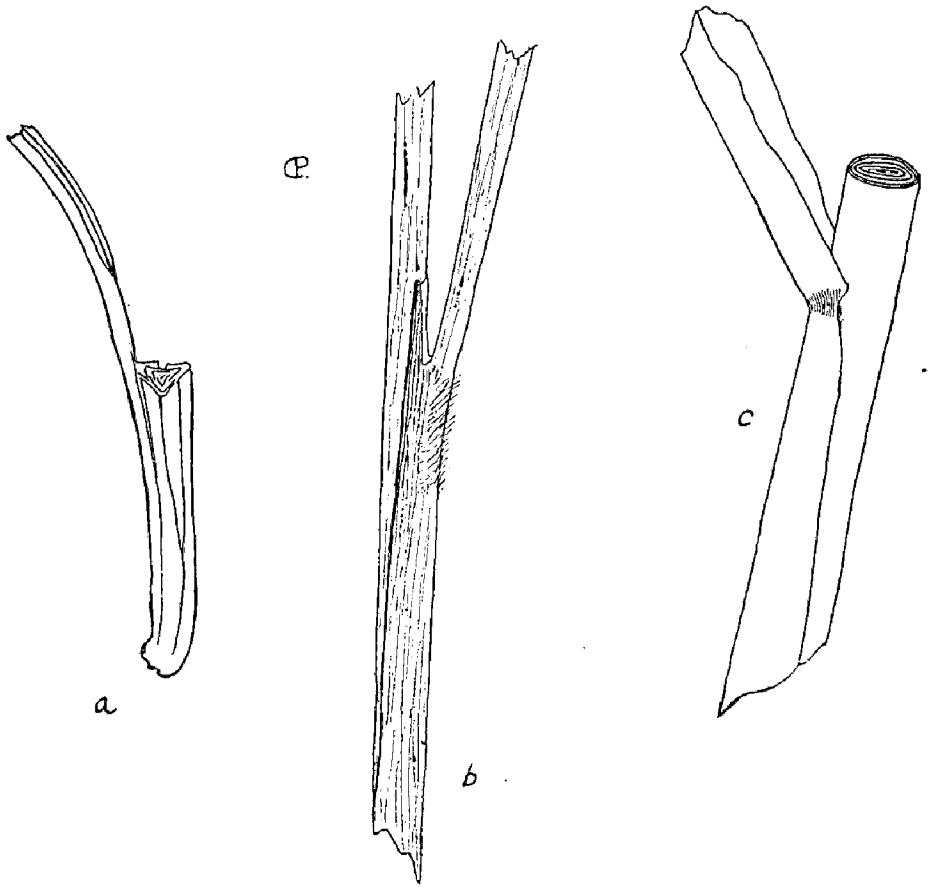


FIGURE 1

Plates IV, V and VI show enlarged details of grass spikelets. The small figure at the side of each shows its natural size.

The drawings for Plates I to VI were made by Miss Ellen Emack of the Maryland Seed Laboratory. The drawings for fig. 1 were made by Miss Dorothy R. Phillips.

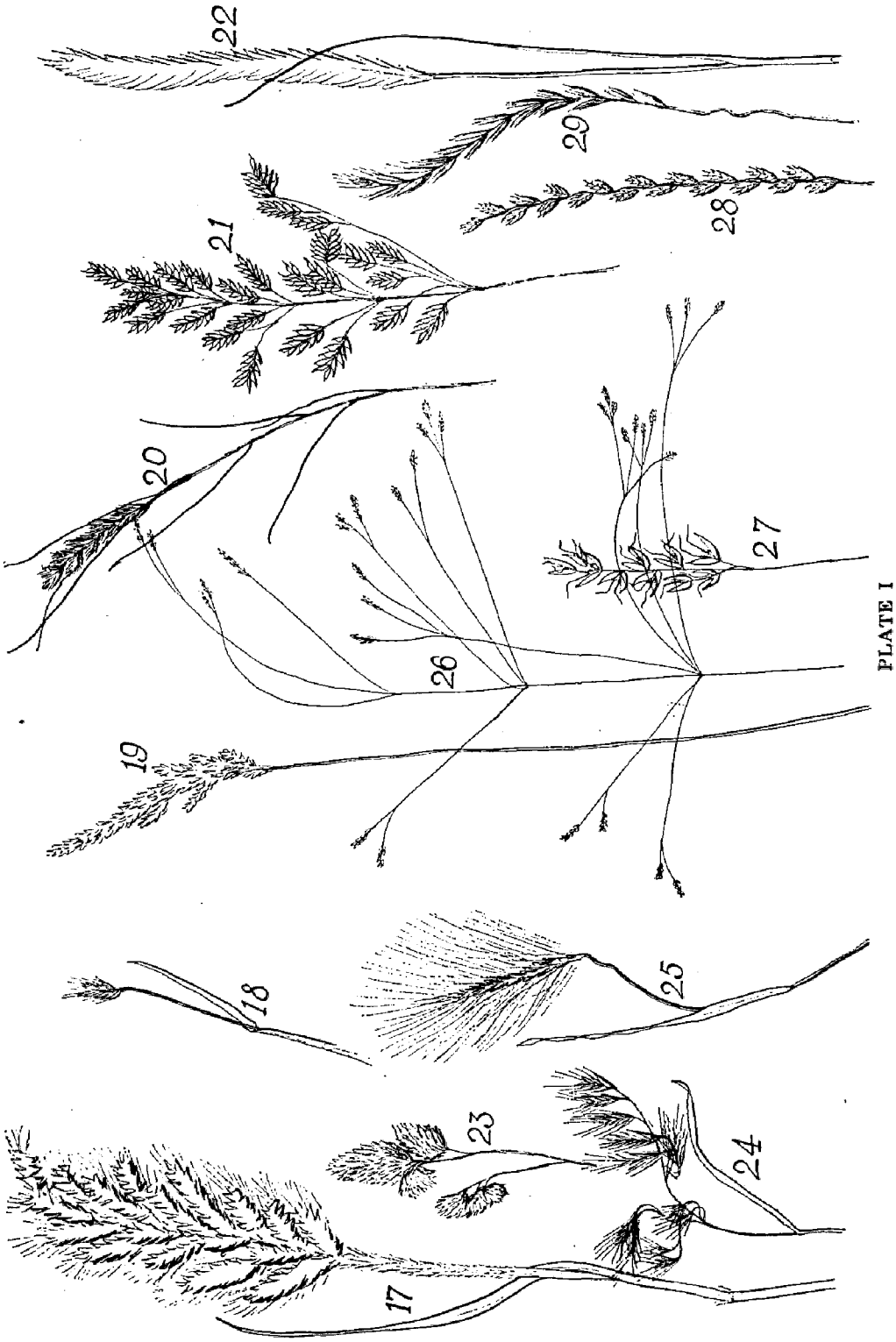


PLATE I

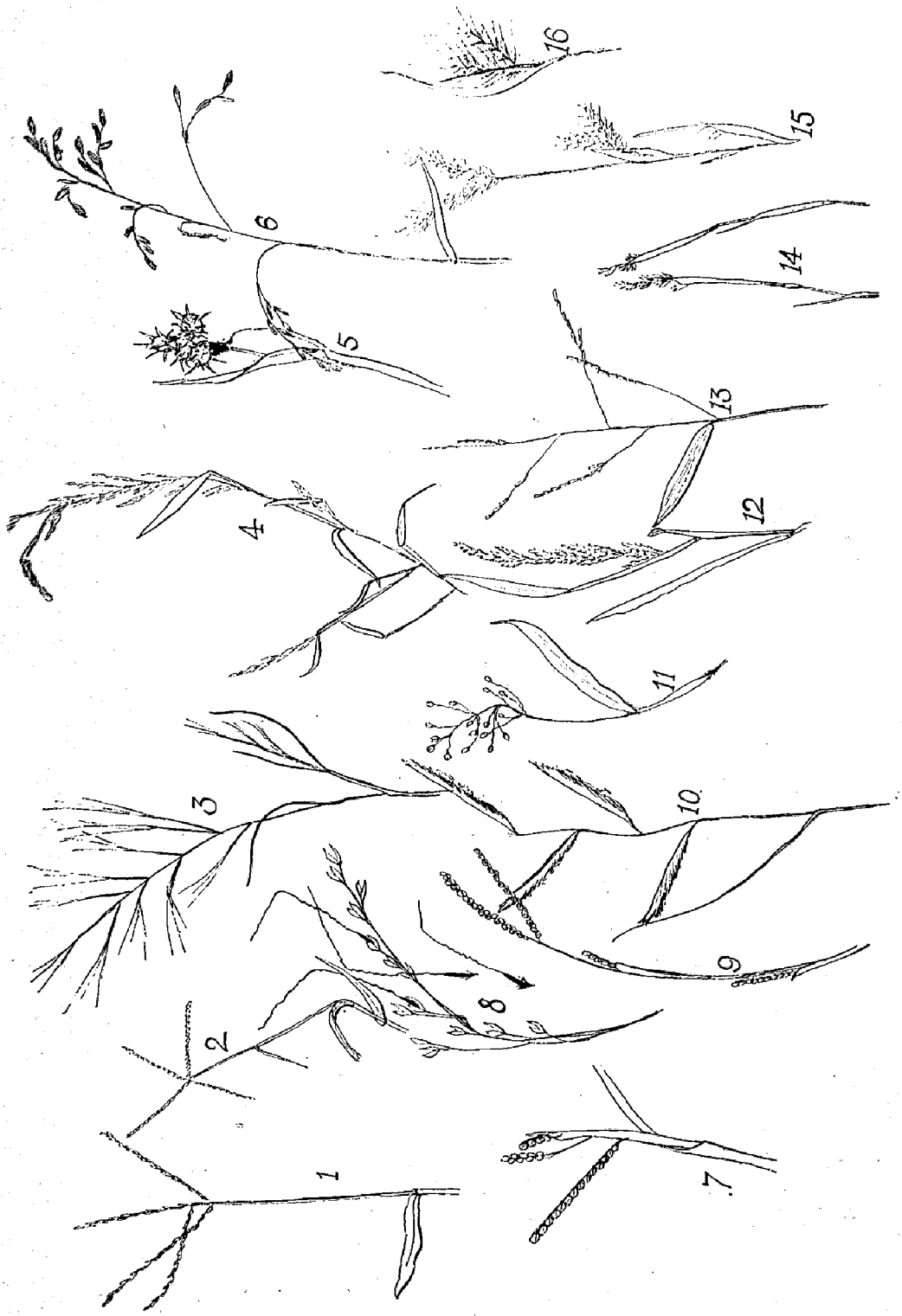


PLATE II

Figure 1a shows a piece of a sedge with 3-cornered stem and 3 ranks of leaves, the grasses having round or slightly flattened stems and leaves in two ranks. At b is shown the collar region of Indian grass with the long ligule. Sprouting crab grass, at c, shows the leaf diverging at the collar, and above, the roll of undeveloped leaves in the cross section of the stem.

Plates I and II show the following grasses: 1, crab grass; 2, small crab grass; 3, needle grass (*A. oligantha*); 4, nimble Will; 5, sandbur (*C. tribuloides*); 6, purple top; 7, field paspalum; 8, black oat grass; 9, slender paspalum; 10, salt meadow grass; 11, Ashe's panicum; 12, satin grass; 13, white grass; 14, Southern poverty grass; 15, silver beard; 16, common broom sedge; 17, plume grass; 18, little barley; 19, Eaton grass (*S. obtusata*); 20, salt grass; 21, cheat; 22, beach grass; 23, orchard grass; 24, downy brome grass; 25, squirrel tail grass; 26, tickle grass; 27, wild oat grass (*D. sericea*); 28, perennial rye grass; 29, quack grass.

In Plate III the agropyron shows a part of the rhizome, the pointed auricles of the leaf on the right, the closed sheath of the left upper leaf and the terminal leaf rolled in the bud. The enlarged leaf of blue grass shows the boat-like tip seen in most poas, the small figure below giving the natural size. The red fescue figure shows two bunches of stems connected by a slender rhizome which is usually lost in the tangle of fibrous roots. The dactylis is shown with leaves folded in the bud and the thin, membrane-like ligule generally conspicuous in orchard grass. A slender stolon of rough-stalked meadow grass is shown rooting at the joints where it touches the ground.

Plate IV gives enlarged details of spikelets of various grasses, some of them with separate florets still more enlarged. The agrostis will illustrate a 1-flowered spikelet, the enlarged floret without glumes showing the palea, absent in some related bent grasses, against the background of the lemma. The eragrostis florets show the palea partly enclosed by the larger lemma. The two lower scales in the eragrostis spikelets are the glumes. One of the three nerves of the lemma is seen on the exposed face of each floret above the two glumes. A few glands on the midnerve of the lemmas in *Eragrostis megastachya* are indicated.

Plate V shows spikelets of several panicums with the seed-like fruit of some of them separated. In the upper left is a spikelet of the common crab grass and at the right of it an Indian grass spikelet with the sterile, stalk-like floret at the side and a long, twisted, bent awn above.

In the upper left of Plate VI the cottony hairs at the base of blue grass florets are shown. In phalaris the small, hairy bodies

at each side the base of the floret, detached from the two glumes below it, are the rudimentary extra lemmas.

GRASS STRUCTURE AND TERMINOLOGY.

The differences in the various parts of grass plants of different kinds, when clearly understood, give us ready means of recognizing the various species. The few technical terms that must be used will be defined in the following paragraphs.

Grass roots are generally abundant and fibrous, clustered at the base of the stems or at the joints of underground stems (rhizomes), or on stems near the ground (Plate III).

Grass stems are cylindrical, sometimes flattened, or flat or grooved on one side. They are generally tubular with solid joints or nodes, though some, like corn, have solid pithy stems. The lower part of each internode, within the leaf sheath retains ability to grow long after other parts are mature. New tissue formed here helps to readjust the plants when blown over.

Branches, tillers, or stools arise from axillary buds at the joints, especially those close together near or in the ground. The creeping underground stems of many grasses make them turf-forming while others branching at the base with short joints close together form bunch grasses.

Grass leaves have a basal portion, the sheath, rolled around the stem, and a free, expanded, usually flat portion, the blade. The blade may be rolled, as in many salt marsh grasses and fescues or may protect against evaporation by rolling up in dry weather.

There is often a small membranous outgrowth, the ligule (Dactylis Plate III), above the junction of blade and sheath. Sometimes only a cluster of hairs is found at this point. In wheat, barley, rye and some other grasses, small points, called auricles, (Agropyron Plate III), extend around the stem from the top of the sheath.

The leaves are two-ranked on the stem. At the base of the stem and on underground parts the leaves may be very short and scale-like. A small leaf called the prophyllum lies between the stem and any branch arising from it. The veins or fibers of the leaves are parallel: they are called nerves in the members of the spikelet.

The flower clusters (inflorescence) of grasses are quite varied in form and characteristic of the different groups of grasses. Plates I and II give diagrammatic outlines of the principal kinds. In every-day terminology the inflorescence is usually called the head whether it is a panicle, or raceme or spike-like.

The most important organs used in distinguishing the grass species and genera are the spikelets. These are the minute flow-

ers and the bracts, scales or "chaff" associated with them. See Plates IV, V and VI for figures of spikelets of many Maryland grasses. The spikelets may stand out clearly from one another on the ends of the branches or pedicels, as in redtop or bluegrass; or they may be clustered so closely, as in timothy, orchard-grass or wheat, that the beginner may not easily separate them. Where the spikelets are set close together, the part of the branch bearing them may be called the rachis.

In the typical spikelet, as in bluegrass, at the end of each little branch, one finds first two empty scales, called the glumes. The next scale, the lemma, subtends a flower consisting of about three stamens and a pistil with two feathery stigmas, and one ovule which later developes into the grain. Above the flower is another more delicate scale, the palea. The flower with its lemma and palea is often called a floret. There may be several florets in a spikelet, as in bluegrass, or only one as in redtop. The minute stem within the spikelet, to which these parts are attached, is called the rachilla.

In the various genera and species of grasses there are many striking variations from this form. Sometimes the mature spikelets fall at a joint below the glumes as in foxtail; sometimes the articulation is above the glumes, and the floret or seeds fall away, leaving the glumes on the plant, as in redtop. Sometimes the rachilla breaks up in separate joints when ripe. In others, like barley and broom sedge, the rachis disjoints in a similar way. The glumes or lemmas are blunt or pointed in different grasses; they may be notched at the tip or prolonged into a beard or awn from the tip or back.

With a hand lens magnifying a few diameters, most of our grasses can be recognized with the aid of the illustrations and the keys on the following pages.

Grass-like Plants.

A number of plants that are not grasses are grown for hay and forage and are sometimes called grasses, using the name in a very general way. The clovers, alfalfa, and other leguminous forage plants are readily distinguished from true grasses by the flower characters previously given.

There are several kinds of plants so grass-like that the beginner will distinguish them with difficulty. Our fields frequently contain grass-like sedges and rushes, and the marshes are full of them. The sedges generally have 3-ranked leaves, the sheath forming a closed tube about the three-sided stem, and the flowers have no palea. The rushes have three distinct sepals and petals in the flower and a small many-seeded pod.

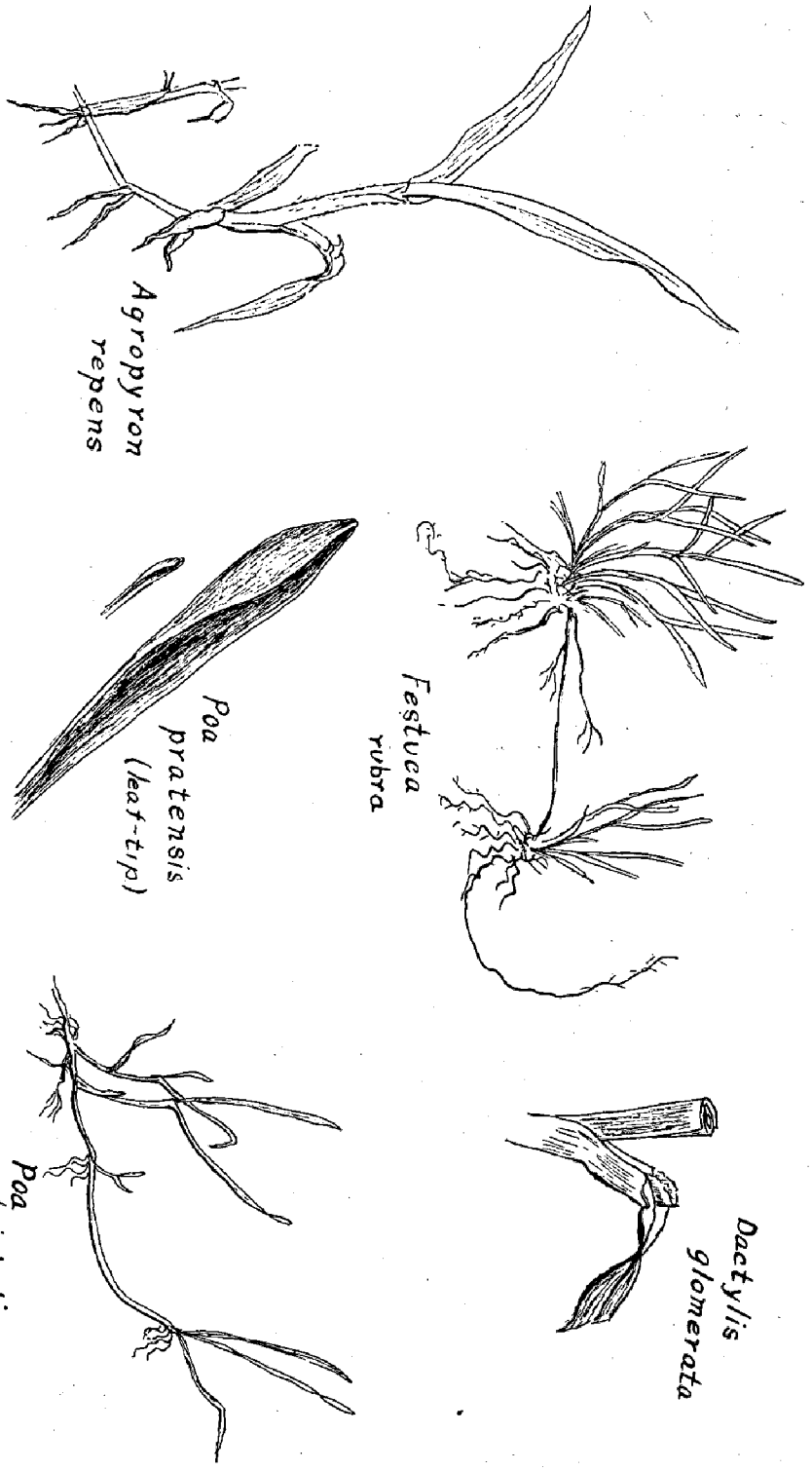

Agropyron repens
Poa pratensis (leaf-tip)
Poa trivialis
Festuca rubra
Dactylis glomerata

PLATE III

Isoetes, cattail, sparganum, triglochin, eel grass, xyris, eriocaulon, melanthium, garlic and other alliums, star grass, blue-eyed grass, iris, and other monocotyledonous plants are rather grass-like except in the flowers and fruit.

Some kinds of plants that may not resemble grasses or are not likely to be confused with grasses, have the word "grass" as part of the common name. Examples are: bear grass for yucca, blue-eyed grass for sisyrinchium, cotton grass or wool grass for certain woolly headed sedges, ditch grass and eel grass for water celery and similar plants so common in brackish waters of Maryland, goose grass for *Galium aparine*, orange grass for *Hypericum gentianoides*, ribgrass for narrow leaf plantain, scurvy grass for winter cress, star grass or golden-eye grass for hypoxis, Whitlow grass for *Draba verna*, swamp grass for various sedges, pepper grass for lepidium, yellow-eyed grass for xyris.

Classification of Maryland Grasses

Vast areas of the earth's surface are covered mainly by grasses; even in cultivated lands most of the crops belong to the grass family. Also in forests and elsewhere, though other plants predominate, grasses form a prominent part of the vegetation.

There are close to 5000 species of grasses recognized in the world. About 1500 of these occur in the United States. This list records 240 grass species found wild in Maryland. But many of these are uncommon kinds and even some found on almost every farm are of little agricultural value and only of botanical interest.

In addition to these and other wild kinds to be expected here, a number of grasses in cultivation have been included to show their position among the others, but full treatment of them would find more appropriate place in bulletins on special cultivated crops.

Twelve of the tribes into which the grass family is divided are represented in Maryland. Before taking up a discussion by tribes, genera and species the following key to the tribes is given for the use of those with some technical knowledge of the grasses and for grass students. The more popular descriptions under the tribe headings and the illustrations and the final key to grass leaves, will aid others to take a shorter cut to identification. The keys divide into two contrasting parts, A1 and A2, one of which fits the grass in question and gives at the right the name or another letter, one of the two divisions of which is followed, and so on until instead of a letter one is lead to the name on the right.

KEY TO TRIBES OF GRAMINEAE.

A 1. Spikelets 1-flowered to many-flowered, reduced florets if any above the perfect florets (except in Phalarideae and Uniola); articulation usually above the glumes; spikelets usually laterally compressed. Subfamily **Poacoideae.** B.

B 1. Stems woody and perennial. **Bambuseae.**

B 2. Stems herbaceous, annual, the underground parts annual or perennial. C.

C 1. Two staminate, neuter or rudimentary lemmas between the glumes and the one fertile lemma (Plate VI). **Phalarideae.**

C 2. Sterile lemmas, if any, above the fertile lemma, except in Uniola. D.

D 1. Spikelets unisexual, 1-flowered, articulate below the glumes, staminate flowers mostly in the lower part of the panicle; tall grasses in or near water. **Zizanieae.**

D 2. Spikelets nearly always bearing both stamens and pistils, usually articulate above the glumes. E.

E 1. Glumes wanting or very small, spikelets articulate below the glumes; 1-flowered, flat; cut-grasses of wet places (Plate II 13). **Oryzeae.**

E 2. One or two glumes well developed, spikelets generally articulate above the glumes. F.

F 1. Spikelets sessile in spikes or heads, not in branching panicles. G.

G 1. Spikelets in one-sided spikes as in Bermuda grass (Plate II 10). **Chlorideae.**

G 2. Spikelets on both sides of the terminal spike or head as in wheat. **Hordeae.**

F 2. Spikelets generally on pedicels and in panicles (as in redtop), which are sometimes spike-like, as in timothy. H.

H 1. Spikelets one flowered as in redtop (Plate IV). **Agrostideae.**

H 2. Spikelets two or more flowered. I.

I 1. Glumes as long as the lowest floret or longer; lemmas often awned on the back, as in oats. **Aveneae.**

I 2. Glumes shorter than the first floret, as in blue-grass, awns if any at or near the lemma tip. **Festuceae.**

A 2. Fertile spikelets with one perfect terminal floret, a staminate floret usually represented by only an empty lemma below the fertile one; articulation below the spikelets, which at least when mature, are dorsally compressed, if at all. **Panicoideae.** J.

J 1. Glumes and sterile lemmas membranaceous; fertile lemma hardened, or at least firmer than the glumes, as in millet or crabgrass (Plate V). **Paniceae.**

J 2. Glumes thick and hard, the lemmas thinner. K.

K 1. Spikelets unisexual, pistillate below, staminate above; example: corn. **Maydeae.**

K 2. Spikelets in pairs, one stalked and staminate or neuter and one sessile and pistillate. Examples: broom sedge and sorghum. See sorghastrum, Plate V. **Andropogoneae.**

TRIBE 1. BAMBOO TRIBE. BAMBUSEAE.

Bamboos have woody canes that live more than one year, are mostly tropical and seen here chiefly in canes, fishing rods and various manufactured articles, made from the tree-like kinds. Two species are wild in the United States, the larger one forming the cane-brakes of the Southern States. The small cane is found from Maryland southward.

Some of the introduced bamboos grow well in Maryland. A beautiful small grove of *Phyllostachys bambusoides,* now up to 25 feet high has been perfectly hardy in Hyattsville for many years. The dark green feathery foliage is very ornamental in winter and the canes, an inch or two in diameter could be used for many purposes. See Bulletin 1329 U. S. Department of Agriculture for an account of the cultivated bamboos.

Arundinaria tecta, small cane, has been found in wet land at Ammendale, Prince Georges County, Stony Run, Anne Arundel County, and in Worcester County. The woody canes are too small for much use, being about pipestem size. The young shoots have been eaten as asparagus. The foliage is palatable to stock.

TRIBE 2. FESCUE TRIBE. FESTUCEAE.

This tribe contains such well known grasses as the blue grasses, cheat and other brome grasses, and fescues. The spikelets are mostly several flowered and borne in panicles (Plate IV and I 21).

KEY TO MARYLAND GENERA.

A 1. Tall reeds with large, plume-like panicles. Spikelets with silky hairs as long as the lemmas. B.
B 1. Cultivated ornamentals, lemmas hairy. **Arundo.**
B 2. Marsh reeds, lemmas not hairy. **Phragmites.**
A 2. Low grasses, few as much as 5 feet tall. C.
C 1. Short, stiff, salt-marsh grasses, with creeping rhizomes, leaves inrolled, sheaths overlapping, some plants seed bearing, others with staminate flowers only. (Plate I 20.) **Distichlis.**
C 2. Spikelets with both stamens and pistils, or these in separate spikelets on the same plant. D.
D 1. The two forms of spikelets in a one-sided terminal spike-like panicle. **Cynosurus.**
D 2. Spikelets all similar in evident panicles. E.
E 1. Lemmas distinctly 3-nerved. F.
F 1. Lemmas with fine hairs on the nerves, a short awn at the apex. G.
G 1. Tall grasses with large, open, generally purple panicle, a sticky secretion collecting dirt on the upper part of the stem (Plate II 6). **Tridens.**
G 2. Low sand grass, the small panicles partly covered by the upper leaf sheaths; nodes hairy. **Triplasis.**
F 2. Lemmas not hairy on the nerves, not awned. H.
H 1. Spikelets compressed, mostly wild weeds (Plate IV). **Eragrostis.**
H 2. Spikelets not flattened, cultivated for forage or ornament. **Molinia.**
E 2. Lemmas with 5 or more nerves, these sometimes obscure. I.
I 1. Spikelets very flat with several empty glumes and lemmas below the first flower, nerves several, obscure. **Uniola.**
I 2. Only the two glumes below the first floret of the spikelet. J.
J 1. Lemmas as broad as long, grown for the ornamental papery inflated spikelets. **Briza.**
J 2. Lemmas longer than broad. K.
K 1. Lemmas keeled at the mid-nerve. Examples: orchard grass and blue grass. L.
L 1. Spikelets crowded in 1-sided clusters at ends of panicle branches (Plate I 23). **Dactylis.**
L 2. Spikelets not crowded in one-sided clusters. M.
M 1. Lemmas with at least a short awn in a minute apical notch, spikelets large. **Bromus.**
M 2. Lemmas awnless, spikelets small. **Poa.**
K 2. Lemmas rounded on the back, at least toward the base N.
N 1. Glumes papery, upper lemmas rolled into a club-shaped body. **Melica.**
N 2. Glumes not papery, lemmas all similar. O.
O 1. Lemmas awnless, mostly obtuse, their nerves parallel. P.
P 1. Nerves prominent, taller grasses of woods or fresh water marshes. **Glyceria.**
P 2. Nerves faint, low salt grasses. **Puccinellia.**
O 2. Lemmas awned or pointed, nerves converging at the apex. Q.
Q 1. Lemmas entire, awn, if any, from the apex. **Festuca.**
Q 2. Lemmas with a tip or awn in or near a minute apical notch, grain adherent to the palea, sheaths usually closed. **Bromus.**

BROME GRASSES. BROMUS.

Bromus includes the cheat or chess grasses, weeds of grain fields, a few other species cultivated for hay or pasture, and a number of inconspicuous species. Even the weedy ones can be used for forage if nothing better is at hand. Few of the species are native here. They are mostly grasses one to three feet high, with closed, not keeled sheaths, flat leaves rolled in the bud and the rather large many-flowered spikelets in panicles, often on long, slender, drooping branches. (Plate I 21, 24.)

KEY TO MARYLAND SPECIES OF BROMUS.

A 1.	Perennials.	B.
B 1.	With creeping rhizomes, lemma without hairs, awnless; cultivated.	**B. inermis.**
B 2.	Without creeping rhizomes, lemma pubescent, awned; native grasses.	C.
C 1.	Panicle small, narrow, erect or nearly so, the spikelets drooping.	**B. Kalmii.**
C 2.	Panicle large, open and drooping.	D.
D 1.	Sheaths shorter than the internodes.	E.
E 1.	Lemmas with hairs on the margin only.	**B. ciliatus.**
E 2.	Lemmas evenly hairy all over.	**B. purgans.**
D 2.	Sheaths overlapping one another.	F.
F 1.	Sheaths not very hairy, except at the top.	**B. altissimus.**
F 2.	Sheaths densely pubescent.	**B. incanus.**
A 2.	Annuals or biennials, introduced plants.	G.
G 1.	Awn not over half an inch long, sometimes none.	H.
H 1.	Awn about half an inch long, divergent; panicle open and drooping.	**B. japonicus.**
H 2.	Awn nearly straight or none.	I.
I 1.	Spikelets much flattened, awn very short, lemmas keeled.	**B. unioloides.**
I 2.	Spikelets slightly or not at all flattened, back of lemma rounded.	J.
J 1.	Sheaths not hairy.	**B. secalinus.**
J 2.	Sheaths hairy.	K.
K 1.	Awn short or none, lemmas nearly as broad as long.	**B. brizaeformis.**
K 2.	Awn about as long as the lemma.	L.
L 1.	Panicle contracted, erect.	M.
M 1.	Lemma not hairy.	**B. racemosus.**
M 2.	Lemma hairy.	**B. hordaceus.**
L 2.	Panicle open, usually drooping.	N.
N 1.	Spikelets wide.	**B. commutatus.**
N 2.	Spikelets long and narrow.	**B. arvensis.**
G 2.	Awn over one-half inch long.	O.
O 1.	Awns one to two inches long or more.	**B. villosus.**
O 2.	Awns generally not over one inch.	P.
P 1.	Spikelets erect.	**B. madritensis.**
P 2.	Spikelets drooping.	Q.
Q 1.	Awn about a half inch long. Spikelets in a dense cluster.	**B. tectorum.**
Q 2.	Awn an inch or more long, panicle more open.	**B. sterilis.**

Bromus unioloides, rescue grass, a short-lived perennial 2 to 4 feet high, sometimes cultivated in the south, occurs in Prince Georges County. It has large very flat spikelets. It is adapted to rich warm humid regions.

Bromus inermis, common brome grass, smooth brome grass, Hungarian brome grass, a tall grass with rhizomes and smooth sheaths, is cultivated in more western states and sometimes in Maryland. It is drouth resistant and is relished by livestock. Escaped and wild at College Park, perhaps elsewhere.

Bromus ciliatus, swamp chess, is found in shady wet places north of Maryland, especially in calcareous soils. It grows up to four feet high with well developed, generally rather hairy leaves, the panicle open and drooping. Reported from Garrett and Allegany counties.

Bromus Kalmii, wild chess, is a rather hairy grass one to three feet high in dry and waste, usually limy soils. We have it from Garrett County only.

Bromus purgans, hairy wood chess, is common in moist woods in northern and western Maryland. It grows up to four or five feet high with a large open nodding panicle. Garrett, Allegany, Washington, Frederick, Montgomery, Prince Georges, Baltimore, and Harford counties.

Bromus altissimus, like the preceding but more hairy, is found along the Potomac in Prince Georges and Montgomery counties.

Bromus incanus is another similar grass with very hairy sheaths. Montgomery, Allegany, Baltimore, and Cecil counties.

Bromus tectorum, downy brome grass (Plate I, 24), is a small, long awned brome grass, with the spikelets rather closely clustered, and the sheaths and collar hairy, common in light soil, along roads, etc., in early summer; Queen Annes, Talbot, Howard, Dorchester, Wicomico, Somerset counties.

Bromus sterilis, barren brome grass, with long-awned spikelets on slender pedicels, in waste places, uncommon; Talbot, Prince Georges and Wicomico counties.

Bromus madritensis, Madrid brome grass, is sometimes cultivated for ornament.

Bromus villosus, a low, very long-awned weed of the far west, the rigid pointed florets of which sometimes injure the eyes and noses of livestock, was growing at College Park a few years ago but has now disappeared; also found at Beltsville.

Bromus brizaeformis, quaking brome grass, a foot high or less, with broad inflated spikelets, rare in Baltimore and Dorchester counties.

Bromus hordaceus, soft chess, with sheaths hairy occurs in fields and waste land; it has been found in Charles, Calvert, Prince Georges, and Caroline counties.

Bromus arvensis, Prince Georges and Worcester counties.

Bromus racemosus, smooth cheat, is one of the weeds of grain fields but not so common as the two following. It has the spikelets rather crowded, short-awned, and has hairy leaves. Specimens from Baltimore County and College Park, and it no doubt occurs elsewhere in the State.

Bromus secalinus, cheat or chess (Plate I 21), is far too common in wheat and other grain fields, sometimes replacing the crop, and contaminating the seed. It is a strong grass two to three feet high with nodding spikelets, the lemmas short-awned and inrolled. The spikelets and leaf sheaths are smooth, but the blades usually hairy. Cultivated crops and clean seed aid in eradicating it. It can be pulled from seed fields before harvest if not too abundant. This grass has been used for hay. Garrett, Allegany, Prince Georges, Baltimore, Talbot, Dorchester, Wicomico and Worcester counties and no doubt throughout the State.

Bromus commutatus, upright chess, a common cheat of grain fields, differs from the previous species in the hairy sheaths and

ligules and conspicuous awns. Washington, Montgomery, Prince Georges, Charles, Calvert, Anne Arundel, Baltimore, Harford, Kent, Talbot, Dorchester, Wicomico, and Worcester counties, and probably elsewhere.

Bromus japonicus, one specimen from Prince Georges County.

FESCUE GRASSES. FESTUCA.

The fescues differ from the brome grasses in lacking the minute notch at the apex of the lemma, which ends directly in an awn or point.

The several to many flowered spikelets are mostly smaller than in the brome grasses. Some species are small bunch grasses with hair-like leaves or turf forming; others are tall meadow grasses; two are early flowering annuals, disappearing by midsummmer.

KEY TO MARYLAND FESCUE SPECIES.

A 1.	Low annuals.	B.
B 1.	Awns about as long as the lemmas; spikelets of 5 to 13 slender florets.	**F. octoflora.**
B 2.	Awns about twice as long as the lemmas; spikelets with not over 5 florets.	**F. myuros.**
A 2.	Perennials.	C.
C 1.	Plant low with the narrow, flat or thread-like rolled leaves mostly basal.	D.
D 1.	Bunch grasses with cylindrical leaves.	**F. ovina.**
D 2.	Generally turf forming, some leaves flat.	**F. rubra.**
C 2.	Plant 2 to 5 feet high with leafy stems.	E.
E 1.	Spikelets on short, erect branches.	**F. elatior.**
E 2.	Spikelets on long, diverging branches.	F.
F 1.	Panicle open; spikelets near the ends of the branches.	**F. nutans.**
F 2.	Panicle compact; spikelets from middle of branches up.	**F. Shortii.**

Festuca myuros, rat tail fescue, is a slender low annual of dry places. Montgomery, Prince Georges, Calvert, Anne Arundel, Talbot, Caroline, Somerset, Wicomico, St. Marys, and Worcester counties.

Festuca octoflora, slender fescue, another early flowering little annual of dry, neutral or acid soil. The many narrow florets close together give the spikelets a delicate fluted appearance. Montgomery, Prince Georges, Calvert, Dorchester, Wicomico, and Worcester counties.

Festuca rubra, red fescue, is a more long-lived turf grass than its cultivated relatives. It is grown for the low, dense, carpet-like turf and its resistance to dry and shaded conditions, spreading by short inconspicuous rhizomes (Plate III), but dense bunches are formed especially in young plants. The old sheaths remain as conspicuous brown fibers at the base of the plant. There are many varieties, differing somewhat from the above characteristics. It is sometimes found wild, especially in somewhat salty meadows. Prince Georges, Talbot, Somerset, and Worcester counties.

Festuca ovina, sheep's fescue, in the typical form, is a bluish green, low bunch grass. The leaves are as thick as broad and

about a twenty-fifth of an inch thick. It is adapted to shady places and light soil, is often sown and sometimes found wild here. There are many varieties, the two following being sometimes considered distinct species.

Variety *capillata,* hair-like fescue, has more slender, bright green leaves.

Variety *duriuscula,* hard fescue, a specially drouth-resistant kind, adapted to cool, dry areas, has leaves broader than thick.

We have specimens of sheep's fescue from Montgomery, Prince Georges, and Calvert counties.

Festuca elatior, meadow fescue, in the common form, is 2 to 3 feet high with a bunch of flat leaves at the base, the underground sheathes red below. A more robust form is cultivated as tall fescue. This species is adapted to rich, especially moist land, stands shade well and is a good pasture grass. Garrett, Allegany, Washington, Montgomery, Prince Georges, Baltimore, and Worcester counties. More common wild in Western Maryland.

Festuca nutans, nodding fescue, somewhat like the latter, is wild in dry or rocky organic soil. The long branches of the panicle droop more or less. Garrett, Allegany, Montgomery, Prince Georges, Carroll, Calvert, Baltimore, and Cecil counties.

Festuca Shortii, a more western grass similar to nodding fescue, occurs in open, wet land in Garrett County.

MANNA GRASSES. GLYCERIA (PANICULARIA).

These are mostly marsh or ditch grasses of medium height, with closed sheaths, flat blades, well developed panicles and deeply nerved and blunt lemmas (Plate II 6). The seed is small but abundant. They are good grasses to consider in development of the wet lands of Maryland.

KEY TO MARYLAND GLYCERIA SPECIES.

A 1.	Spikelets nearly cylindric, and over one-half inch long.	B.
B 1.	Florets long pointed.	**G. acutiflora.**
B 2.	Florets blunt.	C.
C 1.	Lemma one-quarter inch long.	**G. fluitans.**
C 2.	Lemma much shorter.	**G. septentrionalis.**
A 2.	Spikelets more oval, shorter.	D.
D 1.	Spikelets crowded in a dense or long narrow panicle.	E.
E 1.	Spikelets in a long narrow panicle.	**G. Torreyana.**
E 2.	Spikelets in a short dense cluster.	**G. obtusa.**
D 2.	Spikelets on long, spreading or drooping branches in open panicles.	F.
F 1.	Spikelets over one-eighth inch wide, the lemma nerves not distinct.	G.
G 1.	Spikelets mostly 3 to 5 flowered.	**G. laxa.**
G 2.	Spikelets 5 to 10 flowered.	**G. canadensis.**
F 2.	Spikelets narrower, nerves very distinct.	H.
H 1.	Glumes very small, short and broad; spikelets about one-eighth inch long, purple tinted.	**G. nervata.**
H 2.	Glumes close to one-eighth inch long, oblong, spikelets about one-quarter inch long.	I.
I 1.	Spikelets pale green, panicle under 6 inches long.	**G. pallida.**
I 2.	Spikelets purplish, panicle 7 to 12 inches long.	**G. grandis.**

Glyceria Torreyana, long manna grass, 2 to 3 feet high, with narrow, slightly nodding panicle, is found in wet organic soil in limy places in Garrett, Allegany, Washington, Prince Georges, Baltimore, and Cecil counties.

Glyceria obtusa, blunt manna grass, is a swamp grass, 1 to 4 feet high with a dense short head; the leaf sheaths rough and open to about the middle. Prince Georges, St. Marys, Anne Arundel, Wicomico, Somerset, and Worcester counties.

Glyceria canadensis, rattlesnake grass, is 3 to 4 feet high, in swampy and probably acid land, chiefly in the mountains. The open panicle has drooping branches. Garrett, Frederick, and Prince Georges counties.

Glyceria laxa, a very similar grass, is uncommon in Garrett, Prince Georges, and Harford counties.

Glyceria nervata, nerved manna grass (the name, fowl meadow grass, is reserved for *Poa triflora*), is a common grass in nearly neutral organic wet lands. The 3 to 4 foot stem is slightly flattened, the long drooping panicle branches have small but strongly nerved, purplish spikelets. Though relished by livestock, it has been found to contain enough hydrocyanic acid to be poisonous in large quantities. Garrett, Allegany, Washington, Carroll, Montgomery, Prince Georges, Charles, Calvert, Baltimore, Harford, Cecil, Queen Annes, and Talbot counties.

Glyceria grandis, reed meadow grass, a tall northern grass, with a large panicle of spikelets with purple florets and whitish glumes, might be expected in wet non-acid mountain land.

Glyceria pallida, pale manna grass, a similar species with larger, pale green spikelets, is sometimes found in Maryland in swamps. Prince Georges, Anne Arundel, Worcester, (and Dorchester?) counties.

Glyceria fluitans, flote grass, a northern species with narrow spikelets over ½ inch long, is reported from Baltimore county in Plant Life of Maryland.

Glyceria septentrionalis, floating manna grass, similar to the latter, occurs in mucky, wet land in Montgomery, Prince Georges, Anne Arundel, and Charles counties and doubtless elsewhere.

Glyceria acutiflora, with slender, partly flattened stems and overlapping sheaths, occurs in wet land from Delaware, north, and may get to Maryland.

Goose Grass. Puccinellia.

Two species of these tufted salt marsh grasses occur sparingly along Maryland shores. They look like blue grasses but the lemma is rounded, not keeled.

Puccinellia distans, with spikelets toward the ends of the panicle branches, has been found in Talbot and Dorchester counties.

Puccinellia fasciculata, from Dorchester and Worcester counties, bears spikelets throughout the branches.

Blue Grasses. Poa.

The poas are among the finest grazing and low hay grasses. Some of the species are very common, especially in northern and western Maryland. They have panicles of small flattened spikelets, the florets of most species having a minute tuft of cottony hairs at the base (Plate VI). Without flowers, the narrow, folded leaves with the tip closed like the bow of a boat (Plate III) are means of recognition.

KEY TO MARYLAND POAS.

A 1.	Low, pale green annuals.	B.
B 1.	Florets not cottony at base, stems diverging.	**P. annua.**
B 2.	Florets cottony, stems more erect.	**P. Chapmaniana.**
A 2.	Perennials.	C.
C 1.	Plants spreading by slender rhizomes running through the ground.	D.
D 1.	Stems several together in tufts.	E.
E 1.	Low grasses with the panicle not much longer than the leaves, its long, slender branches in twos, spikelets few.	**P. brachyphylla.**
E 2.	Taller, the panicle longer stalked, rather dense with many spikelets; its branches usually in fives.	**P. pratensis.**
D 2.	Stems separate from one another, panicle small and dense.	F.
F 1.	Stems nearly cylindric, 1 to 3 feet high, florets cottony at base.	**P. arachnifera.**
F 2.	Stems flattened, 1 to 2 feet high or less, leaves bluish green; florets with short basal hairs.	**P. compressa.**
C 2.	Stems tufted, or spreading along the ground; rhizomes none or quite short.	G.
G 1.	Branches of panicle in twos.	H.
H 1.	Lemma acute, cottony at base.	**P. saltuensis.**
H 2.	Lemma blunt tipped, not cottony.	**P. autumnalis.**
G 2.	Branches of panicle in fours or fives	I.
I 1.	Lemma blunt or rounded at tip, a cottony tuft at base	**P. sylvestris.**
I 2.	Lemmas acute pointed.	J.
J 1.	Lemmas hairy on the marginal nerves.	K.
K 1.	Panicle erect.	**P. nemoralis.**
K 2.	Panicle drooping.	**P. triflora.**
J 2.	Marginal nerves hairless.	L.
L 1.	Sheaths slightly rough to the touch, panicle rather dense, creeping stolons usually present.	**P. trivialis.**
L 2.	Sheaths smooth, panicle with few spikelets on long branches.	**P. alsodes.**

Poa annua, annual blue grass. This low, yellowish green annual, flowering in very early spring, is common in lawns where it occupies fertile, open spots making a fine, soft cover in spring, but dying and leaving bare patches in summer. Garrett, Montgomery, Prince Georges, Anne Arundel, Dorchester, Wicomico, St. Marys, and Worcester counties.

Poa Chapmaniana, another annual species, occurs from here south, but not reported from Maryland.

Poa compressa, Canada blue grass, easily recognized by the short blue green blades and flat stems, is common, especially in the mountains, on dry banks and barren waste places, growing in areas unfavorable for most grasses. It is resistant to drouth,

heat, and somewhat to acid, and is a useful grass for such conditions. We have specimens from all Maryland counties except Howard, St. Marys, and Queen Annes.

Poa arachnifera, Texas blue grass, a taller grass of similar habit, with large, woolly spikelets, might occur in cultivated Maryland grasses.

Poa nemoralis, wood meadow grass, is a slender, 1 to 2 foot grass with narrow, weak, green leaves; growing in rather dry or clay soil. It is recommended for cool shady places and may be expected wild from the Maryland mountains northward.

Poa triflora, fowl meadow grass, is a similar but more vigorous grass of cool wet meadows. It is well recommended as a hay and pasture grass in most northern states, and may be found wild in the cooler parts of Maryland.

Poa pratensis, Kentucky blue grass, is one of the most common and well known grasses, both wild and cultivated, especially in central and western Maryland, but unusual without special care in the eastern and southern parts of the State. It needs a cool, moist, fertile, limy soil, where it makes the finest lawns and pastures. Its folded, dark green leaves with the blunt boat-shaped tip (Plate III), in tufts from the long rhizomes, are easily noticed characteristics. Garrett, Allegany, Washington, Montgomery, Prince Georges, Anne Arundel, Baltimore, Cecil, Dorchester, Talbot, Worcester, and Wicomico counties.

Poa trivialis, rough-stalked meadow grass, spreads by slender branches rooting along the ground (Plate III). The stems are somewhat flattened, the leaves light green and their sheaths slightly rough upward. It grows well in damp, rich, non-acid soil and is useful in cool, shady places. Allegany, Montgomery, Calvert, Prince Georges, and Kent counties.

Poa saltuensis is a slender grass of mountain woods found once in Allegany County.

Poa sylvestris, another woodland grass of rich humus land has been seen a few times in Montgomery County.

Poa alsodes, wood spear grass, another uncommon mountain species, and of value in wild pastures, occurs in rich, damp, limy soils in Garrett and Allegany counties.

Poa autumnalis is a more common woodland grass, 1 to 3 feet high, with long leaves and open panicle, the spikelets near the end of long branches, the lemmas blunt tipped and not cottony. Allegany, Montgomery, Prince Georges, and Queen Annes counties.

Poa brachyphylla also has blunt but cottony lemmas. It is a low early spring blooming grass of hilly woods. Washington, Montgomery, and Prince Georges counties.

QUAKING GRASS. BRIZA.

These grasses with broad papery spikelets in panicles, are sometimes cultivated for everlasting bouquets. *Briza maxima* is the commoner one with spikelets a half inch long on slender drooping pedicels. *Briza minor,* with smaller upright spikelets, might be found wild along our Atlantic coast.

LOVE GRASSES. ERAGROSTIS.

These are mostly unimportant annual weed grasses, a few perennial, differing from the blue grasses in the three-nerved lemmas, and flat, gray green, pointed leaves. They are not much eaten by livestock (Plate IV).

KEY TO MARYLAND SPECIES.

A 1. Low creeping annual grasses, rooting at the joints. **E. hypnoides.**
A 2. Not creeping. **B.**
B 1. Spikelets 2 to 5 flowered. **C**
C 1. Low plants branching above the base, the panicle somewhat crowded and purplish. **E. Frankii.**
C 2. Taller and branching from the base, the panicle open and pale or green. **D.**
D 1. Plant less than 2 feet high, hairs few. **E. capillaris.**
D 2. Plant taller, a tuft of hairs at the sheath apex. **E. hirsuta.**
B 2. Spikelets more than 5 flowered. **E.**
E 1. Plants 2 feet high or more, annual; the sheaths without hairs but with minute glands; spikelets about one sixteenth inch width. **E. suaveolens.**
E 2. Plants lower or with wider spikelets. **F.**
F 1. Perennial bunch grasses, panicle more than half the length of the plant. **G.**
G 1. Lemmas acuminate, sheaths hairy only in the throat. **E. refracta.**
G 2. Lemmas acute or obtuse. **H.**
H 1. Sheaths hairy. **E. pectinacea.**
H 2. Sheaths not hairy. **E. pectinacea spectabilis.**
F 2. Annuals with shorter panicles. **I.**
I 1. Spikelets one-eighth inch wide, gray green; minute glands on keel of lemmas, leaves, etc. **E. megastachya.**
I 2. Spikelets smaller, lemmas not glandular. **J.**
J 1. Sheaths with diverging hairs and minute glands, spikelets purplish. **E. minor.**
J 2. Sheaths if hairy, only in the throat, no glands present. **K.**
K 1. Sheath throat not hairy, panicle dense. **E. peregrina.**
K 2. Sheath throat hairy, panicle open. **L.**
L 1. Spikelets about one-sixteenth inch wide, gray green; lemma nerves strong. **E. caroliniana.**
L 2. Spikelets narrower, purplish; lemma nerves faint. **E. pilosa.**

Eragrostis hypnoides is a low annual, the stems creeping along damp, sandy stream shores; its staminate and pistillate flowers are often on different plants. Allegany, Washington, Montgomery, and Cecil counties.

Eragrostis capillaris, lace grass, is an annual, up to 2 feet high, rather common in light, non-acid soils; the much branched panicle with slender flexuous branches. Allegany, Washington, Carroll, Frederick, Montgomery, Prince Georges, Harford, Cecil, Kent, Talbot, Dorchester, Wicomico, and Worcester counties.

Eragrostis hirsuta is a southern species, taller than the latter, which has been found in Calvert County.

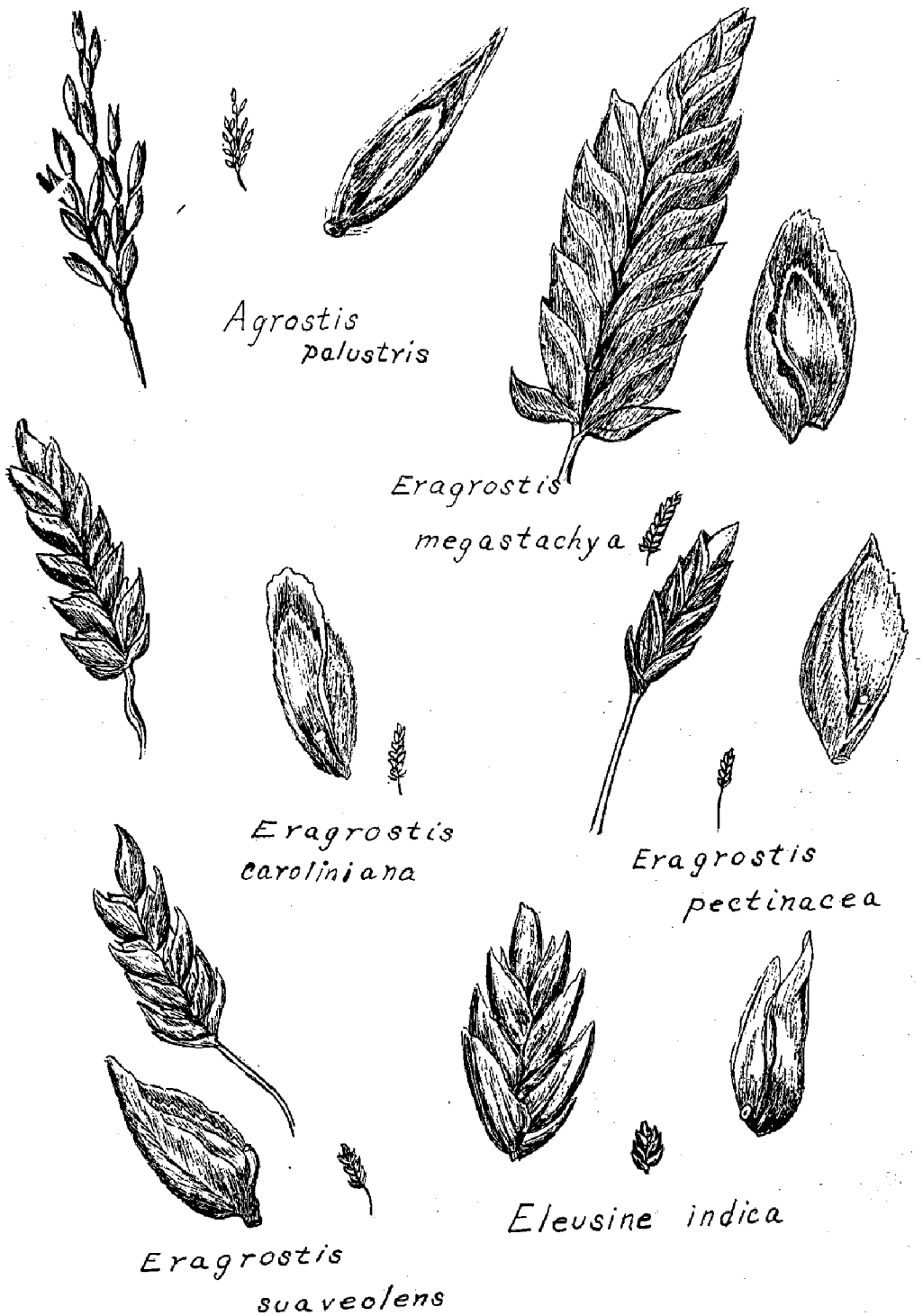

Agrostis palustris
Eragrostis megastachya
Eragrostis caroliniana
Eragrostis pectinacea
Eleusine indica
Eragrostis suaveolens

PLATE IV

Eragrostis Frankii, a low much branched species is frequent in fields and waste places. Allegany, Washington, Montgomery, Prince Georges, Harford, Cecil and Talbot counties.

Eragrostis pilosa is a common little weed of fields and waste places, more frequent east of the Bay. The slender spikelets are only a millimeter wide and purplish. Washington, Frederick, Montgomery, Prince Georges, Charles, Calvert, Baltimore, St. Marys, Kent, Queen Annes, Caroline, Talbot, Dorchester, Somerset, Wicomico, and Worcester counties.

Eragrostis caroliniana (*E. Purshii*) is like *E. pilosa* but the gray green spikelets a half wider (Plate IV). It is the common species of this group in western Maryland. Allegany, Washington, Frederick, Montgomery, Prince Georges, Anne Arundel, Baltimore, Harford, Cecil, Talbot, Wicomico, and Worcester counties.

Eragrostis peregrina, a dwarf, infrequent weed in cultivated land, resembles the latter species, but the spikelets are closer together and no hairs on the plant. Washington and Baltimore counties.

Eragrostis megastachya, stink grass, a common, low, garden weed with spikelets much wider than the three preceding species, the glands on the keels of the lemmas (Plate IV) giving it a peculiar scent, is found throughout Maryland but we have not collected it in Howard, Queen Annes, Caroline, or Wicomico counties.

Eragrostis minor, like the preceding but with smaller, more purple spikelets, glandular only on the sheaths and leaf edges, is an occasional weed in this State. Allegany, Frederick, Carroll, Prince Georges, Baltimore, and Harford counties.

Eragrostis suaveolens, sweet love grass (Plate IV), is a much taller grass of the stink grass type, glandular on the sheaths. It has been cultivated as an ornamental and has become wild rarely in Prince Georges County.

Eragrostis pectinacea, pink grass (Plate IV), is a perennial, a foot or so high, the pink or purple, diffuse panicle with many slender but stiff branches; the sheaths hairy, especially at the top. Represented from all counties except Garrett, Allegany, Howard, and Dorchester. We have specimens of the variety *spectabilis*, without hairy sheaths and with a longer stalked panicle, from Talbot and Somerset counties.

Eragrostis refracta is a similar perennial of the coast region, with more pointed lemmas on the longer, shorter stalked spikelets. Wicomico and Worcester counties.

MOLINIA.

Molinia caerulea, blue pearl grass, is sometimes cultivated as a forage grass, and a striped variety is grown as an ornamental. It has a narrow open panicle. The lemmas are 3-nerved and without hairs on the nerves.

SALT GRASS. DISTICHLIS.

Distichlis spicata is one of the most common low grasses of the higher areas of salt marshes where it grows with the salt meadow spartina (Plate I 20). St. Marys, Calvert, Anne Arundel, Queen Annes, Talbot, Dorchester, Somerset, and Worcester counties.

SPANGLE GRASSES. UNIOLA.

Medium or tall perennial woodland grasses, with very flat spikelets having extra empty lemmas below the seed bearing ones.

Uniola laxa, slender uniola, has a slender panicle, the 3 to 6-flowered spikelets about a quarter inch long. Prince Georges, St. Marys, Anne Arundel, Kent, Queen Annes, Caroline, Talbot, Wicomico, Somerset, and Worcester counties.

Uniola latifolia, broadleaf uniola, an uncommon but handsome grass of rich woodlands, the 6 to 12-flowered spikelets nearly an inch long, broad and very flat on drooping branches, is worthy of a place in flower gardens. Washington, Montgomery, Harford, and Prince Georges counties.

GIANT REED. ARUNDO.

Arundo Donax, a 6 to 10-foot reed, is often grown as an ornamental grass. It has been found up to 20 feet high. Perhaps worth consideration for heavy fiber yield.

WILD REED. PHRAGMITES.

Phragmites communis, 4 to 12 feet high, frequently covers areas in fresh water marshes along Maryland rivers. Seed is not often produced but the thick rhizomes spread it rapidly. Prince Georges, Calvert, Anne Arundel, Baltimore, Dorchester, and Wicomico counties.

ORCHARD GRASS. DACTYLIS.

Dactylis glomerata (Plate I 23) is one of the most frequent and hardy grasses of Maryland agricultural lands, both wild and cultivated. It is a bunch grass with large, light green, folded

leaves, which have a well developed, white, membranous ligule (Plate III). It is good on most soils except sand and muck and endures shade. Specimens are in the collection from Garrett, Allegany, Carroll, Prince Georges, Baltimore, Kent, and Talbot counties.

DOG'S-TAIL GRASS. CYNOSURUS.

Cynosurus cristatus is occasionally cultivated, one specimen collected at College Park. The heads look like yard grass with a single terminal spike instead of several.

MELIC. MELICA.

Melica mutica is a grass in general appearance like the common tall oat grass but without the oat-like awns. Specimens from Montgomery and Prince Georges counties. *Melica nitens* is found in Pennsylvania and might occur in this State. It has unequal glumes shorter than the spikelet, while in *M. mutica* they are of nearly equal length and about as long as the florets. The melica leaf sheaths are closed.

PURPLE TOP. TRIDENS (TRIODIA).

Tridens flavus is a conspicuous grass of late summer, 3 to 6 feet high, the purple, drooping panicle and upper stem covered with a dirty secretion (Plates II 6, VI). The long leaves and stem base are flattened; the ligule a fringe of hairs. It is tough and poor for feed. Allegany, Washington, Frederick, Carroll, Montgomery, Prince Georges, Charles, Anne Arundel, Baltimore, Harford, Kent, St. Marys, and Dorchester counties. A variation without the purple color from Carroll, Prince Georges, Charles, and Anne Arundel.

SAND GRASS. TRIPLASIS.

Triplasis purpurea, a low, short leafed grass, the few spikelets partly covered by the upper leaf sheaths, found in sand along shores. Calvert, Cecil, Kent, Queen Annes, and Worcester counties.

TRIBE 3. BARLEY TRIBE. HORDEAE.

This group contains those grasses with many, one to several-flowered spikelets arranged on opposite sides of the axis of the spike or head, as in barley, wheat, rye, quack grass and rye grass, all of which are members of this tribe. The leaves of this tribe nearly always have claw-like auricles at the sheath and blade junction (Plate III Agropyron).

KEY TO MARYLAND GENERA.

A 1. One spikelet at each joint of the rachis. B.
B 1. Spikelets 1-flowered, lemma not awned, sunken in hollows of the rachis; spikes slender cylindric; low annuals. **Lepturus.**
B 2. Spikelets 2 to several-flowered, not sunken in the rachis. C.
C 1. Spikelets edgewise to the rachis (Plate I 28). **Lolium.**
C 2. Spikelets flatwise to the rachis (Plate I 29). D.
D 1. Perennial, commonly with running rhizomes and so a "wire grass". **Agropyron.**
D 2. Annual cultivated grains. E.
E 1. Glumes ovate, 3-nerved; wheat, etc. **Triticum.**
E 2. Glumes long pointed, 1-nerved; rye. **Secale.**
A 2. More than one spikelet at each joint of the rachis.
F 1. Two of the 3 spikelets at each joint usually represented by awns only; barleys. **Hordeum.**
F 2. Two similar 2 to 6-flowered spikelets to each joint. G.
G 1. Glumes none or bristle-like, the mature spikelets spreading horizontally, the loose spike like a bottle-brush. **Hystrix.**
G 2. Glumes equaling the lemmas, spikelets ascending or erect against the rachis, heads resembling rye or wheat. **Elymus.**

WHEAT GRASSES. AGROPYRON.

Agropyron repens, quack grass, couch grass, is the most common wire grass in the State, especially northward. The long rhizomes spread it rapidly and persistently, and though it makes a good early hay and pasture grass on frequently plowed land, it is one of the worst pests where any other crop is wanted (Plate III).

Disking frequently after midsummer, cultivation with the spring tooth harrow and then raking out the rhizomes with a horse rake followed by smothering crops and clean cultivation next year are aids in its control as a weed. The sulfite sprays for weed killing have been used recently against it with success.

Garrett, Allegany, Frederick, Carroll, Montgomery, Prince Georges, Baltimore, Anne Arundel, Harford, Cecil, Kent, Dorchester, and Wicomico counties.

Some of the western wheat grass species may occasionally be seen in cultivation here.

WHEAT. TRITICUM.

Triticum aestivum, cultivated in many varieties and races (emmer, spelt, Durum wheat, etc.), the leading food crop of the world. is often found outside the grain fields, and easily recognized if in head. The hairy auricles or claws of the leaves aid in separating young wheat plants from other grains.

RYE. SECALE.

Secale cereale, the rye of our grain fields, often also growing spontaneously, differs from wheat in the hairless or absent claws and minutely hairy, but generally more bluish leaves and sheaths.

WILD RYES. ELYMUS.

These are strong perennial grasses of medium height with rye-like heads and flat rather tough blades. Three distinct kinds of wild rye occur in Maryland: *Elymus virginicus* with an erect head partly included in the upper sheath; the generally larger *E. canadensis* with curved or nodding heads with more slender and diverging glumes and awns; and *E. striatus*, a slender stemmed grass with the glumes awn-like to the base, the other two having the glumes flattened near the base. The key below attempts to distinguish several other less clearly defined kinds of wild rye found here. Though rather coarse, the wild ryes are fair forage grasses.

KEY TO ELYMUS SPECIES IN MARYLAND.

A 1. Head not erect, or if so, the glumes awl-like, awns curved outward at the apex when dry. B.
B 1. Leaves one-half inch wide or more; head pendant from the base, plant erect, glumes mostly under three-quarter inch long, lemma short haired. **E. canadensis.**
B 2. Leaves mostly under one-half inch wide, head arching, plants arching at the base, glumes three-quarter inch long or more. C.
C 1. Lemma smooth. **E. robustus.**
C 2. Lemma hairy. **E. robustus vestitus.**
A 2. Heads mostly erect, the awns pointing upward and nearly straight when dry. D.
D 1. Glumes narrow and straight, awn-like to the base. E.
E 1. Spikelets 2 to 4-flowered, blade and sheath rough but not hairy. **E. riparius.**
E 2. Spikelets not over 2-flowered, blade and sheath generally soft hairy; stem slender. F.
F 1. Lemmas hairy. **E. striatus.**
F 2. Lemmas nearly smooth. **E. striatus arkansanus.**
D 2. Glumes flattened somewhat above their thickened and whiter, curved out base. G.
G 1. Glumes, including awn 1 to 1½ inches long, stalk of the head extending beyond the upper sheath. H.
H 1. Glumes and lemmas hairy. **E. australis.**
H 2. Glumes and lemmas smooth or rough. **E. australis glabriflorus.**
G 2. Glumes shorter, base of head usually included in the upper sheath. I.
I 1. Glumes smooth. **E. virginicus.**
I 2. Glumes hairy. **E. virginicus hirsutiglumis.**

Elymus virginicus, Terrell grass, the common, erect, stiff headed wild rye, found mostly in bottom land along streams, is a coarse grass of some feed value. All parts of Maryland except Washington, Frederick, Charles, Caroline, Somerset, Talbot, Dorchester, and Wicomico counties. The more hairy form, variety *hirsutiglumis*, we have from Allegany, Montgomery, Washington, Howard, and Cecil counties.

Elymus australis, southern wild rye, in Maryland is mostly of the less hairy variety *glabriflorus*, occurring frequently in salt marsh borders, etc. Washington, Montgomery, Charles, Calvert, Prince Georges, Baltimore, Cecil, Kent, Queen Annes, Talbot, Dorchester, Anne Arundel, Wicomico, and Worcester counties.

Elymus canadensis, nodding wild rye, a tall coarse grass with large, bushy, nodding rye-like heads, is frequent in bottom land in lime regions. Garrett, Washington, Montgomery, Prince Georges, Carroll, Baltimore, Cecil, and Talbot counties.

Elymus robustus is included in the key, on a possibility of its growing in the western counties.

Elymus striatus, slender wild rye, is a small, slender wild rye common in rocky limestone woods and similar situations. Carroll, Montgomery, Charles, Calvert, Anne Arundel, Baltimore, and Queen Annes counties. Its less hairy variety *arkansanus* has been found in Washington, Montgomery, Baltimore, and Cecil counties.

Elymus riparius, a more vigorous relative of *E. striatus*, occurs in bottom lands. Allegany, Frederick, Montgomery, Baltimore, Prince Georges, and Worcester counties.

HYSTRIX.

Hystrix patula, bottle-brush grass, the diverging awns giving the heads an appearance indicated by the common name, is an unimportant grass of rocky limestone woods. Garrett, Allegany, Washington, Carroll, Frederick, Montgomery, Prince Georges, Charles, Baltimore, and Cecil counties.

BARLEYS. HORDEUM.

In addition to the frequently cultivated barley, *Hordeum vulgare*, recognized by the strong straight beards and the prominent smooth claws and collar on the leaves, two wild barleys are frequent in Maryland. They are usually found in open dry ground. The ripe heads readily break up in short joints.

Hordeum jubatum, squirrel-tail grass, a perennial, has hair-like awns up to 2 inches long on the slender heads (Plate I 25). It occurs in waste non-acid land and may become a troublesome weed, the awns sometimes injuring animals by working into the eyes and nostrils. Prince Georges, Talbot, Dorchester, and Somerset counties.

Hordeum pusillum, little barley, an annual, has coarser heads, the awns about ½ inch long (Plate I 18). Montgomery, Prince Georges, Calvert, and Somerset counties.

Hordeum nodosum, meadow barley, a short-awned perennial, and *H. murinum*, wall barley, an annual with a short, broad, long awned head occur in nearby states but are not yet reported from Maryland.

RYE GRASSES. LOLIUM.

The rye grasses differ from the wheat grasses in having the edge of the spikelets against the rachis, the inner glume being suppressed.

Lolium perenne, perennial rye grass, is a short-lived perennial, common in cultivated soils and often sown in mixtures (Plate I 28). The leaves are folded in the bud, shining on the back and purple on the underground bases. The glumes are shorter than the 8 to 10-flowered awnless spikelets. Garrett, Allegany, Frederick, Montgomery, Prince Georges, Harford, Dorchester, Somerset, Wicomico, and Worcester counties.

Lolium multiflorum, Italian rye grass, is more of a bunch grass than the previous species. It lives a year or two, has 10 to 20-flowered spikelets, usually with short awns on the lemmas. The leaves are rolled in the bud and the stem opposite the spikelets is rough. It is infrequent in cultivated land, preferring loam soils and is sown to some extent. Montgomery, Prince Georges, and Worcester counties.

Lolium temulentum, darnel, is an annual with much larger, 5 to 7-flowered spikelets, the glume as long as the whole spikelet. The grains of some races of darnel contain a fungus poisonous to man and flesh eating animals. Darnel is rare in waste land in Talbot, Somerset, and Worcester counties. The variety *arvense* without awns was found at Ocean City.

HARD GRASS. LEPTURUS (PHOLIURUS).

Lepturus filiformis, a low tufted salt grass, has the spikelets sunken in the almost barren appearing, slender head which breaks up in short, cylindrical joints when mature. It occurs along the coast from New Jersey to Virginia but is not yet found in Maryland.

TRIBE 4. OAT TRIBE. AVENEAE.

In the oat and its relatives, the spikelets are in panicles, and two to several flowered. The glumes are longer than the florets. The lemma usually has a bent or twisted awn on the back (Plate I 27).

KEY TO MARYLAND GENERA.

A 1.	Spikelets not awned.	B.
B 1.	Glumes different, the second wider toward the apex.	**Sphenopholis.**
B 2.	Glumes similar.	**Koeleria.**
A 2.	Spikelets awned.	C.
C 1.	Awn of the upper floret hooked.	**Holcus.**
C 2.	Awn not hooked.	D.
D 1.	Lower floret staminate.	**Arrhenatherum.**
D 2.	Lower floret with both stamens and pistil.	E.
E 1.	Awn from between two apical points of the lemma.	**Danthonia.**
E 2.	Awn from back of lemma.	F.
F 1.	Glumes over a half inch long; oat.	**Avena.**
F 2.	Glumes shorter.	G.
G 1.	Lemmas keeled, awn from above the middle.	**Trisetum.**
G 2.	Lemmas rounded on the back, awn from below the middle; hair grasses.	H.
H 1.	Lemmas blunt or irregular at apex.	**Deschampsia.**
H 2.	Lemmas tapering into two slender points.	**Aira.**

KOELERIA.

Koeleria cristata, a tufted low perennial with irregular spike-like panicles on slender peduncles, has been found as far south as Delaware in sandy land.

TRISETUM.

Grasses similar to Koeleria but the lemma awned. They are good grazing grasses but not common.

Trisetum pennsylvanicum, a slender grass one to two feet high, like redtop except for the awns and larger spikelets, is found in Maryland bogs near Washington. Awnless forms might be referred to the next genus.

Trisetum spicatum may occur in western Maryland mountains.

EATON GRASSES. SPHENOPHOLIS.

These are small, slender, delicate grasses, resembling blue grass, usually in rocky woods, appearing like annuals, but perennial.

Sphenopholis obtusata is about two feet high, the panicles narrow and dense, the glumes of equal length (Plate I 19). It has been found in Garrett, Prince Georges, Wicomico, and Worcester counties.

Sphenopholis pallens is similar but the panicle more open, and the first glume shorter than the second. It is found in damp, non-acid places. Garrett, Montgomery, Prince Georges, Baltimore, Kent, and Dorchester counties.

Sphenopholis nitida has an open panicle and glumes of equal length. In slightly acid dry soil. Garrett, Montgomery, Prince Georges, Charles, and Worcester counties.

AVENA.

Avena sativa is the cultivated oats. It is sometimes found growing spontaneously where oats has been fed or handled. The young oats can be distinguished from other grains by the lack of auricles on the leaves. Wild oats, *Avena fatua*, occurs rarely as a weed in Maryland.

TALL OAT GRASS. ARRHENATHERUM.

Arrhenatherum elatius is cultivated in Maryland and is often found wild. In flower it is much like a half size oat head. The plants are three feet or more high, forming a loose perennial clump. It is drouth resistant, but does not do well in shade or

wet soil. Specimens from Allegany, Washington, Frederick, Carroll, Prince Georges, Baltimore, and Wicomico counties.

Variety *bulbosum* of this species, with round, thickened joints of the rootstock, like a short string of beads, is becoming common especially in southern Eastern Shore counties, for example, Somerset. It is feared as a weed.

DESCHAMPSIA (AIRA).

Deschampsia flexuosa, tufted hair grass, with small, shining spikelets in loose panicles on slender stalks about two feet high from a tuft of hair-like leaves, is found in dry woods, often on loose slopes. Allegany, Washington, Prince Georges, Charles, Calvert, Anne Arundel, Harford, Cecil, and Kent counties.

AIRA.

Aira praecox, a small delicate annual, the hair-like stems shining like brass wire, the panicle, spike-like, has been found in Wicomico County.

Aira caryophyllea, silvery hair grass, about 6 inches high, the panicle open, the spikelets silvery and on slender hair-like pedicels, is found in dry open land. Prince Georges, Charles, Calvert, Baltimore, Caroline, and Dorchester counties.

HOLCUS (NOTHOLCUS).

Holcus lanatus, velvet grass, a velvety hairy grass, one to two feet high, is sometimes cultivated. It is adapted to cool, damp, rich meadows. Found wild in Garrett, Allegany, Frederick, Prince Georges, Charles, Baltimore, Cecil, Dorchester, Somerset, and Worcester counties.

WILD OAT GRASSES. DANTHONIA.

These are very narrow-leafed grasses, one to two feet high, which furnish some grazing on wild waste lands.

Danthonia spicata, curled poverty grass, is a very common low grass with a tuft of curled leaves at the base, and several spikelets along the main axis of the flowering stem, growing on dry, sterile, acid land, often in open dry woods. Throughout the State; we have it from all counties except Howard, St. Marys, Caroline, and Somerset.

Danthonia compressa, flattened poverty grass, has a more branching panicle, the leaves not so curled, and generally is taller than *D. spicata;* it is more common in the mountains and in gravelly, less acid land. Garrett, Allegany, Montgomery, Prince Georges, and Frederick counties.

Danthonia sericea is more characteristic of lighter barren soils; the glumes are twice as long as in the other two and the spikelets and leaf sheaths are densely white hairy (Plate I 27). Common in Dorchester, Wicomico, and Worcester counties.

TRIBE 5. TIMOTHY AND REDTOP TRIBE. AGROSTIDEAE.

The spikelets are 1-flowered, the florets in seed falling away from the glumes and leaving the latter attached to the stem, or in a few kinds the articulation is below the glumes. The spikelets are in panicles, open as in redtop or so contracted as to be spikelike as in timothy (Plate IV, Agrostis).

KEY TO MARYLAND GENERA.

A	1.	Spikelet jointed below the glumes, so that it falls as a whole.	B.
B	1.	Glumes long awned, panicle dense.	**Polypogon.**
B	2.	Glumes awnless.	C.
C	1.	With dense heads, resembling timothy, the glumes fringed with hairs on the keel.	**Alopecuris.**
C	2.	With open panicles, glumes not ciliate.	**Cinna.**
A	2.	Spikelet jointed above the glumes which remain on the plant when the seed falls.	D.
D	1.	The fruiting lemma hard and thick, enclosing the seed, its nerves obscure.	E.
E	1.	Lemma awnless.	**Milium.**
E	2.	Lemma awned (very short awns in some Aristida species).	F.
F	1.	Three awns from apex of lemma (Plate II 3).	**Aristida.**
F	2.	Awn single.	G.
G	1.	Awn large, twisted and bent (Plate II 8).	**Stipa.**
G	2.	Awn deciduous, small, not twisted.	**Oryzopsis.**
D	2.	Lemma thin or firm, the nerves evident.	H.
H	1.	Glumes longer than the lemma.	I.
I	1.	Panicle feathery, about as broad as long, spikelets woolly.	**Lagurus.**
I	2.	Panicle not feathery, spikelets not wooly.	J.
J	1.	Glumes ciliate on the keel; heads cylindric.	**Phleum.**
J	2.	Glumes not keeled and ciliate; panicled.	K.
K	1.	A tuft of hairs at the base of the lemma.	**Calamagrostis.**
K	2.	Few if any hairs at the base of the lemma.	**Agrostis.**
H	2.	Glumes not longer than the lemma.	L.
L	1.	Lemma awned or pointed at the tip.	M.
M	1.	Rachilla prolonged behind the palea, floret on a minute stalk above the glumes.	**Brachyelytrum.**
M	2.	Rachilla not prolonged, floret not stipitate.	**Muhlenbergia.**
L	2.	Lemma awned from the back or without awn.	N.
N	1.	A tuft of hairs at base of lemma.	O.
O	1.	Panicles spike-like, rachilla prolonged (Plate I 22).	**Ammophila.**
O	2.	Panicles open, rachilla not prolonged.	**Calamovilfa.**
N	2.	No basal hair tuft.	P.
P	1.	Spikelets in open or few-flowered panicles, seed free from the lemma.	**Sporobolus.**
P	2.	Spikelets in dense timothy-like heads, partly within the leaf sheaths, seed falling with floret attached.	**Heleochloa.**

CALAMAGROSTIS.

The grasses of this genus are medium height grasses of northern regions, spreading in wet soil by rhizomes. There are many 1-flowered spikelets in panicles. The lemma bears an almost microscopic awn on the back and a conspicuous tuft of hairs at the base.

Calamagrostis canadensis, blue-joint grass, is a very slender, branching, wet land grass about 2 feet high, the spikelets about 1/8 inch long. It is common only locally, but is a good pasture

grass for cool, wet lands. Garrett, Montgomery, and Prince Georges counties.

Calamagrostis cinnoides, reed bent grass, is a taller, rough but not hairy grass with a dense panicle about 6 inches long, of spikelets about 1/3 inch long. It is frequent but not abundant throughout the State and is probably a good grass for wet woodland pasturage. Garrett, Montgomery, Prince Georges, Carroll, St. Marys, Baltimore, Harford, Caroline, Talbot, Wicomico, Somerset, and Worcester counties.

AMMOPHILA.

Ammophila arenaria, beach grass, marram grass, is a characteristic sand dune grass of the Atlantic coast. Its strong, long running rhizomes and abundant fibrous roots make it very effective as a sand binder. It has long, tough, smooth, inrolled leaves with over-lapping sheaths rounded on the back, and a cylindric spike-like head (Plate I 22). It is often planted for holding shifting sand along the tidewater shores. St. Marys, Calvert, Anne Arundel, Harford, and Worcester counties.

Calamovilfa brevipilis is a related shore grass with keeled sheaths and open panicles, sometimes found along the nearby Atlantic coast but not reported from Maryland.

BENT GRASSES. AGROSTIS.

The bent grasses are among the smallest flowered grasses. The spikelets in panicles, have a single floret that falls away at maturity, leaving the little glumes attached to the pedicels. Some, like *A. canina,* have soft, oily seeds. The leaves are flat and narrow, the sheaths rounded on the back and with a membranous ligule often well developed. Several species and varieties are in cultivation as pasture, hay and especially, golf course grasses. Both the common and scientific names are by no means yet uniform in usage.

KEY TO MARYLAND SPECIES.

A 1. Stems spreading along the ground and rooting at the joints; palea present. B.
B 1. Plants of brackish ground, the panicle dense and ligule long. **A. maritima.**
B 2. Plants of cultivated ground, the panicle narrow but loose. **A. stolonifera.**
A 2. Stems erect or bent at the base or spreading as rhizomes underground. C.
C 1. Plants annual, lemma awned near the apex, palea present. **A. spica-venti.**
C 2. Plants perennial, awns if any, below the apex. D.
D 1. Rhizomes long, plants 2 to 4 feet high, panicle reddish, ligule conspicuous, palea present; lemma rarely awned (Plate IV). **A. palustris.**
D 2. Rhizomes short or none; plants smaller and more slender. E.
E 1. Branches of panicle long and hair-like, rough, purplish, branching above the middle; palea wanting. **A. hyemalis.**
E 2. Branches of panicle shorter and branched below the middle. F.
F 1. Lemma awned about the middle, palea wanting. **A. canina.**
F 2. Lemma awnless. G.
G 1. Palea wanting; common wild plants, usually in woods. **A. perennans.**
G 2. Palea present; cultivated grasses. H.
H 1. Panicle contracted and lobed. **A. verticillata.**
H 2. Panicle open, pale; rhizomes 4 to 8 inches long; ligule short and blunt. **A. capillaris.**

Agrostis palustris (*A. alba*), redtop, a grass of damp, neutral or slightly acid soil, common both wild and cultivated, spreads through the soil by abundant, long rhizomes and though it may become a weed, almost like quack grass, it is much easier to eradicate. It has a wide range of adaptation and can stand considerable drouth and other variations from its optimum requirements. It is the largest and most vigorous of our Agrostis species. The reddish brown panicle, the branches of which close together in little clusters when mature, and the long ligules help to distinguish it from some others. All counties west of the bay except Howard, Calvert, Anne Arundel, and Harford. Also in Cecil, Talbot, Somerset, Wicomico, and Worcester. A variety *aristata* represented by specimens from Garrett and Montgomery counties has small awns on the lemmas.

Agrostis stolonifera, carpet bent, creeping bent, is cultivated for the soft carpet-like foliage on long running stolons, by which it is propagated. Prince Georges County.

Agrostis maritima, fiorin, native in wet or brackish soil, is scarcely different from *A. stolonifera.* Charles, Calvert, Queen Annes, Wicomico, and Worcester counties.

Agrostis hyemalis, tickle grass, hair grass, is a common grass of open, dry, poor or acid soil, inconspicuous till the long, delicate, hair-like panicle branches develop (Plate I 26). Garrett, Montgomery, Prince Georges, Calvert, Baltimore, Cecil, Queen Annes, Dorchester, and Wicomico counties.

Agrostis perennans, thin grass, also has very slender but shorter panicle branches which are branched below the middle. It is a common grass of open, moist, acid woodlands. Growing in dryer open places, it is more like redtop but generally green. All counties west of the bay except Charles and Calvert, and in Cecil, Dorchester, and Worcester.

Agrostis canina, velvet bent, brown bent, like a small redtop but with small awns and no palea, makes a dense, soft turf for which it is often cultivated.

Agrostis capillaris, Rhode Island bent, also like a small, narrow leafed redtop, but with shorter ligules and more open panicle, much grown in several varieties for the low smooth turf, especially for golf courses, is adapted to acid soils. Is is frequently found in mixed grass fields and lawns, also possibly wild in Montgomery, Somerset, and Wicomico counties.

Agrostis spica-venti, silky bent grass, an annual, and *A. verticillata,* a perennial with densely clustered spikelets, sometimes occur in cultivation in Maryland.

Wood Reed Grasses. Cinna.

These are tall grasses of wet lands, with many one-flowered spikelets in panicles and a small awn near the apex of the lemma.

Cinna arundinacea, Indian reed, the common species in swampy woods, where it would probably be a useful grass, has the panicle narrow and dense. All counties except Carroll, St. Marys, Howard, and Dorchester.

Cinna latifolia, slender reed grass, rare in Maryland mountains, has smaller spikelets on long spreading or drooping branches of the wider and open panicle. It might be used for pasture in cool, wet, limy mountain land. Allegany County.

Foxtail Grasses. Alopecuris.

Low grasses with timothy-like heads, the lemmas with delicate awns. They are good grazing grasses for wet lands.

Alopecuris pratensis, meadow foxtail, a long-lived perennial, 2 to 3 feet high, with short rhizomes and loose sheaths, the head 2 to 4 inches long, spikelets less than ¼ inch long with silky hairs on the keel of the glumes and awns projecting about ¼ inch, is cultivated for wet pasture land and occurs as an escape in Prince Georges and Dorchester counties.

Alopecuris geniculatus, floating foxtail, an occasional wild grass here, is a lower pale green grass. The glumes are much shorter and blunter than in *A. pratensis*, but the awns as long. It is an excellent grazing grass in wet land. Dorchester County.

Alopecuris agrestis, slender foxtail, another uncommon species here has the largest heads, with glumes ¼ inch long and scarcely hairy on the keel, the lemma awns up to ½ inch long. Prince Georges County.

Polypogon.

Polypogon monspeliensis, beard grass, a low annual grass found along the Atlantic coast, has a foxtail-like head, but more dense and branched. The many fine projecting bristles are the awns of the glumes. It is a palatable pasture grass for salt lands. Dorchester, Somerset, and Worcester counties.

Phleum.

Phleum pratense, timothy, our most extensively cultivated grass, is also often found wild around farms. It is best on rich clay or loam and has a medium lime requirement. Timothy is an open bunch grass, the base of the older stems slightly enlarged like a small bulb. The leaves are rolled in the bud, rough

on the edges, slightly twisted, the membraneous ligule short. The flat spikelets with a row of hairs on the keel are crowded into a dense cylindric, long stalked head. Garrett, Allegany, Washington, Frederick, Montgomery, Prince Georges, Carroll, Baltimore, Harford, Cecil, Dorchester, Somerset, and Wicomico counties.

Lagurus ovatus, rabbit-tail grass, with a short, dense, woolly head is sometimes cultivated for everlasting bouquets.

MUHLENBERGIA.

Muhlenbergias are medium or low grasses, with very small one-flowered spikelets, usually in dense, narrow panicles. Most of our species have short scaly rhizomes. One, the common nimble Will, a lawn weed with fine hair-like stems rooting along the ground, differs from the others in the rudimentary glumes. *M. capillaris*, rare in Maryland has an open panicle with long stalked, long awned spikelets. The species with scaly rhizomes are separated in the following key.

A 1. Blades diverging horizontally from the stem, the glumes broad, shorter than the lemmas. B.
B 1. Lemmas awned, spikelets about one-eighth inch long. **M. tenuifolia.**
B 2. Lemmas awnless, spikelets about one-sixteenth inch long. **M. sobolifera.**
A 2. Blades ascending, or erect along the stem, the glumes narrow and long pointed. C.
C 1. Glumes awned and much longer than the awnless lemmas. **M. racemosa.**
C 2. Glumes not longer than the lemmas. D.
D 1. Panicle long stalked beyond the upper sheath. **M. foliosa.**
D 2. Panicle short stalked or partly included in the upper sheath. E.
E 1. Panicle long and slender, lemma awned, stem usually minutely hairy below the joints. **M. sylvatica.**
E 2. Panicle dense, one-quarter inch wide or more, lemma long and pointed, stem smooth below the nodes. **M. mexicana.**

Muhlenbergia sobolifera, a slender grass 2 to 3 feet high, with short scaly rhizomes, and short diverging leaves, grows in dry limestone land. Garrett, Montgomery, and Baltimore counties.

Muhlenbergia tenuifolia, differing from the preceding in the awned lemmas, is found mostly on dry slopes in Garrett, Allegany, Montgomery, Prince Georges, and Baltimore counties.

Muhlenbergia sylvatica, a similar grass with more erect leaves, grows in dry limy land in Allegany, Washington, Montgomery, Prince Georges, Harford, and Queen Annes counties.

Muhlenbergia foliosa, differing in the long exserted panicle, occurs in Garrett County on damp, rough, limy soil.

Muhlenbergia mexicana, satin grass, is one of our most common species, occurring in open waste places, chiefly in rich damp soil, where it may form much of the ground cover. It is good as a soil binder on banks, but is not succulent enough for good feed. It has a scaly rhizome, short, gray green, erect leaves and a slender, short-stalked panicle (Plate II 12). Cecil, Kent, Wor-

cester, and all counties west of the bay except Howard, St. Marys, Charles, and Calvert.

Muhlenbergia racemosa, wild timothy, differing from the other erect-leaved species in the long-awned glumes, occurs in rough, limestone land in Garrett County.

Muhlenbergia Schreberi, nimble Will, a weed in lawns and other open places in good soil, is spread by the slender stolons, rooting along the ground (Plate II 4). Cecil, Kent, Talbot, Dorchester, Worcester, and all counties west of the bay except St. Marys, Charles, and Howard. Variety *palustris*, a more slender plant with larger glumes, is found in wet land. Frederick, Harford, Prince Georges, and Kent counties.

Muhlenbergia capillaris, with an open, agrostis-like panicle, occurs in Montgomery County.

Drop Seed Grasses. Sporobolus.

These are tough grasses with little foliage, the narrow panicles often partly included in the upper leaf sheaths, usually growing in dry lands. The spikelets are 1-flowered; the palea generally more conspicuous than in other grasses as it is longer than the lemma. Rush grass is another name for them.

KEY TO MARYLAND SPECIES.

A 1.	Panicles open, spikelets long stalked, sheaths much compressed at base.	**S. compressus.**
A 2.	Panicle narrow, its branches mostly short and erect.	**B.**
B 1.	Low, slender, annual poverty grasses, with short inflated sheaths.	**C.**
C 1.	Spikelets about one-eighth inch long, lemma minutely hairy, shorter than the palea.	**S. vaginiflorus.**
C 2.	Spikelets shorter, lemma smooth, about as long as the palea.	**S. neglectus.**
B 2.	Coarser perennials, leaves long and inrolled, spikelets one-quarter inch long or more.	**D.**
D 1.	Lemma smooth, slightly longer than the palea.	**S. asper.**
D 2.	Lemma minutely hairy.	**E.**
E 1.	Palea and lemma of nearly equal length.	**S. canovirens.**
E 2.	Palea much longer than the lemma, base of leaf blade less hairy.	**S. clandestinus.**

Sporobolus clandestinus, a bunch grass 2 to 4 feet high, with long rigid leaves tapering to a hair-like tip, grows in sandy lands. Montgomery and Caroline counties.

Sporobolus canovirens is similar but smaller and more hairy at the base of the blades. In sandy land, in Montgomery, Cecil, Queen Annes, and Talbot counties.

Sporobolus asper, differing in the floret characteristics, has been found in sandy soil in Washington and Talbot counties.

Sporobolus vaginiflorus, southern poverty grass, a low annual with slender, erect or wide spreading branches, the short flower clusters mostly included in the somewhat swollen, short sheaths (Plate II 14), is common on open, sterile, acid land. Garrett, Allegany, Washington, Frederick, Montgomery, Prince Georges,

Baltimore, Talbot, Queen Annes, Dorchester, and Worcester counties.

Sporobolus neglectus, a smaller and more slender species, occurs in more neutral waste land. Baltimore and no doubt elsewhere in the State.

Sporobolus compressus, a perennial 1 to 2 feet high, the stems and sheaths flattened at the base like a broom sedge, was collected in Delaware near the Maryland line.

CAT-TAIL GRASS. HELEOCHLOA.

Heleochloa schoenoides, a small grass with short, cylindric heads, partly included in the enlarged upper sheaths, somewhat like a dwarf timothy, is rare. It is an introduced grass from Delaware, north. No Maryland specimens seen.

SHORT-HUSK. BRACHYELYTRUM.

Brachyelytrum erectum, a grass of rough, limy woodland, is like a large muhlenbergia, 2 to 3 feet high. The spikelets, ½ inch long with a longer awn, are in narrow panicles; the leaves short, broad and diverging. It is of little importance. Garrett, Montgomery, Frederick, Prince Georges, Baltimore, Harford, and Cecil counties.

MILLET GRASS. MILIUM.

Milium effusum, millet grass, wild millet, a perennial grass, 3 to 5 feet high, with abundant, broad, succulent leaves; the spikelets panicum-like, but with only one lemma, in panicles, is infrequent in rich, wet, non-acid places in Garrett County. A good forage grass.

MOUNTAIN RICE. ORYZOPSIS.

Oryzopsis racemosa, a tufted, flat bladed perennial, the few spikelets about the size and shape of a rice grain, in a narrow panicle or spike, the lemma long-awned, is found on limy wooded slopes. Washington County, also in the mountains of adjoining States and in Delaware.

SPEAR GRASS. STIPA.

Stipa avenacea, black oat grass, is a narrow, stiff leafed perennial of dry woods. The thin, half inch glumes are oat-like. The floret is hard, brown and pointed at the base, where it is barbed with hairs; it tapers into a strong, twisted, bent awn about 2 inches long (Plate II 8). Montgomery, Caroline, and Worcester counties.

NEEDLE GRASSES. ARISTIDA.

Aristidas are slender, wiry, low, narrow leafed grasses, with narrow spikelets, the lemmas tipped by three awns. They are of little importance except as indicators of barren land.

KEY TO MARYLAND SPECIES.

A 1. Perennials, the middle awn not more than twice as long as the lateral ones. B.
B 1. Sheaths smooth, leaves 4 to 8 inches long, inrolled at the tips. **A. purpurascens.**
B 2. Sheaths woolly, at least at the base, leaves much longer, blades flatter. **A. lanosa.**
A 2. Annuals. C.
C 1. Awns 1 to 2 inches long, united into a twisted base. **A. tuberculosa.**
C 2. Awns separate, not twisted together. D.
D 1. Awns 1 to 3 inches long, the lateral one not much shorter than the middle one **A. oligantha.**
D 2. Awns shorter, the middle one longer than the lateral ones. E.
E 1. Middle awn not twisted or coiled at base, horizontal, the side awns one-eighth to one-quarter inch long and erect; plant not much branched above the base **A. gracilis.**
E 2. Middle awn twisted or coiled at base, the two side awns reduced to minute teeth. F.
F 1. Glumes about equal, plant forking repeatedly. **A. dichotoma.**
F 2. Glumes unequal and longer. **A. dichotoma curtisii.**

Aristida dichotoma, poverty grass, is a common, low branching annual on open, poor land; the very small lateral awns might be overlooked. All counties west of the bay except Carroll, Howard, Charles, and Calvert, also in Cecil, Kent, Caroline, Dorchester, and Worcester. The variety *Curtisii,* less branched and with glumes unequal and longer, in Allegany, Washington, Montgomery, Charles, and Calvert counties.

Aristida gracilis, a similar but less branched grass, has distinct lateral awns and the middle one not coiled at base; in sandy soil. Prince Georges, Harford, Cecil, Kent, Caroline, Dorchester, Wicomico, and Worcester counties.

Aristida oligantha has delicate, sinuous awns an inch or two long (Plate II 3). Dry soil, Montgomery, Prince Georges, Charles, Calvert, St. Marys, Harford, Cecil, Talbot, Dorchester, Somerset, and Worcester counties.

Aristida tuberculosa has the long awns twisted together into a long neck at their base. In sand, only near the coast, Worcester County.

Aristida purpurascens, arrow grass, a nearly smooth perennial, slender grass, a foot or two high, with long slender leaves, and a narrow purplish panicle with awns about an inch long, occurs in sandy land. Montgomery, Prince Georges, St. Marys, Caroline, and Worcester counties.

Aristida lanosa, a similar but taller grass, the lower sheaths woolly, is found in pine barrens. Caroline, Wicomico, and Worcester counties.

TRIBE 6. GRAMA TRIBE. CHLORIDEAE.

The one to several-flowered spikelets are arranged in two rows on one side of the flowering axis, forming a one-sided spike (Plate II 10). They resemble the crab grasses and Paspalum but have the flowers articulated above the two glumes (Plate II 1, 2, 7, 9). Our common salt-marsh grasses, yard grass and Bermuda grass belong here. The buffalo grass of the "short grass" prairies of the west, forming the dense sod of which early settlers built their houses is an aberrant member of this tribe.

KEY TO MARYLAND GENERA.

A 1.	Spikelets with more than one floret.	B.
B 1.	Spikes slender, numerous, along the axis.	**Leptochloa.**
B 2.	Spikes few arising from the end of the main stem.	C.
C 1.	Spikelets filling the rachis to the end.	**Eleusine.**
C 2.	The tip of the rachis extending beyond the spikelets.	**Dactyloctenium.**
A 2.	Spikelets with only one perfect floret.	D.
D 1.	Spikes several from the end of the main stem (Plate II 2).	E.
E 1.	Spikelets with only one lemma; turf forming by wiry rhizomes.	**Cynodon.**
E 2.	Spikelets with sterile florets above the one perfect floret.	**Chloris.**
D 2.	Spikes along the main stem (Plate II 10).	F.
F 1.	Spikelets far apart, appressed, spikes slender and divergent.	**Gymnopogon.**
F 2.	Spikelets crowded into dense spikes not more than ten times as long as wide.	G.
G 1.	Spikes short, drooping on one side the long axis; dry land grass.	**Bouteloua.**
G 2.	Spikes ascending, long and dense; tough marsh grasses.	**Spartina.**

SLENDER GRASS. LEPTOCHLOA (DIPLACHNE).

Leptochloa fascicularis is an annual grass one to three feet high, the slender leaves, with a ligule of short bristles, are longer than the panicles, the bases of which are covered by the leaf sheaths. It is found in ditches and brackish meadows, generally near the coast. St. Marys, Calvert, Anne Arundel, Queen Annes, Talbot, Somerset, and Worcester counties.

YARD GRASS. ELEUSINE.

Eleusine indica (Plate IV) is a tough annual grass with flat stems, resistant to tramping and drying and so a common weed of yards, paths and gardens. Cutting off with a sharp hoe just at junction of stems and roots, before seeding, is a practical control in yards and gardens. Allegany, Washington, Frederick, Montgomery, Prince Georges, Anne Arundel, Baltimore, Harford, Cecil, Dorchester, and Worcester counties.

Dactyloctenium aegyptium, crowfoot grass, is a somewhat similar grass of the southern states occasionally found as far north as New York. The stems root at the nodes like crabgrass, and the leaves are fringed with hairs. It has been cultivated at College Park.

BERMUDA GRASS. CYNODON (CAPRIOLA).

Cynodon dactylon is a bad weed in cultivated fields from central Maryland southward, where it is the usual wire grass. In

the southern states, Bermuda grass is used for pastures, and even hay. It is suitable for lawns, too far south for better grasses, but the color is a much duller green than Kentucky blue grass. A very dense sod is formed by the strong rhizomes. The ligule is a fringe of hairs. Seed is not often produced. It does best in rich, moist, well drained soils and is poor in shade. All counties except Garrett, Allegany, Carroll, Frederick, Howard, Cecil, and Caroline.

Continued cultivated crops with frequent plowing and harrowing will keep it down where it becomes a weed. Shallow fall plowings and harrowing, followed by a crop of rye or winter oats; then after cutting the grain a thorough plowing and harrowing, and a dense summer crop like soy beans, cow peas, millet or buckwheat with clean hoed crop the next year is a good rotation to eradicate it.

SPARTINA.

The dominant grasses of the salt marshes are spartinas. Four species with several varieties occur in Maryland. The one-sided brush-like spikes have the spikelets densely crowded, except in *S. glabra*. They are perennials, mostly with creeping scaly rhizomes and long, coarse leaves. Spartinas have been used in reclaiming shore lands.

Spartina Michauxiana, slough grass, is found in wet land away from salt water. It grows three to six feet high, and has not more than 20 spikes not very close together on each main stem. The first glume is as long as the lemma, the second ends in a quarter inch awn. Garrett, Allegany, Montgomery, Prince Georges, Cecil, Kent, and Worcester counties, but not common.

Spartina cynosuroides, salt reed grass, is similar, but with 20 to 50 spikes close together on each main stem, and the first glume only half as long as the lemma. It is a characteristic plant of the less salty marshes, growing even to 9 feet high; used for thatching, etc. Charles, St. Marys, Calvert, Anne Arundel, Baltimore, Queen Annes, Talbot, Dorchester, Somerset, Wicomico, and Worcester counties.

Spartina glabra, salt marsh grass, is the predominant plant of the tidal marshes, one of the most tolerant to deeper salt water and important in extending land in marshes. The spikelets are not so crowded on the spikes, which are erect against the main axis and smooth to the touch. Most of the Maryland specimens belong to the variety *pilosa* which has the lemma hairy and glumes rough. Charles, St. Marys, Calvert, Anne Arundel, Harford, Kent, Queen Annes, Talbot, Somerset, and Worcester counties. We have the typical form with smooth spikelets from Calvert and Worcester counties.

Spartina patens, salt meadow grass, is a slender, wiry-leafed grass, not over three feet high, with few small spikes (Plate I 10), which with distichlis forms a turf of fine texture in the less inundated salt land. It is of some value for pasture and is part of the marsh hay used for packing, etc. Charles, St. Marys, Calvert, Anne Arundel, Baltimore, Harford, Queen Annes, Dorchester, Wicomico and Somerset counties. The variety *juncea*, is taller, the spikes and leaves more erect. Judging from the distribution in Maryland it grows in less salty land. St. Marys, Calvert, Anne Arundel, Cecil, Kent, Queen Annes, Talbot, Somerset, and Worcester counties. Variety *caespitosa*, a bunch grass type, is not represented by Maryland specimens, but occurs in nearby states.

SKELETON GRASSES. GYMNOPOGON.

These grasses of dry sandy land have slender, divergent flowering branches and few leaves.

Gymnopogon ambiguus, broad leaved, with side branches bearing spikelets throughout their length, has been found in Montgomery, Prince Georges, Caroline, Wicomico, Somerset, and Worcester counties.

Gymnopogon brevifolius, having narrower leaves and spikelets mostly toward the tips of the side branches, occurs in Wicomico and Worcester counties.

CHLORIS.

Chloris Gayana. Rhodes grass, or other species, might occasionally be found here.

BOUTELOUA.

The mesquite or grama grasses which form a large part of the short grass ranges between the more barren plains and the prairies east of the Rocky Mountains belong to this genus.

Bouteloua curtipendula, side oats, two or three feet high with many short, reflexed spikes along one side of the slender flowering stem, is uncommon on dry, less acid hillsides in Allegany, Washington, and Baltimore counties.

TRIBE 7. CANARY GRASS TRIBE. PHALARIDEAE.

In this tribe the spikelets have one perfect terminal flower with a pair of staminate or neuter, often rudimentary flowers below it within the glumes (Plate VI). The common spring-flowering sweet vernal grass, and reed canary grass found in some wet lands, belong in this tribe. These two grasses represent the

only two genera of the tribe found in Maryland. *Anthoxanthum* with cylindrical spikelets has the sterile lateral florets consisting of hairy awned lemmas longer than the fertile floret between them, while in *Phalaris* the spikelets are compressed and the sterile lateral florets reduced to scarcely distinguishable scale-like bodies at the base of the fertile floret.

ANTHOXANTHUM.

Anthoxanthum odoratum, sweet vernal grass, is about a foot or two high, with a pointed spike-like panicle. It is a common perennial weed in open, acid land in spring, and is sometimes sown in grass mixtures for the fragrance of its high content of cumerin, which, however, may be more desirable to man than to the animals that have to eat it. Garrett, Frederick, Montgomery, Prince Georges, Baltimore, Cecil, Talbot, and Worcester counties.

Anthoxanthum aristatum, an annual with more prominent awn, less pubescent glumes and more branching from the nodes has been introduced in adjoining states and might occur in Maryland.

PHALARIS.

Phalaris arundinacea, reed canary grass, (Plate VI), a large, long lived, perennial grass of wet, non-acid soils, especially along streams northward, is a fine meadow grass spreading by short rhizomes. It is two to five feet high, with leaves one half inch wide and about six inches long, with a conspicuous membranous ligule; the spike-like panicle about four inches long. For seed it should be cut before fully mature, as it shatters easily. Garrett, Allegany, Washington, Frederick, Carroll, Montgomery, Prince Georges, Charles, Anne Arundel, Baltimore, Harford. A variety, *picta*, with white striped leaves is cultivated as a ribbon grass.

Phalaris canariensis, canary grass, a low annual, with a short, broad, ovoid, whitish spike, the glumes with distinct green veins, is cultivated for bird seed and is sometimes wild in waste ground. Allegany County.

Phalaris caroliniana, a southern grass in cultivation, with oblong, compact heads, otherwise much like *P. canariensis*, is listed from Baltimore County.

TRIBE 8. RICE TRIBE. ORYZEAE.

In this tribe the spikelets are one-flowered, laterally compressed, in panicles, the glumes wanting, so that the flower or grain is found within the first scale present, the lemma. Cultivated rice and the cut grasses of our ditches and wet land

represent this small tribe. Two species of *Leersia* (*Homalocenchrus*), the cut grasses, are Maryland's only representatives. The fine teeth on leaves and stem may cut the clothes and skin of persons handling or walking through them.

Leersia oryzoides, rice cut grass, the large coarser one, has the lower branches of the panicle clustered and bearing spikelets from below the middle. Garrett, Allegany Washington, Carroll, Frederick, Prince Georges, Calvert, Baltimore, Harford, Cecil, Queen Annes, Caroline, Talbot, and Worcester counties.

Leersia virginica, white grass, the smaller, finer species, has the panicle branches borne singly, with spikelets toward the branch ends (Plate II 13). It is reported to be little affected by soil acidity variations. Allegany, Washington, Carroll, Frederick, Montgomery, Prince Georges, St. Marys, Baltimore, Harford, Cecil, Kent, Queen Annes, Caroline, Dorchester, Somerset, and Worcester counties.

TRIBE 9. WILD RICE TRIBE. ZIZANIEAE.

This tribe is represented in Maryland by the wild rice of fresh or slightly salty marshes. The lower spikelets of the large panicles are staminate, the upper pistillate. Other related grasses with monoecious spikelets are found in more southern states but this is the common Maryland species.

Zizania palustris, our wild rice, occurs in shallow water along the tributaries of Chesapeake Bay. The grain was used for food by the Indians and is an important food of water fowl, sometimes sown to attract them. The great stalks, four to ten feet high, appear like perennials but grow from seed each year. The leaves are good forage if animals can get to them. Prince Georges, Calvert, Anne Arundel, Baltimore, Harford, Cecil, Kent, Queen Annes, Talbot, Dorchester, Wicomico, Somerset, and Worcester counties.

Zizaniopsis miliacea, represented in our collections by one specimen from Ocean City, has the similar staminate and pistillate spikelets mixed in the panicle.

TRIBE 10. MILLET TRIBE. PANICEAE.

The spikelets of this group of grasses differ from most others in having four instead of three bracts below the single fertile flower. That is, the two glumes, a sterile lemma and the fertile lemma (Plate V, Panicum). The lemma and palea closely surround the seed, are hardened and appear like part of the seed. The spikelet is articulated below the glumes and falls as a whole. The spikelets are usually in panicles. This is a large group, rep-

resented by over 50 species of panic grasses, the crab grasses, foxtails, cultivated millets, barnyard grass, and sandbur.

KEY TO MARYLAND GENERA.

A 1.	Aerial spikelets not seed bearing, the seeds borne on branches in the soil.	**Amphicarpon.**
A 2.	Spikelets all similar.	B.
B 1.	Spikelets surrounded by a bur of barbed spines; annuals (Plate II 5).	**Cenchrus.**
B 2.	Without burs.	C.
C 1.	Bristles at base of spikelets (Plate VI setaria), which are in cylindrical heads.	D.
D 1.	Bristles persistent, the spikelets deciduous at maturity.	**Setaria.**
D 2.	Bristles falling with the spikelets.	**Pennisetum.**
C 2.	Spikelets not subtended by bristles.	E.
E 1.	Glumes or sterile lemmas awned.	F.
F 1.	Blades lanceolate, awns from a notch at apex of glumes.	**Oplismenus.**
F 2.	Blades long and narrow, glumes tapering into the awn.	**Echinochloa.**
E 2.	Glumes and sterile lemma awnless.	G.
G 1.	Spikelets in slender, one-sided racemes or spikes.	H.
H 1.	The one-sided spikelet bearing branches nearly terminal on the stem, spikelets not circular, lemma margin thin; annuals (Plate II 1).	**Digitaria.**
H 2.	Spikes of round, flat spikelets, if more than one, usually scattered along the main stem, lemma margin thick, inrolled (Plate VI).	**Paspalum.**
G 2.	Spikelets generally in panicles.	I.
I 1.	Fertile lemma brown, pointed, with delicate thin margins enclosing the palea.	**Leptoloma.**
I 2.	Fertile lemma with thick, inrolled margins.	**Panicum.**

FINGER GRASS. DIGITARIA. (SYNTHERISMA).

Annual grasses, easily killed by frost; spreading along the ground by rooting at the joints, or sometimes erect. The small, one-seeded spikelets are along one side of slender flowering branches diverging from near the apex of the long flowering stalks.

Digitaria filiformis, slender crabgrass, is a slender wild grass on sandy or barren land. The slender spikelet bearing branches are scarcely flattened and the leaves with few if any hairs. Frederick, Montgomery, Prince Georges, St. Marys, Calvert, Charles, Baltimore, Harford, Cecil, Kent, Caroline, Queen Annes, Talbot, Dorchester, and Worcester counties.

Digitaria villosa also has slender, not flattened, flowering branches, 5 to 10 inches long, and the sheaths are hairy like the common crab grass. One collection from sandy land in Charles County.

Digitaria humifusa, small crab grass, and the following species have the flowering branches flat with the spikelets on the underside. In small crab grass the spikelets are oval and the sheaths smooth or with only a few scattering hairs (Plates II 2. VI). It is a less vigorous weed than common crab grass and flowers later in summer, growing in cultivated land throughout Maryland. We have specimens from all counties except Howard, St. Marys, Charles and Somerset.

Digitaria serotina, like *D. humifusa,* except for the hairy leaves, should occur near the ocean in Maryland, but has not been seen.

Digitaria sanguinalis, crabgrass, is the most common and troublesome weed of fields, lawns and gardens, has diverging hairs on the blades and sheaths, and differs from the preceding two species in the pointed spikelets with angular pedicels (Plates V, II 1). It is a hot weather grass and drouth resistant, rooting abundantly at the joints of the much branched, prostrate stems. It is a fair forage and hay grass and is often cut in the South. Crab grass takes most of the blue grass lawns in summer time. An effective treatment is scalding water, sufficient to kill the crabgrass and its seeds on the surface without reaching the deeper lying blue grass rhizomes. Abundant in fields throughout the State, all counties except Carroll and Howard being represented in our collections.

FALL WITCH GRASS. LEPTOLOMA.

Leptoloma cognatum, a panicum-like grass, differing in the technical characters of the spikelet, is found in nearby states, north and south, but not seen in Maryland.

PASPALUM.

Paspalums are common grasses, some of fair pasture value. In this region they have attracted little attention except as accidental parts of meadows. The ergot on some species is a menace to livestock on over-grazed land in autumn. The round, flat or lens-like spikelets, in rows on one side the flowering branches are their most characteristic features (Plates VI, II 7, 9).

KEY TO MARYLAND PASPALUMS.

A 1. The rachis flat and wider than the smooth spikelets. B.
B 1. Perennial, spikelets pale. **P. dissectum.**
B 2. Annual, spikelets dark brown and shining. **P. Boscianum.**
A 2. The rachis not wide and flat. C.
C 1. A pair of flowering branches together at the top of the stem, bearing pointed, hairy spikelets; perennial by stolons or rhizomes. **P. distichum.**
C 2. One or more flowering branches not in pairs at the end of the stem. D.
D 1. Flowering stalks both terminal and axillary, the latter sometimes hidden in the sheaths; plants perennial, not rooting at the nodes; spikelets crowded and not in straight rows. E.
E 1. Spikelets scarcely over one-sixteenth inch long; blades and sheaths conspicuously hairy. F.
F 1. Stems slender, erect or nearly so, and leafy, the blades mostly erect and about one-quarter inch wide. **P. setaceum.**
F 2. Stems stouter, more spreading; the leaves mostly basal, narrow and spreading. **P. debile.**
E 2. Spikelets larger. G.
G 1. Leaves conspicuously hairy. **P. pubescens.**
G 2. Leaves with few hairs except along the margins. **P. ciliatifolium.**
D 2. Flowering stalks terminal, or on leafy branches. H.
H 1. Spikelets ciliate with long hairs. **P. dilatatum.**
H 2. Spikelets less hairy or smooth. I.
I 1. Plants stout, 3 feet high or more, the spikelets over one-eighth inch long. J.
J 1. Stems ascending, leaves crowded toward the stem base. **P. difforme.**
J 2. Stems nearly erect, leafy throughout. K.
K 1. Leaves hairy. **P. floridanum.**
K 2. Leaves hairless. **P. floridanum glabratum.**
I 2. Plants lower or more slender, spikelets smaller. L.
L 1. Spikelets orbicular, about one-eighth inch long, blades as long as the flowering stems. **P. circulare.**

L 2. Spikelets smaller, longer than broad, blades shorter. M.
M 1. Blades and sheath long haired. P. longipilum.
M 2. Blades and sheaths almost smooth. P. laeve.

Paspalum dissectum is a grass two feet high or less, on muddy banks and in ditches, with short leaves and swollen sheaths, the broad flat flowering branches, an inch or two long with oval spikelets on the lower surface. Queen Annes and Worcester counties.

Paspalum distichum, knot grass, is a good soil binder along streams. Its rooting stolons and pointed spikelets make it resemble a crabgrass more than the usual paspalum. Found along the coast from New Jersey south, but not seen in Maryland.

Paspalum setaceum, slender paspalum, a perennial of sandy openings, or woods, has a few slender stems, 1 to 3 feet high, with sparse, broad, hairy, olive green foliage; the very small, thick spikelets in irregular rows (Plate II 9). Prince Georges, Charles, Calvert, Baltimore, Harford, Cecil, Queen Annes, Caroline, Dorchester, Somerset, Wicomico, and Worcester counties.

Paspalum debile, another of the smaller paspalums, is stouter and the leaves narrower and more aggregated at the plant base. Dry sandy or barren land: Worcester and Charles (?) counties.

Paspalum pubescens (*P. Muhlenbergii*) is like slender paspalum, but the spikelets distinctly larger, yet smaller than in most species. It is a common but unimportant perennial of dry or light soil in open woods, etc. Frederick, Montgomery, Prince Georges, Charles, St. Marys, Calvert, Baltimore, Harford, Cecil, Queen Annes, Caroline, Talbot, Dorchester, and Worcester counties.

Paspalum ciliatifolium, of similar habitat and form but less hairy, is doubtfully reported from Maryland, though found in adjoining states.

Paspalum dilatatum, Dallis grass, differing from all other species in the abundant long hairs fringing the spikelets, is a valuable cultivated grass, 2 to 5 feet high, in the southern states, but not known to be grown in Maryland. Like the next species, it sometimes bears a poisonous ergot.

Paspalum laeve, field paspalum, is a common grass, 1 to 3 feet high, in open land, especially on clay soil (Plate II 7). The flat stems and leaf bases, red underground, radiate from the root and curve upward; there are only a few hairs on the leaves. It is considered of some value in hay and pasture. Sometimes the ordinarily flat, round spikelets are enlarged and irregular like a small popcorn, from the presence of an ergot fungus which is poisonous to livestock, but with an action different from the common grass ergot. Prince Georges, Montgomery, Calvert, Charles, Anne Arundel, and all Eastern Shore counties.

Paspalum longipilum (*P. plenipilum*), long-haired paspalum, is a similar grass but with long-haired foliage, found in light, moist soil. St. Marys, Charles, Calvert, Cecil, Kent, Queen Annes, Caroline, Dorchester, Wicomico, and Worcester counties.

Paspalum circulare, distinguished from *P. laeve* by the larger, circular spikelets, is a more leafy forage grass of fields and open ground. Montgomery, Prince Georges, Queen Annes, Dorchester, and Wicomico counties.

Paspalum floridanum, Florida paspalum, the largest of the paspalums, 3 to 5 feet high, with large, flat, oval spikelets and leaves hairy, especially on the sheaths, is more common south of Maryland but is found here in St. Marys, Baltimore, Anne Arundel, and Worcester counties. The variety *glabratum*, almost without hairs on the leaves, is common in wet, sandy land in southern and eastern Maryland. St. Marys, Calvert, Harford, Cecil, Kent, Talbot, and Worcester counties.

Paspalum difforme, differs from the preceding in the less erect stems with shorter leaves, more crowded at the base. Worcester County.

Paspalum Boscianum, bull grass, a wet land grass, 2 to 3 feet high, found from here southward, has several rows of small spikelets with shining, dark brown fruits on the numerous short flowering branches. It is a good pasture grass. Queen Annes County.

PANIC GRASSES. PANICUM.

More species of panicum occur in Maryland than of any other genus of grasses. The greater number of these belong to the section having a winter rosette of short broad leaves (Plate II 11). Their chief interest is in furnishing puzzles for botanists. Few of them form any considerable part of the grass flora or possess economic merit. Several species of the taller, long leafed kinds are of forage value and promising in agriculture, especially on wet land.

KEY TO MARYLAND PANICUMS.

A 1. Plants annual, blades usually much more than 10 times as long as wide, ligule ciliate, panicle much branched. B.
B 1. Spikelets tuberculate, green; plants of wet land with strong brace roots on the lower joints and smooth except for hairs on the sheath margins. **P. verrucosum.**
B 2. Spikelets hairy or smooth, not tuberculate. C.
C 1. First glume one-quarter or less the length of the pointed spikelet, short and blunt; tall, nearly hairless weeds. **P. dichotomiflorum.**
C 2. First glume acute or long-pointed and about half the spikelet length; sheaths usually with conspicuous diverging hairs. D.
D 1. Panicle nodding; spikelets over one-eighth inch long, ovate. **P. miliaceum.**
D 2. Panicle erect, spikelets shorter. E.
E 1. Spikelets long-pointed, about one-eighth inch long, panicle narrow. **P. flexile.**
E 2. Spikelets shorter and less pointed; panicle usually over half as broad as long. F.
F 1. Plant strong and tending to be erect, the main panicle as long as the rest of the plant. **P. capillare.**
F 2. Plants slender and often spreading, with several panicles shorter than the plant. G.

G 1. Leaves over one-quarter inch wide, plant usually yellowish green, panicles short-stalked. **P. Gattingeri.**
G 2. Leaves narrower, plant often purplish, panicles usually with long slender stalks. **P. philadelphicum.**
A 2. Plants perennial. **H.**
H 1. Rhizomes long jointed; not forming plants in bunches. **I.**
I 1. Glaucous plants of salt beaches, panicle elongated, narrow, spikelets nearly one-quarter inch long. **P. amarum.**
I 2. Green plants in water or wet land, spikelets along one side the rachis, less than one-eighth inch long. **P. hemitomum.**
H 2. Rhizomes short or none, plants in bunches. **J.**
J 1. Blades over 20 times as long as wide, the basal ones similar, and not forming a winter rosette; plants mostly over 2 feet high. **K.**
K 1. Short creeping scaly rhizomes present. **L.**
L 1. Spikelets short-stalked, mostly on one side of the nearly undivided side branches of the panicle; sheaths keeled. **P. anceps.**
L 2. Spikelets in open, much branched panicles, sheaths rounded on the back. **M.**
M 1. Spikelets beaked, over one-eighth inch long. **P. virgatum.**
M 2. Spikelets more blunt and shorter. **P. virgatum cubense.**
K 2. Rhizomes absent, stems close together in dense bunches, spikelets short-stalked along one side the main branches of the panicle, sheaths keeled. **N.**
N 1. Long hairs about the sheath apex or ligule, the few-flowered panicle much longer than the leaves. **P. longifolium.**
N 2. Hairs short or none; the leaves equalling the panicle. **O.**
O 1. Spikelets nearly one-eighth inch long, about one-quarter as long as wide, a short stalk between the glumes and floret. **P. stipitatum.**
O 2. Spikelets smaller and wider, floret not stalked. **P.**
P 1. Panicle open, with ascending branches, redtop-like; the spikelets scarcely over one-sixteenth inch long. **P. agrostoides.**
P 2. Panicle dense with erect branches, the spikelets between the above two in size. **P. condensum.**

J 2. Blades mostly not over 10 times as long as wide but longer in a few species. The basal winter rosette leaves shorter and wider; the early summer phase mostly simple with terminal open panicle, the autumnal form much branched with reduced panicles often numerous and partly included in the upper leaf sheaths. **Q.**
Q 1. Spikelets without hairs visible with a good magnifier. **R.**
R 1. Spikelets one-eighth inch long or more. **S.**
S 1. Spikelets pointed, blades over 10 times as long as wide. **P. depauperatum.**
S 2. Spikelets blunt, blades shorter, some of the sheaths stiff hairy. **P. Scribnerianum.**
R 2. Spikelets shorter. **T.**
T 1. Ligule of hairs one-sixteenth inch long or more, sheaths smooth. **P. spretum.**
T 2. Ligule shorter or none. **U.**
U 1. Spikelets one-sixteenth inch long or less **V.**
V 1. Joints bearded with a short tuft of hairs. **P. microcarpon.**
V 2. Joints not bearded; stem hairless. **W.**
W 1. Plant 18 inches high or more, erect. **P. caerulescens.**
W 2. Plant much shorter, the autumnal form spreading or reclining. **P. ensifolium.**
U 2. Spikelets longer. **X.**
X 1. Blades, or some of them, 20 times as long as wide. **Y.**
Y 1. Blades erect, branches basal. **P. Werneri.**
Y 2. Blades diverging, branching from upper joints. **P. Bicknellii.**
X 2. Blades mostly broader. **Z.**
Z 1. Stems very slender, soon prostrate and vine-like; in wet land. **P. lucidum.**
Z 2. Stems not slender or vine-like. **1.**
1 a. Some of the sheaths rough-hairy. **2.**
2 a. Leaves over one-half inch wide. **P. clandestinum.**
2 b. Leaves narrower, often hairy only near the ground; in wet land. **P. scabriusculum.**
1 b. Sheaths smooth or with few soft hairs. **3.**
3 a. Spikelets distinctly pointed. **4.**
4 a. Blades thin, the sheaths usually with minute glandular spots. **P. yadkinense.**
4 b. Blades firm, sheaths not dotted. **P. cryptanthum.**
3 b. Spikelets acute to rounded or nearly so at apex; leaves diverging. **5.**
5 a. Nodes bearded. **P. barbulatum.**
5 b. Nodes hairless or nearly so, plant erect and branching like a little tree. **P. dichotomum.**

Q 2. Spikelets hairy, at least when magnified against a dark background. **6.**
6 a. Spikelets one-eighth inch long or more. **7.**
7 a. Blades of the middle stem at least 15 times as long as wide; spikelets pointed. **8.**
8 a. Secondary panicles from the base only; plants of dry, sterile land. **P. depauperatum.**
8 b. Secondary panicles from upper part of stem. **P. aculeatum.**
7 b. Blades mostly less than 10 times as long as wide. **9.**
9 a. Ligule of conspicuous hairs, leaves velvety beneath, sheaths hairy. **P. Ravenelii.**
9 b. Ligule minute or none. **10.**
10 a. Nodes bearded, leaves about one inch wide. **11.**
11 a. Sheaths hairless or nearly so, blades not velvety on underside. **P. Boscii.**

11 b. Sheaths downy, leaves velvety beneath. **P. Boscii molle.**
10 b. Nodes not bearded. 12.
12 a. Sheaths hairy only on the edges, leaves over one-half inch wide. 13.
13 a. Spikelets over one-eighth inch long, plants tall, leaves thin. **P. latifolium.**
13 b. Spikelets shorter, plant low, leaves thick, whitish beneath. **P. commutatum.**
12 b. Sheaths hairy on the back. 14.
14 a. Hairs appressed or ascending, leaves less than one-half inch wide. **P. oligosanthes.**
14 b. Hairs of sheath diverging. 15.
15 a. Blades less than one-half inch wide, plants under 2 feet high. **P. Scribnerianum.**
15 b. Blades one-half to 1 inch wide, plants 2 to 3 feet high. 16.
16 a. Sheaths with a few soft hairs. **P. latifolium.**
16 b. Sheaths with coarse stiff hairs. **P. clandestinum.**

6 b. Spikelets less than one-eighth inch long. 17.
17 a. Blades less than one-quarter inch wide, mostly over 4 inches long, secondary panicles at base of plant. 18.
18 a. Sheaths hairy. **P. linearifolium.**
18 b. Sheaths smooth. **P. Werneri.**
17 b. Blades not elongated, secondary panicles not basal. 19.
19 a. Sheaths with abundant long hairs diverging downward; plants light green, forming soft mats; blades hairy, ligule obscure. **P. xalapense.**
19 b. Hairs, if any, on back of sheath, directed upward or outward, or short and few. 20.
20 a. Ligule of distinct hairs. 21.
21 a. Most of the sheaths not hairy on the back, spikelets about one-sixteenth inch long. 22.
22 a. Panicle nearly as wide as long. **P. Lindheimeri.**
22 b. Panicle 2 or 3 times as long as wide. **P. spretum.**
21 b. Sheaths hairy. 23.
23 a. Ligule hairs about one-sixteenth inch long, stem and sheath appressed-hairy. 24.
24 a. Spikelets one-sixteenth inch long, nearly globular, plants olive green. **P. oricola.**
24 b. Spikelets a little longer. 25.
25 a. Plants blue green. **P. tsugetorum.**
25 b. Plants gray green. **P. angustifolium.**
23 b. Ligule hairs about one-eighth inch long. 26.
26 a. Hairs of sheath and stem appressed, spikelets less than one-sixteenth inch long. **P. Wrightianum.**
26 b. Sheath hairs not appressed. 27.
27 a. Spikelets one-sixteenth inch long or less, upper surface of leaf hairy, axis of panicle short-hairy. 28.
28 a. Stems spreading and forming a mat in autumn, olive green. **P. albemarlense.**
28 b. Stems erect or leaning in autumn, plant yellowish green. 29.
29 a. Panicle branches tangled, the lower drooping. **P. implicatum.**
29 b. Panicle branches not tangled. **P. meridionale.**
27 b. Spikelets longer. 30.
30 a. Plants velvety hairy, grayish. **P. lanuginosum.**
30 b. Plants not velvety. 31.
31 a. Hairs of stem diverging horizontally. **P. villosissimum.**
31 b. Hairs of stem appressed or ascending. 32.
32 a. Hairs stiff and rough, plant erect and little branched in autumn. **P. scoparioides.**
32 b. Hairs on stem soft and silky or none. 33.
33 a. Blades stiff, few or no hairs on the upper surface, branching and mat forming in autumn. **P. tennesseense.**
33 b. Blades hairy above at least at the base, plants erect. 34.
34 a. Spikelets a half longer than in 34 b. **P. pseudopubescens.**
34 b. Spikelets a little more than one-sixteenth inch long. 35.
35 a. Blades stiff, erect. **P. huachucae.**
35 b. Blades thin, spreading. **P. huachucae silvicola.**

20 b. Ligule minute or none. 36.
36 a. Joints mostly bearded with a dense hair tuft. 37.
37 a. Spikelets about one-sixteenth inch long. **P. microcarpon.**
37 b. Spikelets longer. 38.
38 a. Blades all velvety. **P. annulum.**
38 b. Blades smooth, except the lower ones. 39.
39 a. Joints and lower sheaths hairy. **P. mattamuskeetense.**
39 b. Sheaths and upper joints smooth. **P. Clutei.**
36 b. Joints not bearded. 40.
40 a. Back of sheaths hairy, at least with minute hairs. 41.
41 a. Plant gray velvety except a smooth ring below each joint. **P. scoparium.**
41 b. Plant not gray velvety. 42.
42 a. Hairs of sheath stiff and diverging, leaves over one-half inch wide. **P. clandestinum.**
42 b. Hairs softer, mostly ascending. 43.
43 a. Spikelets less than one-sixteenth inch long, nearly globular. **P. columbianum thinium.**
43 b. Spikelets over one-sixteenth inch long. 44.
44 a. Plants green, leaves over one-half inch wide. **P. commutatum.**
44 b. Plants olive green. 45.
45 a. Panicle open, branches spreading. **P. Commonsianum.**
45 b. Panicle dense, branches ascending. **P. Addisonii.**

40 b.	Back of sheaths smooth or with microscopic hairs.	46.
46 a.	Mature spikelets nearly spherical, very small, leaves broad, thick, heart-shaped at base.	47.
47 a.	Stems low, spreading, panicle as broad as long.	**P. sphaerocarpon.**
47 b.	Stems erect, tall, panicle two-thirds as broad as long.	**P. polyanthes.**
46 b.	Spikelets not spherical, larger.	48.
48 a.	Stems very slender and vine-like, soon prostrate, in wet land.	**P. lucidum.**
48 b.	Stems not vine-like.	49.
49 a.	Upper blades about 20 times as long as wide.	**P. Bicknellii.**
49 b.	Upper blades not so elongated.	50.
50 a.	Blades over one-half inch wide.	**P. commutatum.**
50 b.	Blades narrower.	51.
51 a.	Blades heart-shaped at base, one-quarter to one-half inch wide.	**P. Ashei.**
51 b.	Blades narrower, not cordate.	52.
52 a.	Plants branching only at base.	**P. Werneri.**
52 b.	Plants branching from upper joints.	53.
53 a.	Stems smooth.	**P. Clutei.**
53 b.	Stems minutely hairy.	**P. columbianum.**

Panicum dichotomiflorum, sprouting crab grass, spreading panicum, a smooth, vigorous, succulent, annual grass, 1 to 5 feet high with long leaves ¼ to 1 inch wide, is a common weed in rich, damp soil (Fig. 1-c, Plate V). It is a fair forage grass of which several cuttings 2 to 4 feet high can be made annually under favorable conditions. All counties except Howard.

Panicum flexile, a much smaller annual than the preceding and with narrower panicle, is infrequent in damp sandy land. Baltimore County and doubtfully from Harford and Worcester.

Panicum Gattingeri, an annual of the tickle grass type with short panicles and yellowish green leaves, grows in open, waste land and is sometimes a weed. Allegany, Washington, Frederick, Carroll, Montgomery, Prince Georges, Anne Arundel, Baltimore, and Cecil counties.

Panicum philadelphicum is more smooth, slender and purplish; in open dry or sandy land. All counties except Howard, St. Marys, Dorchester, Wicomico, and Somerset.

Panicum capillare, witch grass, tickle grass (Plate V), a low, stout annual, the sheaths covered with projecting hairs, the large diffuse panicle half the length of the whole plant, is a frequent weed in open fields and waste land, usually in good soil. All counties except Howard, St. Marys, Calvert, Charles, Anne Arundel, Cecil, and Wicomico.

Panicum miliaceum, European millet, proso, broomcorn millet, an annual, a foot or two high with somewhat drooping panicle with spikelets over ⅛ inch long, is occasionally found in cultivated land. It has been cultivated as a food plant since prehistoric times. The seed yield is very large in proportion to the size of the plant. Allegany and Prince Georges counties.

Panicum virgatum, switch grass, a perennial grass 3 to 5 feet high, in an open clump, with long, narrow, flat leaves, is common along sandy borders of salt marshes, but often in other situations. Some variations with large densely filled panicles

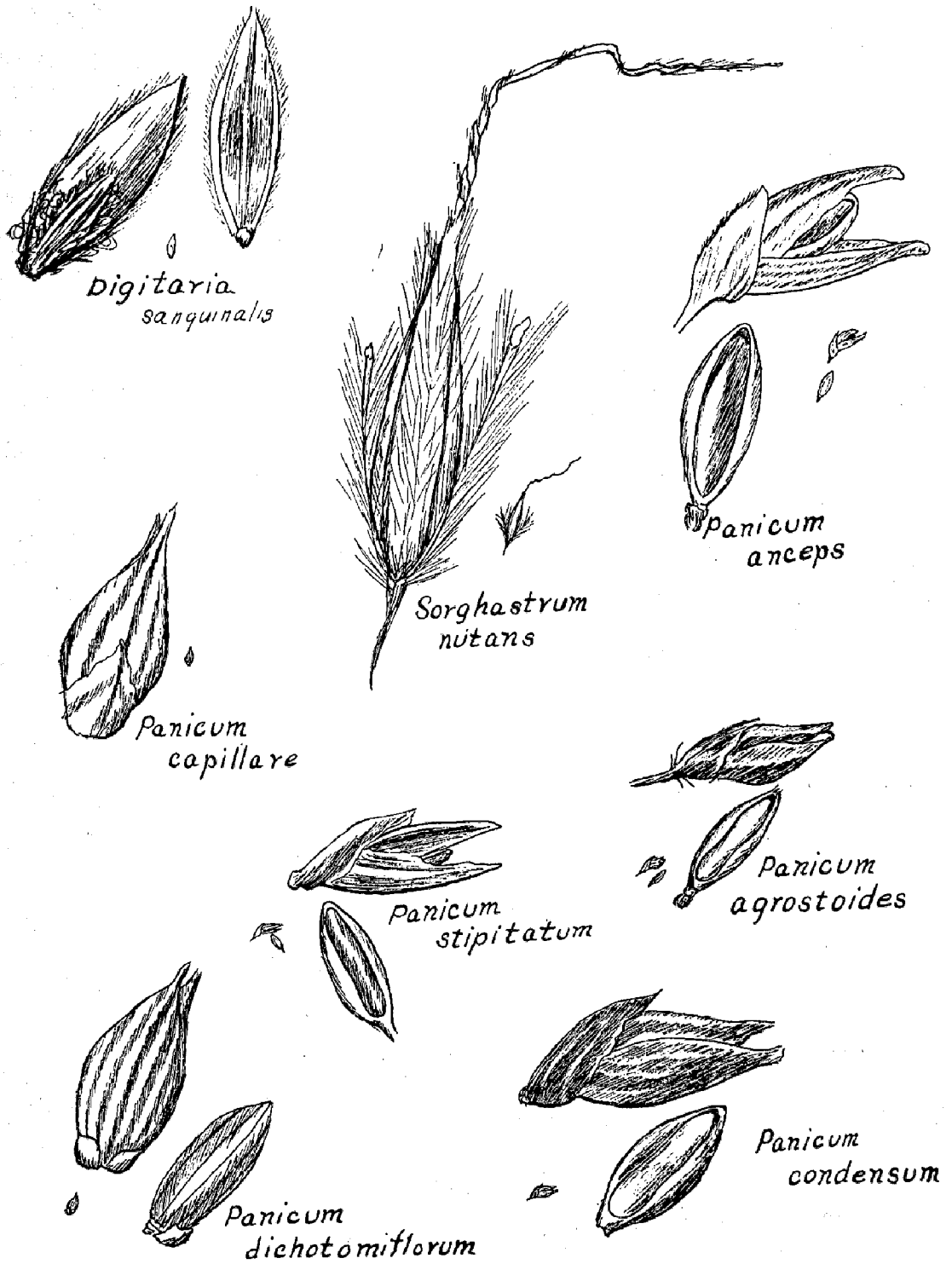

Digitaria sanguinalis
Sorghastrum nutans
Panicum anceps
Panicum capillare
Panicum agrostoides
Panicum stipitatum
Panicum condensum
Panicum dichotomiflorum

PLATE V

might under cultivation give a heavy yield of small grain. All counties except Garrett, Washington, Frederick, Carroll, and Howard. The variety *cubense*, with shorter, more blunt spikelets is mostly in pine woods. Prince Georges and Caroline counties.

Panicum amarum, sea beach grass, a stout, bluish green grass of sandy sea shores and dunes, has tough rolled leaves and long rhizomes, which make it an important sand binder. St. Marys, Calvert, Anne Arundel, Queen Annes, and Worcester counties and doubtless elsewhere on the strand.

Panicum agrostoides, munro grass, a tufted perennial, 2 to 3 feet high, resembling redtop when in head, makes an excellent growth of palatable grass in wet meadows and shore lands (Plate V). Allegany, Frederick, Prince Georges, Montgomery, Charles, St. Marys, Harford, Cecil, Talbot, Caroline, Dorchester, Somerset, and Worcester counties.

Panicum condensum is a similar grass with more congested panicle, found along stream banks and pond edges (Plate V). St. Marys, Kent, Somerset, Wicomico, and Worcester counties

Panicum stipitatum, another of these wet land leafy panicums, differing in the flower character given in the key (Plate V), occurs in Prince Georges, Charles, St. Marys, Baltimore, Kent, Somerset, and Worcester counties.

Panicum longifolium, a sandy land grass like the preceding three, differs in the shorter, narrow leaves, hairy about the collar. Prince Georges, St. Marys, Caroline, and Worcester counties.

Panicum anceps, beaked panicum, differs from the others of its group in the short thick rhizomes (Plate V). It yields well for the dry sandy or gravel soil where it is usually found. Frederick, Montgomery, Prince Georges, Charles, Calvert, St. Marys, Harford, Cecil, Queen Annes, Talbot, and Worcester counties.

Panicum verrucosum, warty panicum, a smooth, slender annual about 2 feet high, rooting at the lower joints, with clear green leaves and spikelets, the latter minutely warty, is common in wet land, usually in shade. Garrett(?), Montgomery, Prince Georges, Charles, Calvert, St. Marys, Anne Arundel, and all Eastern Shore counties except Somerset.

Panicum depauperatum, barren grass, a low, hairy, long-leafed bunch grass, is characteristic of very barren acid land. Prince Georges, Garrett, Montgomery, Charles, Baltimore, Harford, Cecil, Somerset and Talbot counties.

Panicum linearifolium, a similar grass of dry acid woods, has smaller, more blunt spikelets. Garrett, Allegany, Washington, Carroll, Wicomico, Montgomery, and Talbot counties.

Panicum Werneri, another like species on open, sterile woodland, differs in the hairless sheaths. Allegany, Washington, and Prince Georges counties.

Panicum xalapense, a southern species forming low, soft, light green tufts, the stems with long hairs diverging downward, occurs in Montgomery County.

Panicum aciculare and *P. augustifolium*, of the sandy coast woods from New Jersey and Delaware south, might be expected in Maryland. (See key).

Panicum Bicknellii, has the short, broad, basal leaves like all the following species, but the stem leaves are more elongated. It is uncommon in dry or rocky woods. Carroll, Montgomery, and Frederick counties.

Panicum microcarpon, marsh panicum, is the common panicum of wet or swampy woods and marshes. It is nearly smooth except for the hair-barbed joints, soon becoming top heavy and much branched and leafy, with very small spikelets in small panicles. Garrett, Carroll, Montgomery, Prince Georges, Calvert, Charles, Cecil, Kent, Queen Annes, Dorchester, Wicomico, and Worcester counties.

Panicum annulum, a similar plant of drier land, with larger, more hairy spikelets and velvety leaves, is infrequent in Montgomery County.

Panicum matamuskeetense, another and larger grass with the lower nodes bearded, is uncommon in wet land. Montgomery, Prince Georges, St. Marys, Baltimore, Dorchester, Somerset, Worcester, and possibly Garrett counties.

Panicum Clutei, a rare bog species, is similar to the previous three but almost smooth. Prince Georges County.

Panicum dichotomum, bushy panicum, common in dry, open, acid woods, is 2 feet high or generally less, smooth, erect and branching like a little tree. Garrett, Washington, Montgomery, Calvert, Carroll, Prince Georges, Anne Arundel, Baltimore, and Cecil counties.

Panicum barbulatum, a similar grass, common in dry woods, is more reclining and the nodes bearded. Garrett, Washington, Frederick, Montgomery, Prince Georges, Calvert, Harford, Talbot, and Worcester counties.

Panicum yadkinense, a larger grass, of the type of the preceding two species, uncommon in more moist woods, has sunken dot-like glands on the sheaths. Montgomery and Prince Georges counties.

Panicum caerulescens, another of the *dichotomum* group, hairless and bluish green, is in wet woods and bogs from New Jersey south, but not seen in Maryland.

Panicum lucidum, bog panicum, with smooth, slender, vine-like stems, is infrequent in marshes, sphagnum bogs and wet woods. Prince Georges and Worcester counties.

Panicum spretum, a small, slender grass of wet sandy land, with the ligule of distinct hairs, the sheaths without hairs on the back, and very small spikelets in panicles 2 or 3 times as long as wide, is a frequent grass on the Eastern Shore. Frederick, Prince Georges, Baltimore, Harford, Talbot, Dorchester, Worcester, and Wicomico counties.

Panicum Lindheimeri, more common in dry or sandy open woods in western Maryland, has the panicle about as wide as long, but is otherwise about like *P. spretum*. Washington, Montgomery, Prince Georges, Charles, Calvert, Anne Arundel, Baltimore, Carroll, Cecil, and Worcester counties.

Panicum Wrightianum, similar to the preceding, but with appressed hairy sheaths and very minute spikelets, might occur in wet land along our coast.

Panicum meridionale, also has the hairy ligule, but is rather hairy all over, even in the panicle and on the upper side of the leaves. In sandy or barren woods and open land but not common. Garrett, Allegany, Washington, Prince Georges, Charles, Carroll, Calvert, Anne Arundel, Harford, and Somerset counties.

Panicum albemarlense, is a more olive green and mat forming grass in sandy woods. Prince Georges, Charles, St. Marys, Calvert, and Anne Arundel counties.

Panicum implicatum, with the slender panicle branches tangled and drooping, was found in Maryland in Dorchester and Carroll counties.

Panicum huachucae, one of the panicums with long-haired ligules, common in open grass land, grows up to 1 or 2 feet high, and is rather hairy even on the upper side of the stiff, erect leaves. Garrett, Allegany, Carroll, Prince Georges, Charles, Calvert, Baltimore, Cecil, Wicomico, and Worcester counties.

The variety *silvicola*, has more lax and spreading leaves often scarcely hairy above and is common in open woods. All counties west of the Bay except Carroll and Howard, also from Talbot and Worcester.

Panicum tennesseense, frequently seen in open moist land and edges of woods, differs chiefly from the above species in the hairless upper leaf surfaces. Garrett, Allegany, Washington, Montgomery, Prince Georges, Calvert, Baltimore, and Harford counties.

Panicum lanuginosum, hairy panicum, is gray green all over from the dense velvety hair coating, otherwise of the same general type as the five preceding species, but the spikelets are larger. It grows in moist, sandy woods, mostly near the coast. Prince Georges, Anne Arundel, St. Marys, Calvert, Talbot, Dorchester, Wicomico, and Worcester counties.

Panicum villosissimum, with softer, not velvety, projecting hairs, is a common grass in light, dry, acid hillsides and open woods. Allegany, Prince Georges, Montgomery, Calvert, Anne Arundel, and Wicomico counties.

Panicum pseudopubescens, as the following species, has more appressed, silky hairs. It is uncommon in sandy open woods. Prince Georges, Calvert, Caroline and Worcester counties.

Panicum scoparioides, similar to the last, but with fewer, stiffer hairs and leaves close together on the stem, is found in dry, loose soil from Delaware north, but not yet located in Maryland. This and the two preceding species have distinctly larger spikelets than those discussed just before them.

Panicum Commonsianum, differs from the preceding group in lacking the ligule of hairs. The stiff, erect leaves are olive green with dense appressed hairs, also on sheath and stem, and grows in large, low tufts in sand. Dorchester and Wicomico counties.

Panicum Addisonii, a similar grass, common in sand barrens, has a more dense panicle with ascending rather than spreading branches. Prince Georges, St. Marys, Calvert, Dorchester, and Worcester counties.

Panicum tsugetorum, is a low, bluish green grass, uncommon in sandy, acid woods. It has a minute, hairy ligule and like most others of this type, has minute crisp hairs on the stems. Prince Georges County and probably elsewhere in the State.

Panicum columbianum, a frequent, small, delicate grass of sandy woods, is without the ligule; the narrow green leaves smooth, but the sheaths and stems faintly crisp hairy. Garrett, Allegany, Washington, Montgomery, Prince Georges, Anne Arundel, and Wicomico counties. The variety *thinium* is a more branched, matted form with a few long hairs on the leaves. Garrett and Prince Georges counties.

Panicum oricola, an olive green, hairy plant like *P. tsugetorum,* but with larger spikelets, might be expected in coastal sand barrens of Worcester County.

Panicum sphaerocarpon, a low grass with spreading stems, almost hairless, except at the cordate base of the broad leaves, the spikelets very small and round and in small panicles about as broad as long, is common in open places, especially in sandy,

acid soil. Washington, Montgomery, Prince Georges, Charles, St. Marys, Calvert, Anne Arundel, Baltimore, Harford, Cecil, Queen Annes, Caroline, Dorchester, and Worcester counties. The variety *inflatum* has the leaves more parallel margined and the ligule developed. Prince Georges, St. Marys, and Anne Arundel counties.

Panicum polyanthes is of similar form but 1 to 3 feet high with larger, light green leaves, often an inch wide, and a more elongated diffuse panicle. Common in moist land, mostly in open woods. Montgomery, Prince Georges, Charles, Calvert, Baltimore, Harford, Cecil, Queen Annes, Talbot, Somerset, and Worcester counties.

Panicum ensifolium, a delicate, densely tufted, almost hairless, bog grass, without ligule, is rare in Prince Georges County.

Panicum Scribnerianum, a stout grass, 1 to 2 feet high, with erect leaves, the sheaths with stiff, projecting hairs, the spikelets 1/8 inch long and smooth, is uncommon in open sandy land. Montgomery, Prince Georges, Cecil, and Wicomico counties.

Panicum oligosanthes is similar but appressed hairy. It is uncommon, generally in moist sandy woods near the coast. Prince Georges, Wicomico, and Worcester counties.

Panicum Ravenelii is a more hairy grass than the preceding two and differs in having a well developed ligule of hairs. In sandy or gravelly woods but not often seen. Montgomery, Prince Georges, and St. Marys counties.

Panicum scoparium, velvety panicum, a grass 2 to 4 feet high, common in wet or moist places, is grayish velvety all over, except a smooth, viscid ring below each joint. Montgomery, Prince Georges, Charles, Calvert, Anne Arundel, Baltimore, and all the Eastern Shore from Kent County south.

Panicum aculeatum, a much rarer, tall panicum of swampy woods, is rough hairy, the upper leaves more elongated than usual in this type of panicums, and the spikelets 1/8 inch long. Montgomery and Prince Georges counties.

Panicum scabriusculum is a tall grass of wet ground, rough hairy, often only on the lower sheaths. Worcester County.

Panicum Ashei, Ashe's panicum, a common grass, 1 to 2 feet high, in dry, rocky, acid woods, has broad leaves with a cordate base, but differs from the somewhat similar *P. sphearocarpon* in the larger elliptic spikelets and the minutely, crisp hairy stems (Plate II 11). Allegany, Washington, Frederick, Montgomery, Prince Georges, Charles, Calvert, Anne Arundel, Baltimore, Caroline, Wicomico, and Worcester counties.

Panicum commutatum, a nearly hairless grass, common in open woods, is 1 to 3 feet high and has leaves a half inch wide or more. Its spikelets are smaller than the somewhat taller, greener, thinner leafed, woodland *P. latifolium*. Montgomery, Prince Georges, Harford, Cecil, and Caroline counties.

Panicum clandestinum, corn grass, is a very common, coarse grass of moist, generally light soil, the broad leaves having stiff, projecting hairs on the sheaths. All counties except Howard, Anne Arundel, Talbot, and Somerset.

Panicum latifolium, frequent in sandy and rocky, less acid woods, is a tall, broad-leafed scarcely hairy grass, with spikelets over 1/8 inch long. Garrett, Allegany, Frederick, Montgomery, and Baltimore counties.

Panicum Boscii, Bosc panicum, 1 or 2 feet high, with leaves an inch or more wide, and spikelets over 1/8 inch long, has hairy or woolly bearded joints and is rather common in less acid woods. Allegany, Washington, Montgomery, Prince Georges, Calvert, Baltimore, Harford, Cecil, and Worcester counties. The variety *molle* has the leaves velvety beneath. Montgomery, Prince Georges, Calvert, Anne Arundel, Baltimore, Caroline, Harford, and Worcester counties.

Panicum hemitomum, maiden cane, growing in or near water from Delaware south along the coast, is reported from Wicomico county. The thick stems, 3 or 4 feet high, bear pointed spikelets on one side the flowering branches like a paspalum.

Basket Grass. Oplismenus.

Oplismenus compositus. A white and pink striped variety of this grass is cultivated for ornament. It differs most noticeably from panicum in the awned spikelets.

Echinochloa.

This genus consists of coarse, annual grasses with flattened, keeled sheaths and long blades, the ligules undeveloped, the spikelets awned or pointed and crowded on one side of the short branches of the panicle.

Echinochloa crusgalli, barn yard grass, a palatable forage grass as well as a common weed in rather damp, rich soil, has the sheaths smooth and the long or short awned spikelets in irregular panicles. All Maryland counties except Charles, Anne Arundel, Howard, Queen Annes, Caroline, and Wicomico.

Echinochloa frumentacea, Japanese millet, sometimes cultivated, is larger than the preceding and has the nearly awnless

spikelets more numerous and crowded. It yields well only on fertile, moist soil.

Echinochloa Walteri, salt millet, has stiff hairs on the leaf sheaths and very long-awned spikelets. It is a promising grass for somewhat salty wet land where it grows naturally in Charles, Calvert, St. Marys, Baltimore, Somerset, and Worcester counties.

Echinochloa colona, jungle rice, sometimes cultivated for grain and forage further south but probably not adapted to Maryland, is smaller than the other species, and has a single row of short side branches with small, awnless spikelets. One doubtful specimen from Wicomico County.

SETARIA. (CHAETOCHLOA).

The setarias are mostly annual grasses with one-seeded, oval spikelets in cylindric heads and subtended by awn-like bristles. The two common foxtail species are annual weeds of good soil, the seedlings rooting rapidly and firmly and needing frequent cultivation to get rid of them.

KEY TO MARYLAND SPECIES.

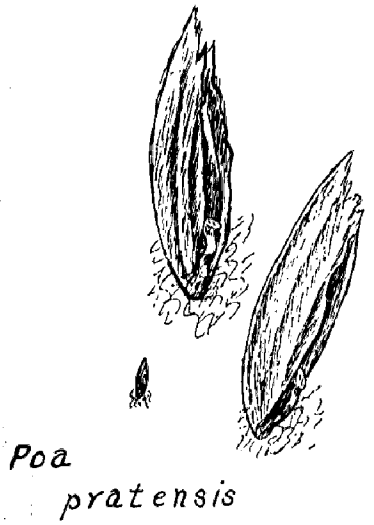
A 1.	Bristles of the head downwardly barbed and rough to the touch.	**S. verticillata.**
A 2.	Bristles upwardly barbed or smooth.	B.
B 1.	Perennial by short, crooked rhizomes; the stem slender and erect; bristles 3 to 4 times as long as the spikelets.	**S. imberbis.**
B 2.	Without rhizomes.	C.
C 1.	Heads 8 inches long or more, an inch or more thick; lemmas smooth, bristles over one-half inch long; wild marsh plants.	**S. magna.**
C 2.	Head smaller, lemmas wrinkled; weeds or cultivated plants.	D.
D 1.	Spikelets on the main head axis without distinct side branches; bristles yellow.	**S. glauca.**
D 2.	Spikelets clustered on small side branches of the head, bristles mostly green or purplish.	E.
E 1.	Spikelets falling entire from a minute cup-like base.	**S. viridis.**
E 2.	The fruit falling away leaving the glumes attached to the rachis.	**S. italica.**

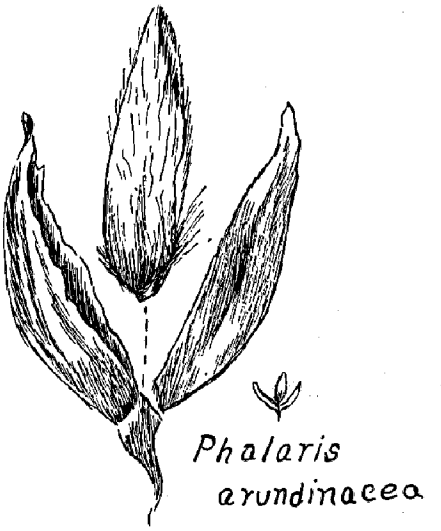
Setaria imberbis, perennial foxtail, a frequent grass of uncultivated open places, resembles the common yellow foxtail. The longer, finer bristles and its rhizomes distinguish it. Montgomery, Prince Georges, St. Marys, Calvert, Anne Arundel, Harford, Cecil, and Worcester counties.

Setaria glauca, yellow foxtail, is one of the most common weeds in cultivated land (Plate VI). From all Maryland counties except Calvert, Anne Arundel, Howard, Kent, Caroline, Talbot, and Wicomico.

Setaria verticillata, rough foxtail, is easily recognized by the roughness felt by drawing the hand upward along the narrow heads. It is often found near dwellings in the eastern United States, but none yet seen in Maryland.

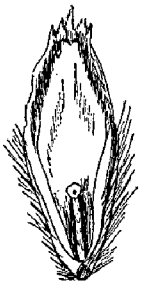
Setaria viridis, green foxtail, another weed very common in cultivated land, has a greenish head narrowing toward the tip. All counties except St. Marys, Howard, and Caroline.


Poa
pratensis


Phalaris
arundinacea

Setaria
glauca

Tridens
flavus



Digitaria
humifusa

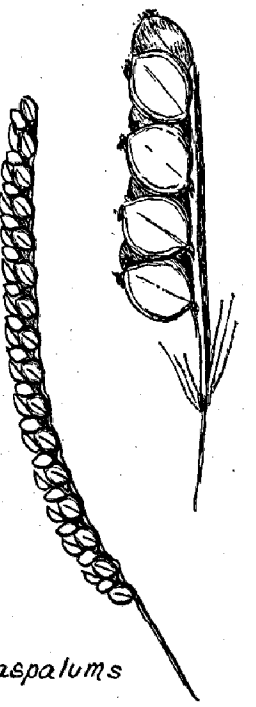

Paspalums

PLATE VI

Setaria italica, millet, foxtail millet, is one of the oldest agricultural crops of Asia. It is cultivated as a quick growing crop in many varieties and often found wild in fields and along roads. Allegany, Prince Georges, Somerset, and Worcester counties.

Setaria magna, giant foxtail. This wild millet, up to 9 feet high, of open wet land and mud banks, has even larger heads than the great German millet, a variety of the preceding species. It is one of the most worthy of wild Maryland grasses for domestication on wet land. St. Marys County.

PEARL MILLET. PENNISETUM.

Pennisetum glaucum, a tall, corn-like grass with a cattail-like head, is sometimes cultivated. *P. Ruppelii,* fountain grass, is sometimes grown as an ornamental.

SANDBUR. CENCHRUS.

The sandburs are annual grasses of sandy land, the spikelets surrounded by a spiny bur. Though a despised weed on account of the vicious spines, the foliage is relished by livestock.

Cenchrus carolinianus, the common species inland, has slightly hairy burs ½ inch or less across, including the spines. Washington, Prince Georges, Calvert, St. Marys, Baltimore, Cecil, Kent, Queen Annes, Caroline, Dorchester, Wicomico, and Worcester counties.

Cenchrus tribuloides, more common near salt water, has burs ½ to ¾ inch in diameter and is more hairy in the burs and leaf sheath edges (Plate II 5). Charles, St. Marys, Calvert, Anne Arundel, Harford, Kent, Talbot, Queen Annes, and Worcester counties.

AMPHICARPON.

Amphicarpon Purshii, a panicum-like grass with unfruitful spikelets in upright panicles and seed bearing spikelets on short, leafless, underground stems, is found nearby in Delaware.

TRIBE 11. SORGHUM TRIBE. ANDROPOGONEAE.

These are mostly large grasses with spikelets in pairs on the branches of the inflorescence, one of the pair usually sessile and seed bearing, the other staminate or neuter and usually stalked. The flowering parts in many of them are quite hairy, giving a feathery appearance to the flower clusters. Many important grasses belong here: the various sorghums, sudan grass, broom sedge, sugar cane, most of the large ornamental grasses of gardens, and the more important grasses of the western prairies.

KEY TO MARYLAND GENERA.

A 1.	Leaf blades ovate lanceolate, with cordate, ciliate base; stems creeping.	**Arthraxon.**
A 2.	Leaf blades elongated, mostly bunch grasses.	B.
B 1.	Both spikelets of the pair with stamens and pistils, surrounded with a conspicuous tuft of soft hairs. Spikelets awned.	C.
C 1.	Mature rachis continuous, the spikelets falling from it; both spikelets of each pair about equally stalked; panicle fan-shaped.	**Miscanthus.**
C 2.	Mature rachis breaking up at the joints, the spikelets falling attached; one of the pair of spikelets not stalked; panicle plume-like.	**Erianthus.**
B 2.	In each pair of spikelets, one is sessile and pistillate, and one stalked and without pistil.	D.
D 1.	Spikelets awnless, appressed to the thickened rachis joint.	**Rottboellia.**
D 2.	Rachis slender, spikelets not appressed and usually awned.	E.
E 1.	Spikelets in several-jointed racemes.	**Andropogon.**
E 2.	Spikelets one to few together in panicles.	F.
F 1.	The stalked spikelets with stamens.	**Sorghum.**
F 2.	The stalked spikelet of each pair represented by a hairy pedicel without flower; ligule very long.	**Sorghastrum.**

MISCANTHUS.

Miscanthus sinensis, eulalia, is a 4 to 10 foot grass with narrow leaves, frequently cultivated for garden ornament. The wind-carried seed has established it wild in several places about Washington in Prince Georges County. Zebra grass is a variety with leaves banded at intervals with yellowish or white; another cultivated variety is striped lengthwise.

PLUME GRASS. ERIANTHUS.

Erianthus Ravennae is the cultivated plume grass often grown in large clumps surmounted by the long-stalked silky plumes over a foot long.

The five species that occur wild in the eastern United States are much alike except in technical characters.

Erianthus saccharoides, a conspicuous head-high grass (Plate I 17) with a long-stalked plume with straight awns is found in open wet land in Prince Georges, Montgomery, Anne Arundel, Baltimore, Kent, Caroline, Talbot, and Worcester counties.

Erianthus contortus, with flat and twisted awns on the spikelets, has been found in Queen Annes and Worcester counties. Other species, differentiated by the compactness of the plume, the length and abundance of hairs on the spikelets, and the kind of awns, are found along the Atlantic coast not far from Maryland.

ANDROPOGON.

This genus includes the common grasses of the broom sedge type. Open wastes and abandoned fields are soon occupied by means of their wind borne seeds. The rich browns of the dead foliage show the warmest colors in the winter landscape. Glaucous varieties of several species are common among the usual green leaved ones.

KEY TO MARYLAND SPECIES.

A 1. Racemes solitary on ends of stem branches, the joints of the rachis tapering downward. **A. scoparius.**
A 2. Racemes 2 to 6 together, joints not tapering. B.
B 1. The two terminal racemes on a long stalk above the leaf sheaths; hairs not very conspicuous on the spikelets; the stalked spikelets with stamens. **A. furcatus.**
B 2. The racemes close to or within the upper inflated sheaths, conspicuously hairy; the stalked spikelets with glumes only. C.
C 1. Upper sheaths inflated, up to one-half inch wide. **A. Elliottii.**
C 2. Upper sheaths narrower. D.
D 1. The flowering sheaths in a dense terminal cluster. **A. glomeratus.**
D 2. The flowering branches scattered along the stem. E.
E 1. Flowers mostly enclosed by the sheaths. **A. virginicus.**
E 2. The peduncles of some of the flowering stems reaching beyond the sheaths. **A. ternarius.**

Andropogon scoparius, little blue stem, is a slender stemmed, common, summer blooming, upland bunch grass, 2 to 4 feet high, soon too hard and dry for feed. Garrett, Allegany, Washington, Montgomery, Prince Georges, Charles, St. Marys, Calvert, Baltimore, Harford, Cecil, Kent, Talbot, Dorchester, Somerset, and Worcester counties.

Andropogon glomeratus, bushy broom sedge, with a dense, broom-like, terminal cluster, red brown in winter, grows 3 to 4 feet high in wet sandy or gravel acid soil, and makes good pasture when young. Prince Georges, Caroline, Talbot, Wicomico, and Worcester counties.

Andropogon virginicus, common broom sedge (Plate II 16), is the most abundant andropogon, a characteristic plant of old acid fields and barren open land, soon covering most fields left without cultivation. It may be used as early pasture where better grasses do not grow. It is a rather slender grass 2 to 4 feet high, the lower sheaths flat and keeled. Doubtless in all parts of Maryland as we have specimens from all counties except Garrett, Frederick, Wicomico, and Somerset.

Andropogon Elliottii, flaming broom sedge, is frequent in open, somewhat wet land. The large upper sheaths, orange brown in winter, make it quite distinct from other grasses. Washington, Montgomery, Prince Georges, Anne Arundel, Baltimore, and Worcester counties.

Andropogon ternarius, silver beard, a grass 2 to 4 feet high (Plate II 15), topped by the conspicuous white silky racemes about 2 inches long, is found in dry soil mostly east of the Bay. Charles, Cecil, Dorchester, Wicomico, Somerset, and Worcester counties.

Andropogon furcatus, big blue stem, is not common in Maryland but is one of the best constituents of prairie hay and pasture lands. It is relished when young by livestock and especially when the flower stalks are forming. Garrett, Allegany, Carroll, Montgomery, Prince Georges, Harford, and Cecil counties, often on rocky land.

ARTHRAXON.

Arthraxon ciliaris, a Japanese grass, with creeping stems, the blades ovate lanceolate, with cordate, ciliate base, occurs near Chevy Chase, Montgomery County.

SORGHUM (HOLCUS).

The cultivated sorghums, grown in many varieties and groups of varieties, for grain and forage, as well as the sweet juiced kinds for molasses, and broom corn, etc., belong to this genus.

Sorghum halepense, Johnson grass, is a sorghum-like grass, 3 to 5 feet high, with strong creeping rhizomes, making it a difficult weed to kill out, though it is a fine forage grass and endures both wet and dry extremes well. A clump endured many years at College Park without spreading much, and finally died out. Prince Georges, Caroline, Dorchester, and Wicomico counties.

Sudan grass, *Sorghum sudanense*, recently come into cultivation here, is similar to Johnson grass but not perennial.

SORGHASTRUM.

Sorghastrum nutans, Indian grass, is common in prairie hay, and is frequently cut for coarse hay in Maryland, where it is a common grass of moderately wet or uncultivated dry fields and open woods. It grows 3 to 5 feet high with long leaves and open bronze panicles (Plate V; Fig. 1 b). Garrett, Allegany, Carroll, Montgomery, Prince Georges, Charles, Calvert, Baltimore, Kent, Cecil, Caroline, and Wicomico counties.

JOINT GRASS. ROTTBOELLIA.

Rottboellia rugosa. The stem one to two feet high terminates in a single, cylindrical, jointed spike not much thicker than the stem. It resembles a small gama grass. It has been found in wet soil near the Atlantic coast in Maryland and Delaware.

TRIBE 12. CORN TRIBE. MAYDEAE.

These are robust grasses with spikelets seed-bearing in the lower part and staminate above, or with the pistillate flowers in ears entirely separate from the staminate spikelets in the tassel as in corn. This, the highest development of the grass family, is well represented by the dominant crop of America, the greatest gift of the new world to agriculture. One occasional wild

grass of Maryland, gama grass, and two other genera in cultivation, teosinte and Job's-tears are minor representatives.

Tripsacum dactyloides, gama grass, a large grass with leaves about an inch wide and a foot long, has about 3 spikes, staminate above and seed bearing below, on long slender stems, from thick creeping rhizomes. It is found in fertile moist soil, and if abundant would furnish good natural forage, as it is relished by all livestock. Montgomery, St. Marys, Anne Arundel, Cecil, Talbot, Wicomico, and Worcester counties.

KEY TO GRASSES BEFORE FLOWERING

The following key is for the identification of the commoner grasses by leaf, stem and underground characters. A key to vegetative characters alone must of necessity be imperfect since some related species cannot be easily separated even with flowers. The leaf characters vary greatly even in different parts of the same plant. Many species have to be included in several places in the key for this reason and to provide for indistinct characters that might be overlooked. The ligules of the upper leaves are generally longer than those of lower leaves. The lower sheaths are closed in most younger grasses, and the early or immature leaves are less characteristic. To save repetition, sometimes slight variations are referred to other parts of the key by numbers in parentheses.

Different parts of more than one plant should be examined, especially the basal leaves and underground parts. A good hand-lens is helpful, but the key is based on characteristics visible to the unaided eye. The finer hairs used as distinguishing characters can be seen by holding the plant up in strong light before a dark background. The dead vegetation of the previous year, often with flowering parts still attached, and the rudimentary flowers down in the roll of young leaves, sometimes a month before blooming time, will aid one in naming grasses in the spring. If the soil is carefully washed from the roots of young grass seedlings, the still attached seed may give a clue to them.

The key divides into two contrasting parts, 1a and 1b, one of which fits the grass in question, and gives at the right the name or another number, which is followed in the same way until finally the name is found at the right, after which the work should be checked by comparison with the description of the respective species in the text, remembering that some less common species are not included in this key.

KEY TO SOME GRASS-LIKE PLANTS.

1 a. Leaf-sheath rolled around the stem, the edges overlapping (includes some rushes with no blades and pithy stems). **Most grasses.**
1 b. Leaf-sheath closed, at least part of its length, forming a tube around the stem, or sheath none. (See Agropyron, Plate III). 2.
2 a. Stem 3-sided, leaves 3-ranked (fig. 1a). **Most of the Sedge family.**
2 b. Stem not 3-sided. 3.
3 a. Leaves cylindrical, or if flat, very narrow, or only a sheath without blade; no collar or ligule. 4.
4 a. Sheaths without blade, tubular around the base of slender, unbranched stems. **Eleocharis.**
4 b. Blades present, cylindrical. 5.
5 a. Onion scented. **Garlic, onion, etc.**
5 b. Not strong scented. **Rush (Juncus).**
3 b. Blade present, flat, twisted or folded. 6.
6 a. Collar and sometimes ligule present, stems usually hollow, leaves 2-ranked. **Some grasses.**
6 b. Collar and ligule none; including beside the following many other plants of the lily family and similar groups. 7.
7 a. Leaves with sheath and broad blade. **Wandering Jew, etc.**
7 b. No distinct sheath. 8.
8 a. Leaves flat with faces together in the bud. **Cat-tail.**
8 b. Leaves equitant, the leaf base split on the inner edge to receive the edge of the next one above. 9.
9 a. Leaf twisted; low bog plant; flowers in a small head. **Xyris.**
9 b. Leaf flat. 10.
10 a. Fibrous roots, leaves one-half inch or less broad. **Blue-eyed grass.**
10 b. Strong rhizomes, bulbs or corms. 11.
11 a. Rhizomes or bulbs, veins of leaf not prominent. **Iris.**
11 b. Corms, veins prominent. **Gladiolus.**

KEY TO TRUE GRASSES

1 a. Stems woody, perennial; blades tapering abruptly into a short petiole. **Bamboos, small cane.**
1 b. Stems herbaceous, or surviving winter only at the base or underground. 2.
2 a. Blades folded in the bud (Plate III, Dactylis), which is flattened. Filiform leaves, which are mostly folded or U-shaped in cross-section, but not flat, are included here. Young basal shoots may still show the bud form after the main stems have flowered. (If the mature leaves are folded and flat but the bud cylindrical, see 2b). 3.
3 a. Blades mostly filiform though some of them may be narrow but flat. Some leaves normally flat and so in 3b may be thread-like if wilted. 4.
4 a. Ligule a distinct membrane. 5.
5 a. Sheaths closed, angular; blades long, narrow, rough and hairy; dry woods grasses with rhizomes. **Melic.**
5 b. Sheaths rolled around the stem, dry land bunch grasses. 6.
6 a. Blades thread-like in a dense basal tuft, sheaths slightly rough. **Tufted hair grass.**
6 b. Blades thicker and fewer, often over 1 ft. long; sheaths smooth (Plate II 8). **Black oat grass.**
4 b. Ligule obscure or none. 7.
7 a. Low annuals of sterile land with blades about 6 inches long. 8.
8 a. Branching at most joints above base (Plate II 3). **Needle grasses.**
8 b. Branching mostly at base. 9.
9 a. Much branched, late summer flowering, often with a few delicate hairs on the leaves (Plate II 14). **Southern poverty grass. Some needle grasses.**
9 b. Little branched, early summer flowering. 10.
10 a. Blue green, sheaths overlapping; about 1 ft. high. **Rat tail fescue.**
10 b. Green, sheaths usually not overlapping; low and slender. **Slender fescue.**
7 b. Perennials. 11.
11 a. Salt land grasses with rhizomes and long stiff leaves. **Salt meadow grass.**
11 b. Low grasses, leaves about 6 inches long or less. 12.
12 a. Blades wider than thick, green or yellowish. 13.
13 a. Salt marsh grasses with rhizomes; sheaths overlapping. **Salt grass.**
13 b. Low turf grasses, of field or dry land, in bunches or finally spreading by rhizomes or stolons, base often red and fibrous (Plate III). **Red fescue.**
12 b. Blades about as wide as thick; low bunch grasses. 14.
14 a. Green, leaves very slender. **Hair-like fescue.**
14 b. Blue-green or whitish, larger leafed. **Sheep's fescue.**

3 b. Blades, at least most of them, flat or folded, unless rolled from wilting. 15.
15 a. Sheaths rounded on the back. A strong midrib may make a slight keel on some (see 19a). 16.
16 a. Ligule not a distinct membrane. 17.
17 a. Fall flowering annuals (see needle grasses and poverty grass in 9b).

17 b. Perennials, old leaves curled at base of plant; hairy about collar and base of sheath. 18.
18 a. Low, more hairy, stem nearly cylindrical (Plate I 27). **Curled poverty grass.**
18 b. Higher, less hairy, stem somewhat flattened. **Flattened poverty grass.**
16 b. Ligule a definite membrane, though low in some; perennials without hairs. 19.
19 a. Sheath a closed tube. **Some manna grasses.**
19 b. Sheaths rolled around the stem. 20.
20 a. Slender blue-green swamp grass with rhizomes and long thin ligule. **Pale manna grass.**
20 b. Cultivated bunch grasses. 21.
21 a. Underground base purple. **Perennial rye grass.**
21 b. Underground base yellow. **Dog's-tail grass.**

15 b. Sheaths keeled or angled on the back. 22.
22 a. Ligule not a distinct membrane. 23.
23 a. Ligule none or only a line without hairs. 24.
24 a. Annuals without ligule, sheaths sharply keeled, base of blade about as thick as wide. 25.
25 a. Nearly hairless grasses of fields and wet land. **Barnyard grass.**
25 b. Salt marsh grasses with stiff-hairy sheaths. **Salt millet.**
24 b. Perennials. 26.
26 a. Bunch grasses. 27.
27 a. Coarse, wet land grasses. **Manna grass.**
27 b. Slender, dry land grasses with very narrow leaves. **Arrow grass.**
26 b. Grasses with rhizomes (see 42b). 28.
28 a. Rhizomes with joints not much longer than thick. 29.
29 a. Rhizomes about one-eighth inch thick; a few scattered soft hairs on blades. **Perennial foxtail.**
29 b. Rhizomes one-half inch or more thick. **Gama grass.**
28 b. Rhizomes long jointed. 30.
30 a. Dry land grasses with small, folded leaves, sheath smooth. **Kentucky blue grass.**
30 b. Tall, wet land grasses, sheaths rough when stroked upward (see other manna grasses). **Blunt manna grass.**

23 b. Ligule of hairs, or low and hair fringed, or hairs adjoining it. 31.
31 a. Perennials (see also some paspalums). 32.
32 a. Bunch grasses in wet land, a few hairs on upper side of the long leaves and top of sheath. **Panicum longifolium.**
32 b. Grasses with short thick rhizomes (see 28).
31 b. Annuals, hairy chiefly on sheath edges. 33.
33 a. Stems mostly erect, sheaths scarcely keeled; blades one-quarter to one-half inch broad, broadest near the base. **Yellow foxtail.**
33 b. Stems spreading horizontally from the crown, the short, rough, inflated sheaths flat and sharply keeled below; sandy land grasses. 34.
34 a. Leaves flat or folded, hairs none or only near the collar. **Common sandbur.**
34 b. Leaves rolled at tip, hairy on the sheaths and more blue-green (Plate II 5). **Coastal sandbur.**

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22 b. Ligule a distinct membrane, sometimes hairs near it. 35.
35 a. Sheaths closed at least to the middle in main stem leaves; without hairs; perennial by rhizomes. (See also some poas under 37 b). 36.
36 a. Sheaths angled, not overlapping above; dry land grasses. **Melic.**
36 b. Sheaths slightly keeled, overlapping one another; wet land grasses. **Several species of manna grass.**
35 b. Sheaths rolled around stem or sometimes closed at base or in early lower leaves. 37.
37 a. Hairs present on some parts. 38.
38 a. Annuals. 39.
39 a. Ligule a conspicuous membrane, only a few hairs near collar and on blade; a tough, flat-stemmed grass of paths and gardens. **Yard grass.**
39 b. Ligule hair fringed or hairs simulating a membrane and a few soft hairs on upper side of blade. (See also 34) (Plate VI.) **Yellow foxtail.**
38 b. Perennials. 40.
40 a. With rhizomes. 41.
41 a. Rhizomes elongated; leaves with fine short hairs, the leaf tip boat-form (Plate III). **Hairy Kentucky blue grass.**
41 b. Rhizomes short, so the stems are in open bunches, hairs few. 42.
42 a. Over 3 feet tall, a few hairs on lower shoots, the main stem leaves rolled in the bud. **Big blue stem.**
42 b. Mostly 1 to 3 feet high, leaves about one-half inch wide (see also 29 a) (Plate V). **Beaked panicum.**
40 b. Bunch grasses. 43.
43 a. Blade diverging (Fig. 1 c) more or less at the collar, ligule soon brown. 44.
44 a. Blades one-half to 1 inch wide, stem tall and erect, one-quarter inch thick; hairs few. **Florida paspalum.**
44 b. Plants smaller, with narrower leaves. 45.
45 a. Stems diverging from the base, a few soft hairs on the sheath (Plate VI). **Field paspalum.**

45 b. Stems mostly erect, leaves hairy. **Long-haired paspalum.**
43 b. Keel of sheath extending into the midrib of the blade without a distinct angle (fig. 1 b). 46.
46 a. Long, narrow, basal leaves tapering to a narrower base; appressed hairy, especially at the joints (Plate I, 17). **Plume grass.**
46 b. Base of sheaths broad, flat and fan like, the blades roughish. 47.
47 a. Basal fans very broad, the sheaths rough; wet land grasses. **Bushy broom sedge.**
47 b. Basal fans about one-half inch wide; sheaths smooth. 48.
48 a. Old upper sheaths one-half inch wide, orange brown; wet land grasses. **Flaming broom sedge.**
48 b. Upper sheaths narrower, dry land grasses. 49.
49 a. Slender, flowering stems developing by July; old leaves gray brown in spring. **Little blue stem.**
49 b. Less slender, flowering later, old leaves red brown in spring. The second species found only on the Eastern Shore (Plate II 16). **Common broom sedge, Silver beard.**

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37 b. Hairs not visible without a lens. 50.
50 a. Annuals, the blade tips boat-like; yellowish green, low, early flowering. **Annual blue grass.**
50 b. Perennials. 51.
51 a. With rhizomes or stolons. 52.
52 a. With stolons. 53.
53 a. Stems fine and wiry, blades short, pale blue green, sheath smooth, ligule short (Plate II 4). **Nimble Will.**
53 b. Upper sheaths slightly rough to up stroke, ligule triangular, pointed; blades elongated, yellowish green (Plate III). **Rough-stalked meadow grass.**
52 b. With rhizomes. 54.
54 a. Leaf tips taper-pointed, the blades elongated; early flowering mountain grasses. **Poa brachyphylla.**
54 b. Leaf tips boat-like (Plate III, VI). 55.
55 a. Stems round, usually in bunches, dark green leaves elongated. **Kentucky blue grass.**
55 b. Stems flat, separate; blue green blades 10 to 20 times their width. **Canada blue grass.**

51 b. Bunch grasses. 56.
56 a. Blades mostly one-quarter inch wide or more. 57.
57 a. Blue green field grass; upper sheaths slightly rough to up stroke, ligule conspicuous (Plate III). **Orchard grass.**
57 b. Blades green, more elongated; ligule low and narrow; wild wet land grasses. **Munro grass and related species.**
56 b. Blades narrower. 58.
58 a. Grayish sand grasses with short blades and somewhat inflated sheaths. **Goose grasses.**
58 b. Woodland, meadow or mountain grasses with green, elongated blades (Poa species). 59.
59 a. Blades 3 to 5 millimeters wide; low mountain grasses, with rough, partly closed sheaths. **Wood spear grass.**
59 b. Blades 2 to 3 millimeters wide, sheaths mostly smooth. 60.
60 a. Ligules long and pointed; summer flowering meadow grass. **Fowl meadow grass.**
60 b. Ligules mostly no longer than wide; early flowering woods grass. **Poa autumnalis, etc.**

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2 b. Leaves rolled in the bud, or U-form in cross-section in some. When too small to see the roll it is indicated by flat leaves with filiform bud and round stems (see also 2 a for some water grasses with closed sheaths). 61.
61 a. Claw like auricles (Plate III, Agropyron) from the collar clasping the stem, sheaths not keeled except in some rye grasses. The auricles obscure in some ryes, wild barleys and wild rye. 62.
62 a. Ligule a mere line or none. 63.
63 a. No hairs present. 64.
64 a. Sheath bases under ground red or purple, back of blade shining; cultivated grasses. **Meadow fescue.**
64 b. Sheath bases generally white or green under ground, wild grasses, blades often rough on back. 65.
65 a. Low glaucous grasses of rocky land. **Bottle brush grass.**
65 b. Tall, coarse, green grasses of low lands or shores. **Wild rye species.**
63 b. Hairs present. 66.
66 a. Sheaths short hairy all over; stems slender. **Slender wild rye.**
66 b. Hairs only on upper side of blades or sheath edges or some lower sheaths. **Other wild ryes.**
62 b. Ligule a distinct, though sometimes very narrow membrane. 67.
67 a. Hairy, at least below. 68.
68 a. Annuals or winter annuals, cultivated grains (see wheat, rye, etc., sometimes hairy, under 67 b). **Emmer.**
68 b. Perennials wire grasses with long jointed rhizomes, hairy on the lower blades and sheaths (Western wheat grass has a narrower, more bluish leaf). **Quack grass.**

67 b. Hairs not visible without a lens, unless a few on the auricles. 69.
69 a. Annuals or winter annuals; cultivated grains. 70.
70 a. Older blades rough to upward stroke on the back, yellowish green, about 20 times as long as wide, auricles and collar conspicuous. **Barley.**
70 b. Older blades smooth on the back, more elongated, greener. 71.
71 a. Auricles not hairy, sometimes absent, bluish green. **Rye.**
71 b. Auricles with minute hairs, greener and slower growing. **Wheat.**
69 b. Perennial bunch grasses, or with quite short rhizomes. 72.
72 a. Edge of blade smooth, the back shining; sheath bases red or purple below ground. **Italian rye grass.**
72 b. Edge of blade rough. 73.
73 a. Blades mostly over one-quarter inch wide. **Wild ryes.**
73 b. Blades narrower. **Meadow fescue.**

61 b. No claw-like auricles. 74.
74 a. Sheaths keeled (Plate III, Dactylis) or angled on the back; (rounded back with only a keel-like midrib in 74 b). 75.
75 a. Ligule a distinct membrane, if hairy near it, the membrane easily seen. 76.
76 a. Sheath closed, scarcely hairy. **Rescue grass.**
76 b. Sheath open. 77.
77 a. No hairs visible. 78.
78 a. Annuals, stems over one-half inch thick, blades up to 1 or 2 inches wide. 79.
79 a. Large cultivated grain (also Sudan grass and other sorghums smaller and sheaths more keeled). **Corn.**
79 b. Tall grass in water and mud along rivers, etc., the lower sheaths cross-veined. **Wild rice.**
78 b. Perennials. 80.
80 a. Sheaths extending in a long point each side the ligule; bunched or with short rhizomes (Fig. 1 b). **Indian grass variety.**
80 b. Sheaths and ligule otherwise. 81.
81 a. Bunch grasses of woods. **Slender uniola.**
81 b. Short jointed rhizomes present, blades blue green, short, minutely light dotted between the smaller veins (Johnson grass coarser, with long jointed rhizomes). **Muhlenbergias.**
77 b. Hairs present. 82.
82 a. Annuals. 83.
83 a. Growing erect or ascending. 84.
84 a. Small, delicate stemmed, rather hairy, wild grasses. **Slender crab grass.**
84 b. Coarse, scarcely hairy, cultivated grain. **Corn.**
83 b. Spreading along the ground, and later rooting at the joints. 85.
85 a. A few soft hairs (Plates VI, II 2). **Small crab grass.**
85 b. Divergent hairs abundant especially on the sheaths (Plates V, II 1). **Common crab grass.**
82 b. Perennials. 86.
86 a. Sheath extending in a long point each side the long ligule, the lower sheaths hairy (fig. 1 b). **Indian grass.**
86 b. Sheath and ligule otherwise. 87.
87 a. A ring of short hairs at the joints. 88.
88 a. Blades 50 or more times longer than wide, sheaths smooth. **Big blue stem.**
88 b. Blades 15 to 40 times as long as wide, yellowish green, sheaths often very rough; wet land plants. 89.
89 a. Rhizomes short and scaly, stems 1 or 2 millimeters thick, blades microscopically cross-veined (Plate II, 13). **White grass.**
89 b. Rhizomes long jointed, sheaths very rough, stems larger. **Cut grass.**
87 b. Not differently hairy at the joints. 90.
90 a. Blades very long and stiff, with very strong mid-ribs, hairy near the collar. **Eulalia.**
90 b. Blades pliable, mid-rib ordinary. 91.
91 a. Rhizomes one-half inch or more thick; hairs few. **Gama grass.**
91 b. Rhizomes slender or none. 92.
92 a. Very hairy with soft hairs on blade and sheath, blades about 20 times as long as wide or more (Plate II 9) (see also velvet grass). **Paspalum species, Slender paspalum, etc.**
92 b. Hairs mostly near the collar. 93.
93 a. Large, sandy land grass; leaves one-half inch wide or more, 12 to 20 times as long. **Florida paspalum.**
93 b. Leaves narrower, stems more slender. 94.
94 a. Sheaths scarcely keeled (see 88). **Big blue stem.**
94 b. Sheaths keeled distinctly. 95.
95 a. Sandy land plants. **Paspalum species.**
95 b. Wet land plants. **Panicum species.**

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75 b. Ligule none, a mere line, or of hairs or a tuft of hairs near it, no membrane unless obscured by hairs. 96.
96 a. Ligule a mere line or none, scarcely hairy. 97.

97 a. Sheath a closed tube around the stem, a low, early flowering annual with almost velvety hairy sheaths. **Downy brome grass.**
97 b. Sheath overlapping around the stem. 98.
98 a. Hairs none. 99.
99 a. Annuals. 100.
100 a. Large grass, without ligules. **Barnyard grass.**
100 b. Delicate, thin-leafed grass; ligule a scarcely visible line of hairs. **Eragrostis peregina.**
99 b. Perennial marsh grasses with delicate hair-like stems and small, lanceolate leaves. **Marsh muhlenbergia.**
98 b. Hairs present. 101.
101 a. Perennials. 102.
102 a. With short rhizomes (see also 87 b); sheath short hairy; blade one-half inch wide, edge wavy (Plate V). **Panicum anceps.**
102 b. Bunch grasses. 103.
103 a. Blades rarely one-eighth inch wide, a few scattered hairs on the leaves, slender, late flowering, dry land grasses. **Arrow grass.**
103 b. Blades one-eighth to one-quarter inch or more wide. 104.
104 a. Blades and sheaths rather soft hairy; sandy land grasses related to **Slender paspalum.**
104 b. A few delicate hairs at the base of the long blades which taper to both ends from the broader middle; woodland grasses. **Slender uniola.**

101 b. Annuals. 105.
105 a. Blades tapering decidedly from the middle downward; lower sheaths and upper sheath edges hairy. **A foxtail millet.**
105 b. Blades nearly as broad at base as in the middle. 106.
106 a. Ligule none. 107.
107 a. Sheaths without hairs or nearly so; a field weed. **Barnyard grass.**
107 b. Sheaths stiff hairy; a salt marsh grass. **Salt millet.**
106 b. Ligule a line. 108.
108 a. Clear green, wet land grasses with brace roots at the base; sheath hairy on the edges. **Warty panicum.**
108 b. Low, dry land grasses, much branched at base; a few scattering hairs; spikelets with long, 3-forked awns in the fall (Plate II 3). **Needle grass species.**

96 b. Ligule of hairs or hairs near it, but no distinct membrane. 109.
109 a. Hairs few, if any, except about the ligule. 110.
110 a. Perennials. 111.
111 a. With rhizomes or stolons; low, dull green, a few hairs on the blade and sheath and a hair tuft at the collar (Plate II 2). **Bermuda grass.**
111 b. Low, bunch grasses (see also 93 a) with narrow, stiff leaves, a tuft of hairs at the collar. 112.
112 a. Blades one-eighth to one-quarter inch wide. **Pink grass variety.**
112 b. Blades mostly one-eighth inch or less wide; in coastal sands. **Eragrostis refracta**
110 b. Annuals. 113.
113 a. Leaves one-quarter to one-half inch wide, hairy chiefly on the upper sheath edge. 114.
114 a. Stems flat and spreading along the ground; sheaths short and somewhat inflated. **Sandbur.**
114 b. Stems round, erect or nearly so. 115.
115 a. Leaves tapering from middle to base. **A foxtail millet.**
115 b. Leaves broadest near the base. **Green foxtail.**
113 b. Leaves rarely one-quarter inch wide. 116.
116 a. Plants with a mouse-like odor; low weeds with a hair tuft at the collar (Plate IV). **Stink grass.**
116 b. Not mouse scented. 117.
117 a. Stems up to one-eighth inch thick, 2 to 3 feet tall (Plate IV). **Sweet love grass.**
117 b. Low weeds with more delicate stems, much branched at the base. 118.
118 a. Plant much branched above the base. **Eragrostis Frankii.**
118 b. Plant usually branched at the base only. **Eragrostis caroliniana.**

109 b. Hairs elsewhere, though sometimes scarcely visible. 119.
119 a. Perennial bunch grasses (if strong rhizomes see 91 a). 120.
120 a. Short hairs at the joints only; leaves short. **Sand grass.**
120 b. Joints not bearded more than other parts. 121.
121 a. A tuft of short hairs outside the collar; an acid secretion of the stem and sheath collecting dirt; the long blades tapering to the base (Plates II 6, VI). **Purple top.**
121 b. Most of the sheath covered with hairs. 122.
122 a. Blades narrow and stiff, the sheath with stiff, spreading or ascending hairs (Plate IV). **Pink grass.**
122 b. Blades flexible and soft hairy. 123.
123 a. Blades mostly over one-quarter inch wide. **Paspalum pubescens.**
123 b. Blades about one-quarter inch wide (Plate II 9). **Paspalum setaceum.**
119 b. Annuals. 124.
124 a. Slender stems rooting along open, muddy land. **Eragrostis hypnoides.**
124 b. Stems not stoloniferous. 125.
125 a. Sheaths nearly free of hairs (see also 115 and 96). 126.

126 a. Tall, rank weed, not strong scented; blades about one-quarter to one-half inch wide (fig. 1 c). **Sprouting crab grass.**
126 b. Low, mouse-scented weed, with minute glands along the leaf edges, a few hairs on the blade (Plate IV). **Stink grass.**
125 b. Sheaths hairy. 127.
127 a. Sheaths with few soft hairs. 128.
128 a. Scarcely visible glands on leaf edges giving a mouse like odor; back of sheath hairy. **Eragrostis minor.**
128 b. Hairs chiefly on sheath edges; lemon scented. **Lace grass.**
127 b. Sheaths covered with stiff, diverging hairs. 129.
129 a. Blades one-quarter inch wide or less. **Panicum philadelphicum.**
129 b. Blades wider. 130.
130 a. Stems stout, little branched. **Witch grass.**
130 b. Stems slender, much branched. **Panicum Gattingeri.**

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74 b. Sheaths rounded on the back, at most a slight angle due to a projecting midrib (see some species of wild rye, paspalum and eragrostis under 74 a). 131.
131 a. Ligule an easily seen membrane not obscured by hairs. 132.
132 a. Sheaths closed, at least to the middle (some marsh grasses with rigid, tightly rolled sheaths appear to be closed). 133.
133 a. Without hairs, rhizomes present, wild grasses of wet land (see also 136). 134.
134 a. Slender, blue green. **Pale manna grass.**
134 b. Stout, green. **Blunt manna grass.**
133 b. Hairs present. 135.
135 a. Perennials. 136.
136 a. Extensively spreading by rhizomes; nearly hairless cultivated grasses. **Common brome grass.**
136 b. Bunch grasses or with short rhizomes, mostly woodland plants. 137.
137 a. Sheaths overlapping one another. 138.
138 a. Sheaths thickly covered with hairs. **Bromus incanus.**
138 b. Sheaths with few hairs, except near the collar. **Bromus altissimus.**
137 b. Sheaths not overlapping, includes two slender species, rather rare in Maryland (Bromus Kalmii, B. ciliatus) and the common, coarser **Bromus purgans.**
135 b. Annuals. 139.
139 a. Most of the sheaths without hairs, blades generally hairy above but smooth on the back; common grain field weed (also Madrid brome grass). **Cheat.**
139 b. Sheaths hairy, the short hairs mostly pointing downward. 140.
140 a. Plants 1 to 3 feet high; sheaths slightly rough to down stroke, common field weeds. **Upright chess, Smooth chess.**
140 b. Plants averaging about 1 foot high; early flowering weeds, easy to distinguish in flower; several Bromus species including the common **Downy brome grass.**

132 b. Sheaths with overlapping edges rolled around the stem; closed sometimes at the base and in young leaves. 141.
141 a. Hairs present on some part of leaf or stem. 142.
142 a. Annual grains, hairy especially at the joints, stems rough to up stroke below the joints (compare also corn and small crab grass). **Oats.**
142 b. Perennials. 143.
143 a. With rhizomes, the stems at least separated, rather than in close bunches (see also 147). 144.
144 a. Rhizomes an inch thick; blades leathery, 1 to 2 inches wide; tall, cultivated ornamentals. **Giant reed.**
144 b. Rhizomes much smaller; woodland grasses (see also 102 a). 145.
145 a. Blades over one-half inch wide, minutely lighter mottled by microscopic cross veins, minutely hairy on sheaths, below joints, etc. **Short husk.**
145 b. Blades narrower; hairy on the sheath near the collar, sometimes on blade and sheath. **Reed bent grass.**
143 b. Bunch grasses. 146.
146 a. Blades rarely over 30 times longer than wide. 147.
147 a. Velvety all over and blue green. **Velvet grass.**
147 b. Not velvety. 148.
148 a. Blades about one-quarter inch wide, hairy, fragrant. **Sweet vernal grass.**
148 b. Blades much narrower, very short hairy, sheaths rough to down stroke. **Sphenopholis obtusata.**
146 b. Blades 40 to 50 or more times longer than wide. 149.
149 a. Midribs of ordinary size. 150.
150 a. Sheath extending in long points each side the ligule; lower parts more hairy (Plate V, fig. 1 b). **Indian grass.**
150 b. Sheath not ending in long points, few hairs present. **Big blue stem.**
149 b. Midribs strong and prominent, the blades long and stiff, appressed hairs on the back and hairy at the collar; ornamental grasses, occasionally wild. 151.
151 a. Blades cross-barred lighter. **Zebra grass.**
151 b. Blades green or striped. **Eulalia.**

141 b. *No hairs visible* without a lens. 152.
152 a. Annuals (*see 148 b for apparent annual*, and wild barley). 153.
153 a. Ligule broader than high, sometimes a *mere line*. 154.
154 a. A small, green, narrow leafed, wild grass (Plate *125*). **Squirrel tail grass.**
154 b. Large, cultivated grains. 155.
155 a. Blue green, winter annual; leaves one-quarter to one-half inches wide. ***Rye.***
155 b. Large, thick stemmed, summer annual; leaves one-half to 2 inches wide. **Corn.**
153 b. Ligule prominent, as high as wide or more. 156.
156 a. Very small, blue green grasses, the ligule membrane extended along the sheath edge; a few short leaves. **Silvery hair grass.**
156 b. Ligule not extended along sheath edge. 157.
157 a. About a foot high, the very narrow blades 50 times as long as wide. **Silky bent grass.**
157 b. Tall, water grasses, the leaves an inch or more wide. **Wild rice.**

152 b. Perennials. 158.
158 a. Rhizomes, stolons or tuber-like organs present. 159.
159 a. Stolons. 160.
160 a. Low, turf forming, green grasses. **Creeping bent.**
160 b. Tall, blue green, swamp grass. **Pale manna grass.**
159 b. Rhizomes (see also 160 b) or tubers. 161.
161 a. A string of several round, tuber like joints underground. **Bulbous oat grass.**
161 b. Long-jointed rhizomes present. 162.
162 a. Blades rolled, or U form in cross section, stiff or leathery. 163.
163 a. Sand beach and dune grasses, with long cylindrical flower heads (Plate I 22). **Beach grass.**
163 b. Salt marsh or salt meadow grasses; sheaths rigid and apparently closed; flowers in one-sided spikes. 164.
164 a. Stems average one-eighth inch in diameter, 1 to 3 feet high (Plate II 10). **Salt meadow grass.**
164 b. Stems one-quarter to one-half inch thick, 3 to 9 feet high. **Salt marsh grass, Salt reed grass.**
162 b. Blades flat unless wilted; not salt grasses. 165.
165 a. Blades one-half inch wide or more, about 15 times as long; collar and ligule prominent. 166.
166 a. Leaves striped; cultivated ornamental. **Ribbon grass.**
166 b. Leaves green; generally wild. **Reed canary grass.**
165 b. Blades narrower, 20 times longer than wide or more. 167.
167 a. Bluish dark green; wet or dry land grasses, usually under cultivation. 168.
168 a. Ligule long and prominent; rhizomes extended; plant 1 or 2 feet high (Plate IV). **Red top.**
168 b. Ligule and rhizomes short; a low, delicate, turf grass. **Rhode Island bent.**
167 b. Pale green, marsh grasses. 169.
169 a. Blades over one-quarter inch wide, stems 2 to 3 millimeters thick. **Reed bent grass.**
169 b. Leaves under one-quarter inch wide, stems more slender. **Blue-joint grass.**

158 b. Bunch grasses, or few stemmed. 170.
170 a. Blades about one-eighth inch wide or less, stems very slender. 171.
171 a. Ligules lanceolate; slender, delicate, June flowering grasses with shining stems, appearing like annuals. Eaton grasses. 172.
172 a. Sheaths rough to down stroke. **Sphenopholis obtusata.**
172 b. Sheaths smooth. **S. pallens.**
171 b. Ligules generally blunt, stems dull and coarser (Agrostis species). 173.
173 a. June flowering, sterile land grass (Plate I 26). **Tickle grass.**
173 b. Late summer flowering grasses, mostly in woods and moist fields. **Thin grass.**
170 b. Blades one-quarter inch or more wide. 174.
174 a. Underground base red; ligule long and soon much torn; grass of wet woods, sometimes bulb-like at base. **Indian reed.**
174 b. Underground base white, ligule more entire (see also 155 b). 175.
175 a. Second year stem base thickened bulb-like; sheaths smooth, blade generally with a slight twist; wall of straw thick, the lower joints pithy. **Timothy.**
175 b. The base rarely bulboid; sheath slightly rough, blade not twisted; straw thin, hollow nearly to the ground. **Tall oat grass.**

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131 b. Ligule none or without a distinct membrane, of hairs or obscured by hairs (see 137 for some brome grasses with obscure ligules and closed sheaths). A row of small hairs forming the ligule may simulate a membrane. 176.
176 a. Ligule of hairs, or hairs adjoining the obscure ligule. 177.
177 a. Hairy only about the collar and ligule; perennials. (See also annuals in 39 b, 115 a). 178.
178 a. Bunch grasses. 179.
179 a. Sand grass with short, wide, stiff, diverging blades; no ligule, but hairy at collar. **Skeleton grass.**
179 b. Swamp grass, the thin blades 15 to 20 times as long as wide; ligule of hairs. **Panicum spretum.**

178 b. Rhizomes present. 180.
180 a. Stems one-quarter inch or more thick and up to 9 feet high; blades one-half inch or more wide, rough edged. **Salt marsh grass.**
180 b. Stems smaller. 181.
181 a. Rhizomes short, the grass in wide clumps; the coarse stiff blades 40 to 60 times as long as wide, tapering at both ends, sometimes hairy above. **Switch grass.**
181 b. Rhizomes elongated, turf forming or stems separate; salt grasses, leaves generally rolled. 182.
182 a. Blades elongated; stems 1 to 3 feet high, slender. **Salt meadow grass.**
182 b. Blades 6 inches or less long, rolled in the bud but edges not overlapping; a few hairs about the ligule, sheaths covering the stem joints, stems about 1 foot high. **Salt grass.**

177 b. Hairs present in other places, perennials (for annuals see 39 b, 115 a, 9 b, 126 a). 183.
183 a. Rhizomes present, long jointed (if short and the grass in open clumps, see 181 a). 184.
184 a. Blades one-half to 2 inches wide, 6 to 18 inches long, stems up to 1 inch thick, mostly tall reeds near water. **Wild reed.**
184 b. Blades one-quarter to one-half inch wide or less; low, salt shore grasses with leathery, often in-rolled leaves (see also 163 a, here by error, and 111 a). **Sea beach grass.**
183 b. Bunch grasses (see also 181 a). 185.
185 a. Without short, broad leaves in a basal winter rosette (see 185 b, for panicums in late summer which do not clearly show the rosette leaves). 186.
186 a. Hairy only at the joints; short leafed. **Sand grass.**
186 b. Hairy elsewhere. 187.
187 a. Stems flattened somewhat; hairy above joints and about collar, old leaves curled. **Flattened poverty grass.**
187 b. Stem round. 188.
188 a. Low and stocky, with stiff narrow leaves; the sheaths covered with stiff hairs. **Pink grass.**
188 b. Slender, the very narrow leaves tapering to hair-like tips; few hairs. **Sporobolus clandestinus.**
185 b. With short, broad, winter rosette leaves, the wider stem leaves rarely as much as 20 times longer than wide (several other panicums found in Maryland are not in the key). 189.
189 a. Stem not hairy. 190.
190 a. Sheath with stiff, divergent hairs, leaves over one-half inch wide, cordate. **Corn grass.**
190 b. Sheath hairless or only fine hairy on the edge. 191.
191 a. Blades one-quarter inch wide or more, often ciliate at base (stem is minutely crisp hairy). **Ashe's panicum.**
191 b. Blades about one-eighth inch wide, sometimes more erect and in late summer branched like a little tree. **Bushy panicum.**
189 b. Stem hairy. 192.
192 a. Velvety, except a smooth ring below the joints; upper sheaths often viscid when young. **Velvety panicum.**
192. b. Not velvety. 193.
193 a. Back of most of the sheaths hairless. 194.
194 a. Ligule of hairs about one-eighth inch long. **Lindheimer panicum.**
194 b. Hairy only at the cordate base of leaves, sheath edge and stem; several species of panicum including **Ashe's panicum.**
193 b. Most of the sheaths hairy on the back. 195.
195 a. Sheath hairs appressed or ascending. Includes, among others, **Panicum pseudopubescens and P. oligosanthes.**
195 b. Hairs of the sheaths mostly spreading, longer than the stem width. 196.
196 a. Long, nearly erect hairs on the upper blade surface. 197.
197 a. Upper sheaths and stem scarcely hairy. **Panicum meridionale.**
197 b. Stem and sheath hairs horizontal, one-eighth inch long. **Panicum villosissimum.**
196 b. Short appressed hairs on the upper blade surface. 198.
198 a. Blades erect and stiff. **Panicum huachucae.**
198 b. Blades thin and lax. **P. huachucae silvicola.**

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176 b. Ligule indistinct, a mere line or none and without nearby hairs; perennials. (If sheath closed see 198 a; for annuals see 108 and 9 b). 199.
199 a. Blades over 20 times as long as wide. 200.
200 a. Hairs none (see 203 b, 202 a, 65 b, 73 a).
200 b. Hairs present. 201.
201 a. Blades long and narrow, the upper sheaths with short down pointing hairs; underground leaf bases red. **Meadow fescue.**
201 b. Blade length about 20 times the width. 202.
202 a. Salt marsh grasses with rhizomes. **Salt grass.**
202 b. Dry land bunch grasses. 203.
203 a. Basal leaves short and wide. **Panicum Bicknellii.**
203 b. Basal leaves elongated almost as much as the others; plants of sterile ground. **Barren grass and relatives.**

199 b. Blade length not over 20 times the width, or sometimes some of the upper ones a little longer. 204.
204 a. No basal winter rosette of shorter, broader leaves; stems one-eighth inch or less thick (for larger ones see 91 a, 144 a, 184 a). 205.
205 a. Blades one-half inch wide or more, 8 to 10 times as long, woods grasses with very broad flat spikelets. **Broad leaf uniola.**
205 b. Blades not over one-quarter inch wide, more elongated. **Wild barley.**
204 b. A basal winter rosette of shorter, broader leaves. 206.
206 a. Hairs none or rare; slender woodland grasses with minute gland-like dots on the sheaths; leaves about one-quarter inch wide. **Panicum yadkinense.**
206 b. Hairs present. 207.
207 a. Joints with a beard of short hairs. 208.
208 a. Blades less than one-half inch wide; marsh grasses, nearly hairless, the sheaths minutely gland dotted. **Marsh panicum.**
208 b. Blades one-half inch or more wide, hairy on the edges of the cordate base; plants of dry woods. 209.
209 a. Not velvety. **Panicum Boscii.**
209 b. Blades velvety on the lower side. **P. Boscii molle.**
207 b. Joints not bearded more than the sheaths. 210.
210 a. Soft sheath hairs one-eighth inch long directed out and downward, blades bright green, hairy only on the edges, shining. **Panicum xalapense.**
210 b. Otherwise hairy. 211.
211 a. Stems about 1 millimeter or less thick. 212.
212 a. Blades one-quarter inch wide or more, ciliate at the cordate base, about 2 inches long (Plate II 11). **Ashe's panicum.**
212 b. Blades narrower. 213.
213 a. Stems filiform and vine-like, almost hairless, except basal sheaths; marsh plants. **Bog panicum.**
213 b. Stems erect and later branched like a little tree. **Bushy panicum.**
211 b. Stems over 2 millimeters thick. 214.
214 a. Blades one-half inch or more wide, with a thin white edge, the cordate base ciliate. 215.
215 a. Stems short and diverging from the base; blades about one-half inch wide. **Panicum sphaerocarpon.**
215 b. Stems tall and erect; blades one-half to 1 inch wide. **Panicum polyanthes.**
214 b. Cordate blade base not ciliate. 216.
216 a. Wet land plants, about 3 feet high. **Panicum scabriusculum.**
216 b. Much lower, sandy land plants with stiff, thick, diverging leaves. **Skeleton grass.**

"ALL FLESH IS GRASS."

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