

or occasionally the lowest 1 or 2 separate, spreading, loosely flowered, tawny or frequently greenish; perigynium narrowly ovate, thin, longer than the scale, the points much spreading and very conspicuous. (*C. mirabilis*, Dewey.) — Shady places, throughout; frequent.

Var. *brevior*, Dewey. (Pl. 6, fig. 6-10.) Culm always stiff,  $1\frac{1}{2}$ -2 $\frac{1}{2}$ ° high, longer than the stiff long-pointed leaves; spikes 3-8, all distinct, contiguous or more or less separated, large (3-5" broad), globular, the head always short and erect; perigynium orbicular or ovate-orbicular, often cordate at base, mostly very broadly winged. (*C. straminea*, and vars. *typica*, *hyalina*, and *Meadii*, last ed.) — Dry soils, throughout; common.

Var. *aperta*, Boott. Culm slender but strict below the head, 1-2° high, growing in dense tufts; leaves very narrow, usually much shorter than the culm; spikes 4-6, large, heavy, much contracted below, usually all separated, becoming rusty, disposed in a weak or nodding head; perigynium narrowly ovate. — Bogs, throughout; rare westward. Transition to n. 128, from which the ovate perigynia distinguish it.

Var. *invisa*, W. Boott. Culm very slender, weak above; leaves very narrow with exceedingly long thin points, about the length of the culm; spikes small (3" broad or less), ovate, variously disposed in dense or open heads or sometimes the lowest remote or even subradical, rusty, the lower ones subtended by filiform bracts 2-5' long. — Swales near the sea-board, Maine to Del.; infrequent. Apt to be confounded with n. 128.

Var. *alata*, Bailey. Culm very stiff,  $1\frac{1}{2}$ -3° high, longer than the stiff leaves; spikes very large, oblong or conical, always pointed, usually all contiguous, green or sometimes becoming tawny; perigynium orbicular or orbicular-obovate, very abruptly contracted into a short beak which is prominent in the spike. (*C. alata*, Torr.) — Swales, Mass. to Ill., and southward; rare and uncharacteristic far inland.

Var. *cumulata*, Bailey. Culm very stiff, 2-3° high, greatly exceeding the firm leaves; spikes 5-30, all aggregated or densely capitate, green, widely divergent, pointed above, very abruptly contracted or even truncate at base, very densely flowered; perigynium small, broad, very obscurely nerved, the points inconspicuous. — Dry grounds, Penn. to N. Eng., and northward; rare.

Var. *fœnea*, Torr. Culm very stiff, longer than the leaves, 1-2° high; spikes 4-8, contiguous or separated, never densely aggregated, prominently contracted both above and below, very densely flowered, green, or often silvery-green. (*C. fœnea*, last ed., excl. vars.; not Willd.) — Near the sea-coast; frequent.

*C. LEFORINA*, L. Distinguished from *C. straminea*, var. *brevior*, as follows: — Usually lower; spikes rusty-brown, ovoid or oblong, erect or appressed, more or less contracted both above and below, contiguous in an interrupted head 1' long or less; perigynium lance-ovate, thin, very narrowly margined, erect and appressed, obscurely nerved. — About Boston (*W. Boott*, *Morong*). (Adv. from Eu.)

\* 12. — + 3. *Cyperoideæ*.

133. *C. sychnocéphala*, Carey. Erect, 3-18' high, leafy; head  $\frac{1}{2}$ -1' long; perigynium very slender, faintly nerved, 5-6 times longer than the exceedingly small achene, mostly a little longer than the sharp scale. — Glades, central N. Y. to Minn., and far westward; rare.

# ORDER 129. GRAMINEÆ. (GRASS FAMILY.)

Grasses, with usually hollow stems (culms) closed at the joints, alternate 2-ranked leaves, their sheaths split or open on the side opposite the blade; the hypogynous flowers solitary in the axils of imbricated 2-ranked glumes, forming a 1-many-flowered spikelet; the lower glumes (1 or usually 2) empty, the succeeding flowering glumes enclosing each a somewhat smaller and usually thinner scale (called the *palet*) and 2 or 3 very minute hyaline scales (*lodicules*) at the base of the flower. Stamens 1-6, commonly 3; anthers versatile, 2-celled, the cells distinct. Styles mostly 2 or 2-parted; stigmas hairy or feathery. Ovary 1-celled, 1-ovuled, forming a seed-like grain (*caryopsis*) in fruit. Embryo small, on the outside and at the base of the floury albumen. — Roots fibrous. Sheath of the leaves usually more or less extended above the base of the blade into a scarious appendage (*ligule*). Spikelets paniced or spiked. Palet usually 2-nerved or 2-keeled, enclosed or partly covered by the glume. Grain sometimes free from, sometimes permanently adherent to, the palet. — A vast and most important family, as it furnishes the cereal grains, and the principal food of cattle, etc. The terms *flowering glume* and *palet* are now adopted in place of the *outer* and *inner* *palets* of previous editions, while for convenience the term *flower* is often retained for the flower proper together with the enclosing flowering glume. (See Plates 7-15.)

SERIES A. Spikelets jointed upon the pedicel below the glumes, of one terminal perfect flower (sometimes a lower staminate or neutral flower in n. 5), or some or all of the 1-flowered spikelets unisexual in n. 10-12. Glumes 4 (rarely only 2 or 3).

Tribe I. PANICEÆ. Spikelets of one perfect flower, in spikes or panicles. Flowering glume awnless, in fruit more rigid than the empty glumes.

\* Spikelets in 2-4 ranks on a more or less flattened rhachis. — See also n. 5 (§ *Digitaria*).

+ Rhachis produced beyond the upper spikelet; glumes 3.

1. *Spartina*. Spikelets much flattened laterally in 2 close ranks.

+ Rhachis not produced above the upper spikelet (rarely in n. 3).

2. *Beckmannia*. Spikelets obovate, in 2 close rows. Glumes 3 (or 4), strongly concave, carinate.

3. *Paspalum*. Spikelets plano-convex, sessile or nearly so. Glumes 3 (rarely 2).

4. *Eriochloa*. Spikelets plano-convex, lanceolate, with a basal callus, short-pedicelled.

\*\* Spikelets irregularly paniculate or spicate.

5. *Panicum*. Spikelets ovate, not involucre nor the pedicels bristly. Glumes 4, the lowest usually small or minute.

6. *Setaria*. Spikelets in dense cylindrical spikes or panicles, the pedicels bristle-bearing.

7. *Cenchrus*. Spikelets (1-5) enclosed in a globular spiny bur-like involucre.

8. *Amphicarpum*. Spikelets of 2 kinds, one in a terminal panicle, the other subterranean on radical peduncles.

Tribe II. ORYZEÆ. Spikelets unisexual or perfect, in loose panicles, with only 2 glumes (in our genera) and palet none. Stamens often 6.

9. *Leersia*. Flowers perfect. Spikelets much flattened. Glumes carinate.

10. *Zizania*. Spikelets unisexual. Glumes convex, narrow.



**Tribe III. MAYDEÆ.** Spikelets of a single perfect or unisexual or rudimentary flower, in jointed spikes, in pairs at each joint, mostly imbedded in the thick rhachis.

11. **Tripsacum.** Spikelets monocious, the staminate above in the spike.
12. **Rottboellia.** One spikelet of each pair sterile and shortly pedicelled, the other fertile, sessile and sunk in the rhachis.

**Tribe IV. ANDROPOGONEÆ.** Spikelets in pairs or threes on the (usually jointed and bearded) rhachis of a spike or branches of a panicle, one sessile and fertile, the lateral pedicelled and often sterile or rudimentary; 2 upper glumes smaller and hyaline, that of the fertile flower mostly awned.

13. **Erianthus.** Spikelets in pairs, spicate, all alike fertile, involucre with a silky tuft.
14. **Andropogon.** Spikelets spicate, in pairs, the pedicellate sterile or rudimentary; rhachis bearded.
15. **Chrysopogon.** Spikelets in open panicles, in pairs or threes, only the sessile fertile.

**SERIES B.** Rhachis of the spikelet usually jointed above the persistent lower glumes (jointed below the glumes only in n. 19, 31, and 36). Spikelets 1-many-flowered, the uppermost flowers often imperfect or rudimentary.

**Tribe V. PHALARIDEÆ.** Glumes 5, only the uppermost fertile, the 2 middle ones rudimentary or empty or staminate; palea 1-nerved. Panicle mostly contracted and spike-like.

16. **Phalaris.** Middle glumes mere rudiments each side of the shining triandrous flower.
17. **Anthoxanthum.** Middle glumes empty, awned on the back. Stamens 2.
18. **Hierochloa.** Middle glumes triandrous. Fertile flower diandrous.

**Tribe VI. AGROSTIDEÆ.** Glumes 3; flower solitary, perfect (rarely a rudimentary or perfect second flower in n. 23 and 32-34); palea 2-nerved.

- Flowering glume with a terminal awn (none in n. 22), closely embracing the grain in fruit; spikelets in panicles or loose spikes, the rhachis not produced beyond the flower (except in n. 24 and a single species of n. 23). — **STIPEÆ.**

+ Fruiting glume firm and indurated, with a callus at base (none in n. 22).

19. **Aristida.** Awn 3-fid, the branches divaricate. Callus acute.
20. **Stipa.** Awn simple, twisted. Callus mostly acute.
21. **Oryzopsis.** Awn simple, straight, deciduous. Flower oblong; callus short, obtuse.
22. **Milium.** Awn none. Flower small, ovoid, without callus.

+ Fruiting glume thin and membranous; outer glume smaller or minute.

23. **Muhlenbergia.** Flower mostly hairy at base, the glume mucronate or awned.
24. **Brachyelytrum.** Rhachis produced into a bristle above. Outer glumes very small, the flowering one long-awned. Stamens 2.

• Flowering glume awnless or short-awned, loosely embracing the grain, thin, the lower glumes complicate-carinate; spikelets in dense spike-like panicles, the rhachis not produced. — **PHLEOIDEÆ.**

25. **Heleochoa.** Awns none. Spikes short and scarcely exerted.
26. **Phleum.** Glumes somewhat truncate, mucronate or short-awned. Spike cylindric.
27. **Alopecurus.** Lower glumes united at base, the flowering awned on the back. Palea none. Spike cylindric.

• • • Glumes membranous, the lower rarely strongly complicate, the flowering with a dorsal awn or awnless; spikelets variously panicled. — **AGROSTÆÆ.**

+ Flowering glume 1- (rarely 3-) nerved, awnless; grain loosely enclosed or naked.

28. **Sporobolus.** Culms wiry or rigid. Leaves involute.

+ Flowering glume 3-5-nerved, mostly awned; grain enclosed.

+ Rhachis not reduced above the single flower.

29. **Agrostis.** Spikelets in an open panicle.
30. **Polypogon.** Empty glumes long-awned. Panicle spike-like.
31. **Cinna.** Spikelets flattened, in a loose panicle. Palea 1-nerved. Stamen 1.

+ + Rhachis bearing a rudimentary second flower or short bristle (except in species of n. 33).

32. **Apera.** Flowering glume bifid, awned. Panicle very loose and delicate.
33. **Calamagrostis.** Flowers hairy-tufted at base. Glumes membranaceous. Palea thin.
34. **Ammophila.** Spikelets large. Flowers hairy-tufted at base. Glumes and palea chartaceous.

**Tribe VII. AVENEÆ.** Spikelets 2-several-flowered, panicled, the rhachis or base of the flowers often bearded; upper flower imperfect or rudimentary (except in n. 37). Flowering glume bearing a twisted, bent or straight awn on its back or below the apex.

\* One of the flowers staminate only.

35. **Arrhenatherum.** Lower flower staminate, long-awned; middle flower perfect, nearly awnless; the upper rudimentary.
36. **Holcus.** Flowers 2, the lower perfect, awnless, the upper staminate, awned.

\* • Flowers all perfect or the uppermost usually rudimentary.

37. **Aira.** Spikelets very small, in a diffuse panicle. Flowers 2, perfect, awned toward the base.
38. **Deschampsia.** Spikelets 2-flowered, with a hairy rudiment. Glumes thin-scarious, the flowering one erose-truncate, awned near the middle.
39. **Trisetum.** Spikelets 2-several-flowered. Flowering glume thin, compressed, carinate, 2-toothed, awned above by the excurrent mid-nerve.
40. **Avena.** Spikelets 2-several-flowered. Flowering glume hard and firm, rounded on the back, 5-9-nerved, the mid-nerve long-excurrent at or below the 2-toothed apex.
41. **Danthonia.** As *Avena*, but the 3 middle nerves of the flowering glume running into a flattish twisted awn from between the teeth.

**Tribe VIII. CHLORIDEÆ.** Spikelets 2-several-flowered with one or more of the upper flowers imperfect (flower 1 and perfect in n. 45), arranged in 2 rows upon the rhachis of a 1-sided spike.

\* Spikelets with one perfect flower.

42. **Cynodon.** Spikes 3-5, slender, digitate. Flower and the rudiment awnless.
43. **Ctenium.** Spike solitary, terminal. Flowers 4-6, the middle one perfect.
44. **Gymnopogon.** Spikes filiform, racemose. Spikelets remote, of a perfect flower and an awned rudiment.
45. **Schedonnardus.** Spikes 3-9, slender, scattered, distant. Spikelets small, 1-flowered, awnless.
46. **Bouteloua.** Spikes scattered (rarely 1 and terminal), dense. Glume of perfect flower 3-toothed. Rudimentary flowers 1-3-awned.

\* • Spikelets with two or more perfect flowers; awns none.

47. **Eleusine.** Spikes digitate, dense.
48. **Leptochloa.** Spikes racemose, slender. Spikelets small, alternate.
49. **Buchloe.** Pistillate spikes capitate, sessile, the spikelets 1-flowered; staminate spikes (2 or 3) on a peduncle, the spikelets 2-3-flowered.

**Tribe IX. FESTUCEÆ.** Spikelets few-many-flowered, panicled, the uppermost flowers often imperfect or abortive. Glumes pointless or the flowering ones tipped with a straight awn or bristle.

\* Flowering glume 1-3-nerved, 2-3-toothed. Rhachis short-bearded or glabrous.

50. **Triodia.** Rhachis of the spikelet bearded. Nerves of the flowering glume 3, villous, at least the middle one more or less excurrent.
51. **Diplachne.** Rhachis glabrous. Glume 1-3-nerved, with 2 small teeth, and a short awn in the cleft.
- • Glume 3-nerved, entire or 2-toothed and mucronate between the teeth. Rhachis and flowers long-villous. Tall reeds with ample panicles.
52. **Phragmites.** Spikelets 3-7-flowered: lowest flower naked, staminate or neutral. Glume entire.
53. **Arundo.** As n. 52, but flowers all perfect. Glume bifid.



- \*\*\* Glume 3-nerved, the nerves (at least the mid-nerve) excurrent; spikelets few, in the axils of floral leaves.
54. **Munroa**. Low or prostrate much-branched annual.  
 \*\*\*\* Glume 3- (rarely 1-) nerved, obtuse or acute, awnless; rhachis and flower naked.
55. **Koeleria**. Panicle contracted. Spikelets 2-4-flowered. Glumes compressed-keeled, acute or mucronate.
56. **Eatonia**. Panicle slender, more or less dense. Spikelets 2-flowered. Glumes very dissimilar, usually obtuse, the upper empty one enclosing the flowers.
57. **Eragrostis**. Spikelets flattened, 2-many-flowered. Glumes acute or acutish. Palea persistent.  
 \*\*\*\*\* Glume 3-5-nerved, obtuse or abrupt-cuspidate; spikelet 3-5-flowered; upper sterile flowers convolute around each other.
58. **Melica**. Glumes 5-nerved or more, scarious, obtuse. Panicle simple or nearly so.
59. **Diarrhena**. Glumes 3-nerved, coriaceous, the flowering one abruptly cuspidate. Panicle loosely few-flowered.  
 \*\*\*\*\* Flowering glume 5-nerved or more (sometimes obscurely so). Only the terminal flower abortive, or none.  
 + Glumes more or less strongly compressed and carinate (ventricose in n. 63).
60. **Uniola**. Spikelets broad, flat and 2-edged, in usually loose panicles. Glumes coriaceous, acute, the 3-6 lower ones empty.
61. **Distichlis**. Diccious. Spikelets large, flattened, in a close panicle. Empty glumes 2, acute.
62. **Dactylis**. Panicle contracted in 1-sided clusters. Glumes herbaceous, awn-pointed, rough-ciliate on the keel.
63. **Briza**. Spikelets heart-shaped, in lax panicles. Glumes roundish, ventricose, scarious-margined.
64. **Poa**. Spikelets small, flattened, ovate to lance-ovate, in a loose panicle. Flowering glumes membranous and scarious-margined, pointless, usually webby or pubescent toward the base.
65. **Graphephorum**. Spikelets compressed, in a loose panicle, the hairy jointed rhachis produced into a hairy pedicel. Glumes thin-membranous, faintly nerved, entire.  
 + Glumes convex on the back, not carinate (or somewhat so in n. 70).
66. **Scolochloa**. Spikelets subterete, in a lax panicle, the rhachis villous at the base of the flowers, ending in a naked pedicel. Glumes coriaceous, prominently 7-nerved, toothed at the apex. In water.
67. **Glyceria**. Spikelets terete or flattish. Flowering glumes scarious at the usually blunt summit, prominently 5-7-nerved.
68. **Puccinellia**. Mainly as *Glyceria*, but the glumes obsoletely 5-nerved.
69. **Festuca**. Spikelets terete or flattish. Flowering glume acute, pointed or awned at the tip, few-nerved. Styles terminal.
70. **Bromus**. Glume rounded or keeled on the back, mostly awned below the 2-cleft tip, 5-9-nerved. Styles scarcely terminal.
- Tribe X. HORDEÆ.** Spikelets 1-several-flowered, sessile on opposite sides of a zigzag jointed channelled rhachis, forming a spike. Empty glumes sometimes abortive or wanting. Uppermost flower imperfect or abortive.  
 \* Spikelets single at each joint of the solitary spike.
71. **Lolium**. Spikelets many-flowered, placed edgewise on the rhachis of the spike, with one empty glume.
72. **Agropyrum**. Spikelets 3-several-flowered, placed flatwise on the rhachis. Empty glumes 2, right and left.
73. **Lepturus**. Spikelets small, 1-2-flowered; empty glumes 1 or 2. Spike very slender.  
 \*\* Spikelets 2 or more at each joint of the solitary spike; the empty glumes side by side in front of the spikelets (none or rudimentary in n. 76.)
74. **Hordeum**. Spikelets 1-flowered, 3 at each joint, the lateral ones usually sterile.

75. **Elymus**. Spikelets 1-several-flowered, all perfect and similar.
76. **Asprella**. Spikelets few-flowered, somewhat pedicelled, 1-3 at each joint. Glumes none or small and deciduous.
- Tribe XI. BAMBUSEÆ.** Tall woody reeds, the flat leaves with a short petiole jointed upon the sheath. Spikelets few-many-flowered, flattened, in panicles or racemes.
77. **Arundinaria**. Flowering glumes rounded on the back, many-nerved, acuminate or bristle-pointed; empty glumes very small.

# 1. SPARTINA, Schreber. CORD OR MARSH GRASS. (Pl. 9.)

Spikelets 1-flowered, very much flattened laterally, jointed and sessile in 2 ranks on the outer side of a triangular rhachis. Glumes 3, unequal, lanceolate, strongly compressed-keeled, acute or bristle-pointed, mostly rough-bristly on the keel; palea thin, equalling or longer than the flowering glume. Stamens 3. Styles long, more or less united. — Perennials, with simple and rigid often reed-like culms, from extensively creeping scaly rootstocks, racemed spikes, very smooth sheaths, and long tough leaves (whence the name, from *σπάρτιν*, a cord, such as was made from the bark of the *Spartium* or Broom).

\* Spikelets compactly imbricated very rough-hispid on the keels; spikes (2-4' long) more or less peduncled; culm and elongated leaves rigid.

1. **S. cynosuroides**, Willd. (FRESH-WATER CORD-GRASS.) Culm rather slender (2-6° high); leaves narrow (2-4° long,  $\frac{1}{2}$ ' wide below or less), tapering to a very slender point, keeled, flat, but quickly involute in drying, smooth except the margins; spikes 5-20, scattered, spreading; rhachis rough on the margins; glumes awn-pointed, especially the middle one (its awn about  $\frac{1}{4}$ ' long), strongly serrulate-hispid on the keel, the lower equalling the upper, whose strong midrib abruptly terminates below the membranous apex. — Banks of rivers and lakes, or in rich soil, especially northward. Aug.

2. **S. polystachya**, Willd. (SALT REED-GRASS.) Culm tall and stout (4-9° high, often 1' in diameter near the base); leaves broad ( $\frac{1}{2}$ -1'), roughish underneath, as well as the margins; spikes 20-50, forming a dense oblong raceme (purplish); glumes barely mucronate, the lower half the length of the flowering one, of which the rough-hispid midrib reaches to the apex. — Salt or brackish marshes, within tide-water, especially southward.

3. **S. juncea**, Willd. (RUSH SALT-GRASS.) Culms low (1-2° high) and slender; leaves narrow and rush-like, strongly involute, very smooth; spikes 1-5, on very short peduncles, the rhachis smooth; glumes acute, the lower scarcely half the length of the middle one, not half the length of the upper. — Salt marshes and sea-beaches. Aug. (Eu.)

\* Spikelets loosely imbricated, or somewhat remote and alternate, the keels only slightly hairy or roughish under a lens; spikes sessile and erect, soft; leaves, rhachis, etc., very smooth; culm rather succulent.

4. **S. stricta**, Roth. (SALT MARSH-GRASS.) (Pl. 9, fig. 1-3.) Culm 1-4° high, leafy to the top; leaves soon convolute, narrow; spikes few (2-4), the rhachis slightly projecting beyond the crowded or imbricated spikelets; glumes acute, very unequal, the larger 1-nerved, a little longer than the flower. — Salt marshes, Penn., etc. — Odor strong and rancid. (Eu.)

Var. **glabra**, Gray. Culm and leaves longer; spikes 5-12 (2-3' long); spikelets imbricate-crowded. — Common on the coast.



Var. *alterniflora*, Gray. Spikes more slender (3-5' long), and the spikelets remotish, barely overlapping, the rhachis continued into a more conspicuous bract-like appendage; larger glume indistinctly 5-nerved; otherwise as in the preceding form, into which it passes.—Common with the last; also Onondaga Lake, J. A. Paine.

## 2. BECKMANNIA, Host. (Pl. 15.)

Spikelets jointed upon the pedicels, 1-2-flowered (only one fertile), obovate and laterally compressed, imbricated in 2 rows upon one side of the angled rhachis of a spike. Glumes 3 or 4, the 2 lower strongly concave and carinate, obtuse or acutish, the 1 or 2 flowering glumes narrower, lanceolate, acute or acuminate and a little exserted, becoming rather rigid and with the thin palea enclosing the oblong grain.—A stout erect subaquatic perennial, with the short spikes erect and simply spicate or in a strict narrow panicle. (Named for John Beckmann, professor of botany at Goettingen.)

1. *B. erucæformis*, Host, var. *uniflora*, Scribn. Glumes 3 and spikelets 1-flowered; spikes (6" long or less) panicle.—N. W. Iowa, W. Minn., and westward. The Old World form, which also is found in the far northwest, has 2-flowered spikelets.

## 3. PÁSPALUM, L. (Pl. 13.)

Spikelets spiked or somewhat racemed, in 2-4 rows on one side of a flattened or filiform continuous rhachis, jointed upon very short pedicels, plano-convex, awnless, 1-flowered. Glumes 3 (rarely only 2), the terminal one flowering. Flower coriaceous, mostly orbicular or ovate, flat on the inner side, convex on the outer. Stamens 3. Spikes one or more, at or toward the summit of an elongated peduncle. (Πασπάλος, a Greek name for Millet.)

\* Spikes with a (1") broad and thin membranaceous or foliaceous and keeled rhachis, the incurved margins partly enclosing the small two-rowed spikelets. (Smooth, aquatic, or nearly so, decumbent or floating.)

1. *P. fluitans*, Kunth. Annual; leaves lanceolate, flat (3-8"), broad; spikes numerous in a raceme, the rhachis somewhat projecting beyond the minute and slightly pubescent spikelets into a tapering point, scabrous on the back.—River-swamps, Va. to S. Ill., Mo., and southward. Sept., Oct.

2. *P. Walterianum*, Schultes. Perennial; leaves linear, short; spikes 3-7, the lowest partly included in the sheath of the uppermost leaf, the rhachis blunt; spikelets glabrous.—Low or wet grounds, N. J. (Cape May, Nuttall), Del., and southward.

\*\* Spikes with a narrow wingless rhachis; perennials, or mostly so.

+ Spikelets very obtuse, orbicular; spikes one terminal and often 1-5 lateral.

3. *P. setaceum*, Michx. Culm ascending or decumbent (1-2° long), slender; leaves (2" wide, flat) and sheaths clothed with soft spreading hairs; spikes very slender (2-4' long), smooth, mostly solitary on a long peduncle, and usually one from the sheaths of each of the upper leaves on short peduncles or included; spikelets (½" wide) narrowly 2-rowed.—Sandy fields; common from E. Mass. to Ill., and southward. Aug.

4. *P. læve*, Michx. (Pl. 13, fig. 1-3.) Bright green, sparingly villous, rather stout; stems somewhat decumbent; leaves and spikes widely spread-

ing; spikes (2-4) approximate, 2-4' long, smooth or nearly so; spikelets about 1" wide, 2-rowed.—Moist soil, S. New Eng. to Ky., and southward.

5. *P. Floridanum*, Michx. Stout, erect, 3-6° high, glaucous; sheaths and leaves more or less villous, the latter and the spikes erect or ascending; spikes (2-5) broader, 2-5' long, the smooth spikelets nearly 2" broad, in 2 rows.—Moist soil; Del. to Fla., Ark., and Tex.

+ + Spikelets acute; spikes several, racemose.

6. *P. dilatatum*, Poir. Stout, erect, 2-5° high, villous at the top of the sheath; spikes few on a naked peduncle, erect, 2-3' long; spikelets 1" long or more, the lower glume soft-villous on the margin.—Va. to Tex.

+ + + Spikelets acute; spikes always a pair at the summit of the naked peduncle.

7. *P. distichum*, L. (JOINT-GRASS.) Nearly glabrous, rather glaucous; culms ascending (about 1° high) from a long creeping base; leaves linear-lanceolate (2-3' long); peduncle usually short; spikes short and closely-flowered (9"-2' long), often slightly separated; rhachis flat on the back; spikelets ovate, slightly pointed (barely 1½" long), approximate on one side of the rhachis.—Wet fields, Va. and southward. July-Sept.

8. *P. Elliottii*, Watson. Culms ascending (1-2½° high) from a creeping base; leaves lanceolate (3-6' long, 4-6" wide); spikes slender, rather sparsely flowered (1-4' long), both sessile upon the long slender peduncle; spikelets ovate-lanceolate (2" long), on nearly opposite sides of the rhachis. (Miliun paspalodes, Ell. P. Digitaria, Chapm.; not Poir.)—Va. and southward.

## 4. ERIÓCHLOA, HBK. (Pl. 15.)

Spikelets ovate, subsessile or shortly pedicelled upon one side of the rhachis of a spike, with a callus at base and jointed on the pedicel, 1-flowered. Glumes 3, the 2 empty ones slightly unequal, membranaceous, acute, the flowering one shorter, indurated, obtuse, enclosing the free grain.—Coarse tufted grasses, with flat leaves, the spikes more or less scattered along a common peduncle, and the pedicels and rhachis of the spike usually pubescent or hairy (hence the name, from ἔριον, wool, and χλόα, grass).

1. *E. polystachya*, HBK. Culms erect or decumbent, 2° high; spikes 6-12, erect or ascending, 1-2' long, forming a compound spike 3-6' long; spikelets glabrous, very shortly pedicelled, oblong-lanceolate, nearly 2" long.—S. Kan. to Tex. and Mex.

## 5. PÁNICUM, L. PANIC-GRASS. (Pl. 13.)

Spikelets jointed upon the pedicels, ovate, panicle, racemed, or sometimes spiked, not involucrate, with one perfect and sometimes a second lower rudimentary or staminate flower. Glumes 4, but the lower one usually short or minute (rarely even wanting), and the third empty or sterile, membranaceous-herbaceous. Upper flower perfect, closed, coriaceous or cartilaginous, usually flattish parallel with the glumes, awnless (except in § 3), enclosing the free and grooveless grain. Stamens 3. Stigmas plumose, usually purple. (An ancient Latin name of the Italian Millet, P. Italicum (now Setaria Italica), of uncertain origin and meaning.)



§ 1. **DIGITARIA.** Spikelets crowded 2-3 together in simple and mostly 1-sided clustered spikes or spike-like racemes, wholly awnless and pointless, 1-flowered; lower glume minute or obsolete or wanting; annual, often purplish.

\* Spikes erect; the rachis filiform and nearly terete.

1. **P. fliforme**, L. Culms very slender (1-2° high), upright; lower sheaths hairy; spikes 2-8, alternate, approximate, filiform; spikelets oblong, acute ( $\frac{1}{4}$ " long); lower glume almost wanting. — Dry sandy soil, Mass. to N. J. along the coast, to Iowa, Neb., and southward. Aug.

\*\* Spikes spreading; the rachis flat and thin.

**P. GLABRUM**, Gaudin. Culms spreading, prostrate, or sometimes erect (5-12' long), glabrous; spikes 2-6, widely diverging, nearly digitate; spikelets ovoid (about 1" long); upper empty glume equalling the flower, the lower almost wanting. — Cultivated grounds and waste places; common, especially southward; sometimes appearing indigenous. Aug., Sept. (Nat. from Eu.)

**P. SANGUINALE**, L. (COMMON CRAB- or FINGER-GRASS.) (Pl. 13, fig. 1-3.) Culms erect or spreading (1-2° high); leaves and sheaths glabrous or hairy; spikes 4-15, spreading, digitate; spikelets oblong ( $1\frac{1}{2}$ " long); second glume half the length of the flower, the lower one small. — Cultivated and waste grounds. Aug.-Oct. (Nat. from Eu.)

§ 2. **PANICUM** proper. Spikelets scattered, in panicles, awnless.

\* Panicle elongated and racemose, wand-like or pyramidal; the numerous and usually pointed spikelets short-pedicelled, excepting n. 3 and 4.

+ Sterile flower none; lower glume short; spikelets  $\frac{1}{2}$ - $1\frac{1}{2}$ " long; annuals except n. 4; leaves flat; sheaths flattened.

++ Glabrous and smooth throughout; spikelets appressed, short-pedicelled.

2. **P. proliferum**, Lam. Culms usually thickish and rather succulent, branched, geniculate and ascending from a procumbent base; sheaths flattened; ligule ciliate; panicles terminal and lateral, compound, pyramidal, the slender primary branches at length spreading; spikelets pale green, rarely purplish; lower glume broad,  $\frac{1}{2}$  to  $\frac{3}{4}$  the length of the upper, which is little longer than the flowering one. — Marshy river-banks and shores, especially if brackish, but also in the interior, from Mass. to Iowa, and southward. Aug.

++ Hispid or hairy on the sheaths, at least the lower; spikelets mostly scattered on slender pedicels in an ample, loose, at length very effuse panicle; culms mostly branched from the base, erect or ascending (10-20' high).

3. **P. capillare**, L. (OLD-WITCH GRASS.) (Pl. 13, fig. 4, 5.) All the sheaths and usually the leaves copiously hairy or hispid; panicle mostly very compound, the branches divaricate when old; spikelets from ovoid to narrowly oblong, pointed; lower glume half the length of the upper empty one, which is longer than the elliptical obtuse perfect flower. — Sandy soil and cultivated fields everywhere. Aug.-Oct. — Varies extremely in size and appearance, the culms erect and simple, or decumbent, geniculate and branched; in depauperate forms the spikelets only  $\frac{1}{2}$ ", in the larger forms  $1\frac{1}{2}$ " in length.

4. **P. autumnale**, Bosc. Root perennial (?), lower sheaths and margins of the small narrow leaves more or less hairy, otherwise glabrous, except some bristly hairs in the main axils of the very effuse capillary panicle, its much elongated divisions sparingly branched, or even simple and terminated with solitary spindle-shaped spikelets; lower glume minute; perfect flower lanceolate.

oblong and pointed, nearly equalling the lance-oblong obtusish empty glumes. — Sand-hills, Ill. to Minn., Mo., and southward.

+ Sterile flower rudimentary (staminate in n. 7), its glume fully twice the length of the lower glume; spikelets small (1 or  $1\frac{1}{2}$ " long); root perennial.

5. **P. anceps**, Michx. Culms flat, upright (2-4° high); leaves rather broadly linear (1-2° long, 4-5" wide), smooth; panicle contracted-pyramidal; spikelets ovate-lanceolate, pointed, a little curved; second glume 5-7-nerved; neutral flower one third longer than the perfect one. — Wet sandy soil, N. J. and Penn. to S. Ill., and southward. Aug. — Spikelets larger and branches of the panicle longer and narrower than in the next.

6. **P. agrostoides**, Muhl. Culms flattened, upright (2-4° high); leaves long, and with the sheaths smooth; panicles terminal and often lateral, pyramidal (4-8' long); spikelets racemose, crowded and one-sided on the spreading branches, ovate-oblong, acute (purplish); second glume 5-nerved, longer than the neutral flower; perfect flower shorter, bearded at the apex. — Wet meadows and shores, E. Mass. to Minn., Neb., and common southward. Aug.

7. **P. Curtisii**, Chapm. Culms stout, 3-4° high, often rooting below; mostly glabrous; panicle slender, simple, spike-like (6-8' long), the spikes appressed; spikelets lanceolate, acute; lower glume half the length of the 5-nerved second one. — Ponds, Del. to Fl. and Tex.

++ Sterile flower staminate; lower glume more than half the length of the next; spikelets large (2-2 $\frac{1}{2}$ " long), ovate, pointed, as are the glumes, etc.; perennials, glabrous, with tall or stout and rigid upright culms.

8. **P. virgatum**, L. (Pl. 13, fig. 8, 9.) Tall (3-5° high); leaves very long, flat; ligule silky-bearded; branches of the compound loose and large panicle (9'-2° long) at length spreading or drooping; spikelets scattered, usually purplish. — Moist sandy soil; common. Aug.

9. **P. amarum**, Ell. Culms ( $1\frac{1}{2}$ " high or more) sheathed to the top; leaves involute, glaucous, coriaceous, the uppermost exceeding the contracted panicle, the simple racemose branches of which are appressed; spikelets pale. — Sandy shores, Conn., Va., and southward. Aug., Sept. — The northern form (var. *minus*, Vasey & Scribn.) somewhat smaller than the southern.

\*\* Panicle short or small, loosely spreading or diffuse; perennials.

+ Sterile flower none; spikelets warty roughened.

10. **P. verrucosum**, Muhl. Smooth; culms branching and spreading, very slender (1-2° long), naked above; leaves linear-lanceolate (2-3" wide), shining; branches of the diffuse panicle capillary, few-flowered; spikelets dark green, oval, acute,  $\frac{3}{4}$ " long; lower glume  $\frac{1}{2}$  as long as the faintly nerved second. — Sandy swamps, N. Eng. to Va., near the coast, and southward.

++ Lower (sterile) flower neutral, or in n. 12 and sometimes in n. 11 staminate, the pale scarious and sometimes small and inconspicuous.

++ Culm-leaves broadly lanceolate or wider, with 9-15 principal nerves (obscure or none in n. 17).

= Spikelets 1- $1\frac{1}{2}$ " long.

11. **P. xanthophyllum**, Gray. Culm simple, or at length branched near the base (9-15' high); sheaths hairy; leaves lanceolate, very acute (4-6'



long by  $\frac{1}{4}$ ' wide), not dilated at the ciliate-bearded clasping base, smooth except the margins, strongly 9-11-nerved; panicle long-peduncled, very simple, the appressed branches bearing a few roundish-obovate spikelets (about  $1\frac{1}{4}$ " long); lower glume ovate, acutish,  $\frac{1}{2}$ - $\frac{3}{4}$  the length of the 9-nerved second. — Dry sandy soil, Maine to Penn., Wisc., Iowa, and northward; rare. June. — Yellowish-green; spikelets minutely downy; sterile flower sometimes staminate.

12. *P. latifolium*, L. Culm (1-2° high) smooth; the joints and the throat or margins of the otherwise smooth sheaths often bearded with soft woolly hairs; leaves broadly oblong-lanceolate from a heart-clasping base (often 1' wide), taper-pointed, 11-15-nerved, smooth, or sparingly downy-hairy; panicle more or less exserted (2-3' long), usually long-peduncled, the branches spreading; spikelets obovate,  $1\frac{1}{2}$ " long, downy; lower glume ovate, not half the length of the many-nerved second; sterile flower often (not always) with 3 stamens. — Moist thickets; common. June - Aug.

13. *P. clandestinum*, L. (Pl. 13, fig. 6, 7.) Culm rigid (1-3° high), very leafy to the top, at length producing appressed branches, the joints naked; sheaths rough with papillæ bearing very stiff and spreading bristly hairs; leaves oblong-lanceolate from a heart-clasping base, very taper-pointed; lateral and usually also the terminal panicle more or less enclosed in the sheaths, or with the terminal one at length long-peduncled; — otherwise resembling n. 12; but the spikelets more ovoid, often smooth; the lower flower (always?) neutral. — Low thickets and river-banks, N. Eng. to Mich., Mo., and southward. June - Sept.

14. *P. viscidum*, Ell. Culms stout, upright or ascending, at length much branched, leafy to the top, densely velvety-downy all over, as also the sheaths, with reflexed soft and often clammy hairs, except a ring below each joint; leaves likewise velvety, lanceolate ( $\frac{1}{2}$ ' wide), 11-13-nerved; panicle spreading, the lateral ones included; spikelets obovate, 1 or  $1\frac{1}{4}$ " long, downy; the roundish lower glume scarcely one fourth the length of the 7-nerved second one. — Damp soil, N. J. to Va., and southward. Aug.

15. *P. scoparium*, Lam. Culms upright, at length much branched and reclining (1-2° long), roughish; leaves lanceolate (3-5' long by  $\frac{1}{4}$ - $\frac{1}{2}$ ' wide), rather faintly 9-nerved, hairy or smooth, fringed on the whole margin or next the base with long and stiff spreading hairs, the sheaths bristly throughout with similar hairs; panicle open, nearly simple, bearing few tumid-obovate hairy or smoothish spikelets about  $1\frac{1}{2}$ " long; lower glume roundish, about half or a quarter of the length of the upper one. (*P. pauciflorum*, Ell.) — Wet meadows and copses, E. Mass. to Minn., west and southward. June, July.

16. *P. commutatum*, Schultes. Rather slender, erect, 1-2° high, nearly glabrous; leaves lanceolate, acuminate (3-6' long), the margins toward the base and the sheaths sparsely ciliate; panicle spreading, often short-peduncled; spikelets scattered, glabrous, oblong, acutish, little more than 1" long; lower glume ovate, often acute. — N. Y. to Fla. — A frequent variety with smaller spikelets (not 1" long) approaches the next, and has also been confused with *P. dichotomum*. — Ont. to Va. and southward.

= = Spikelets less than 1" long.

17. *P. nitidum*, Michx. (Lam.?) Resembles the last; leaves rather thick and the principal nerves very obscure or none except at the base; pan-

icle broad, more slender; spikelets smaller ( $\frac{3}{4}$ " long), broadly ovate and very obtuse; lower glume very obtuse. (*P. sphaerocarpon*, Ell.) — N. Y. to Ga., and westward.

18. *P. microcarpon*, Muhl. Like the last; the broadly lanceolate leaves nearly similar, but usually longer (8' long or less), distinctly nerved; panicle soon exserted on a slender peduncle, rather narrower, with numerous slender branches and very many-flowered (3-7' long); spikelets about  $\frac{1}{2}$ " long, ovoid, smooth or smoothish; lower glume orbicular and very small. — Dry or moist thickets, Penn. to Mich., Neb., and southward. July - Sept.

++ ++ Culm-leaves linear or sometimes narrowly lanceolate (basal often lanceolate); primary nerves often indistinct or none; spikelets small.

19. *P. depauperatum*, Muhl. Culms simple or branched from the base, forming close tufts (6-12' high), terminated by a simple and few-flowered contracted panicle, often much overtopped by the narrowly linear and elongated (4-7') upper leaves; spikelets  $\frac{3}{4}$ - $1\frac{1}{4}$ " long, oval-obovate, commonly pointed when young; lower glume ovate. — Varies, with the leaves involute, at least when dry (*P. involutum*, Torr.), and with the sheaths either beset with long hairs or nearly smooth; the panicle either partly included, or on a long and slender peduncle. — Dry woods and hills; rather common. June.

20. *P. consanguineum*, Kunth. Culms slender, 1-2° high, often decumbent and rooting below; nearly glabrous or the sheaths and leaves somewhat pubescent or villous; panicle small, with rather few spreading few-flowered branches; spikelets 1- $1\frac{1}{2}$ " long, oblong-obovate, acutish. — Dry woods, Norfolk, Va., and south to Fl. and Tex.

21. *P. dichotomum*, L.! Culms (8'-2° high) at first mostly simple, bearing a more or less exserted spreading compound panicle (1-3' long), and linear to linear-lanceolate flat leaves (those tufted at the root usually ovate-lanceolate and very short, thickish); but commonly branching later in the season, the branches often clustered, and bearing nearly simple and included small panicles; spikelets  $\frac{1}{4}$ - $\frac{3}{4}$ " long, elliptical, obtuse, downy or smooth; lower glume roundish. — Common everywhere. Very variable both in habit and in the amount of villosity (depending upon the soil, exposure, season, etc.), so that it is difficult to specify any well defined varieties. The more conspicuous forms are (a) *commune*, with simple culms erect or ascending, and leaves suberect, usually pale green — (b) *fasciculatum*, with clustered leafy branches and short peduncles, a common autumnal state — and (c) *gracile*, the culms lax, very slender and elongated, with rather distant spreading leaves (usually bright green), and mostly long-pedunculate panicles.

22. *P. laxiflorum*, Lam.! Closely resembling the last species, in its several forms; distinguished by the larger acutish spikelets (nearly or quite 1" long). — Common.

§ 3. *ECHINÓCHLOA*. Spikelets imbricated-spiked on the branches of the simple or compound raceme or panicle, usually rough with appressed stiff hairs; lower pale of the sterile flower awl-pointed or awned.

*P. CRUS-GALLI*, L. (BARNYARD-GRASS.) Root annual; culms stout, branching from the base (1-4° high); leaves lanceolate ( $\frac{1}{2}$ ' wide or more), rough-margined, otherwise with the sheaths smooth; spikes alternate (1-3' long), crowded in a dense panicle; glumes ovate, abruptly pointed; glume



of the neutral flower bearing a rough awn of variable length. — Varies greatly; sometimes awnless or nearly so; sometimes *long-awned*, especially in the var. *HISPIDUM*, a very large and coarse form with the sheaths of the leaves very bristly. — Moist, chiefly manured soil; the variety in ditches, especially of brackish water; possibly indigenous. Aug. - Oct. (Nat. from Eu.)

#### 6. SETARIA, Beauv. BRISTLY FOXTAIL GRASS. (Pl. 13.)

Spikelets altogether as in *Panicum* proper, and awnless, but with the short peduncles bearing below the joint of the spikelet solitary or clustered bristles resembling awns (but not forming an involucre). Inflorescence a dense spiked panicle, or apparently a cylindrical spike. — Annuals, in cultivated or manured grounds, with linear or lanceolate flat leaves. (Name from *seta*, a bristle.)

\* Bristles single or in pairs, roughened or barbed downward.

**S. VERTICILLATA**, Beauv. Spike cylindrical (2-3' long, pale green), composed of apparently whorled short clusters; bristles short, adhesive. — Near dwellings. (Adv. from Eu.)

\* \* Bristles in clusters, roughened or barbed upward.

**S. GLAUCA**, Beauv. (FOXTAIL. PIGEON-GRASS.) (Pl. 13, fig. 1, 2.) Spike cylindrical, dense, tawny yellow (2-4' long); bristles 6-11 in a cluster, much longer than the spikelets; perfect flower transversely wrinkled. — Very common, in stubble, etc. (Adv. from Eu.)

**S. VIRIDIS**, Beauv. (GREEN FOXTAIL. BOTTLE-GRASS.) Spike nearly cylindrical, more or less compound, green; bristles few, longer than the spikelets; flower striate lengthwise and dotted. — Cultivated grounds. (Adv. from Eu.)

**S. ITALICA**, Kunth. Spike compound, interrupted at base, thick, nodding (6-9' long), yellowish or purplish; bristles 2 or 3 in a cluster, either much longer or else shorter than the spikelets. — Cultivated under the name of MILLER, or HUNGARIAN or BENGAL GRASS; rarely spontaneous. (Adv. from Eu.)

#### 7. CENCHRUS, L. HEDGEHOG- or BUR-GRASS. (Pl. 14.)

Spikelets as in *Panicum*, awnless, but enclosed 1 to 5 together in a globular and bristly or spiny involucre, which becomes coriaceous and forms a deciduous hard and rigid bur; the involucre sessile in a terminal spike. Styles united below. (An ancient Greek name of *Setaria Italica*.)

1. **C. TRIBULOIDES**, L. Annual; culms branched and ascending (1° high or less); leaves flat; spike oblong, of 8-20 spherical heads; involucre prickly all over with spreading and barbed short spines, more or less downy, enclosing 2 or 3 spikelets. — Sandy soil, on river banks, etc. Aug. — A vile weed.

#### 8. AMPHICARPUM, Kunth. (Pl. 13.)

Spikelets jointed upon the pedicels, 1-flowered, oblong or ovoid, of two kinds; one kind in a terminal panicle, deciduous from the joint without fruit, although the flower is perfect; the other kind solitary at the extremity of slender runner-like radical peduncles (more or less sheathed toward the base), much larger than the others, perfect and fertile, subterranean, fertilized in the bud. Glumes 3, nearly equal, 5-nerved in the panicle, many nerved in the fertile spikelets; palea a little shorter; all becoming indurated and enclosing the very large grain. Stamens 3 (small in the radical flowers). Stigmas plumose, deep purple. (Name from *ἀμφικαρπός*, doubly fruit-bearing.)

1. **A. PURSHII**, Kunth. Annual or biennial (?), erect, 1-4° high; leaves lanceolate, copious on the lower part of the culm, hispid, especially on the

sheaths; panicle strict, naked; grain ovoid or oblong (2-3" long), terete. — Moist sandy pine-barrens, N. J. to Fla. Sept.

#### 9. LEERSIA, Swartz. WHITE GRASS. (Pl. 7.)

Flowers crowded in one-sided paniced spikes or racemes, perfect, but those in the open panicles usually sterile by the abortion of the ovary, those enclosed in the sheaths of the leaves close-fertilized in the bud and prolific. Spikelets 1-flowered, flat, more or less imbricated over each other, jointed upon the short pedicels. Glumes 2, chartaceous, strongly flattened laterally or conduplicate, awnless, bristly-ciliate on the keels, closed, nearly equal in length, but the lower much broader, enclosing the flat grain. Palea none. Stamens 1-6. Stigmas feathery, the hairs branching. — Perennial marsh grasses; the flat leaves, sheaths, etc., rough upward, being clothed with very minute hooked prickles. (Named after *John Daniel Leers*, a German botanist.)

\* Spikelets narrowly oblong, rather loosely crowded.

1. **L. VIRGINICA**, Willd. (WHITE GRASS.) Panicle simple; the spikelets closely appressed on the slender branches, around which they are partly curved (1½" long); stamens 2 (a third imperfect or wanting); glumes sparingly ciliate (greenish-white). — Wet woods; Maine to Minn., and southward. Aug.

2. **L. ORYZOIDES**, Swartz. (RICE CUT-GRASS.) (Pl. 7, fig. 1-3.) Panicle diffusely branched; spikelets flat, rather spreading (2½-3" long); stamens 3; glumes strongly bristly-ciliate (whitish). — Very wet places; Mass. to Minn., and southward; common. Aug. (Eu.)

\* \* Spikelets broadly oval, imbricately covering each other (2½-3" long).

3. **L. LENTICULARIS**, Michx. (CATCH-FLY GRASS.) Smoothish; panicle simple; glumes very flat, strongly bristly-ciliate (said to close and catch flies); stamens 2; otherwise like the preceding. — Low grounds, Va., Ill., and southward.

#### 10. ZIZANIA, Gronov. WATER or INDIAN RICE. (Pl. 7.)

Flowers monœcious; the staminate and pistillate both in 1-flowered spikelets in the same panicle. Glumes 2, subtended by a small cartilaginous ring, herbaceous-membranaceous, convex, awnless in the sterile, the lower one tipped with a straight awn in the fertile spikelets. Palea none. Stamens 6. Stigmas pencil-form. — Large, often reed-like water-grasses. Spikelets jointed upon the club-shaped pedicels, very deciduous. (Adopted from *ζίζανιον*, the ancient name of some wild grain.)

1. **Z. AQUATICA**, L. (INDIAN RICE. WATER OATS.) (Pl. 7, fig. 1-4.) Annual; culms 3-9° high; leaves flat, 2-3° long, linear-lanceolate; lower branches of the ample pyramidal panicle staminate, spreading; the upper erect, pistillate; lower glume long-awned, rough; styles distinct; grain linear, slender, 6' long. — Swampy borders of streams and in shallow water; common, especially northwestward. Aug.

2. **Z. MILIACEA**, Michx. Perennial; panicle diffuse, ample, the staminate and pistillate flowers intermixed; awns short; styles united; grain ovate. — Penn. (?), Ohio, and southward. Aug. — Leaves involute.



**11. TRÍPSACUM, L.** GAMA-GRASS. SESAME-GRASS. (Pl. 14.)

Spikelets monœcious, in jointed unilateral spikes, staminate above and fertile below. Staminate spikelets in pairs, sessile at each triangular joint of the narrow rhachis, both alike, 2-flowered, longer than the joints; glumes 4, coriaceous, the lower (outer) one nerved, the second boat-shaped, the upper with the palea very thin and membranaceous, awnless; anthers opening by 2 pores at the apex. Pistillate spikelets 2-flowered (the lower flower neutral), single and deeply imbedded in each oblong joint of the cartilaginous thickened rhachis, occupying a boat-shaped recess which is closed by the polished and cartilaginous ovate outer glume, the inner glume much thinner and pointed, the upper with the palea very thin and scarious, pointless. Styles united; stigmas very long (purple), hispid. Grain ovoid, free. — Culms stout and tall, solid, from very thick creeping rootstocks. Leaves broad and flat. Spikes axillary and terminal, separating spontaneously into joints at maturity. (Name from *τριβω*, to rub, perhaps in allusion to the polished fertile spike.)

1. **T. dactyloides, L.** Spikes (4–8' long) 2–3 together at the summit (when their contiguous sides are more or less flattened), and also solitary from some of the upper sheaths (when the fertile part is cylindrical); in var. **MONOSTACHYUM**, the terminal spike also solitary. — Moist soil, from Conn. to Penn. and Fla., near the coast, and from Ill. southward. Aug. — Culm 4–7' high; leaves like those of Indian Corn. This is one of our largest and most remarkable Grasses; sometimes used for fodder at the South.

**12. ROTTBÉLLIA, L. f.** (Pl. 15.)

Spikelets in pairs at each joint of a terete slender spike, awnless; one imperfect or rudimentary on a short and thick appressed pedicel; the other sessile and imbedded in an excavation of the joint of the rhachis, 1-flowered or rarely with a second staminate flower. Glumes 4, obtuse, the outer hard and cartilaginous, with a transverse depression next the base, the inner one boat-shaped and membranaceous, the 2 upper thin and delicate. Stamens 3. Styles 2. — Tall or coarse perennials, with rigid stems, and single cartilaginous spikes terminating the stem and axillary branches, chiefly subtropical. (Named for Prof. C. F. Rottboell, an excellent Danish botanist, who wrote much upon Gramineæ, Cyperaceæ, etc.)

1. **R. rugosa, Nutt.** Culm flattish, 2–4' high; leaves linear; spikes 1–2' long, the lateral ones on short clustered branches in the axils, often partly included in the sheaths of the leaves; sterile flower neutral; lower glume transversely rugose. — Low pine-barrens, from S. Del. (*W. M. Canby*) southward near the coast. Sept. — Oct.

**13. ERIÁNTHUS, Michx.** WOOLLY BEARD-GRASS. (Pl. 14.)

Spikelets spiked, in pairs upon each joint of the slender rhachis, one sessile, the other pedicelled, both 1-flowered, alike. Glumes 4, the 2 lower nearly equal, one 4–5-nerved, the other many-nerved; the 2 upper hyaline, one empty, the upper awned from the tip. Stamens 3. Grain free. — Tall and stout reed-like perennials, with the spikes crowded in a panicle, and clothed with long silky hairs, especially in a tuft around the base of each spikelet (whence the name, from *ἔριον*, wool, and *ἄνθος*, flower).

1. **E. saccharoides, Michx.** (Pl. 14, fig. 1, 2.) Culm (4–6° high) woolly-bearded at the joints; panicle contracted; the silky hairs longer than the spikelets, shorter than the awn; stamens 2. (*E. alopecuroides, Ell.*) — Wet pine-barrens, from N. J. and Ill. southward; rare. Sept., Oct.

2. **E. brevibarbis, Michx.** Culm (2–5° high), somewhat bearded at the upper joints; panicle rather open; silky hairs shorter than the spikelets. — Low grounds, Va., and southward.

**14. ANDROPÒGON, Royen.** BEARD-GRASS. (Pl. 14.)

Spikelets in pairs upon each joint of the slender rhachis, spiked or racemed, one of them pedicelled and sterile (staminate, pistillate or neutral), often a mere vestige, the other sessile, 1-flowered and fertile; lower glume the larger, coriaceous and nerved, blunt, the second carinate and acute, the 2 upper hyaline, the flowering glume awned from the tip. Stamens 1–3. Grain free. — Coarse, mostly rigid perennials, mostly in sterile or sandy soil; with lateral or terminal spikes commonly clustered or digitate; the rhachis hairy or plumose-bearded, and often the sterile or staminate flowers also (whence the name, composed of *ἀνθή*, man, and *πάρων*, beard).

\* Spikes digitate, thickish, short-bearded, the sterile spikelet staminate; stamens 3.

1. **A. furcatus, Muhl.** (Pl. 14, fig. 1–3.) Tall, 3–4° high, rigid, the naked summit of the culm (and usually some lateral branches) terminated by 2–5 rigid spikes; spikelets approximate, appressed; hairs at the base of the fertile spikelet, on the rhachis and on the stout pedicel of the awnless staminate spikelet short and rather sparse; awn of fertile flower long and bent; leaves flat, roughish, the lower ones long. ("A. provincialis, Lam.") — Common in dry sterile soil. Aug. — Oct.

\*\* Spikes with slender often zigzag rhachis, silky-villous,

+ Single and scattered along the branches, with the silky hairs shorter than the flowers; sterile spikelet conspicuous but mostly neutral; the fertile triandrous.

2. **A. scoparius, Michx.** Culms slender (1–3° high), with numerous paniculate branches; lower sheaths and narrow leaves hairy; spikes slender, scattered, mostly peduncled (1–2' long), very loose, often purplish, silky with lax dull-white hairs; sterile spikelet awn-pointed or awnless; the fertile about half the length of its twisted or bent awn. — Dry ground. July–Sept.

3. **A. maritimus, Chapm.** Smooth and glaucous; culms ascending from creeping rootstocks, 1–1½° high; leaves rather rigid, divaricate, their compressed sheaths imbricated; panicle short; peduncles included within the conspicuous bracts; rhachis and pedicels copiously ciliate with spreading hairs; glumes larger, 3–4" long. — Sandy sea-coast; Cape May, and south to Fla.

+ + In pairs or clustered; the copious soft-silky hairs much longer than the flowers; sterile spikelet a small neutral rudiment (in n. 4 and 5), or altogether wanting on the very plumose-hairy pedicel; fertile flower monandrous, its awn capillary; leaves narrow, the lower or their sheaths often rather hairy.

4. **A. argenteus, Ell.** Smooth; culms rather slender (1–3° high); spikes in pairs (rarely in fours) on short mostly exserted and loosely panicu-