

on the outer face, rather faintly nerved on the inner, rough-edged above, sharply toothed, spreading, a little longer than the scale. — Cold swamps and lake-borders, N. Eng. and eastern N. Y. to N. J.; rare.

* 12. *HYPARRHENE*. — 1. *Elongata*.

++ *Perigynium* very sharp-margined, firm, often thickened at base, spreading in open and at maturity stellate spikes.

118. *C. echinata*, Murray, var. *cephalantha*, Bailey. Rather stiff but slender, 1–2° high; leaves very narrow and involute, about the length of the culm; spikes 5–8, approximate or even aggregated into a head, green, compactly 15–30-flowered, short-oblong or nearly globular; perigynium ovate-lanceolate, rough on the margins above, nerved on both faces, spreading or reflexed at maturity, the beak long and prominent, longer than the sharp white scale. (*C. stellulata*, last ed.) — E. Penn. (*Porter*) to Mass. (*Morong*), and westward to L. Superior; rare. — Var. *CONFERTA*, Bailey. Very stiff; spikes contiguous or scattered, spreading, short-oblong or globular, dense; perigynium broadly ovate or even nearly round-ovate, very strongly nerved, reflexed or widely spreading. Near the sea-coast; uncommon. The perigynia resemble those of n. 112. — Var. *MICRÓSTACHYS*, Boeckl. Mostly very slender; spikes few, 3–10-flowered, usually tawny; perigynium small, lance-ovate, nerved on the outer face but usually nerveless on the inner, erect or spreading, the beak rather long or prominent. (*C. scirpoides*, Schkuhr. *C. sterilis*, Willd.) Swales, throughout; very common and variable. — Var. *ANGUSTATA*, Bailey. Exceedingly slender; spikes few and very few-flowered, mostly all contiguous; perigynium lanceolate or linear-lanceolate, twice the length of the scale or more. N. Y., Vt., and northward; rare.

++ ++ *Perigynium* scarcely sharp-margined, thin in texture, not thickened at base, mostly in closely flowered and rounded or oblong spikes.

= *Perigynium* ovate or nearly so, the beak short or none.

a. Bracts not prolonged.

119. *C. canescens*, L. Stiff and rather stout, 1–2½° high, glaucous and pale throughout, growing in stools; spikes 4–8, globular or oblong, very densely 20–50-flowered, approximate or somewhat scattered on the upper part of the culm, usually prominently contracted below with the staminate flowers; perigynium short-ovate, silvery-white and minutely punctulate, never thickened at base, faintly few-nerved, smooth throughout, ascending, the beak very short and entire; scale obtuse or acutish, about the length of the perigynium. — Cool swamps and bogs, N. Eng. to Penn., west and northward; frequent northward. (Eu.)

Var. *vulgaris*, Bailey. Very slender, lower, not glaucous, in small and loose tufts; spikes smaller and usually fewer, loosely flowered; perigynium mostly more beaked, prominently spreading. — Mostly in drier places; very common. Perigynium much shorter than in any form of n. 118.

Var. *alpicola*, Wahl. Low and stiff, or at lower altitudes becoming somewhat slender, seldom much over 1° in height; spikes small, globular or nearly so, dense, well defined and brown or tawny; perigynium as in the type, ascending. (*C. vitilis*, Fries.) — Mountains from N. Eng. to Ga., sparingly along our northern boundary, and far westward. (Eu.)

Var. *polystachya*, Boott. Erect and mostly strict, not glaucous, 1½–2½° high, scarcely tufted; leaves very lax and exceeding the culm; spikes oblong, more or less aggregated in an oblong interrupted head, the lowest 1 or 2 subtended by short scale-like bracts; perigynium somewhat spreading. (*C. arcta*, Boott.) Low woods, N. New Eng. to N. Minn.; rare. Resembles *C. echinata*, var. *cephalantha*.

120. *C. Norvégica*, Willd. Low and stiff, but rather slender, 1° high or less; leaves very narrow, mostly shorter than the culm; spikes 3–5, somewhat scattered, brown, globular or oblong, compactly many-flowered, the terminal one long-contracted below with the staminate flowers; perigynium very short-ovate, thick, the beak rough, a little longer than the very obtuse scale. — Salt marshes, Maine, and northward, rare. (Eu.)

121. *C. tenuiflora*, Wahl. Very slender and diffuse, 1–1½° high, in tufts; leaves very narrow and lax, shorter than the filiform culm; spikes 2–4, all loosely few-flowered and silvery-green, and aggregated into a small globular head; perigynium elliptic, obscurely nerved, smooth, beakless, spreading, about the length of the white thin scale. — Bogs, N. New Eng. to N. Minn.; local. (Eu.)

b. Bracts much prolonged, the lowest 2–3' long.

122. *C. trispérma*, Dewey. (Pl. 6, fig. 1–5.) Exceedingly slender, in small and loose tufts, the weak reclining culms 1–2° long; leaves soft and narrow, shorter than the culm; spikes 2–3, 1–3' apart, silvery-green, 2–3-flowered; perigynium very thin, finely nerved, the beak entire or nearly so; scale acute, very thin, usually shorter than the perigynium. — Cold bogs, throughout; common northward.

= = *Perigynium* ovate-lanceolate to linear-lanceolate.

123. *C. Deweyana*, Schwein. Weak, 1–1½° high; leaves flat and soft, shorter than the culm, yellowish-green; spikes 3–6, mostly oblong or sometimes but 2–3-flowered, loose, the upper ones contiguous but the lower 1 or 2 usually considerably separated on the zigzag rhachis and mostly subtended by a bract, all silvery-green; perigynium ovate-lanceolate or narrower, very thin in texture, nerveless, somewhat thickened below on the outer face, the long beak rough; scale very thin, acute or cuspidate, about the length of the perigynium. — Dry woods; common.

124. *C. bromoides*, Schkuhr. Lax, 1–2° high, in dense stools; leaves very narrow, about as long as the culm; staminate flowers variously situated in the head, sometimes a few spikes wholly sterile, rarely the plants dioecious; spikes 3–6, oblong or short-cylindric, erect, silvery-tawny or brown; perigynium linear-lanceolate, firm especially at the base, prominently nerved, the long and roughened beak toothed; scale sharp, shorter than the perigynium. — Open bogs; common.

* 12. — 2. *Ovales*.

++ *Perigynium* ovate-lanceolate, with winged margins.

125. *C. siccata*, Dewey. Extensively creeping, 1–2° high, erect; leaves firm, narrow, about the length of the culm; staminate flowers variously situated, usually some of the spikes wholly sterile; spikes 3–5, aggregated or separated, ovoid or short-oblong, silvery-brown; perigynium firm, nerved on

both faces, the long beak rough and toothed, the margins prominent or sometimes very narrow; scale acute, about the length of the perigynium. — Sandy fields and banks, N. Eng. to Ohio, west and northward; frequent.

++ ++ *Perigynium ovate-lanceolate or narrower, scale-like, with little distinction between body and margin.*

126. *C. Muskingumensis*, Schwein. Robust, erect, 2–3° high; leaves many and lax, loosely sheathing, those on the sterile shoots crowded near the top, all flat and long-pointed; spikes 6–12, contiguous, erect, narrowly cylindrical (often 1' long), becoming light brown and presenting a dried appearance, very densely flowered; perigynium linear-lanceolate (3" long), prominently nerved, ciliate on the white margins above, appressed, twice the length of the scale or more. (*C. arida*, Schwein. & Torr.) — Woods and coves, Mich. and Ohio to Ill. and Wisc.; local.

127. *C. tribuloides*, Wahl. Stout and erect, 2–3° high; leaves narrower than in the last, loosely sheathing; spikes 6–15, aggregated into an oblong or somewhat interrupted heavy head, short-oblong or sometimes nearly globular, green or tawny-green, compact, not narrowed above; perigynium linear-lanceolate (3" long), obscurely nerved, erect but the points conspicuous, rough-margined, nearly twice the length of the scale. (*C. lagopodioides*, Schkuhr.) — Open swales; frequent. — Var. *TURBATA*, Bailey. Culm softer and often lax; the leaves broader; spikes more loosely disposed, forming a head 1–2' long, which is slender and more or less interrupted but always erect, green, becoming tawny, if at all, only when the perigynia begin to fall, obovate-oblong ($\frac{1}{4}$ to rarely $\frac{1}{2}$ long), contracted below; perigynium ascending and more appressed, the points therefore not conspicuous. Woods, throughout; rare. — Var. *REDUCTA*, Bailey. Very slender, 1–2° high, the culm projecting beyond the leaves; spikes 2–10, small and nearly globular (usually less than 3" broad), all usually distinct, the lowest separated, brown, especially at maturity, the head often flexuose; perigynium small, the points spreading and conspicuous. Coves, N. Eng. to the Dakotas; infrequent.

Var. *Bébbii*, Bailey. Stiff or rather slender, erect, 1–2½° high; head dense, ovoid or oblong ($\frac{1}{4}$ – $\frac{1}{2}$ or very seldom 1' long), the lowest spike only rarely distinct, straw-colored; spikes small (3" long or less), their axes ascending; bracts at the base of the head small or none; points of the small perigynium conspicuous. (*C. Bébbii*, Olney.) — Dry low grounds, throughout; common.

Var. *cristata*, Bailey. Stout and stiff, 1½–3° high; head more or less open or at least the lower 1 or 2 spikes commonly distinct, 1' long or more, green; spikes larger than in the last and almost exactly globular, their axes more divergent or fully horizontal; bracts usually conspicuous, sometimes one of them foliaceous; perigynium spreading, the points more conspicuous. (*C. cristata*, Schwein.) — Moist ground, throughout from Penn. northward; common.

128. *C. scoparia*, Schkuhr. Rather slender but erect, 1–2½° high; leaves very narrow, shorter than the culm; head short and comparatively thick, always tawny or brown, bractless or nearly so; spikes 3–8, all contiguous or bunched, ovate-oblong, always prominently narrowed or cone-shaped above, ascending; perigynium as in n. 127, but erect or ascending. — Open swales, throughout; common eastward.

Var. *minor*, Boott. Much smaller, 6–10' high, the leaves very narrow; head very small and darker brown; spikes very small (2–4" long). — Rocky and sterile places, northward; frequent.

++ ++ *Perigynium ovate or broader, thickened in the middle, wing-margined (in n. 129 marginless).*

= Head silvery-brown, silvery-green, or silvery-whitish.

129. *C. adusta*, Boott. Very stiff and stout, 1½–2½° high, in dense tufts; head very heavy, erect, varying from globular to oblong, silvery-brown; spikes 5–10, globular and heavy, all aggregated or sometimes distinct, the lowest 1 or 2 subtended by a short and very broad-based, nerved and pointed bract; perigynium broadly ovate, wingless or very nearly so, plump, shining, nerved on the outer face but nerveless on the inner, filled by the large achene; scale acute, about the length of the perigynium. (*C. pinguis*, Bailey.) — Dry and mostly hard soils, Mt. Desert, Maine (*Greenleaf*), and northward, and Crawford Co., Mich. (*Bailey*), to N. Minn., and far northwestward; local.

130. *C. fœnea*, Willd. Slender, erect or the top of the culm flexuose, 1–2° high; head long and weak, often nodding; spikes 5–8, small, nearly globular and much contracted below, silvery-green, alternately disposed; perigynium varying from ovate to long-ovate, very thin, much longer than the small achene, prominently rough-margined, strongly many-nerved on both faces, especially on the small inner face; bracts entirely wanting or inconspicuous. (*C. adusta*, last ed.) — Dryish coves, N. Eng. to Penn. and Minn.; not common. — Var. *PERPLEXA*, Bailey. Mostly taller and stouter; spikes larger and less attenuated or even truncate below, approximate or even aggregated, the head erect or nearly so and the lowest bract occasionally prominent; perigynium thicker and firmer in texture. N. Eng. to Minn.; infrequent.

131. *C. silicea*, Olney. Stiff, 1–2° high, in clumps; leaves very narrow, becoming involute, not exceeding the culm; head 1–3' long, usually flexuose or nodding above the middle at maturity; spikes 5–8, silvery-white or silvery-tawny at full maturity, all more or less separated, ovate, conspicuously contracted below and cone-shaped above, erect on the culm; perigynium very broad-ovate and very thin, obscurely nerved, appressed, about as long as the acute colorless scale. (*C. fœnea*, var. *sabulonum*, last ed.; *C. straminea*, var. *moniliformis*, Tuckerm.) — Sands of the sea-shore, Maine to N. J.; frequent.

= Head dull brown or green (usually somewhat silvery in var. *fœnea* of n. 132).

132. *C. straminea*, Willd. Very slender, erect, but the top of the culm often flexuose, 1–3° high; leaves narrow and long-pointed, stiff, shorter than the culm; spikes 3–8, tawny, very small (2–3" broad), globular or sometimes a little tapering below from the presence of many staminate flowers, usually all entirely distinct on the very slender, often zigzag or flexuose rhachis; bracts none, or only the lowest conspicuous; perigynium small and ovate, nerved on both faces but never unusually prominently nerved on the inner face (as is the perigynium of n. 130), the points spreading and rather conspicuous; scale acute, about the length of the perigynium. (*C. straminea*, var. *tenera*, last ed.) — Dryish coves and fields; common. Immensely variable.

Var. *mirabilis*, Tuckerm. Culm long and mostly weak, often 4° high, much longer than the loose leaves; spikes 4–8, larger, usually all contiguous

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.