

Fig. 28.—Panicum, inflorescence and spikelet.

- h. Panicle 1.0-2.5 dm long; spikelets 2.4-2.7 mm long, with the upper glume equalling or longer than the sterile lemma (Fig. 28).
6. *P. longifolium*
- h. Panicle 0.3-1.5 dm long; spikelets 2.7-3.4 mm long, with the upper glume shorter than the sterile lemma. *P. longifolium* var. *tusketense*
- a. Basal leaves different from those of the stem, shorter and stouter, forming a winter rosette; all our smaller native *Panicums* belong here
- i. Leaves narrow, often 20 times as long as wide, exceeding the panicles; nodes bearded; ligule less than 1 mm long
- j. Spikelets about 3.5 mm long, sharp-pointed or beaked (Fig. 28); on sand. 7. *P. depauperatum*
- j. Spikelets 2.2-2.4 mm long, blunt and not beaked. 8. *P. linearifolium*
- i. Leaves not nearly so elongate.
- k. Leaf-blades less than 1 cm wide, not heart-shaped at the base; spikelets less than 2.5 mm long.
- l. Ligule less than 1 mm long; spikelets 2.2-2.4 mm long; culms, leaves and sheaths glabrous except at the nodes, often with a purplish tinge, the whole plant having a smooth appearance (Fig. 28). 9. *P. boreale*
- l. Ligule of conspicuous hairs 2-5 mm long; spikelets less than 2.1 mm long.
- m. Sheaths glabrous; plants 3-9 dm high, with the panicle much longer than wide with strongly-ascending branches; lateral panicles common; spikelets about 1.5 mm long. 10. *P. spretum*
- m. Sheaths more or less pubescent.
- n. Spikelets 1.3-1.5 mm long; small plants, rarely over 4 dm high.
- o. Axis of the panicle puberulent to glabrous; lower panicle-branches ascending, little branched, not tangled; ligule barely 1 mm long; sheaths and culms not papillose -pubescent. 11. *P. meridionale*
- o. Axis of panicle usually pilose; lower branches spreading or reflexed, tangled; ligule 2-5 mm long; papillose pubescent. 12. *P. lanuginosum* var. *implicatum*
- n. Spikelets 1.6-2.1 mm long.
- p. First glume less than one-third the length of the spikelet, acute or obtuse; panicle-branches slender, spreading, the lower often reflexed; sheaths glabrous or with spreading hairs.
- q. Axis of panicle spreading pilose, at least on the lower internodes; blades mostly pilose above and pubescent below. *P. lanuginosum* var. *fasciculatum*
- q. Axis of panicle smooth or with at most a few appressed hairs; blades glabrous to sparsely pilose above and minutely pubescent beneath. *P. lanuginosum* var. *septentrionale*
- p. First glume nearly one-half the length of the spikelet, acute; panicle-branches stout, ascending; sheaths with appressed or ascending hairs; blades long-pilose on both sides (Fig. 28). 13. *P. subvillosum*
- k. Leaf-blades 1-3 cm wide, glabrous, rounded or heart-shaped at the base; spikelets 2.5-3.8 mm long.
- r. Blades of leaves rounded at the base, mostly 1-2.2 cm wide; spikelets few on strongly-ascending branches of the narrow panicle, 3.7-4 mm long, the first glume half the length of the spikelet. 14. *P. xanthophysum*

r. Blades clasping-cordate at base, 1-3.5 cm wide; spikelets numerous on flexuous spreading branches, 2.5-3 mm long; first glume one-fourth the length of the spikelet (Fig. 28).
 15. *P. clandestinum*

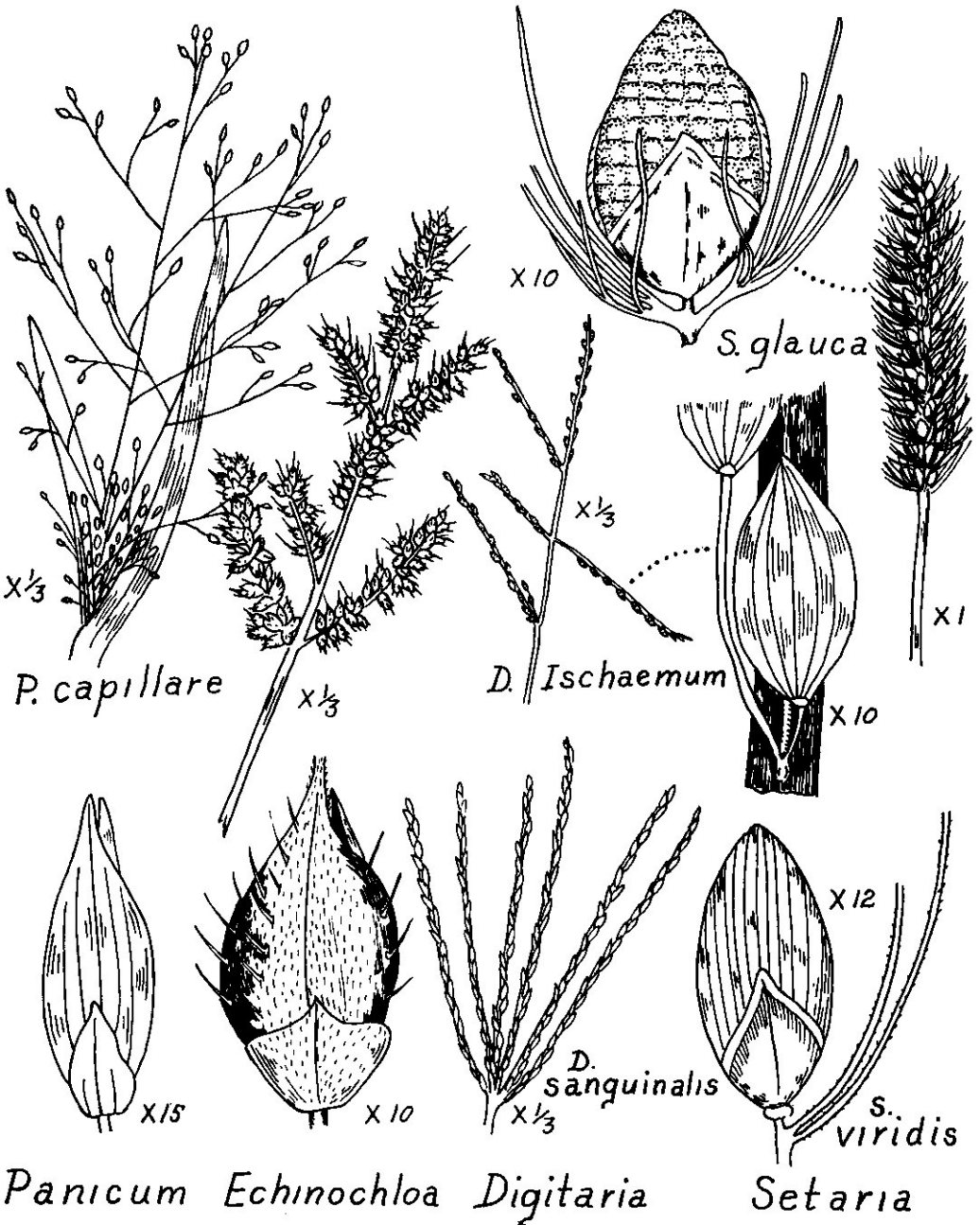


Fig. 29.—Grass inflorescences and spikelets.

1. *P. dichotomiflorum* Michx. Fig. 28. Map 99.

Scattered and rather rare, in the Tusket Valley, Yarmouth Co., on sandy and gravelly shores of lakes and borders of savannahs; found in similar places beside Harper and Welshtown Lakes, Shelburne Co. All of our native plants apparently belong to var. *geniculatum* (Wood) Fern., the coastal extreme. Inland, the typical plant may become weedy and a plant found in the railroad yard at Halifax was probably introduced from central Canada.

Fla. north to N.S. and inland to Minn.

2. *P. capillare* L. Fig. 29. WITCH-GRASS

Scattered in sandy fields, along roadsides and in waste places, occasionally becoming a weed in gardens. Maine southward and westward, probably introduced into N.S.

Var. *occidentale* Rydb. is a smaller plant with more exerted panicles and larger spikelets. Occasionally seen about railroad yards, as at Windsor Junction, Halifax and Sydney; occasionally elsewhere around farms and obviously introduced. Widely distributed and more common westward.

N.S. to B.C. south to W. Va., Texas and Calif.

3. *P. philadelphicum* Bernh.

Known by one collection from the Province: cranberry bog, Bridgewater, (McLellan, Sept. 11, 1939). This collection belongs to var. *Tuckermanni* (Fern.) Steyermark & Schmoll (Rhodora 41: 86-90. 1939).

N.S.; Que. to Minn. south to Va.

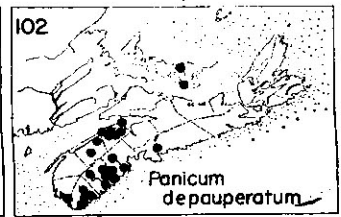
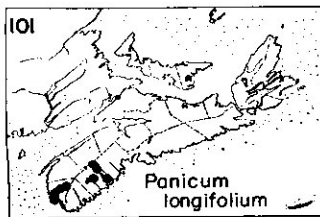
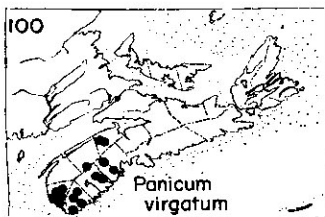
4. *P. miliaceum* L. MILLET

Plants large, 2-10 dm high, with large, usually drooping panicles. Occasionally planted in the Province and sometimes found along roadsides and in waste places; not persisting. Cultivated strains and varieties of diverse appearance may be found. Eurasia.

5. *P. virgatum* L., var. *spissum* Linder Fig. 28. Map 100.

A large coarse species found on sandy, gravelly or cobbly beaches, in thickets, bogs and on peaty borders of lakes; scattered throughout the southwestern part, becoming rarer to the lakes of Kings and Lunenburg Cos. This eastern variety, with short, ascending, rather than long creeping rootstocks, grows from N.S. to Penn. and reaches its best development in N.S. and eastern Mass.

N.S. to Sask. south to the Gulf States; Bermuda; S.A.



6. *P. longifolium* Torr. Fig. 28. Map 101.

Found in two places in the interior of Queens Co. by Weatherby; and along the Tusket River in Yarmouth Co. The plants occurring on the sandy or gravelly beaches and peaty margins of lakes in the Tusket River Valley have been referred to a separate indigenous variety, var. *tusketense* Fern. The distinctions given between the two are included in the key. However, later collections from Queens Co., and even from the Tusket Valley, seem to be more typical of the species than of the variety.

A coastal-plain plant; Fla. to Tex. north to Ohio, Mass. and N.S.

7. *P. depauperatum* Muhl., var. *psilophyllum* Fern. Fig. 28. Map 102.

Very common on the sandy soils of the Annapolis Valley, and scattered on sandy, gravelly or sterile soils elsewhere from Shelburne to Halifax County. All our plants belong to this northern variety, characterized by the glabrous sheaths. Its forma *cryptostachys* Fern. is a dwarfed form growing in very sterile locations and bearing only reduced basal panicles of 1-4 spikelets. The type specimens are from dryish, open sandy plains, Middleton. Scattered throughout the range of the variety.

N.S. to Minn. south to Ga. and Texas.

8. *P. linearifolium* Scribn., var. *Wernerii* (Scribn.) Fern.

Represented by collections from sandy soils in the vicinity of Coldbrook, Kings Co. This northern variety, with essentially glabrous sheaths, is known from Maine to Minn. south to Va. and Texas. These plants, found by Roland and Dore, are rather small and very difficult to distinguish among the other grasses. Its distribution in N.S. may therefore be much wider.

9. *P. boreale* Nash Fig. 28.

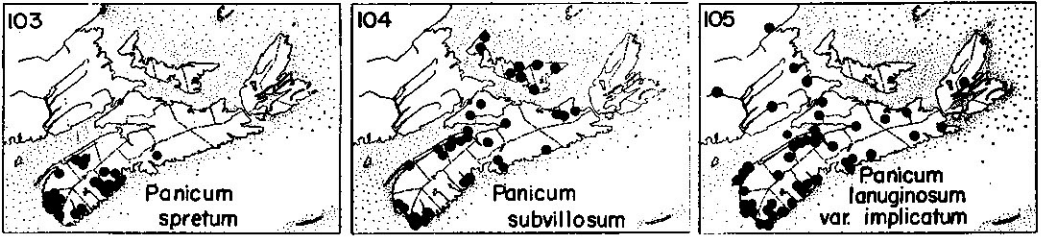
Common in damp or moist situations throughout. This neat grass, around 3-4 dm high, is the main *Panicum* in the northern and eastern part of the Province, where it can usually be found in moist situations either in the sun or in shade.

Nfld. to N.J. and Ind.

10. *P. spretum* Schultes Map 103.

A tall, erect plant 3-9 dm high with a rather diffuse manner of bearing the panicles; wet or peaty swales, gravelly or sandy upper borders of lake beaches, or wet margins of pools and ditches; scattered from Yarmouth Co. east to Annapolis and Halifax Cos. and, as with most of our *Panicums*, much more common in the southwestern counties.

A coastal-plain plant; Fla. to Tex. north to N.S.



11. *P. meridionale* Ashe

Known from but one station east of Mass.; collected by the Gray Herbarium Expedition (1922) on the cobbly beach of Gavelton (Butler's) Lake, Gavelton, Yarmouth Co. The status of this plant is thus largely unknown; it should be looked-for further in southwestern N.S.

N.S.; Mass. to Minn. south to Ga.

12. *P. lanuginosum* Ell. Fig. 28. Map 105.

This is an extremely variable and difficult species; some combinations of characters appear more frequently than others and have been recognized as varieties. See Fernald, *Rhodora* 23: 223-228. 1921.

Var. **implicatum** (Scrib.) Fern. is a small plant 2-5 dm high, generally erect but loosely branching from the middle or lower nodes. It is one of the commoner forms, abundant in the southwestern counties and becoming gradually scarcer eastward to C.B.; meadows, bogs, heavy soils and in low areas in sand, often in damp soil which is devoid of taller vegetation. Plants more nearly glabrous on the panicle axis and leaves approach var. *Lindheimeri* (Nash) Fern.

Var. **fasciculatum** (Torr.) Fern. is often a much taller and stouter plant than the preceding, although grading into it; growing on lake shores and in damp locations in southwestern N.S. and gradually becoming rarer eastward; not nearly as abundant as var. *implicatum*.

Var. **septentrionale** Fern. Rare; known from a wet sphagnous swale at the border of Beaver Lake, Yarmouth Co.; and from dry pine and oak woods on steep slopes along the LaHave River, Bridgewater (Fernald, 1921); roadside at Lowe's Landing, Queens Co.

Nfld. to Minn. south to Fla. and Texas.

13. *P. subvillosum* Ashe Fig. 28. Map 104.

This is the most common species of *Panicum* through the center of the Province and in the Annapolis Valley, extending eastward only to James River in N.S. but found by Erskine to be scattered throughout P.E.I.; dryish sandy or rocky open soils, fields, roadsides and barrens. This stiffly erect plant, 2-4 dm high, is a neat plant with usually a decidedly reddish tinge to the panicle.

N.S. to Sask. south to Penn. and Mo.

14. *P. xanthophysum* Gray

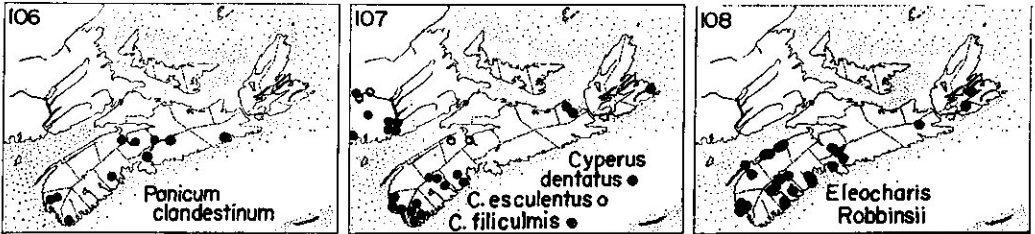
Collected by J. Macoun, 1910, in open thickets at Bridgewater, Lunenburg Co.

Found in dry, sandy or rocky soil in open or thin woods from Maine to Man. south to Penn. and Mich.

15. *P. clandestinum* L. Fig. 28. Map 106.

Plants coarse with very broad leaves, often growing in large patches where found: occasional in the Tusket Valley, Yarmouth Co.; along the Clyde River; the LaHave R. and in damp, rocky or gravelly thickets of the upper border of cobble beach, Wentzell Lake, Lunenburg Co.; scattered eastward, always along river banks, at Gaspereau in Kings Co., the Herbert River by the bridge on the Rawdon Road in Hants Co., the Shubenacadie, the Gay's River, and at Middle Musquodoboit, with the most eastern station being on the St. Mary's River above Sherbrooke in Guysborough Co. (Erskine, 1953). This tall, bright-green species makes a very handsome plant when in flower or fruit.

N.S.; central Me. to Iowa south to Fla.

50. *ECHINOCHLOA* Beauv.1. *E. crusgalli* (L.) Beauv. Fig. 29. BARNYARD-GRASS

This is a very variable grass in all its characteristics; a common weed in waste ground, along ditches, in gardens and around dwellings, generally growing in rich or moist soil, often a bad weed in cultivated ground. Forma *mitis* (Pursh) Peterm. has the spikelets awnless or nearly so, the awns being less than 3 mm long. Forma *longiseta* (Trin.) Farw. is the opposite extreme with many of the spikelets having awns 2.5-3.5 cm long. Both variations are found in the Annapolis Valley and may be expected throughout.

Var. *frumentacea* (Roxb.) Wight has been occasionally cultivated under the name of Japanese Millet or Billion-dollar Grass. The racemes are thick with incurved, appressed branches; spikelets awnless and purplish.

Native of Europe; now almost cosmopolitan.

51. SETARIA Beauv. FOX-TAIL

Introduced garden weeds, the spikes short-cylindrical with long bristles.

- a. Bristles below each spikelet numerous; spikelets 3 mm long, the sterile lemma transversely rugose; base of leaf-blade with a few flexuous hairs; margin of sheath glabrous. 1. *S. glauca*
- a. Bristles below each spikelet 1-3; spikelets 2.0-2.5 mm long, the sterile lemma smooth or nearly so; blade glabrous; margin of sheath ciliate.
- b. Spikelets articulated below the glumes, falling away entire; panicle cylindrical, not interrupted.
- c. Panicle green, densely-flowered; about 6 cm long; bristles 1.0-1.5 cm long. 2. *S. viridis*
- c. Panicle purplish-tinged, irregularly-flowered, generally 2-3 cm long; bristles shorter, less than 1 cm long. *S. viridis* var. *Weinmanni*
- b. Spikelets articulated above the glumes, the fruit shelling out and leaving the glumes and sterile lemma behind; panicle large, usually much interrupted, green, yellow or purplish. 3. *S. italica*

1. *S. glauca* (L.) Beauv. Fig. 29. YELLOW FOX-TAIL

A weedy annual common in the Annapolis Valley on the light and sandy soils, in gardens, orchards and along roadsides; rarer throughout the rest of the Province but to be expected anywhere.

Introduced from Eu. and widely distributed.

2. *S. viridis* (L.) Beauv. Fig. 29. GREEN FOX-TAIL

In light to heavy soils, in gardens, waste places, fields, orchards and along roadsides, more general and more widely distributed than the preceding species, often a common weed; common in the Annapolis Valley and scattered throughout the rest of the Province. Introduced from Eu.; throughout N.A.

Var. *Weinmanni* (R. & S.) Brand is a smaller plant with a purplish color, and culms more or less decumbent and bent at the base; scattered on light soils in the Annapolis Valley and occasionally around railroad yards and waste places elsewhere.

Introduced from Eu.; Nfld. to Ia. south to Va.

3. *S. italica* (L.) Beauv. FOX-TAIL MILLET

A cultivated form with robust culms, broad blades and large, often lobed panicles. Many different varieties and strains have been developed so that plants of very diverse appearance may be found. Occasionally cultivated for summer forage and found as an escape in waste places.

Eurasia; widely introduced.

19. CYPERACEAE SEDGE FAMILY

The sedge family comprises a large group of grass-like plants which are very common in wet areas and on poorly-drained soils. The leaves are often in three longitudinal rows and the stems may be triangular in cross-section. The simple flowers are borne directly in the axils of scales and are grouped to make heads or spikes. Each flower produces a dry, one-seeded fruit called an achene.

- a. Stamens and pistils in the same flower; achenes in the axils of bracts of the inflorescence, not enclosed in sac-like perigynia.
- b. Spikelets with 6-many fertile flowers; or, if fewer-flowered, terminal without leafy bracts.
- c. Scales of the spikelets strictly 2-ranked, folded and keeled.
- d. Inflorescence terminal; flowers without bristles; achenes beakless; stem solid, more or less 3-angled. 1. *Cyperus*
- d. Inflorescence lateral; flowers with 6-9 bristles; achenes long-beaked; stem hollow, round (Fig. 30, b). 2. *Dulichium*
- c. Scales of the spikelet spirally arranged and overlapping.
- e. Spikelet solitary and terminal; leaves reduced to sheaths; base of the style persistent as a tubercle at the top of the achene; bristles present, little longer than the achene (Fig. 30, d, etc.). 3. *Eleocharis*
- e. Spikelets one to usually many; leaves present, or occasionally absent in *Scirpus*; base of the style not persistent, or if so not sharply delimited from the achene.
- f. Bristles 0-8, usually short, if exerted then with the spikelet solitary, or the spikelets very small and numerous (Fig. 32). 4. *Scirpus*
- f. Bristles 6, 4-6-cleft to near the base and appearing to be very numerous, long and exerted (Fig. 33). 5. *Eriophorum*
- b. Spikelets with 1-2 fertile flowers and several empty lower scales; inflorescence subtended by one to several leafy bracts.
- g. Style 2-cleft, the enlarged base forming a persistent tubercle on the achene; bristles present (Fig. 34, a-c). 6. *Rhynchospora*
- g. Style 3-cleft, the base not enlarging to form a tubercle; bristles absent (Fig. 34, d). 7. *Cladium*
- a. Stamens and pistils in separate flowers, often in separate spikes; achene enclosed in a sac-like covering called a perigynium, with the style projecting from the apex (Fig. 35-45). 8. *Carex*

1. CYPERUS L. GALINGALE

This genus, after which the family is named, consists of around 40 species in northeast N.A. The plants are usually erect, 1-6 dm high, with a characteristic terminal, branching inflorescence with long spikelets. N.S. is at the northern limit of its range and the plants are rare and local.

- a. Spikelets long and terete, the scales pointing forward and overlapping less than half of the next scale above, arranged along an axis. 1. *C. esculentus*
- a. Spikelets flattened, with several to many attached at one point on the inflorescence (Fig. 30, a).

- b. Scales of the spikelet spreading and overlapping most of the next scale above on the same side; spikelets in many sessile and stalked groups to make an open inflorescence. 2. *C. dentatus*
- b. Scales of spikelet overlapping less than half their length; inflorescence usually a single semi-globose sessile group of spikelets, or occasionally one to a few groups on long slender branches. 3. *C. filiculmis*

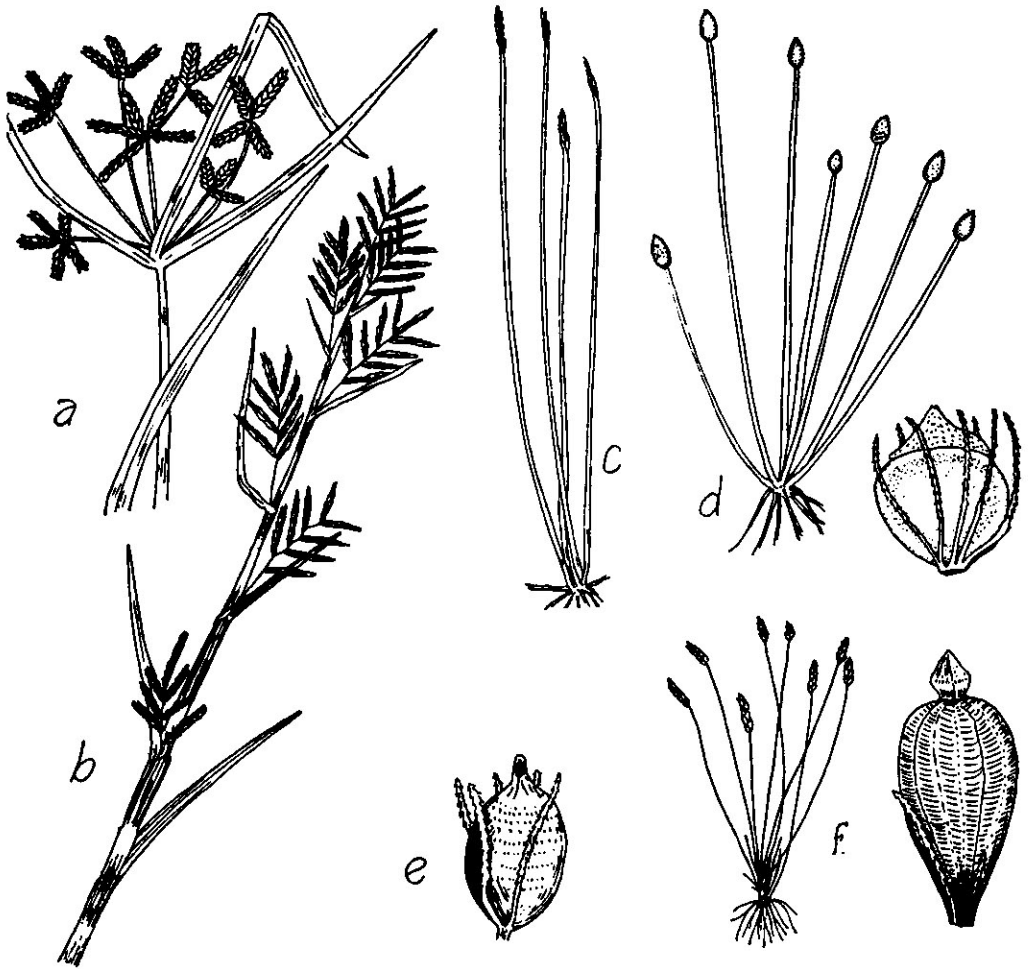


Fig. 30.—*Cyperus dentatus*. a, top of plant, x $\frac{1}{2}$. *Dulichium arundinaceum*. b, top half of plant, x $\frac{1}{2}$. *Eleocharis Robbinsii*. c, plant, x $\frac{1}{4}$. *E. obtusa*. d, plant, x $\frac{1}{4}$; achene, x 12. *E. rostellata*. e, achene, x 8. *E. acicularis*. f, plant, x $\frac{1}{4}$; achene, x 25.

1. *C. esculentus* L. Map 107. NUT-GRASS

A local introduced weed which may be aggressive since it spreads by means of many small underground nutlets or tubers; earlier found in an orchard at Starr's Point, Kings Co.; now known to be a bad weed in a low sandy field at Somerset.

N.S. to Wash. south to Mexico; tropical America; Eu.

2. *C. dentatus* Torr. Map 107.

Characteristic of many sandy and gravelly lake-shores and beaches; common in Yarmouth Co., scattered east at least to Lunenburg Co. (Fernald, 1922).

N.S. to Ind. south to W. Va.

3. *C. filiculmis* Vahl Map 107.

Collected on sand behind the beach, Pomquet, Antigonish Co. by W. G. Dore in 1940; since collected also from a sand beach at Antigonish Harbour. The plants are immature and probably belong to var. *macilentus* Fern., a smaller, more northern form with 4-8-flowered spikelets.

N.S.; Me. to Minn. south to Fla.

2. **DULICHIMUM Pers.**1. *D. arundinaceum* (L.)Britt. Fig. 30, b.

Muddy shores, around lakes and ponds, and occasionally in poorly-drained swamps; throughout, especially abundant in the Atlantic region of the Province; common in the dense vegetation along the bog meadows above the influence of the tide on the Fundy marshes.

Nfld. to Wash. south to Fla. and Tex.

3. **ELEOCHARIS R.Br. SPIKE-RUSH**

A very common group of plants with stiff, leafless culms and but one compact spike at the tip of each fertile culm. In many cases identification is possible only when mature achenes are present. Fernald, M. L. and A. E. Brackett. The representatives of *Eleocharis palustris* in North America. *Rhodora* 31: 56-77. 1929. Svenson, H. K. Monographic studies in the genus *Eleocharis*-V. *Rhodora* 41: 1-19; 43-77, 90-110. 1939.

a. Culms sharply 3-angled in cross-section; spikelet with 3-9 scales, barely broader than the culm; achenes minutely reticulate, tipped by a flattened tubercle.

1. *E. Robbinsii*

a. Culms more than 3-angled in cross-section; spikelets usually conspicuously different from the culm.

b. Achenes without conspicuous tubercles, the summit being of a slightly different texture than the body of the achene.

c. Culms slender (less than 1 mm thick), all ascending, usually less than 1 dm tall; stolons often with small tubers; spikelets flattened, 2-9-flowered.

d. Culms 1-7 cm high, often in dense mats or tiny clumps; spikelets 2-4 mm long; scales green or pale brown, 1.5-2.5 mm long; achenes 0.9-1.5 mm long; usually of saline habitats.

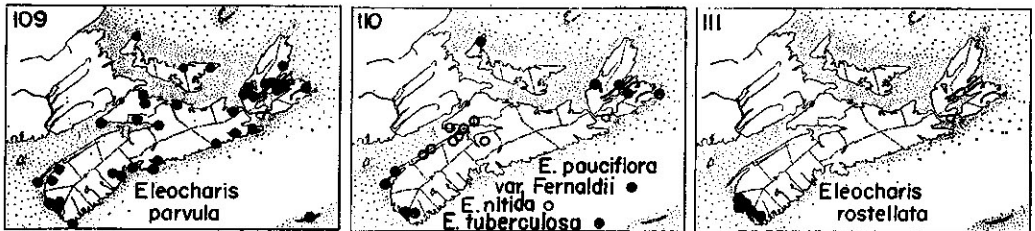
2. *E. parvula*

d. Culms 3-15 cm high, from creeping rhizomes; spikelets 4-7 mm long; scales purple or brown-tinged, 3-8 mm long; achenes 1.8-2.5 mm long; usually of alkaline habitats.

3. *E. pauciflora*

- c. Culms coarse (more than 1 mm thick), strongly compressed, 1-5 dm tall, the lower ones arching and often rooting at the tips; stolons absent; spikelets not flattened, 0.6-2 cm long, 12-20-flowered; usually in thick clumps.
4. *E. rostellata*
- b. Achene with tubercle of conspicuously different texture than the body of the achene, usually articulated with the achene.
- e. Achenes with prominent straight longitudinal ridges separated by numerous slender cross-bars; scales 2-3-ranked, membranaceous; culms capillary, less than 0.5 mm thick; spikelets flattened, often reddish-purple.
5. *E. acicularis*
- c. Achenes lacking prominent straight longitudinal ridges; culms various; spikelets never flattened.
- f. Achenes with deep coarse regular honeycomb reticulations; tubercle nearly as large as the achene body; scales coriaceous or cartilaginous; in dense stiff tussocks.
15. *E. tuberculosa*
- f. Achenes without coarse deep honeycomb reticulations; tubercle always smaller than the achene body; scales membranaceous to sub-herbaceous.
- g. Plants in clumps (occasionally with soft threadlike rhizomes), without firm rhizomes and stolons.
- h. Upper sheaths towards the culm-base loose with white scarious tips; plant small, tufted; outer scales of spikelet ovate-oblong with prominent green mid-ribs and brown, purplish or pale sides, round-tipped; mature achenes olive to dark brown, with tubercle green.
6. *E. olivacea*
- h. Upper sheaths close with herbaceous to coriaceous orifices; plants in clumps; achenes chestnut brown, with a flattened deltoid to conic brown tubercle.
- i. Base of the broadly deltoid tubercle nearly covering the summit of the achene, slightly constricted at the base.
7. *E. obtusa*
- i. Base of conic tubercle covering about two-thirds of the achene, not constricted at the base.
8. *E. ovata*
- g. Plants stoloniferous with firm reddish, purple or black rhizomes or stolons.
- j. Achenes biconvex, plump, glossy chestnut brown, smooth or shallowly reticulate, mostly covered by sub-persistent scales; bristles usually present.
- k. Basal scales of spikelet usually 2 or 3 and below the thinner fertile scales; culms 1-5 mm thick at the summit of the upper sheath; bristles commonly elongate; tubercle variously shaped, from lanceolate to truncate onion-shaped.
9. *E. Smallii*
- k. Basal scale solitary, like a spathe and often encircling the base of the spikelet; culms filiform, 0.3-2 mm thick at the summit of the upper sheath.
- l. Spikelet closely many (30-)flowered, linear-lanceolate to slenderly ovoid; single scale at base of spikelet to 1 mm long, pale brownish; fertile scales membranaceous, closely appressed; culms usually dull glaucous green; achenes 0.7-1 mm thick.
10. *E. erythropoda*
- l. Spikelets loosely few (5-30) flowered, lanceolate to ovoid; single scale to 2 mm long and glossy; fertile scales firm, lustrous, loosely ascending; culms usually glossy dark green; achenes 1-1.5 mm thick.
11. *E. halophila*
- j. Achenes trigonous, yellowish to olivaceous, their surfaces granular to wrinkled or papillate, often persisting after the scales fall; bristles often absent or soon disappearing.
- m. Tips of upper sheath of culm white-tipped; culms not often exceeding 9 cm high, often arching; spikelets 1.5-4.5 mm long; achenes 0.7-0.8 mm long, sharply angled; tubercle truncate, with a central apiculation; bristles absent.
12. *E. nitida*

- m. Tip of upper sheath of culm dark-girdled; culms usually exceeding 8 cm, rarely arching; spikelets usually more than 5 mm long; achenes 0.9-1.5 mm long, not sharply angled; tubercle usually conic; bristles present.
- n. Culms 4-5-angled; mature achene olivaceous; the reticulations usually deep and without prominent cross-bands; tubercle conic and about one-third the length of the achene; rhizomes normally 1-1.5 mm thick, soft and flexible. 13. *E. tenuis*
- n. Culms 6-8-angled, usually coarse and wiry, at least 1 mm thick; mature achene yellow to orange, lacking shallow reticulations but with many prominent transverse bands; tubercle truncate-conic; rhizomes coarse, dark purple, wiry and more than 1.5 mm thick. 14. *E. elliptica*



1. *E. Robbinsii* Oakes Fig. 30, c. Map 108.

Readily distinguished from all other native species. It grows in the shallow water of peaty muck-margined lakes; most common from southwestern N.S. to around Halifax and becoming scattered to rare to central C.B.

Florida north via the coastal plain into N.S. and extending west to Mich. and Ont.

2. *E. parvula* (R. & S.)Link Fig. 31, b. Map 109.

This species can be confused with no other found in saline or brackish habitats except *E. acicularis*. *E. pauciflora* is occasionally found near the sea but its achene is smaller and the shape is different. Brackish shores, often forming an extensive turf around ponds; with a broken distribution around the whole coast except for northern C.B.

A circumpolar temperate species with disjunct populations in Cuba and Brazil.

3. *E. pauciflora* (Lightf.)Link, var. *Fernaldii* Svenson Map 110.

Its resemblance to *Scirpus cespitosus* is superficial: the *Scirpus* grows in dense cespitose clumps and has a sharply triangular achene. Rare in N.S., generally in alkaline marshes and bogs in a few stations in central C.B. and on Digby Neck; occasionally on maritime cliffs.

Circumboreal species with a disjunct population in the deserts of Chile: the variety is restricted to N.S.; Nfld. to James Bay south to N.J., Ohio and Iowa.

4. *E. rostellata* Torr. Fig. 30, e. Map 111.

This superficially resembles *E. Smallii* but the culms are strongly compressed and more wiry and it has a coarse stem-base and generally cespitose habit. The culms are often very long and arching with many rooting at the tip. The achene is characteristic (Fig. 30, e) and does not resemble that of any other N.S. species. Confined to salt marshes, presumably restricted to the southwestern area; saline or brackish marshes and swales of Yarmouth Co.; Sand Beach, Chebogue, Tusket and Argyle and along the shore up to the Yarmouth-Digby line.

Fla. to southern Me. and N.S.; West Indies; around the Great Lakes; and on alkaline regions from southern B.C. to Mexico and south.

5. *E. acicularis* (L.)R. & S. Fig 30, f.

An extremely variable species rarely found with ripe achenes. Among beach pebbles of lake-margins the plants form reddish tufts; on muddy shores they form a depressed mat of filiform green culms; and among reeds of swamp margins they form a tangled green mat. Many variants have been given formal names but most of these are ecological responses to changing environment, particularly of submergence. The submerged form is recognized by stiff-appearing tufts (that relax when removed from the water) of short green, generally sterile culms. These are generally 3-4 inches long, but may exceed 8 or 9, especially when growing in rapidly-flowing water. A form with bristles absent has been found around Cape Cod; collected at Great Pubnico Lake in Yarmouth Co. (Svenson, *Rhodora* 31: 190. 1929).

Common near most freshwater bodies throughout; not noted on Sable Island.

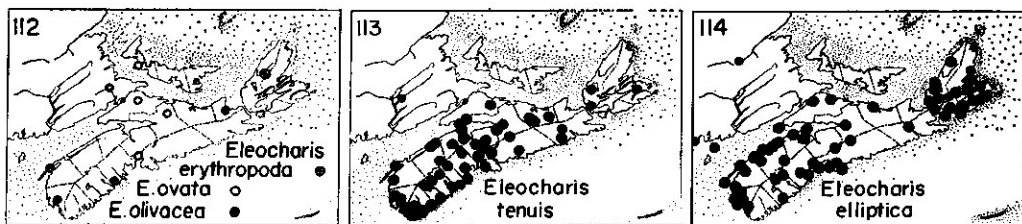
Circumboreal; Nfld. and Lab. west to B.C. southward to Fla. and Mexico.

6. *E. olivacea* Torr. Map 112.

This may be confused with small forms of *E. obtusa* or *E. ovata* but the spikelets are generally fewer-flowered, the scales are not readily deciduous, and the conical pale tubercle is conspicuously different in that it has a constriction at the base and does not resemble the somewhat flattened tubercle that merges without a perceptible constriction to the achene. The short tufts of *E. olivacea* are often joined by reclining stolons while those of the other two are not.

In peaty muck of bogs and wet sandy shores; very local in N.S. and found at Argyle Head, margin of pond-hold east of Tiddville, Italy Cross, and in a cat-tail swale at Antigonish.

N.S. to Ore. south to Michigan and thence, largely via the Coastal Plain, to Florida.



7. *E. obtusa* (Willd.)Schultes Fig. 30, d.

A fairly variable species in N.S., but its characteristic red-based cespitose clumps of soft culms, the multi-flowered ovoid, red-brown spikelets that shed the lower scales upon maturing of the achenes, and the distinctive achene all separate it from any other species—with the possible exception of *E. ovata*. The so-called “var. *jejuna* Fern.” appears to be nothing more than a late season form of this species and deserves no formal name. It differs in no significant way except in size and the form appears on areas that emerge from flooding late in the season.

Throughout on muddy shores and in ditches; common.

N.S. to Minn. south to Fla. and e. Texas; southern B.C. south to Calif.; Hawaii.

8. *E. ovata* (Roth) R. & S. Fig. 30, d. Map 112.

This form most closely resembles *E. obtusa*, especially its late season forms, but the narrowly conic tubercle is plainly different and the size of the clumps is generally smaller. Very local: Truemanville, Sandy Cove, and abundant on the margin of a dried-up pond behind the barrier beach at Black Point, Halifax Co.; presumably confined to calcareous muds of lakes and ponds. The Black Point collection is particularly interesting since this is from an isolated outcrop of limestone in a country of predominantly acid rock (Schofield, 1955).

Var. *Heuseri* Uechtritz, with the culms densely crowded, arching, recurving and depressed, and the spikelets very dark, is doubtfully distinct. Abundant on a pond-margin at Truemanville, Cumberland Co. and also found at Earltown Lake in Colchester Co. and Sandy Cove.

Scattered from Nfld. to Va. west to the Great Lakes area; very local in Wash. and Ore.; Eurasia.

9. *E. Smallii* Britt. Fig. 31, a.

Including *E. palustris* (L.)R. & S. and its var. *major* Sonder. Svenson, *Rhodora* 49: 61-67. 1947, considers these to belong to a single species and until more detailed study has been done this appears to be the most reasonable alternative. The culms vary dependent on the degree of submergence. Those of lake shallows, to 3 dm of water, are often very thick (to 5 mm) and the spikelets are often small. This

is *E. palustris* var. *major* of many authors. In swampy lake margins and swales they tend to be more slender and shiny with the spikelets often large in comparison to the 1.5 mm diameter of the culm. Occasionally completely emerged plants are quite small with the spikelet less than 1.5 mm broad at its widest part and the culm near 1 mm in diameter. There is also a great variation in the number of flowers per spikelet, texture and colour of the "glumes", and color, shape and texture of the tubercle. Generally within a single spikelet the achenes are essentially identical but this is by no means universal.

Scattered throughout on lake shores, meadow swales, pond margins and occasionally in peat bogs, often forming extensive stands into the shallow water of lakes.

Northern Que. and Nfld. west to the Great Lakes and south to Ala.

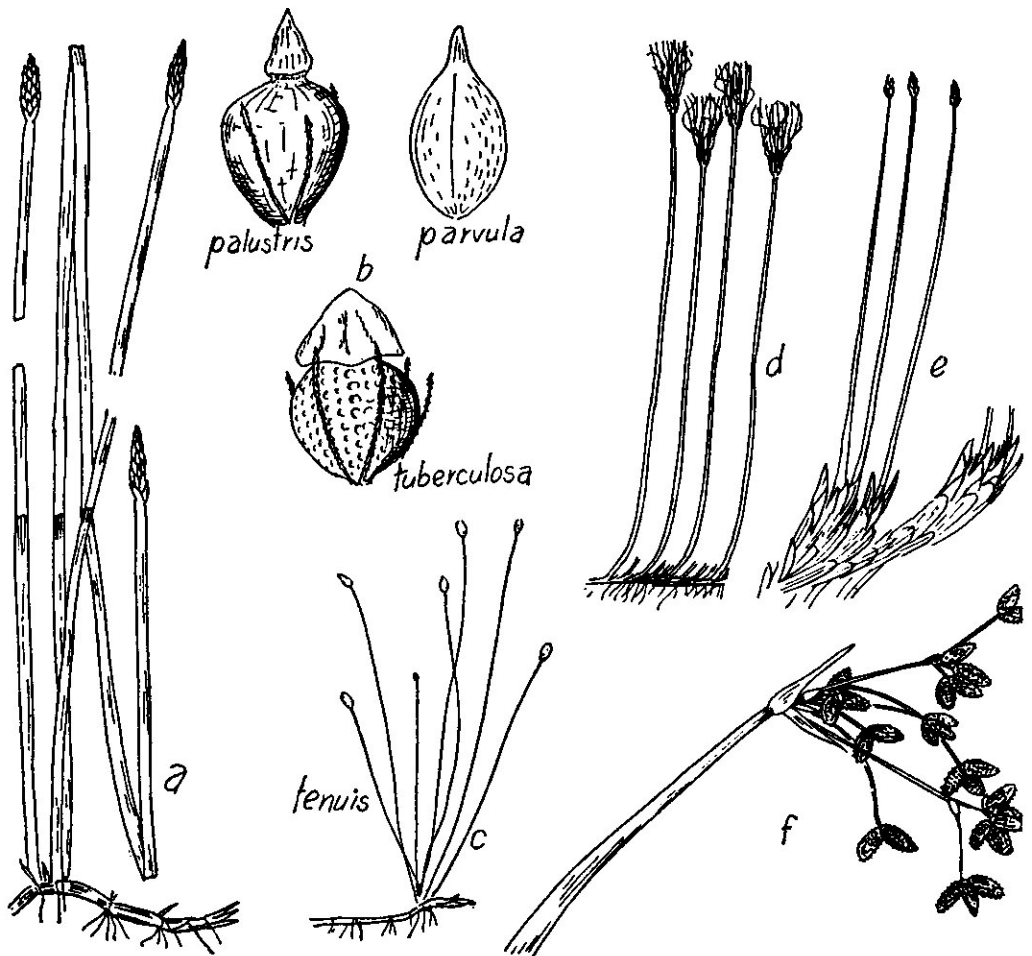


Fig. 31.—*Eleocharis*. a, *E. Smallii*, x $\frac{1}{2}$. b, achenes, x 10. c, *E. tenuis*, x $\frac{1}{4}$. *Scirpus*. d, *S. hudsonianus*, x $\frac{1}{4}$. e, *S. caespitosus*, x $\frac{1}{4}$. f, *S. validus*, top of plant, x $\frac{1}{3}$.

10. *E. erythropoda* Steud. Map 112.

This species closely resembles *E. halophila*; and the number of flowers in a spikelet is extremely variable in both species. Very rare; known only from McDonald's Barren, Northwest Margaree, Inverness Co. where it was collected by C. B. Robinson long ago.

N.S. and Que. west to Alta. and south to Tenn. and Texas.

11. *E. halophila* (Fern. & Brack.) Fern. & Brack.

Primarily of saline or brackish shores, both scattered around the coast and inland around salt springs, in alkaline habitats and near sink holes in gypsum country.

James Bay, Nfld., and the Gulf of St. Lawrence south along the coast to Va.

12. *E. nitida* Fern. Map 110.

This species is quite different from any other in N.S. Its fruits earlier so that the bright whitish-yellow achenes mature as early as mid-June. It most closely resembles depauperate plants of *E. tenuis*.

Local, generally on soils derived from volcanic rock; most collections have been made from moist soil or woods roads over basalt along the North Mountain and at Cape d'Or and Economy Mountain; also in burned-over area, north-east end of Scatari Island, Cape Breton (Schofield, 1955).

James Bay and the Ottawa Valley to Nfld. and N.S. and south to N.H.; Alaska.

13. *E. tenuis* (Willd.) Schultes Fig. 31, c. Map 113.

Mature specimens with ripe achenes are necessary to determine this species with any confidence. Even with this, it is often difficult to distinguish this species from some slender forms of *E. elliptica* since, unfortunately, this species in some environments becomes rather filiform in both stolons and culms and the tubercle of its achene may become rather conic. The cross-sectional shape of the culm is often difficult to determine in dried material.

Roadside ditches, meadows, lake margins and occasionally in bogs; apparently absent from the extreme eastern part of the mainland and in C.B.

N.S. south to Ga. and west just beyond the western flank of the Appalachian Mts.

14. *E. elliptica* Kunth Map 114.

Scattered throughout along streams and rivers, lake margins and meadows.

Nfld. to B.C. south to Penn. and around the Great Lakes.

15. *E. tuberculosa* (Michx.)R. & S. Fig. 31, b. Map 110.

Represented in N.S. by two minor forms, one known but from a single locality. Forma *retrorsa* Svenson, *Rhodora* 39: 250, 1937, has the bristles around the achene downwardly barbed; known from the wet or peaty beach of Harper's Lake, Shelburne Co. Forma *pubnicoensis* (Fern.)Svenson has the bristles smooth. This is known only from the sandy and boggy border of Great Pubnico Lake, Yarmouth Co. where it was collected and described by Fernald.

This species is completely unlike any other in N.S. The stiffly cespitose clumps, large ovoid spikelets and the remarkably large tubercle surmounting the honey-comb sculptured achene immediately identify it.

Southwestern N.S.; N.H. southward chiefly on the Coastal Plain to Fla. and Texas; extending inland to n. Alabama and the Cumberland Plateau in Tenn.

4. *SCIRPUS* L. BULRUSH

A large and varied group, the most common and conspicuous being a number of tall species growing in swales, out into the shallow water of ponds and lakes, or around salt marshes (Fig. 31, 32).

- a. Spikelets terminal, solitary; involucre none or merely an outer scale of the spikelet; plants erect, with the leaf-blades reduced to short awl-like bracts.
- b. Plants densely cespitose; culms terete, smooth above; bristles of the spikelets barely longer than the achenes (Fig. 31, e). 1. *S. cespitosus*
- b. Plants with running rootstocks; culms triangular and scabrous above; bristles 2-3 cm long, silky and conspicuous (Fig. 31, d). 2. *S. hudsonianus*
- a. Spikelets not terminal, usually numerous; involucre varying from a short continuation of the stem to numerous leafy bracts; plants with definite leaf-blades (Fig. 32).
- c. Spikelet solitary; involucre green, 5-15 mm long; plant usually floating or submerged in water, with long, weak, filiform leaves. 4. *S. subterminalis*
- c. Spikelets several to many, rarely one; plants normally erect.
- d. Involucre short, appearing to be a continuation of the stem (Fig. 32, a, b).
- e. Spikelets 2-5-flowered, crowded in a 2-ranked sub-terminal spike; plant very slender, 1-6 dm high. 3. *S. rufus*
- e. Spikelets many-flowered, plainly lateral, not 2-ranked; plants 2-25 dm high.
- f. Stem sharply 3-angled, to 12 dm high; spikelets in a sessile cluster, occasionally solitary.
- g. Involucral leaf 4-15 cm long; upper sheath with a long narrow leaf; spikelets pointed (Fig. 32, a). 5. *S. americanus*
- g. Involucral leaf 1-3 cm long; the upper sheath with a short triangular leaf or none; spikelets blunt (Fig. 32, b). 6. *S. Olneyi*
- f. Stems round, 0.5-2.5 m high (Fig. 31, f).
- h. Scales of the spikelet shorter than and exposing the achenes, with reddish gummy spots scattered and usually only on and along the mid-vein; mature achenes usually less than 2 mm long; culm soft.

7. *S. validus*

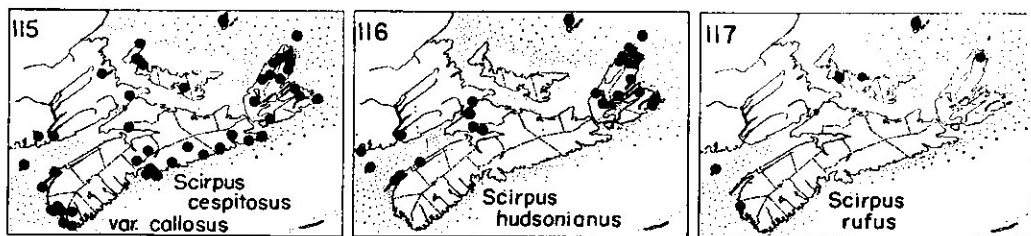
- h. Scales of the spikelet long and completely embracing the achenes, always papillose on the upper half with dense reddish gummy spots; mature achene usually longer than 2 mm; culm firm. 8. *S. acutus*
- d. Involucre consisting of several to many leafy bracts.
- i. Spikelets large, 1-2 cm long, 6-10 mm thick; salt-marsh plants (Fig. 32, c).
- j. Scales reddish-brown, thicker and not translucent, very tightly appressed, the awn short and abruptly recurved. 9. *S. robustus*
- j. Scales of spikelet pale- to chestnut-brown, never reddish-brown, thin and semi-translucent particularly on the hyaline margins, more or less loose, the awn long and gradually recurved. 10. *S. maritimus*
- i. Spikelets smaller, 2-15 mm long, 1-3 mm thick, numerous in a compound inflorescence; plants of non-brackish habitats (Fig. 32, d-g).
- k. Bristles retrorsely barbed, barely exerted or included within the scales; stems solitary or loosely clustered, with thick scaly stolons; spikelets in glomerules (small, compact clusters).
- l. Lower leaf-sheaths reddish-tinged; bristles barbed almost to the base, longer than the achene; spikelets 4-8 mm long (Fig. 32, g). 11. *S. rubrotinctus*
- l. Lower leaf-sheaths green; bristles barbed only above the middle, shorter than the achene; spikelets 2-4 mm long (Fig. 32, d). 12. *S. atrovirens*
- k. Bristles smooth or sparingly barbed upward; stems loosely or densely clumped, without stolons; spikelets separate or in glomerules.
- m. Spikelets nearly all in glomerules of 3-15; involucels (scales at base of branches of the inflorescence) reddish- to dull-brown. 13. *S. cyperinus*
- m. Spikelets nearly all single and stalked.
- n. Spikelets 3-6 mm long; base of the involucre not covered with a sticky secretion; achenes whitish to light-colored.
- o. Plants stout, with leaves 5-8 mm wide; involucels and scales brownish; rare. 14. *S. pedicellatus*
- o. Plants slender with leaves 3-5 mm wide; involucels and scales blackish-green; scales 1-2 mm long; common (Fig. 32, f). 15. *S. atrocinctus*
- n. Spikelets 6-10 mm long; base of the involucre sticky, blackish; achenes reddish-brown; scales 2-3 mm long. 16. *S. Longii*

1. *S. cespitosus* L., var. *callosus* Bigel. See Fernald, *Rhodora* 23: 21-25. 1921. Fig. 31, e. Map 115.

General on the Atlantic slope of the Province where it is often abundant on the dryish, peaty barrens from Digby Co. to northern C.B.; scattered to rare inland and in the north-central region; characteristic of bogs, poorly-drained swamps, and sedge heaths.

Var. *delicatulus* Fern. has the culms more slender, softer and flexuous; with the basal sheaths more membranous and darker, black to dark gray. Locally abundant, festooning dripping cliffs, Big South west Brook, Inverness Co. (Smith and Schofield, 1952); abundant in damp cliff crevices, McCoy's Pool, Northeast Margaree River; and cliffs on the Cheticamp River. Nfld., Gaspe, northern N.B. and Me.; and in northern Mich.

Nfld. and Lab. to Alaska south to N.Eng., and the mts. of N.C. and Utah; northern Eurasia.



2. *S. hudsonianus* (Michx.) Fern. Fig. 31, d. Map 116.

Found by Fernald on Digby Neck; abundant in wet cliff crevices, West Moose River, Cumberland Co. (Schofield, 1955) and is also local on Moose River; abundant in small bog south of Amherst (Fernald, 1921); common in Cape Breton where it is found in poorly-drained swamps and bogs and on wet cliffs. Fernald also mentions it from Lunenburg Co. but no collections have been seen from the Atlantic side of the Province.

Lab. to Alaska south to N.Y. and Mont.; northern Eurasia.

3. *S. rufus* (Huds.) Schrad., var. *neogaeus* Fern. Map 117.

Brackish or saline marsh, Sand Beach, Yarmouth Co. (Fernald, 1921); typical of brackish marshes in northern C.B., as, for instance, on the inside of Cheticamp Island. (Not shown on map). This is the American variety of the Eurasian plant.

Rare: Nfld., Gaspe, the Maritime Provinces and Me. with isolated stations on Hudson Bay.

4. *S. subterminalis* Torr. Map 118.

Somewhat general and probably often overlooked in its area. Fernald (1923) records it from sandy and peaty pools and lake margins, Yarmouth to Hants Co.; common from Yarmouth to central and northern C.B. It is rare or absent from north-central N.S. although it has been found in P.E.I. and in neighboring N.B. Plants growing in the water tend to produce very numerous, elongate capillary leaves. Var. *cylindricus* (Torr.) Koyama, with a triangular culm and only a few flat leaves, has been found in Lac Fox Creek near Moncton, N.B. but not as yet in N.S. (*S. Torreyi* Olney).

Nfld. to B.C. south to N.J., Mo. and Idaho.

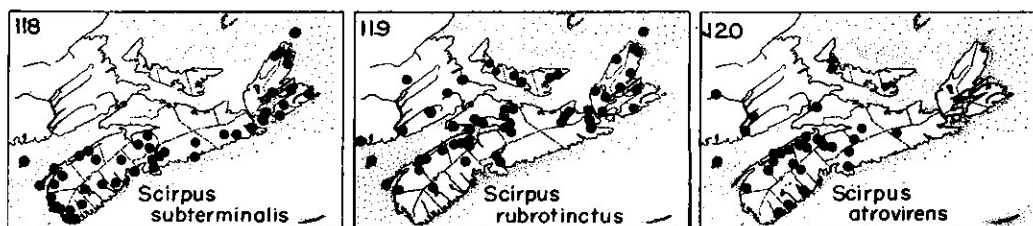




Fig 32.—*Scirpus*. a, *S. americanus*, x 1/3. b, *S. Olneyi*, x 1/3. c, *S. maritimus*, x 1/3. d, *S. atrovirens*, x 1/3; achene, x 10. e, *S. cyperinus*; part of the inflorescence, x 1/2; achene, x 12. f, *S. atrocinctus*, part of inflorescence, x 1/2. g, *S. rubrotinctus*, part of inflorescence, x 1/2; achene, x 12.

5. *S. americanus* Pers. Fig. 32, a.

Common on brackish marshes and occasionally in bogs near the coast; common in the dune hollows of Sable Island; around the whole coast of the Province. This plant often forms open, almost pure colonies on wet sand around depressions where the soil is somewhat salty.

Temperate N.A., in fresh water inland; S.A. and Eu.

6. *S. Olneyi* Gray Fig. 32, b.

Recorded from Canada only from salt and brackish marshes and swales of Yarmouth Co.; Sand Beach, Chebogue, Arcadia, Tusket and Eel Lake; extensive sloughs along Abram River were full of it (Fernald, 1921).

N.S. to the Gulf of Mexico; rarely inland; on the Pacific Coast.

7. *S. validus* Vahl Fig. 31, f.

This and the following species comprise the tall, straight leafless bulrushes found in shallow water around many ponds and lakes, both in fresh and in brackish water. In some shallow lakes acres of plants may form an open pure colony with the plants 2 m high. Koyama (1962) places both this and the following species as subspecies of the almost world-wide *S. lacustris* L.

N.S. to B.C.; throughout the U.S., Hawaiian Islands, West Indies and South America.

8. *S. acutus* Muhl. See Can. Jour. of Bot. 40: 922-928. 1962.

Rather similar in appearance to and growing in locations much like the preceding.

N.S. to Alaska south to N.C. and Calif.; Eu.

9. *S. robustus* Pursh

Collections from Baddeck have been listed here by Beetle, Amer. Jour. Bot. 29: 86. 1942. The distribution of this coarse plant is not well known but it may be expected scattered along our coasts.

N.S. south along the coast; Calif., Mex. and S.A.

10. *S. maritimus* L. See Koyama. The *Scirpus maritimus* complex in North America. Can. Journ. of Bot. 40: 932-937. 1962. Fig. 32, c.

This complex presents a very difficult and variable group of plants. The form with the achenes mostly lenticular, *S. maritimus* var. *Fernaldii* forma *agonus*, is considered to be identical to the species of Europe. Forma *cymosus* (Reichenb.) Koyama is about as common and has the achenes mainly trigonous. Scattered around the coast on salt marshes, upper edge of beaches, and along brackish streams and estuaries. Formerly very luxuriant along the Annapolis River above Annapolis.

Var. *paludosus* (A. Nelson)Kukenth. is also common around the coast; brackish marshes, bare areas on the marshes or dyke-lands, often dominant on the shoreward reaches of the salt meadows; brackish ponds on Sable Is. Spikelets blunt at apex, pale to light brown.

Throughout southern Canada and the northern U.S.

11. *S. rubrotinctus* Fern. Fig. 32, g. Map 119.

Locally abundant in swamps, low hayfields, meadows and along ditches and streams. It most often forms pure colonies where there is a steady seepage of fresh water. Throughout the northern region from Digby Co. to C.B.; rare or absent in southwestern N.S. and along much of the Atlantic region of the mainland. Forma *radiosus* Fern., with the spikelets linear-cylindrical, 7-13 mm long and aggregated in clusters, has been collected in swales near Aylesford, Kings Co.

Nfld. to Sask. south to Conn, N.Y. and Minn.

12. *S. atrovirens* Willd., var. *georgianus* (Harper) Fern. Fig. 32, d. Map 120.

Swales, damp thickets, wet roadsides and meadows; occasional through the Annapolis Valley to Cumberland Co.; abundant along the basaltic North Mt. from Digby Neck to Cape Blomidon; common to rather scattered from Yarmouth to Guysborough Co., growing in the moister areas.

Nfld. to Minn. south to Ga. and Ark.

13. *C. cyperinus* (L.) Kunth, var. *pelius* Fern. Fig. 32, e.

Common to abundant throughout, the woolly *Scirpus* most often observed in late summer: sandy shores, bogs, meadows, ditches and edges of streams. This is the northern variety with reddish-brown involucels without blackish bases. This passes gradually into the species southward so that all N.S. plants are placed in the variety. Forma *condensatus* (Fern.) S. F. Blake, with the panicle very condensed, is occasionally seen.

Nfld. to Minn. south to Penn. and Ohio.

14. *S. pedicellatus* Fern.

Still known from but a single collection; wooded bank of the Sissiboo R., Weymouth (Fernald, 1921).

N.S.; Que. to Minn. south to Mass., N.Y. and Iowa.

15. *S. atrocinctus* Fern. Fig. 32, f.

Very common throughout; poorly-drained soil, swamps, bogs, beside streams, in ditches and often characteristic of areas that are inundated early in the season. This species is the tallest in N.S. of this group and may often occupy the center of a swale with *S. cyperinus* more abundant around the margins.

Nfld. to Alta. south to Penn. and Iowa.

16. *S. Longii* Fern., *Rhodora* 13: 6. 1911.

Rare; peaty marsh, shore of Ponhook Lake, Queens Co.; also one battered individual, probably of this species, at Moosehorn Lake in the same region (Weatherby, 1942).

N.S.; Que.; Mass. to N.J.; N.C.

5. ERIOPHORUM L. COTTON-GRASS

Bog and meadow plants with the bristles of the flowers becoming very long and conspicuous as the achenes mature, giving a cotton-like appearance to the inflorescence (Fig. 33). The smaller, slender *Scirpus hudsonianus* is the only plant that might be confused with these.

a. Spikelets solitary and terminal without a leafy involucrel bract; leaves of the stem mostly reduced to bladeless sheaths (Fig. 33, a).

- b. Stem solitary from underground rootstocks; spikelets with 7 or fewer empty basal scales. 1. *E. Chamissonis*
- b. Stems densely tufted, without rootstocks; spikelets with 10-15 empty scales at the base; bristles shining white. 2. *E. spissum*
- a. Spikelets 2-several in a head or umbel, with an involucre of 1 or more leafy bracts (Fig. 33, b-e).
- c. Involucral bract 1; leaves 1-2 mm wide, triangular-channeled.
- d. Plant weak and slender, with no basal leaves at flowering time; upper leaf-blade smooth and round-tipped, 1-4 cm long; base of involucre and scales of spikelets dark; achenes 1.5-2 mm long. (Fig. 33, c). 3. *E. gracile*
- d. Plant stiff and erect with long, slender, pointed basal leaves; uppermost leaf-blade rough, sharp, 3-18 cm long; base of involucre and scales of spikelets brownish; achenes 2.5-3 mm long (Fig. 33, b). 4. *E. tenellum*
- c. Involucral bracts 2 or more; leaves flat, 1.5-8 mm wide.
- e. Spikelets loosely umbellate; bristles white or rarely buff; scales of the spikelet with but one prominent rib; stamens 3 (Fig. 33, e).
- f. Scales of the spikelets with a wide, blunt whitish tip and indistinct midrib (Fig. 33, f); upper leaf-sheaths ringed with black at the apex.
- g. Leaves 1.5-4 mm wide. 5. *E. angustifolium*
- g. Leaves 5-8 mm wide; plant stouter. *E. angustifolium* var. *majus*
- f. Scales of the spikelet with a sharp, thick tip, and the midrib prominent to the tip (Fig. 33, g); upper leaf-sheaths usually not dark-ringed. 6. *E. viridi-carinatum*
- e. Spikelets in a dense head; bristles tawny or copper-colored, rarely whitish; scales of the spikelet with several prominent ribs; stamen 1 (Fig. 33, d) 7. *E. virginicum*

1. *E. Chamissonis* C. A. Mey. Map 121. RUSTY COTTON-GRASS

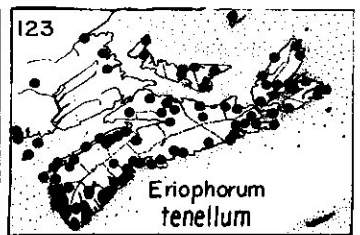
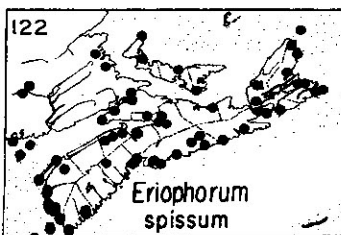
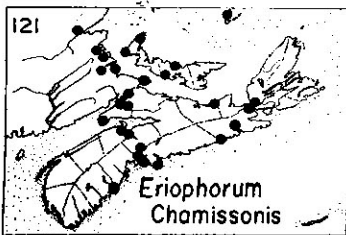
Scattered, not uncommon near the coast; bogs, muskegs and swamps; Cumberland and Hants Cos. to southern C.B. Forma **albidum** (F. Nylander) Fern., *Rhodora* 23: 131. 1921, is a form with white bristles; found in many parts of the range of the species, bog south of Amherst; collected by Smith et al in a bog behind the sea-beach, West Advocate, also in Cumberland County. (*E. russeolum* Fries).

Lab. to Alaska south to N.S., Minn. and down the Rockies.

2. *E. spissum* Fern. Fig. 33, a. Map 122. HARE'S-TAIL

Throughout; flowering very early and forming white clumps before the end of May in dryish bogs, swales and muskegs; common on Sphagnum mats in wet, or high and mature bogs in northern C.B. Forma **erubescens** Fern., with reddish-brown bristles, was found growing abundantly in a bog with the typical form, near the center of Scatari Island, Cape Breton Co.

Lab. to Alaska south to Penn. and Wisc.



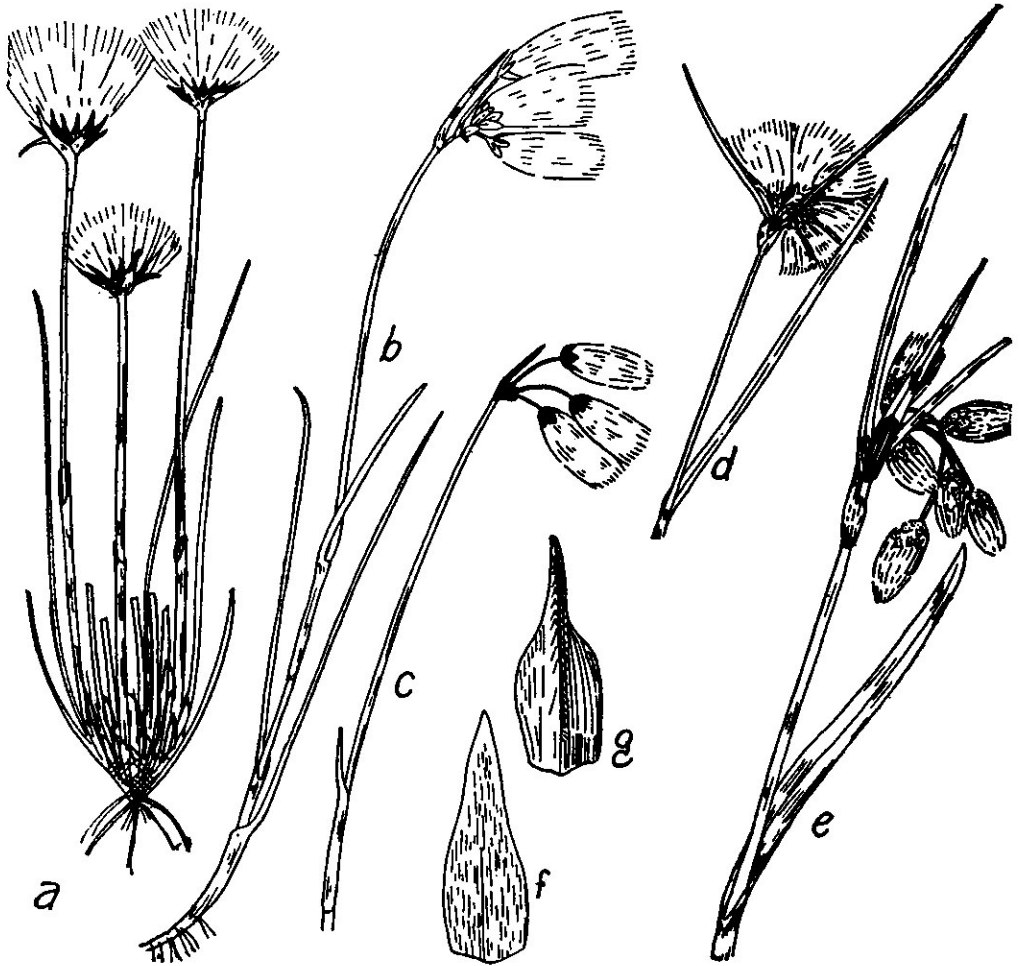


Fig. 33.—*Eriophorum*. a, *E. spissum*, x 1/3. b, *E. tenellum*, x 1/3. c, *E. gracile*, x 1/3. d, *E. virginicum*, x 1/3. e, *E. angustifolium* young plant, x 1/3. f, scale of spike of *E. angustifolium*. g, scale of *E. viridi-carinatum*.

3. *E. gracile* W. D. J. Koch

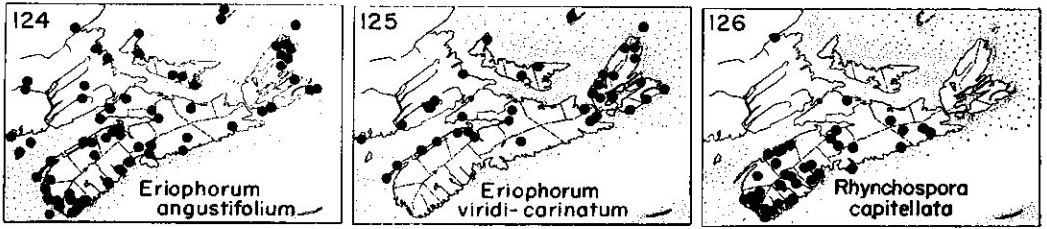
Scattered and probably the rarest member of the genus in N.S.; cold bogs and swamps, usually near the coast; near Two Rivers in Cumberland Co., Karsdale, Annapolis Co. and at Truro. June-July.

Lab. to Alaska south to Penn., Mich. and Calif.

4. *E. tenellum* Nutt. Fig. 33, b. Map 123.

Common throughout; grassy swamps, peat bogs and swales. This is the most abundant of the late summer species and low meadows may be white with it. The plant itself is rather neat with a reddish tinge to the involucre and the scales. A collection made by J. A. Calder from a boggy field near Halifax shows a distinctly bluish color to the ends of the bristles. Mid July to August.

Nfld. to Sask. south to Penn. and Mich.



5. *E. angustifolium* Honckeney Fig. 33, e. Map 124.

Common throughout; bogs, swamps, wet meadows, cranberry bogs and sphagnum areas. Areas of the Annapolis Valley turfed for cranberry bogs often come into a dense mat of this species where it is a bad weed. Northward and in the Cobequids the following species seems to replace it to a considerable extent although *E. angustifolium* is also common in northern C.B. Flowering in early June and becoming ragged by the end of the month.

Var. *majus* is occasionally seen.

Arctic regions south to N.Y., around the Great Lakes and to N.M.; Eurasia.

6. *E. viridi-carinatum* (Engelm.) Fern. Map 125.

Common in C.B. and in the Cobequids, scattered west to Digby Neck; in bogs, wet meadows and swamps. June-July, appearing later than the preceding species; pure shining white.

Lab. to Alaska south to N.Y., Iowa and B.C.

7. *E. virginicum* L. Fig. 33, d.

Very common throughout; bogs, swamps and on the sphagnum mat around lakes and ponds. It is conspicuous in late summer and early autumn; stouter and more restricted to bogs than is *E. tenellum*. The bristles of the species are typically tawny but often verge towards white as they get older. Plants with white bristles occasionally occur and have been named forma *album* (Gray) Wieg., *Rhodora* 26: 2. 1924. Bog near North Sydney and on Digby Neck. Aug.-Sept.

Nfld. to Man. south to Fla. and Nebr.

6. RHYNCHOSPORA Vahl BEAK-RUSH

Slender, grass-like perennials with narrow leaves and only a few flowers in small, loosely-arranged spikes (Fig. 34, a, b, c). The distinguishing feature is the beaked achene. Gale, Shirley. *Rhynchospora*, Section *Eurhynchospora* in Canada, the United States and the West Indies. *Rhodora* 46: 89-134; 207-249; 255-278. 1944.

a. Scales of the spikelets white, becoming tawny when mature; spikelets usually 2-flowered, 3.5-5 mm long; stamens usually 2; bristles 9-12 (-20). (Fig. 34, a).

2. *R. alba*

- a. Scales of the spikelet chestnut-colored; spikelets with several flowers and fruits; bristles 6.
- b. Bristles downwardly barbed or smooth.
- c. Spikelets 3.5-5 mm long, numerous and crowded in the inflorescence with the lower spreading or reflexed to make a hemispheric glomerule; body of the achene sub-orbicular.
1. *R. capitellata*
- c. Spikelets 5-7 mm long, 1-5-flowered, mostly erect in small fascicles so that the inflorescence is ellipsoid; leaves narrowly linear and plant slender; body of achene ellipsoid.
3. *R. capillacea*
- b. Bristles upwardly barbed; spikelets 4-6 mm long, few and ascending in the inflorescence; leaves about 1 mm wide, flat or involute (Fig. 34, c).
4. *R. fusca*

1. *R. capitellata* (Michx.) Vahl Fig. 34, b. Map 126.

Frequent on lake shores, savannahs and peaty openings in the southwestern counties, and scattered east to Antigonish and Guysborough Cos. (Smith, 1959). Abundant in flood-plain of St. Mary's



Fig. 34.—*Rynchospora*. a, *R. alba*, $\times \frac{1}{2}$; achene, $\times 10$. b, *R. capitellata*. c, *R. fusca*. *Cladium*. d, *C. mariscoides*, plant. $\times \frac{1}{2}$; achene, $\times 10$. *Carex*. e, *C. convoluta*, inflorescence, $\times \frac{1}{2}$; perigynium and pistillate scale, $\times 5$.

River at Caledonia, Guys. Co. (Erskine, 1953); abundant on the swampy margin of Dewar's L., Cumberland Co. (Schofield, 1955), the plants reported as much slenderer than those from the southwestern counties. Forma *discutiens* (C. B. Clarke)Gale, with smooth bristles, is less common than the species but is local in Yarmouth, Shelburne and Lunenburg. Cos.

Fla. to Tex. north to N.S., N.B., southern Ont. and Wisc.

2. *R. alba* (L.)Vahl Fig. 34, a.

Common throughout in bogs, sphagnum mats, poorly-drained swamps or even in wet meadows in the moister areas.

Nfld. to Alaska south to Fla.; the Great Lakes and Calif.

3. *R. capillacea* Torr.

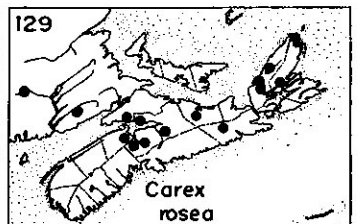
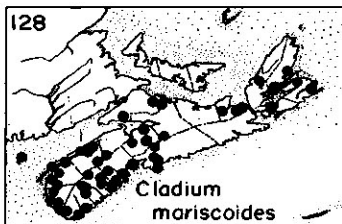
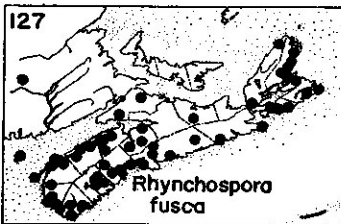
Growing abundantly in an alkaline bog in association with *Eleocharis pauciflora*, Black River at the southern end of Lake Ainslie, Inverness Co. (Smith and Schofield, 1952). The plants were all forma *leviseta* (E. J. Hill)Fern., with smooth bristles.

Nfld. to Sask. in calcareous locations south to Tenn.

4. *R. fusca* (L.)Ait. Fig. 34, c. Map 127.

Common in southwestern N.S. east at least to Lunenburg and Hants Cos. (Fernald, 1922); scattered east of Halifax (Rousseau, 1935); found in various situations in C.B. Schofield (1955) reports it as abundant on the boggy margin of Leak Lake and on the moist margin of a swamp, west end of Dewar's Lake, in Cumberland Co. Wet peaty, sandy or gravelly shores and bogs, poorly-drained swamps or sphagnum mats, much rarer than *R. alba*.

Nfld. to Ont. south to Dela. and Mich.



7. CLADIUM P.Br. TWIG-RUSH

1. *C. mariscoides* (Muhl.)Torr. Fig. 34, d. Map 128.

Rather local throughout, although often abundant where found; boggy swales, inundated lake margins, marshes or swales in the gypsum areas. Forma *congestum* Fern. has the inflorescence compacted with the branches short or suppressed. This occurs scattered with the typical form; first described from Tiddville, Digby Co. (Rhodora 23: 234.

1921), but also common in swales and around ponds outside of Windsor in the gypsum area.

Southwest Nfld. to Fla. west to Minn. and Sask.

8. CAREX L. SEDGES

A large genus of grass-like plants with the flowers unisexual and arranged in spikes: the staminate consisting of 3 stamens in the axil of a bract or scale; and each pistillate one consisting of a single pistil with two or three styles and enclosed by a sac called a perigynium. The genus is divided up into a number of sections; within each the species are often rather similar and difficult to identify. The most recent and comprehensive treatment of *Carex* is K. K. MacKenzie's monograph in the *North American Flora* 18: 1-478. 1931-1935, in which 535 species are described.

- a. Stigmas two and achenes lenticular; spikes usually bisexual, the lateral ones sessile. Subgenus *Vignea*
- a. Stigmas three and achenes triangular or, if stigmas two, the achenes lenticular and the lateral spikes stalked; spikes mostly unisexual. Subgenus *Eucarex*

SUB-GENUS VIGNEA

- a. Spikes solitary on each culm; perigynia about 3-3.5 mm long.
- b. Plants loosely stoloniferous, 4-30 cm high; pistillate spike without empty scales at the base; perigynia spreading to reflexed, finely nerved dorsally. 1. *C. gynocrates*
- b. Plants densely caespitose, 15-70 cm high; spikelet with empty scales at the base; perigynia ascending to spreading, coarsely 3-5-ribbed on the back. 16. *C. exilis*
- a. Spikes more than one.
- c. Spikes with the staminate flowers terminal, and the lower pistillate; perigynia not sub-terete.
- d. Spikes few, usually less than 10, green even at maturity.
- e. Spikes crowded in a short terminal inflorescence. 4. *C. spicata*
- e. Spikes few, small, widely separated.
- f. Perigynia strongly flattened, usually more than 4 to a spike. Sect. 2. BRACTEOSAE
- f. Perigynia nearly terete, usually 1-3 in scattered spikes; plant very delicate (Fig. 36). 9. *C. disperma*
- d. Spikes numerous, often more than 10, closely crowded into a terminal spike-like inflorescence.
- g. Perigynia 2.0-2.75 mm long, olive to brown, abruptly narrowed to the beak; culms not weakly cellular; leaves 1-4 mm wide.
- h. Inflorescence 3-10 cm long, with many very narrow bracts; spikes more or less separated and oblong-ascending; perigynia yellowish-green (Fig. 36). 5. *C. vulpinoidea*
- h. Inflorescence 2-5 cm long, without setaceous bracts; spikes densely crowded, spreading-orbicular; perigynia shining-brown to dark. Sect. 4. PANICULATAE

- g. Perigynia 4-5 mm long, straw-colored, gradually narrowed from the base to the end of the beak; culms weakly cellular, flattening in drying; leaves 4-8 mm wide (Fig. 36). 8. *C. stipata*
- c. Spikes with the pistillate flowers terminal; if otherwise, with the perigynia sub-terete and the spikes 1-3-flowered.
- i. Perigynia without winged margins, at most thin-edged, the lower part of the body spongy-thickened; culms not hollow.
- j. Perigynia with rounded edges, membranous, appressed to diverging, green.
- k. Perigynia 2-4 mm long, ascending to reflexed, the beak short and delicate, not serrate. Sect. 6. HELEONASTES
- k. Perigynia 4-4.5 mm long, closely appressed, with a long serrate beak nearly the length of the body (Fig. 37, a). Sect. 7. DEWEYANAE
- j. Perigynia with thin edges, flattened, very spongy at the base, diverging or reflexed at maturity, usually brownish (Fig. 35, d). Sect. 8. STELLULATAE
- i. Perigynia winged, the lower part not spongy-thickened; spikes oval with the perigynia usually closely appressed; culms hollow (Fig. 37, b-d). Sect. 9. OVALES

SUB-GENUS EUCAREX

- a. Spikes appearing to be solitary on each culm.
- Perigynia 1-10, glabrous.
- Perigynia oval, rounded at the tip, appressed-ascending, greenish (Fig. 37). 36. *C. leptalea*
- Perigynia tapering to a long acute tip, strongly reflexed, yellowish (Fig. 43). 85. *C. pauciflora*
- Perigynia many, pubescent, in a dense cylindrical spike 1.5-3 cm long; staminate with one spike only. 37. *C. scirpoidea*
- a. Spikes more than one per culm.
- b. Stigmas 2; achenes lenticular; lateral spikes stalked, or if sessile, elongate; terminal spike usually staminate.
- Lowest bract long-sheathing; perigynia orbicular, becoming golden-yellow at maturity (Fig. 42). 49. *C. aurea*
- Lowest bract sheathless, or very rarely short-sheathing; perigynia not orbicular.
- Achenes not constricted in the middle; pistillate scales not long-awned, shorter or about the same length as the perigynia, 1-nerved (Fig. 39). Sect. 18. ACUTAE
- Achenes constricted in the middle; scales long-awned, or acute and much longer than the perigynia, 3-nerved. Sect. 17. CRYPTOCARPAE
- b. Stigmas 3; achenes trigonous.
- c. Perigynia pubescent or scabrous (*C. tonsa*, with short and crowded basal spikelets, may be nearly glabrous).
- d. Beak of the perigynia absent or nearly so.
- Upper sheath of the fertile culm bladeless; spikes with 1-8 perigynia; plant glabrous; lowest bract long-sheathed. 46. *C. pedunculata*
- Upper sheath of the fertile culm with long blades; perigynia numerous; lowest bract sheathless or nearly so.
- Perigynia 10-30; culm and leaf-blades finely pilose. 68. *C. Swanii*
- Perigynia 50-100; culms and leaves glabrous and glaucous (Fig. 40). 62. *C. flacca*

- d. Beak of the perigynia prominent, or if short then the lower bract is sheathless.
- e. Leaf-blades glabrous; or if soft-hairy (*C. hirta*) the teeth of the beak long, widely spreading and hispidulous.
 Perigynia strongly ribbed; the teeth long, spreading, and hispid or scabrous within (Fig. 40, a; 41, e). Sect. 23. **HIRTAE**
 Perigynia more obscurely nerved, the teeth small, erect, short, smooth within.
 Culms 0.2-4 dm high, about equalled by the leaves; of dry situations (Fig. 38). Sect. 12. **MONTANAE**
 Culms 3-12 dm high, the leaves 2-5 dm long; of bogs and swamps. Sect. 23. **HIRTAE**
- e. Leaf-blades hirsute or scabrous above; teeth of the perigynia short, not spreading.
 Bracts leafy, at least twice as long as the inflorescence; perigynia and blades scabrous; perigynia strongly nerved (Fig. 40). 63. *C. scabrata*
 Bracts not exceeding the inflorescence; perigynia and blades hirsute; perigynia nerveless (Fig. 38). 48. *C. hirtifolia*
- c. Perigynia glabrous.
- f. Style articulated with the achene, at least deciduous; perigynia membranous, with beak absent or if present with the teeth small and erect; spikes either long and slender, or else up to 1.5 cm wide and barely longer than wide; plants average in size.
- g. Perigynia 2-6, 2 mm long, very persistent; lower sheath bladeless; pistillate spikes 3-8 mm long (Fig. 38); leaves short, filiform. 47. *C. eburnea*
- g. Perigynia more numerous and spikes larger; lower blade present.
- h. Beak of the perigynium absent, or very short and lacking teeth.
- i. Bract at base of inflorescence sheathless or nearly so.
- j. Terminal spikes half pistillate or more; pistillate scales deep brown or with deep brown margins. Sect. 19. **ATRATAE**
- j. Terminal spikes mostly or wholly staminate.
 Plants of acid bogs; spikes pendulous on slender peduncles; roots covered with dense felt-like pubescence; scales longer than the perigynia. Sect. 20. **LIMOSAE**
 Plants of fields and meadows; spikes firm and erect; roots without pubescence.
 Leaves glabrous and very glaucous below; perigynia nerveless, pale; spikes several times longer than wide. 62. *C. flacca*
 Leaves softly pubescent below; spikes short-cylindric; perigynia ellipsoid green and finely nerved. 67. *C. pallescens*
- i. Bract at the base of the inflorescence with a prolonged closed or tubular sheath.
- k. Plants tall and lax, growing in clumps; pistillate spikes long and linear, on long slender peduncles.
 Terminal spike partly fertile; spikes drooping; perigynia beakless (Fig. 42). 69. *C. gracillima*
 Terminal spike staminate. Sect. 30. **LAXIFLORAE**
- k. Plants lower; pistillate spikes 1-2 cm long, erect.
 Plants from elongated rootstocks, often with stolons, glaucous or bluish-green; edges of lower sheath smooth. Sect. 29. **PANICEAE**
 Plants green, in clumps; edges of lower sheath serrulate upwardly on margin; perigynia oblong, tapering to the tip, with prominent impressed nerves (Fig. 42). 74. *C. conoidea*

h. Beak of the perigynia conspicuous and toothed.

Plant low, densely clumped, leaves mostly basal; spikes 5-15 mm long, nodding; rock crevices in northern C.B. 73. *C. capillaris*

Plant larger, erect and leafy.

Spikes loosely flowered, oblong to linear on long peduncles (Fig. 42).

Sect. 26. SYLVATICAE

Spikes dense, short-cylindrical to globose, sessile (Fig. 41, c, d).

Sect. 31. EXTENSAE

f. Style continuous with the achene and of the same texture, persistent; perigynia with beak conspicuous, toothed, the teeth stiff and 0.3-1 mm long or longer, often spreading; spikes 5-25 mm thick; plants stout, 4-12 dm high.

l. Pistillate spike ovoid to cylindrical with 20-75 or more perigynia.

m. Scales of fertile spikes with rough or barbed awns longer than their body; pistillate spikes elongate, dense.

Sect. 34. PSEUDO-CYPEREAE

m. Scales of fertile spikes blunt or with awns that are short and smooth.

n. Pistillate spikes ovoid, 3-6 cm long; perigynia 13-20 mm long, tapering evenly into a serrulate beak (Fig. 45). 94. *C. lupulina*

n. Pistillate spikes cylindrical to elongate.

Perigynia coriaceous, closely overlapping, elliptical, the beak rather short and with weak teeth; plant large and stout from creeping rhizomes, to 1 m high (Fig. 44). 86. *C. lacustris*

Perigynia membranous, more spreading, contracted to a beak with prominent teeth. Sect. 37. VESICARIAE

i. Pistillate spikes globose with 1-15 perigynia.

o. Leaves 1-3 mm wide, involute; pistillate spikes 7-9 mm thick, sessile, widely separated (Fig. 45). 98. *C. oligosperma*

o. Leaves 2-15 mm wide; pistillate spikes over 1 cm thick, peduncled, or sessile on the plant having wide leaves.

Beak of the perigynia serrate; pistillate spikes short-cylindrical, with the mature perigynia straw-colored (Fig. 43).

Sect. 35. FOLLICULATAE

Beak of the perigynia smooth; pistillate spikes dense, ovoid or round, with the mature perigynia green (Fig. 45).

93. *C. intumescens*

SECT. 1. DIOICAE

1. *C. gynocrates* Wormsk.

Two collections are known from the Province: bog on St. Paul's Is., northern C.B. (Perry, 1931) and sphagnum of bog, Black River, Inverness County (Smith, 1959).

Greenland to Alaska south to N.Y. and B.C.; in Eurasia.

SECT. 2. BRACTEOSAE

a. Perigynia with the lower third to half corky-thickened; spikes separated in a slender inflorescence 3-6 cm long; scales of pistillate spike about half as long as the perigynia.

- b. Stigmas short, stout, strongly twisted or contorted; perigynia 3.25-4.5 mm long; leaf-blades 1.5-3 (averaging 2.5) mm wide (Fig. 34, e). 2. *C. convoluta*
- b. Stigmas long, slender, usually not twisted, light-reddish; perigynia 2.5-3.5 mm long; leaf blades 1-2 mm wide. 3. *C. rosea*
- a. Perigynia with the body inconspicuously corky-thickened, often spongy at the base, 4-4.5 mm long; spikes aggregated in a head 1.5-3 cm long; scales acuminate, nearly as long as the perigynia. 4. *C. spicata*

2. *C. convoluta* Mackenz. Fig. 34, e.

Scattered from Annapolis to Pictou and Cumberland Cos.; grassy intervalles, rich open woods, near gypsum cliffs, etc.; intergrading with *C. rosea* and considered by some as merely a variation of it. *C. radiata* (Wahlenb.)Dew. has been reported from N.S. but these plants are probably merely smaller plants of *C. rosea*.

Woods and thickets: N.S. to Man. south to Ala. and Ark.

3. *C. rosea* Schkuhr Map 129.

Alluvial woods and damp thickets, rare; known from 12 locations scattered from Annapolis and Kings Co. to Cape North. Abundant under hardwoods of slope near base of cliff, New Prospect, Cumb. Co. (Schofield, 1955).

Rich woodlands and thickets: N.S. to N.D. south to Ga.

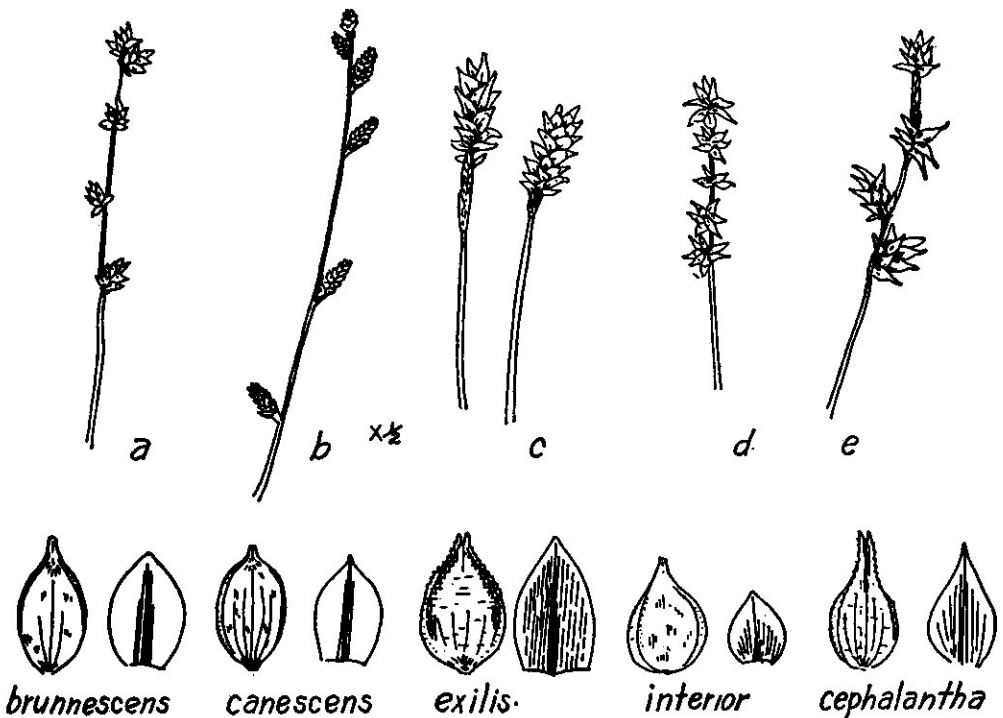


Fig. 35.—*Carex*: inflorescences, x 1; perigynia and scales, x 5.

4. *C. spicata* Huds.

Common along the roadsides in the gypsum area around Windsor, Newport and Brooklyn in Hants Co., growing in large stools (Fernald, 1922); Liverpool: rare on margin of pool at Louisburg, C.B. County (Smith and Schofield, 1952); and a garden weed at Pictou.

Locally naturalized from Eu.; N.S. to s. Ont. south to Va. and Ohio.

SECT. 3. MULTIFLORAE

5. *C. vulpinoidea* Michx. Fig. 36. Map 130.

Common along roadside ditches between Berwick and Middleton in the Annapolis Valley; often abundant on damp slopes along the North Mt. in the same area; a few stools in moist ground in an abandoned saw-mill clearing, Lake Rossingnol Reservoir, Queens Co. (Weatherby, 1942); found by Schofield on moist slopes above a cliff at Cape d'Or; damp areas about Economy; and along the banks of the Shubenacadie River at Milford; roadside ditch, middle Musquodoboit.

Nfld. to B.C. south to Fla. and Tex.

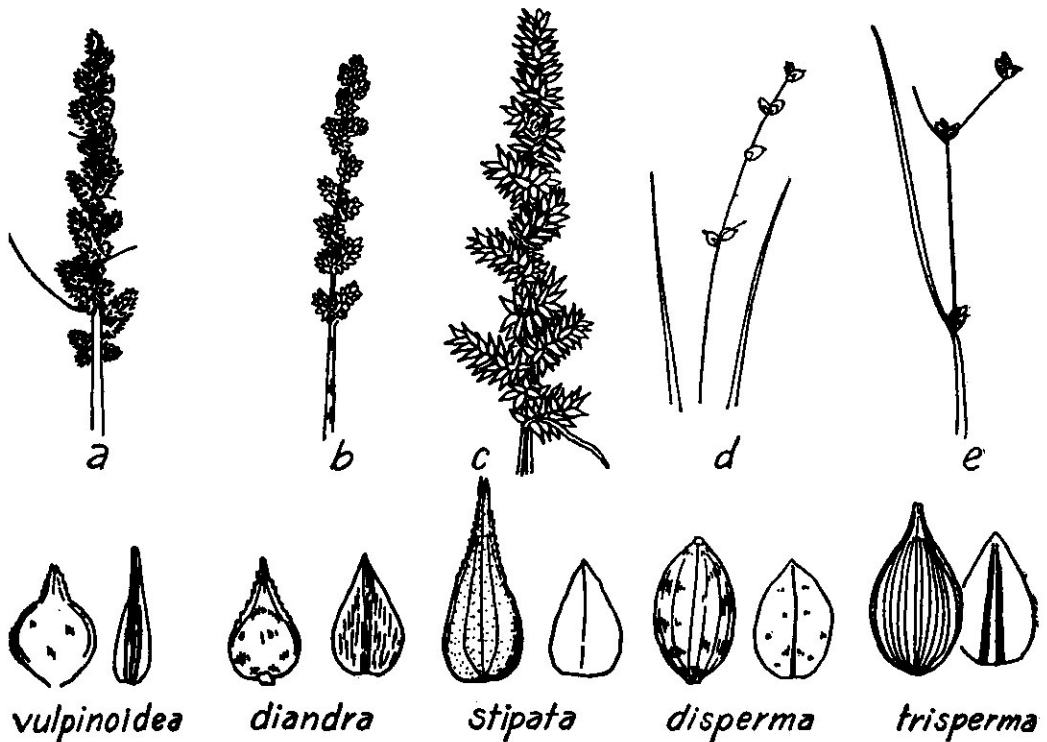
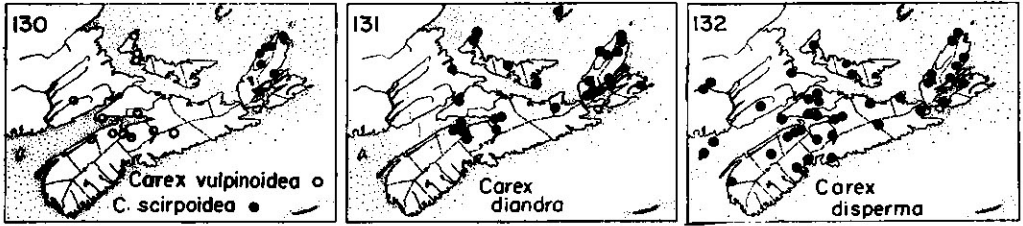


Fig. 36.—*Carex*: inflorescences x 1; perigynia and scales x 5.



SECT. 4. PANICULATAE

- a. Spike dense, crowded, rather stiff; mature perigynia nearly black, the two veins on the lower side enclosing a lighter, often depressed area; summit of leaf sheath pale. 6. *C. diandra*
- a. Spike open and lax; mature perigynia brownish, the principal veins not enclosing an area of different texture; summit of leaf sheath bronze. 7. *C. prairea*

6. *C. diandra* Schrank Fig. 36. Map 131.

Common and locally abundant in bogs, cat-tail swales, and marshes along the northern part of the Province; common in the extensive areas above Kentville, near Truro, at Amherst and to northern Cape Breton.

Nfld. to Yukon south to N.J., Ind. and Calif.; Eurasia.

7. *C. prairea* Dew.

In standing water of *Typha* swamp, Centreville, Kings County (Erskine, 1951).

Bogs and meadows: N.S. and Quebec to Alta. south to Penn. and Iowa.

SECT. 5. VULPINAE

8. *C. stipata* Muhl. Fig. 36.

Swamps, swales, damp meadows, roadside ditches; general throughout and often abundant.

Nfld. to N.C. and N.M.; eastern Asia.

SECT. 6. HELEONASTES

- a. Spikes with the staminate flowers terminal, mostly with 1-3 fertile flowers; perigynia unequally biconvex, almost terete (Fig. 36). 9. *C. disperma*
- a. Spikes with the staminate flowers basal; perigynia flattened and plano-convex.
- b. Lowest bract of the inflorescence bristle-like, many times exceeding the 1-5-flowered spike, spikes widely separated.
- c. Leaves 1-2 mm wide; spikes 2-3, 2-5-flowered; perigynia 3.3-4.8 mm long (Fig. 36). 10. *C. trisperma*
- c. Leaves 0.3-0.5 mm wide; spikes 1-2, 1-3-flowered; perigynia 2.5-3.5 mm long. *C. trisperma* var. *Billingsii*

- b. Lowest bract of the inflorescence lacking or to about twice as long as the spike; spikes several to many-flowered, the upper close together.
- d. Scales reddish-brown, larger than the perigynia; culms smooth; perigynia stalked, coriaceous, obscurely beaked, enveloped by the scales; salt marshes.
11. *C. Mackenziei*
- d. Scales light-colored, smaller than the perigynia; culms rough above; perigynia not stalked, membranous, distinctly short-beaked, not enveloped by the scales; not of salt marshes.
- e. Perigynia appressed-ascending, 10-30 to a spike; leaves glaucous, 2-4 mm wide (Fig. 35).
- f. Spokes ovoid to cylindric, 6-12 mm long; perigynia 2-3 mm long.
- g. Inflorescence 2-7 cm long, the spikes all close together.
12. *C. canescens*
- g. Inflorescence 6-15 cm long, with the lower spikes separated and 2-4 cm apart.
- C. canescens* var. *disjuncta*
- f. Spikes short and nearly subglobose; perigynia barely 2 mm long; and the inflorescence small and short.
- C. canescens* var. *subloliacea*
- e. Perigynia loosely spreading, 5-10 to a spike; leaves green, 1-2.5 mm wide (Fig. 35).
13. *C. brunnescens*

9. *C. disperma* Dew. Fig. 36. Map 132.

Moist woods, shaded swamps and wet to sphagnous shaded areas: Annapolis and Lunenburg Cos. to C.B. A common and distinctive woodland species.

Nfld. to Alaska south to N.J. and Calif.; Eurasia.

10. *C. trisperma* Dew. Fig. 36.

Mossy woods and wet thickets, throughout and usually growing in large loose clumps. Nfld. to Sask. south to N.C. and Minn.

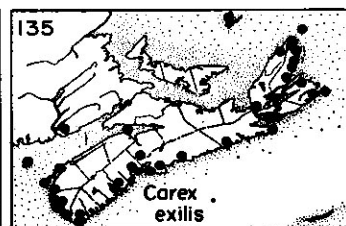
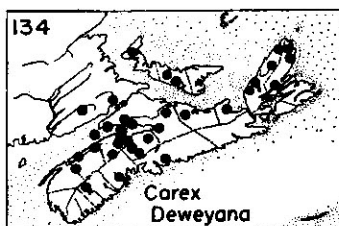
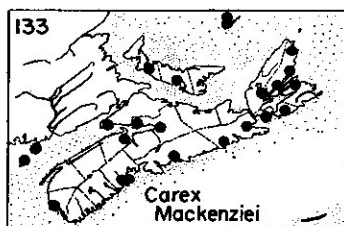
Var. *Billingsii* Knight is characteristic of dryish knolls in bogs and peaty barrens throughout; often abundant and sometimes cover the ground in open woods or cut-over areas near the coast.

Acid soils, Nfld. to Ont. south to N.J. and Penn.

11. *C. Mackenziei* Krecz. Map 133.

Scattered around the coast; brackish soil, sometimes forming a band with other plants about the heads of the marshes or about salt ponds; little collected but probably general. Quaking areas on salt marsh, Five Islands, Colchester Co. and mucky areas of salt marsh, Advocate (Schofield, 1955).

Lab. to Me.; Hudson Bay; Alaska; Eurasia.



12. *C. canescens* L. Fig. 35.

Common throughout and very variable; grading into and represented mostly by the following variety.

Var. *disjuncta* Fern. Common throughout; lake margins, marshes, swamps, sphagnum mats and wet meadows.

Var. *subloliacea* Laestad. is a smaller variety known from a few collections from northern C.B., but to be expected also around the Bay of Fundy.

Greenland to Alaska south to Va., Ariz. and Calif.; Eurasia.

13. *C. brunnescens* (Pers.)Poir, var. *sphaerostachya* (Tuckerm.) Kuenth. Fig. 35.

Common from Cape Breton to Kings and Halifax Cos. and scattered west to Yarmouth. This species is characteristic of open moist woods and thickets in acid soil. The variety is the more southern variation.

Nfld. to B.C. south to N.J., N.C. and Wash.; Eurasia.

SECT. 7. DEWEYANAE

a. Culms very rough above, with the spikes close together, terminal and closely appressed, the lower bracts much shorter than the spikes; perigynia narrowly lanceolate, with the achenes linear-lanceolate. 14. *C. bromoides*

a. Culms smooth to more or less roughened above, with the spikes separated, spreading, the lower bracts much longer than the spikes; perigynia oblong-lanceolate with the achenes sub-orbicular. 15. *C. Deweyana*

14. *C. bromoides* Schkuhr

Known from a marsh near Truro; specimens were collected by Macoun and identified by Mackenzie; in large clumps in damp woods, Strathlorne, Inverness Co. (Smith and Erskine, 1954); under alders, Five Mile River, Hants Co.

Swampy woods; N.S. to Wisc. south to Fla. and La.

15. *C. Deweyana* Schwein. Fig. 37. Map 134.

Annapolis and Queens Cos. to northern C.B.; rich woods, more frequent in gypsum or limestone areas; common in hemlock woods on gypsum near Windsor.

Open rich woods and banks, Nfld. to B.C. south to Penn. and Colo.

SECT. 8. STELLULATAE

This group, with the exception of the easily identifiable *C. exilis*, consists of multitudes of small plants growing in every damp, poorly-drained area. The perigynia early become widely spreading or reflexed so that the small heads have an irregular star-shaped outline, hence the name of the section.

a. Spikes one to a culm; leaves narrow, involute and rigid (Fig. 35).

16. *C. exilis*

a. Spikes more than one; leaf-blades not rigid, 0.5-4 mm wide.

b. Perigynia 2.25-3.25 mm long, the teeth very shallow and barely visible; the beak one-quarter to one-third the length of the body; scales one-half to two-thirds the length of the perigynium body (Fig. 35, d).

c. Perigynia nerveless ventrally or few-nerved at the base, yellowish-brown, the beak with the ventral false suture obscure; scales obtuse; leaves 1-3 mm wide.

17. *C. interior*

c. Perigynia strongly nerved ventrally, deep green, the beak with the ventral false suture conspicuous; scales subacute; leaves 0.25-1 mm wide.

18. *C. Howei*

b. Perigynia 2.75-4.75 mm long, the beak deeply bidentate with the teeth 0.3-0.5 mm long.

d. Pistillate scales obtuse, one-half to two-thirds the length of the perigynia; perigynia ovate to widely heart-shaped.

e. Scales about half as long as the perigynia; perigynium body 2-2.5 mm wide, the inner face prominently nerved, green.

19. *C. atlantica*

e. Scales about two-thirds as long as the perigynia; body of perigynia 1.2-2 mm wide, nerveless or nearly so.

20. *C. Wiegandii*

d. Pistillate scales acute, as long or longer than the perigynia; body of perigynia mostly lanceolate.

21. *C. muricata*

16. *C. exilis* Dew. Fig. 35. Map 135.

Bogs and peaty barrens; scattered throughout; a tall and rather distinctive species.

Lab. to James Bay south to N.Y. mostly near the coast.

17. *C. interior* Bailey Fig. 35.

Spruce swamps, wet or swampy meadows, widely distributed throughout and our common small species.

Nfld. to B.C. south to Penn., Ind. and n. Calif.

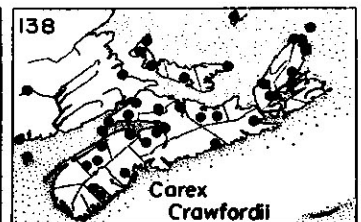
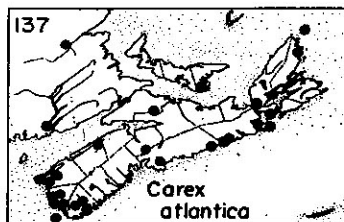
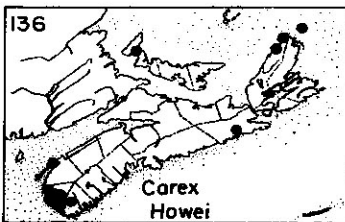
18. *C. Howei* Mackenz. Map 136.

Swamps, wet woods, thickets and boggy swales; abundant in Yarmouth and Digby Cos. (Fernald, 1921); peat bog on St. Paul's Island (Perry, 1931); one station in Guysborough Co. and three in n. Cape Breton.

Fla. to La. north to s. Me. and N.S. and locally west to Ohio and Mich.

19. *C. atlantica* Bailey Map 137.

Common in swamps, bogs and peaty barrens; Yarmouth to Annapolis and Guysborough and characteristic of the *Polytrichum*-areas in



the sand-barrens near Middleton. It is common along the Atlantic coast and is found scattered in Cape Breton.

Near the coast Fla. to Tex. and north to N.S. and e. N.B.

20. *C. Wiegandii* Mackenz.

This species, which is reported in Gray's Manual from N.S. and has its range surrounding N.S., is not well known here. Further study should establish it as at least scattered.

Boggy and peaty soils; Nfld. to Ont. south to Mass. and N.Y.

21. *C. muricata* L. Fig. 35, e.

This highly variable and conspicuous species is found everywhere throughout the Province in bogs, peaty soils, swamps and ditches. Two variations have been reported as species. These seem to intergrade in their characteristics and are here treated as varieties.

Var. *angustata* Carey has the perigynia lanceolate and nerveless on the inner face, 2.5-3.5 mm long; with the achenes longer than wide. (*C. angustior* Mackenz.).

Var. *cephalantha* Bailey is very common throughout; perigynia ovate, 3.5-4.5 mm long, strongly nerved on the inner face; with the achenes about as long as wide.

Swampy woods, meadows, shores and bogs across the continent; Eurasia.

SECT. 9. OVALES

The members of the Ovales all have oval heads or spikes, usually with the scales closely appressed. They are very common on poorly-drained areas bare or partly bare of other vegetation. *C. scoparia* is by far the most common species of this section.

- a. Scales of the pistillate spikes shorter than the perigynia, lanceolate and tapering above to expose the tops of the perigynia (Fig. 37, b).
 - b. Perigynia lanceolate, 3.5-6.5 mm long, 0.5-2 mm wide, widest near the base; scales acute to acuminate (Fig. 37).
 - c. Spikes separated in a flexuous moniliform inflorescence; culms slender and up to 5-10 dm high.
 - d. Leaves 3-7 mm wide, those of the sterile culms widely spreading, well developed and numerous, not clustered; perigynia loosely spreading, 3-5 mm long, one-fourth to one-third as wide as long, sharply nerved beneath.
24. *C. projecta*
- d. Leaves 1-3 mm wide; perigynia ascending, without spreading tips, 2.6-4 mm long, about half as wide as long.
 - e. Spikes usually crowded; perigynia appressed.
27. *C. tenera*
- e. Leaves 3-7 mm wide, as in *C. projecta*; perigynia 3-5 mm wide, obscurely nerved on both sides.
 - e. Leaves 1-3 mm wide, those of the sterile culms ascending, usually clustered at the apex, the sterile culms poorly developed.
 - f. Winged margin of the perigynia plainly visible to the base; plant 1.5-10 dm high, leaves 5-50 cm long; perigynia 4-6.5 mm long (Fig. 37, b).
23. *C. tribuloides*

- g. Plant to 10 dm high; spikes 4-12; scales and the perigynia both straw-colored to pale brown. 22. *C. scoparia*
- g. Plant 2-4.5 dm high; spikes 3-6; scales dark brown, contrasting with the pale perigynia. *C. scoparia* var. *tesselata*
- f. Winged margin of the perigynia (not the whole area outside of the achene) nearly obsolete at the base; plant 1-6 dm high, leaves 7-15 cm long; perigynia 3.5-4 mm long. 25. *C. Crawfordii*
- b. Perigynia elliptical to obovate, at most twice as long as they are wide (Fig. 37, c).
- h. Upper leaf-sheath strongly white-hyaline ventrally; perigynia wide, often obovate and widest above the middle; sand or fresh-water marshes.
- i. Perigynia less than 4 mm long and 2 mm wide, the body elliptical; spikes brownish, densely aggregated. 26. *C. Bebbii*
- i. Perigynia more than 4 mm long or more than 2 mm wide.
- j. Perigynia 3.5-4.2 mm long, almost orbicular; culms stiff and rigid, the spikes firm, crowded and rounded at the base, often greenish.
- k. Pistillate scales nearly as long as the perigynia; perigynia nerved on the upper face, 3.5-4.2 mm long; plant coarse. 28. *C. albolutescens*
- k. Pistillate scales much shorter than the perigynia; perigynia nerveless on the upper face, 3.3-4 mm long; plant more slender. 29. *C. cumulata*
- j. Perigynia 4-5.2 mm long, appressed, elliptical; culms flexuous, the spikes club-shaped at the base, widely separated, silvery; on sandy sea-shores. 30. *C. silicea*
- h. Upper leaf-sheath green and strongly nerved ventrally nearly to the mouth; perigynia widely lanceolate; bracts often several times the length of the spikes; on or near salt marshes. 31. *C. hormathodes*
- a. Scales of the pistillate spikes about the length of the perigynia and the same width above so that they hide the tips of the perigynia; perigynia widely lanceolate to ovate (Fig. 37, d).
- l. Perigynia widely lanceolate, serrulate above, with a long terete beak, the upper 1-2 mm of which are little if at all serrulate, concealed by scales of the same shape; leaves 2-4 mm wide. 32. *C. leporina*
- l. Perigynia with the beak flattened, margined and serrulate to the apex.
- m. Pistillate scales about as wide as the perigynia; inflorescence stiff, the spikes close together to aggregated; lower bract dilated and longer than the inflorescence. 33. *C. adusta*
- m. Pistillate scales narrower than the perigynia and exposing their edges above.
- n. Plant stiff with crowded spikes in an inflorescence 2-6 cm long; body of perigynium widest at or above the middle, suborbicular. 28. *C. albolutescens*
- n. Plant with a more flexuous or moniliform inflorescence; lower bract shorter than the spike.
- o. Scales and perigynia dull or yellowish-brown; perigynia shortly or obscurely nerved on the upper side, the beak reddish-brown tipped. 34. *C. aenea*
- o. Scales and perigynia permanently silvery tinged; perigynia strongly 5-7-nerved above, the beak hyaline-tipped. 35. *C. argyrantha*

22. *C. scoparia* Schkuhr Fig. 37.

Very common throughout; in ditches and poorly-drained soil. The typical form has the spikes all ascending. The form with the spikes slightly thicker, 1.3-2.5 cm thick, and some of the crowded spikes divergent, is forma **condensa** (Fern.)Kukenth. Forma **moniliformis** (Tuckerm.)Kukenth. has the heads in a flexuous loose inflorescence. A similar form with the heads more top-shaped is forma **subturbinata** (Fern. & Wieg.)Fern. Forma **peracuta** Fern. has slender acuminate spikes. Nfld. to B.C. south to S.C., N.M. and Ore.

Var. **tesselata** Fern. & Wieg. is known from southwestern N.S. to L.I. Wet sandy and gravelly swales and roadsides, Belleville, Yarmouth Co. (Fernald, 1921).

23. *C. tribuloides* Wahlenb.

Scattered in much of the Province; collections are known from Kings, Queens and Guysborough Cos. This should occur throughout.

Swales and wet woods: N.S. to Minn. south to Fla. and La.

24. *C. projecta* Mackenz.

Meadows, damp thickets and shaded swamps; rather common, and probably throughout.

Nfld. to Man. south to D.C. and Mo.; southern B.C.

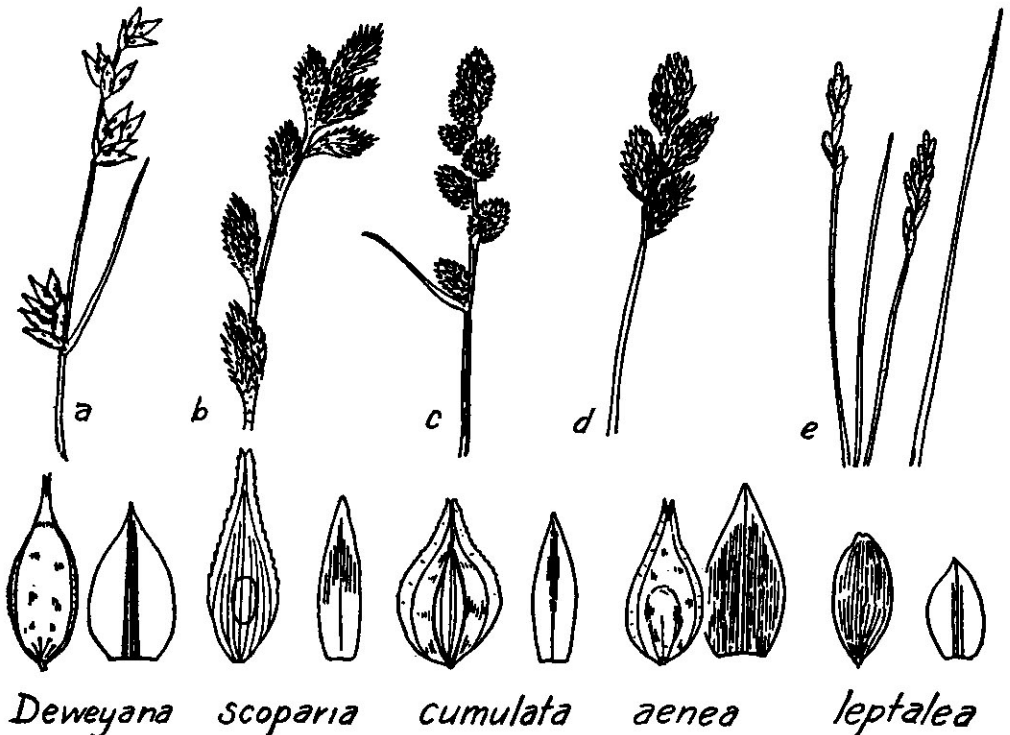


Fig. 37.—*Carex*: inflorescences x 1; perigynia and scales x 5.

25. *C. Crawfordii* Fern. Map 138.

Swales and damp peaty barrens; Annapolis and Queens Cos. to C.B. (Fernald, 1921). The favorite habitat for this and some others of this group is on damp sand or gravelly soils around ponds and lakes.

Nfld. to B.C. south to Conn., W. Va. and Wash.

26. *C. Bebbii* Olney

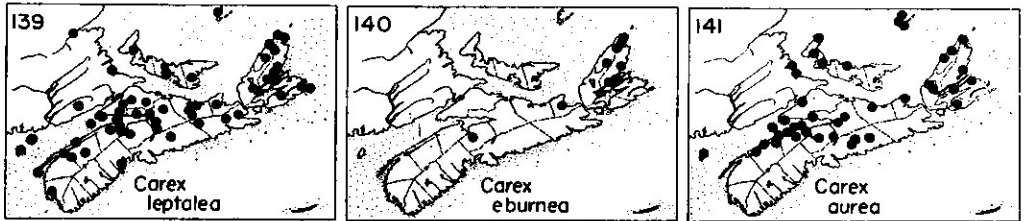
Local; boggy swale on a hillside near limestone quarries, George R., C.B. Co. (Fernald, 1921); dryish swales near the Wentworth gypsum quarries, Windsor (Fernald, 1922); near salt springs, Glendyer, Inverness Co.; and in marshy pasture northeast of Mantua, Hants Co.

Swales and meadows, Nfld. to Alaska south to N.J.

27. *C. tenera* Dew.

Scattered: swale at Linwood, Antigonish Co.; Salt Springs, Pictou Co.; and from a hardwood slope in Cumberland Co.

Meadows and woodlands: N.S. and Que. to Alta. south to N.C.

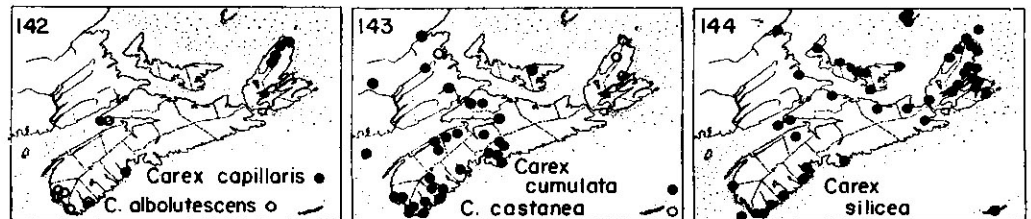
28. *C. albolutescens* Schwein. Map 142.

Somewhat general on the borders of the savannahs along the east branch of the Tusket R., Yarmouth Co.; rare in low woods and thickets by Butler's L., Gavelton; thicket bordering salt marsh, Village-dale, and moist *Polytrichum*-covered barrens near Clement Pond, Barrington, Shelburne Co.; dry areas near Lake Rossignol, Queens Co.

La. north near the coast to Mass., southern N.H. and N.S.; scattered inland.

29. *C. cumulata* (Bailey)Mackenz. Fig. 37. Map 143.

Dry or moist open barrens; frequent from Yarmouth to Halifax and Cumberland Cos.; common on the cranberry bogs of the Annapolis Valley. A collection from Broad R., Queens Co., with the spikes



7-20 mm apart, has been named forma *soluta* Fern. A hybrid with *C. scoparia* was found on damp *Polytrichum*-covered plains at Middleton, Annapolis Co.; growing with the parents and more abundant than either of them (Fernald, 1921).

Acid soils; P.E.I. to Sask. south to N.J. and Ohio.

30. *C. silicea* Olney Map 144.

Sands, barrier beaches and rocks of the outer coast from Yarmouth to northern C.B.; seldom absent on the shingle beaches in C.B.; common on the dunes and drier sand flats of Sable Is. The leaves are often stiff and involute and the whole plant has a whitish-silvery appearance.

Near the coast; Nfld. and the Gaspé south to Dela.

31. *C. hormathodes* Fern.

Common near the coast on poorly-drained soils and around the salt marshes where it may usually be found; around the Province.

Salt marshes and their borders; lower St. Lawrence and Nfld. to Va.; Ind.

32. *C. leporina* L.

Common in springy or seepy fields or along roadsides; Digby, Yarmouth and Shelburne Cos. (Fernald, 1921).

Naturalized from Eu.; Nfld. and P.E.I. to Penn. and N.C.

33. *C. adusta* Boott

A single plant growing among disturbed rocks by the roadside, Armdale, Halifax Co. (Fernald, 1922); Truro; dry roadside, Black Brook and at Warren Brook, Victoria Co.; Liscomb Mills, Guysborough Co.

Dry acid soils; Nfld. to Mackenzie south to N.Y., Wisc. and Sask.; adv. in B.C.

34. *C. aenea* Fern. Fig. 37.

Scattered; dry *Polytrichum*-covered barren near the head of Abram R., Yarmouth Co.; dry open barrens, Springhill Junction, Cumberland Co.; and collected by Macoun in Point Pleasant Park, Halifax (Fernald, 1921). It has since been found in similar dry open or shaded locations from Queens Co. to northern C.B. Island.

Dry places; Nfld. to Alaska south to N.Y. and Mont.

35. *C. argyrantha* Tuckerm.

Rathered scattered; sandy thickets, dry woods and clearings and occasionally in damp areas or woodland swamps, from Annapolis and Cumberland Cos. to C.B. Island. The heads of this species also have a silvery appearance.

N.S. to Ont. south to N.C. and Minn.

SECT. 10. POLYTRICHOIDEAE

36. *C. leptalea* Wahlenb. Fig. 37. Map 139.

Common throughout the northern half of the Province from Yarmouth to northern C.B.; rarer on the Atlantic side. Often frequent in wooded swamps and on seepy slopes of ravines, sometimes in meadows.

Nfld. to Alaska south to Fla. and Calif.

SECT. 11. SCIRPINAE

37. *C. scirpoidea* Michx. Map 130.

A specimen in the Canada National Museum was collected by Macoun on the "coast of northern C.B. near Glace Bay". Locally abundant in damp cliff crevices and on ledges, Lockhart Brook, Salmon River (Smith and Erskine, 1954) and cliff ledges and crevices, Indian Brook, Victoria Co.; seepy ledges of cliff, Cheticamp River; damp cliff ledges, Corney Brook; damp cliff ledges, Big Intervale of the Margaree River; and along LeBlanc Brook, Inverness Co.

Greenland to Alaska south to N.Y., Colorado and B.C.; rare in arctic Eurasia.

SECT. 12. MONTANAE

Rather slender plants growing in clumps, with small erect pistillate spikes and a terminal staminate one; at times the pistillate flowers may be hidden around the bases of the culms. The perigynia are long-beaked and are more or less pubescent or scabrous. Common on sterile soils.

- a. Staminate and pistillate spikes at most moderately separate, both near the top of the erect culm (Fig. 38, a).
- b. Plant very loosely cespitose, the clump often a tangle with scaly leafless stolons and runners.
- c. Plants coarse, leaves 1-3 mm wide; perigynia subglobose; spikes often crowded and sessile.
- d. Perigynia 2-3 mm long, the beak one-fourth to one-fifth as long as the body.
- d. Perigynia 3-4 mm long, the beak two-thirds as long as the body or longer.
- c. Plant very delicate with leaves 0.7-1.5 mm wide; perigynia ellipsoid, longer than thick; spikes usually separate, the staminate and lowest pistillate one often short-peduncled.
- b. Plants densely cespitose, growing in dense tight clumps.
- e. Culms 15-50 cm high, erect; leaves 3-7 mm wide, shorter than the culms; lower sheaths not fibrillose.
- e. Culms 3-25 cm high, slender; leaves 0.2-3 mm wide, often longer than the culms.

38. *C. pensylvanica*

C. pensylvanica var. *distans*

41. *C. novae-angliae*

39. *C. communis*

- f. Perigynia about the length of the sharp scales; basal heads not present; lowest bract of the inflorescence shorter or about the length of the inflorescence; spikes crowded. 40. *C. Emmonsii*
- f. Perigynia much exceeding the scales; most plants with pistillate heads among the basal leaves; lowest bract usually exceeding the staminate spike. 42. *C. deflexa*
- a. Lowest pistillate spikes much below the upper one, their peduncles arising from near the base of the culm; or all the spikes crowded near the base of the plant (Fig. 38, c).
- g. Bract of the lowest non-basal pistillate spike leaf-like, normally exceeding the staminate spike; leaves thin and narrow; perigynia 2.5 mm long, short-beaked. 42. *C. deflexa*
- g. Bract of the lowest non-basal pistillate spike scale-like and shorter than the staminate spike, if rarely longer then auriculate and reddish-brown tinged at the base.
- h. Perigynia membranous, the body short-pubescent above; leaf-blades thinnish, light-green, erect or ascending, not stiff, 1.5-3 mm wide.
- i. Perigynia 3.2-4.7 mm long, their beaks 0.9-1.7 mm long, about three-fourths as long as the body; pistillate scales lance-ovate, tapering to a long tip. 43. *C. umbellata*
- i. Perigynia 2.2-3.3 mm long, their beaks 0.5-1 mm long, about half as long as the body; scales wider with merely an acute tip. 44. *C. abdita*
- h. Perigynia subcoriaceous, the body glabrous to very sparsely short-pubescent above; beak about three-fourths the length of the body; leaf-blades short, thick, stiff and deep-green, 2.0-4.5 mm wide. 45. *C. tonsa*

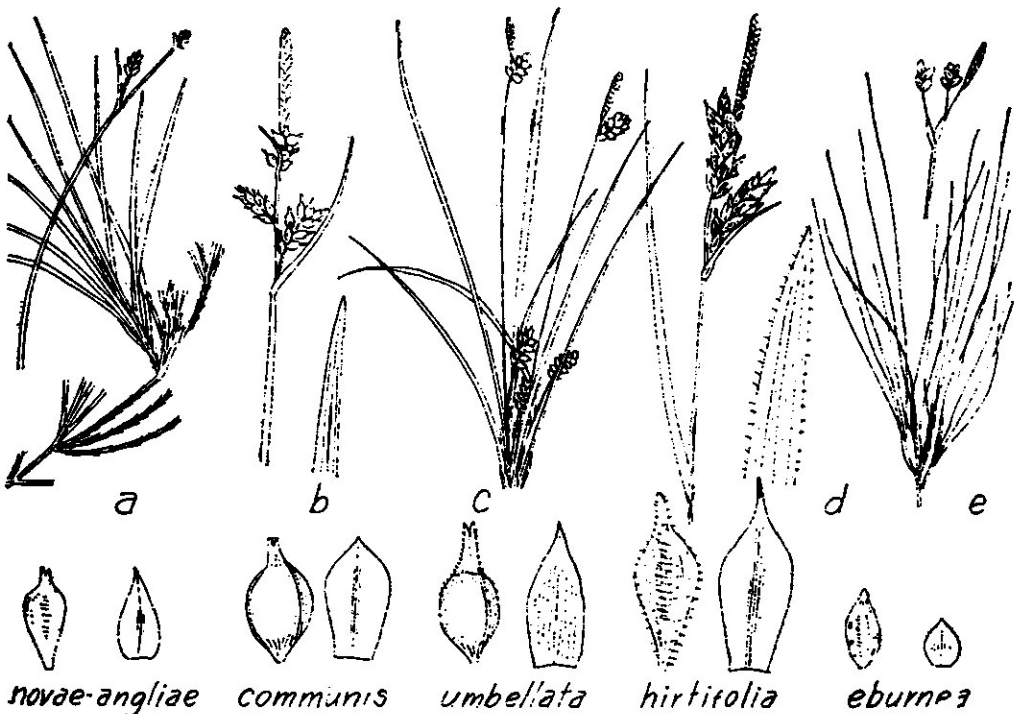


Fig. 38.—*Carex*: inflorescences x 1; perigynia and scales x 5.

38. *C. pensylvanica* Lam

Apparently rare; a specimen from Bridgewater collected by Macoun and determined by Mackenzie is in the National Museum, Ottawa. Que. to N.D. south to Mass. and Iowa.

Var. *distans* Peck is more common. Dry rock and gravelly soil west of Bridgewater (Fernald, 1921); dry roadside at Mahone Bay; dry open woodlands in Queens Co.; Cape Blomidon in Kings Co. and from northern Inverness Co. (*C. lucorum* Willd.).

39. *C. communis* Bailey Fig. 38.

Very common throughout; dry woodlands, roadsides and clearings; often found on cliff faces and in crevices in northern C.B.

N.S. to Minn. south to Ga., Ky. and Ark.

40. *C. Emmonsii* Dew

Abundant in dry or moist peaty soil, even on knolls in sphagnum bogs; Yarmouth and Shelburne Cos. (Fernald, 1921); scattered eastward at least to Halifax and Antigonish Cos. (*C. albicans* Willd.).

Dry woodlands and acid soils; Fla. to Ala. north to N.S., P.E.I. and around the Great Lakes.

41. *C. novae-angliae* Schwein. Fig. 38.

Scattered to common throughout; damp woods, pasture knolls and recent clearings.

Nfld. to Ont. south to Penn. and Wisc.

42. *C. deflexa* Hornem.

Although not considered rare only scattered collections have been made from Yarmouth to northern C.B.; it has not been collected from Cumberland Co. to Antigonish but it should occur there since it is found in eastern P.E.I. Dry sandy, mixed or coniferous woods and in northern C.B. abundant in rock crevices, tributary of the North Aspy River (Smith and Schofield, 1952).

Greenland to the Yukon south to N.Y., Wisc. and B.C.

43. *C. umbellata* Schkuhr Fig. 38.

Sterile, sandy fields and roadsides in the center of the Province; Queens, Lunenburg and Halifax Cos.; in the Annapolis Valley and on the lighter soils of Cumberland Co.; Truro.

N.S. and P.E.I. to Minn. south to Md. and Mo.

44. *C. abdita* Bickn.

Rare; one collection from Queens Co.; and wet run in old field, south of North Point, Brier Island (Smith and Erskine, 1954).

Nfld. to Sask. south to Va., Ill. and Minn.

45. *C. tonsa* (Fern.) Bickn.

A specimen from Truro was identified by Mackenzie. It is scattered to common in the Annapolis Valley and in Colchester and Cumberland Cos. in sandy areas and neglected fields. Found in Queens and Lunenburg Cos.; and one report for C.B. Island; locally abundant on gravelly road embankment, near mouth of Warren Brook, Victoria Co. (Smith and Schofield, 1952). It is perhaps merely an extreme of *C. umbellata* growing in the open sun, for intermediate forms are found.

N.S. to Minn. and Alta. south to Va. and Ind.

SECT. 13. DIGITATAE

46. *C. pedunculata* Muhl. Map 166.

Rare and local; it was first collected on the North Mt. north of Annapolis and on the talus slopes of Cape Blomidon. Now known from Digby to Hants Co.; rich hardwood slope east of Refugee Cove and Moose Island in southern Cumberland Co. (Schofield, 1955); and from a number of stations in northern C.B.

Calcareous areas; Nfld. to Alta. south to Va., Iowa and S.D.

SECT. 14. ALBAE

47. *C. eburnea* Boott Fig. 38. Map 140.

Scattered but may be abundant locally on cliffs, talus slopes, or slopes under coniferous woods on gypsum; and on cliff ledges, apparently found wherever gypsum exists in any amount; Hants Co. and from Antigonish Co. to northern C.B.

Nfld. to Alaska south to Va. and Tex.

SECT. 15. TRIQUETRAE

48. *C. hirtifolia* Mackenz. Fig. 38.

Scattered to common on the intervalles, rich alluvial meadows and grassy thickets in the calcareous districts near Shubenacadie and near Brookfield, Colchester Co.

N.S. to Minn. south to D.C. and Kans.

SECT. 16. BICOLORES

49. *C. aurea* Nutt. Fig. 42. Map 141.

Common in the northern, more alkaline districts of the Province from Annapolis Co. and Cumberland Co. to northern C.B. It is common along the basaltic North Mt.; often abundant in fields and low

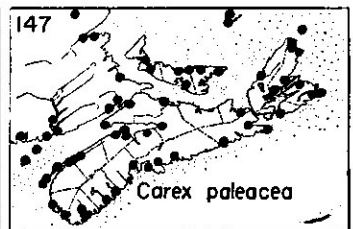
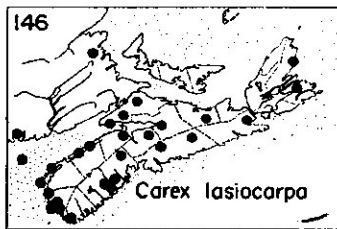
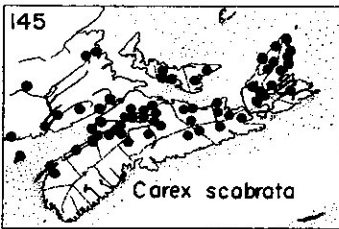
areas in Cumberland Co.; and in intervalles and on hillsides eastward.

Wet meadows and banks; Nfld. to Alaska south to Penn., Ohio and Calif.

SECT. 17. CRYPTOCARPAE

Large coarse plants growing in beds or in tall clumps. The achenes are lenticular and constricted in the middle; and the pistillate scales are much longer than the perigynia and often long-awned. Very common around salt marshes; and characteristic around shaded streams.

- a. Plants of tidal flats, and on or near saline marshes; with elongate leafless stolons, scattered or in small clumps.
- b. Spikes usually pendulous, stout, often elliptical, long-stalked; scales of pistillate heads with awns longer than their blades. 50. *C. paleacea*
- b. Spikes erect, sessile or nearly so, long and slender; scales acute to short-awned, much longer than the perigynia. 51. *C. salina*
- a. Plants of damp, fresh-water habitats, growing in large clumps.
- c. Sheaths of the leaves smooth and glabrous on the ventral side.
- d. Culms 3-15 dm high; spikes moderately separated, spreading to drooping, 3-10 cm long; pistillate scales exceeding the perigynia. 52. *C. crinita*
- d. Culms 3-6 dm high; spokes aggregated towards the top of the culm, ascending to spreading, not over 3.5 cm long; scales not exceeding the upper perigynia and commonly less than twice as long as the lower. *Var. minor*
- c. Sheaths of leaves rough-hispidulous on the ventral side; staminate spikes often pistillate at the tip.
- e. Culms 5-15 dm high with leaves 4-12 mm wide; pistillate spikes 2.5-10 cm long, drooping; perigynia 3.5 mm long. *Var. gynandra*
- e. Culms 3-8 dm high, with leaves 4-6 mm wide; pistillate spikes 1-3.5 cm long, sub-erect; perigynia 2.5-3 mm long. *Var. simulans*



50. *C. paleacea* Wahlenb. Fig. 43. Map 147.

Common around the coast; growing in large pure areas around the heads of the salt marshes, or scattered with other salt marsh plants where the soil is more brackish; occasionally growing in swales or in pockets of the cliffs near the salt water.

An extreme form with very short, and short-stalked, pistillate spikes which are erect instead of drooping, has been named forma *erectiuscula* Fern.

Salt or brackish meadows and shores; Greenland and Lab. south to Mass.; Hudson Bay and scattered southward.

51. *C. salina* Wahlenb., var. *kattogatensis* (Fries)Almq.

Common in parts of the Province and possibly around the whole coast; brackish meadows, heads of the salt marshes and coastal swales, usually growing in locations less brackish than that of the preceding species. It may hybridize with *C. paleacea* and *C. stricta* and actually rather resembles *C. stricta* in appearance. The variety has a more southern distribution than the species. (*C. recta*).

Lab. and Hudson Bay to Mass.; n. Eu.

52. *C. crinita* Lam. Fig. 43.

Scattered from Kings and Cumberland Cos. to northern C.B.; wet meadows, flood plains, along brooks and streams and in ditches. Nfld. to Man. south to Ga. and Mo.

Var. *minor* Boott is a smaller extreme, found in the southwestern counties and extending east at least to the middle of the Province; found in Victoria Co. Most of the specimens northward, however, are luxuriant in size and long-spiked. N.S. to N.Y. east to Minn.

Var. *gynandra* (Schwein.)Schwein. & Torr. General throughout; ditches, moist places, as clumps by streams and in swampy woodlands. Swampy woodlands, Nfld. to Wisc. south to N.C. and Tenn.

Var. *simulans* Fern. was collected in a woodland on St. Paul Island (Perry, 1931); and on Big Southwest Brook, Inverness Co. It is a northern variety ranging from Nfld. to Ont. south to N.S. and Mass.

SECT. 18. ACUTAE

The *Acutae* have lenticular achenes with the perigynia flattened and without pubescence. The spikes are cylindrical and tend to be erect, with the scales usually shorter and narrower than the perigynia. Several kinds are among our most common species in swales and meadows.

a. Spikes erect or stiffly ascending; perigynia with the beak usually not twisted.

b. Lower sheath at the base of the stem not conspicuously fibrillose.

c. Perigynia nerveless ventrally or only obscurely impressed-nerved; plants tall, in small tufts with horizontal rootstocks; leaves 2-8 mm wide.

d. Plant slender, 2-8 dm high; spikes 1-4 cm long; upper part of the culm obtusely angled and smooth; perigynia mostly elliptic and broadest below the apex.

53. *C. aquatilis*

d. Plant coarse, to 1.5 m high; spikes to 10 cm long; upper part of culm sharply angled, smooth or scabrous; perigynia mostly obovate and broadest towards the apex.

C. aquatilis var. *altior*

c. Perigynia conspicuously nerved ventrally; leaves 1-3 mm wide.

e. Spikes not closely aggregated at the top of the culm; scales of pistillate spikes with the green mid-rib very narrow or absent (Fig. 39, b).

f. Plants loosely cespitose and usually growing in beds, to 6 dm high; pistillate spikes crowded, densely-flowered, 1-4 cm long.

54. *C. nigra*

f. Plants densely cespitose, forming erect clumps, to 10 dm high; pistillate spikes separated, relatively loosely flowered, about 4 cm or more in length.

C. nigra var. *strictiformis*

- e. Spikes aggregated close to the summit of the culm, the lower progressively longer, producing a broom-like effect; plants in dense clumps without stolons; green mid-rib of scales about as wide as the brown margins (Fig. 39, a).
- g. Spikes dense with the perigynia 1.75-2 mm long, with the terminal spike staminate or mostly so. 55. *C. lenticularis*
- g. Spikes more open with perigynia 2.0-2.8 mm long, the terminal spike staminate only at the base. *C. lenticularis* var. *Blakei*
- b. Lower sheaths on the culm without leaf-blades, conspicuously fibrillose with a network of fibrous lines across the ventral sides; plants tall (Fig. 39, c). 56. *C. stricta*
- a. Spikes widely spreading or drooping; staminate spike solitary, the pistillate ones slender, 2-7.5 cm long; beak of the perigynium usually prominent and twisted (Fig. 39, d). 57. *C. torta*

53. *C. aquatilis* Wahlenb.

Swamps and edges of bogs on the plateau of northern C.B., grading into the following variety. Arctic America south to Nfld., C.B., Gaspé and in the mts. to Calif.

Var. *altior* (Rydb.) Fern. is found in ditches, on flood-plains, and around lakes and ponds; rather common, especially in the northern counties and at higher altitudes.

Nfld. to B.C. south to N.J., Ind. and Ore.

54. *C. nigra* (L.) Reichard Fig. 39.

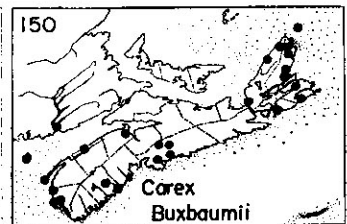
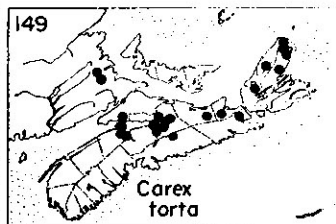
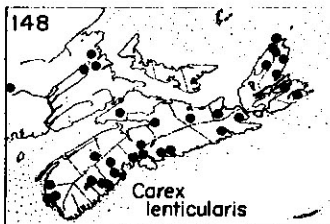
Common throughout; poorly-drained soil, near the coast, in meadows, along streams and in low areas in fields, often growing in large pure colonies in cut-over meadows where the taller grasses or sedges have been eliminated. Greenland to R.I. near the coast; Eurasia.

Var. *strictiformis* (Bailey) Fern. is the larger American extreme; widely distributed in brackish or fresh habitats in the Province. Nfld. and the lower St. Lawrence south to R.I.

55. *C. lenticularis* Michx. Fig. 39. Map 148.

Gravelly and sandy lake shores; throughout wherever the proper habitat occurs. Most common from Yarmouth to Halifax Co., Lab. to Mackenzie south to Mass. and Minn.

Var. *Blakei* Dewey is known in Canada from scattered areas in N.S. and N.B.: cobbly beach of Wentzell L., Lunenburg Co. and at Ingonish, C.B. (Fernald, 1921); stony strand of First Christopher Lake, South Brookfield, Queens Co. (Weatherby, 1942). Lab. south to N.Y. and west to Minn.



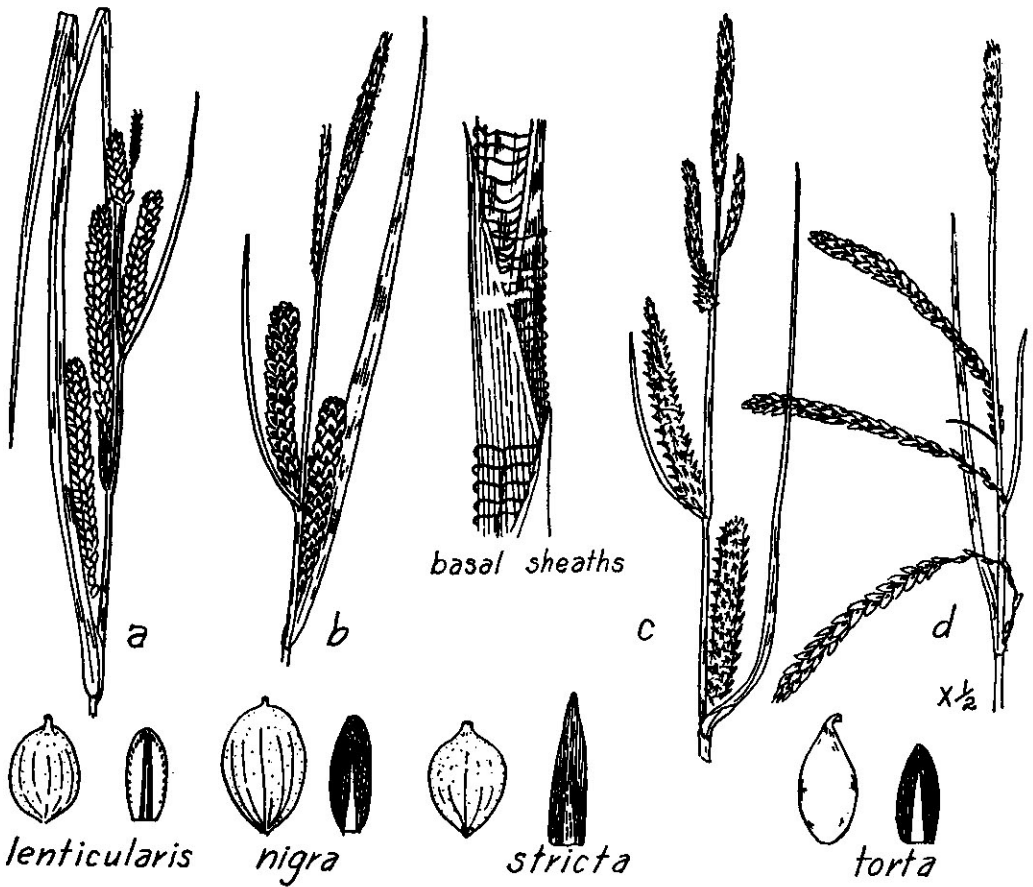


Fig. 39.—*Carex*: inflorescences, x 1 and $\frac{1}{2}$; perigynia and scales, x 5.

56. *C. stricta* Lam. Fig. 39.

Common, particularly in the north-central counties, often being the dominant vegetation over large areas of poorly-drained depressions, in bogs and swales.

Var. **strictior** (Dew.) Carey is a more glaucous form with horizontal stolons so that numerous smaller tussocks are formed; leaf-sheaths hispidulous ventrally with the basal sheaths sparingly fibrillose. Grading insensibly into the species.

N.S. to Minn. south to Fla. and Tex.

57. *C. torta* Boott Fig. 39. Map 149.

Common from Annapolis Co. to northern C.B.; characteristic of brooksides, margins of rivers, on boulder plains, occasionally beside lakes. The habitat is widely different from that of most other members of this section. It flowers very early and often forms pure bands along mountain brooks.

N.S. to Minn. south to N.C. and Ark.

SECT. 19. ATRATAE

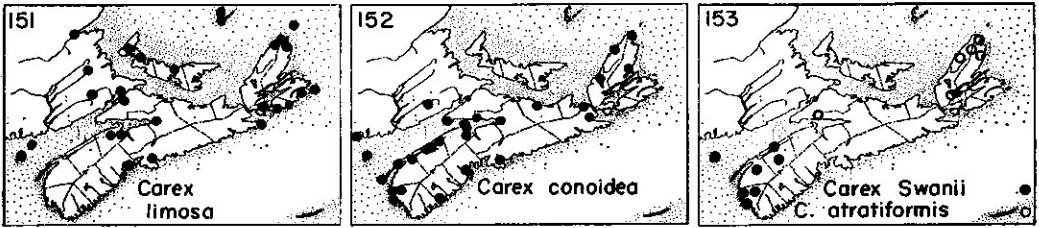
- a. Pistillate spikes on slender peduncles 1-4 cm long.
 a. Pistillate spikes sessile or nearly so.

58. *C. atratiformis*
 59. *C. Buxbaumii*

58. *C. atratiformis* Britt. Map 153.

Rock crevices, Salmon R., Victoria Co. (Erskine, 1951); fairly common in northern Cape Breton in rock crevices of brook and river banks and moist cliff faces: Big Southwest Brook, Cheticamp River and Skye Glen Mountain, Inverness Co.; Clyburne Brook, Victoria Co. (Smith and Schofield, 1952); the only location on the peninsula is on a moist cliff facing a waterfall, McAlese Brook, New Prospect, Cumberland Co. (Schofield, 1955).

Lab. to Yukon south to N.S., Mich. and Sask.

59. *C. Buxbaumii* Wahlenb. Map 150.

Local and scattered throughout; swamps, swales and in marshes, mostly near the sea.

Swamps and meadows in calcareous areas: Nfld. to Alaska south to N.C. and Calif.; Eurasia.

SECT. 20. LIMOSAE

- a. Plants strongly stoloniferous; leaves glaucous, 1-3 mm wide; pistillate scales ovate to sub-orbicular, equalling the perigynia and largely hiding them.
 60. *C. limosa*
 a. Plants loosely cepitose; leaves deep green, 2-4 mm wide; pistillate scales lanceolate, longer and narrower than the perigynia.
 61. *C. paupercula*

60. *C. limosa* L. Fig. 40. Map 151.

Common in Cape Breton and scattered west to Cumberland, Kings and Lunenburg Cos.; floating mat at the edge of ponds, in sphagnum swamps or in poorly-drained bogs.

Lab. to Alaska, south to Dela. and Calif.; Eurasia.

61. *C. paupercula* Michx. Fig. 40.

Common throughout; swampy areas, bogs and wet Sphagnum; often in spruce or open bogs about the heads of the salt marshes near the sea. The typical species has been considered to be a northern plant and two more-southern varieties have been proposed: var. *irrigua*

(Wahlenb.) Fern. with smooth culms and var. *pallens* Fern. with the culms scabrous-serrulate on the angles below the inflorescence and with paler scales.

Lab. to Alaska south to Penn., Minn. and Utah; Eurasia.

SECT. 21. PENDULINAE

62. *C. flacca* Schreb. Fig. 40.

This species, reported by Macoun in 1888 from dry, clay banks on the railway cutting just outside of Windsor, is now a very abundant and variable species throughout this gypsiferous region, often growing in grassy pastures near the gypsum cliffs. It has now also been collected from Kings Co.; Avonport and below Arlington.

Naturalized; N.S., Que. Ont. and Mich.; Eurasia and Afr.

SECT. 22. ANOMALAE

63. *C. scabrata* Schwein. Fig. 40. Map 145.

Throughout the northern part of the Province from Digby Co. to northern C.B.; alluvial woods, rich thickets, along woodland streams, and in mucky soil or seepage areas. This rough scabrous plant is most often found in shaded areas on seepy muck soil.

N.S. to Mich. south mostly in the mts. to S.C. and Tenn.

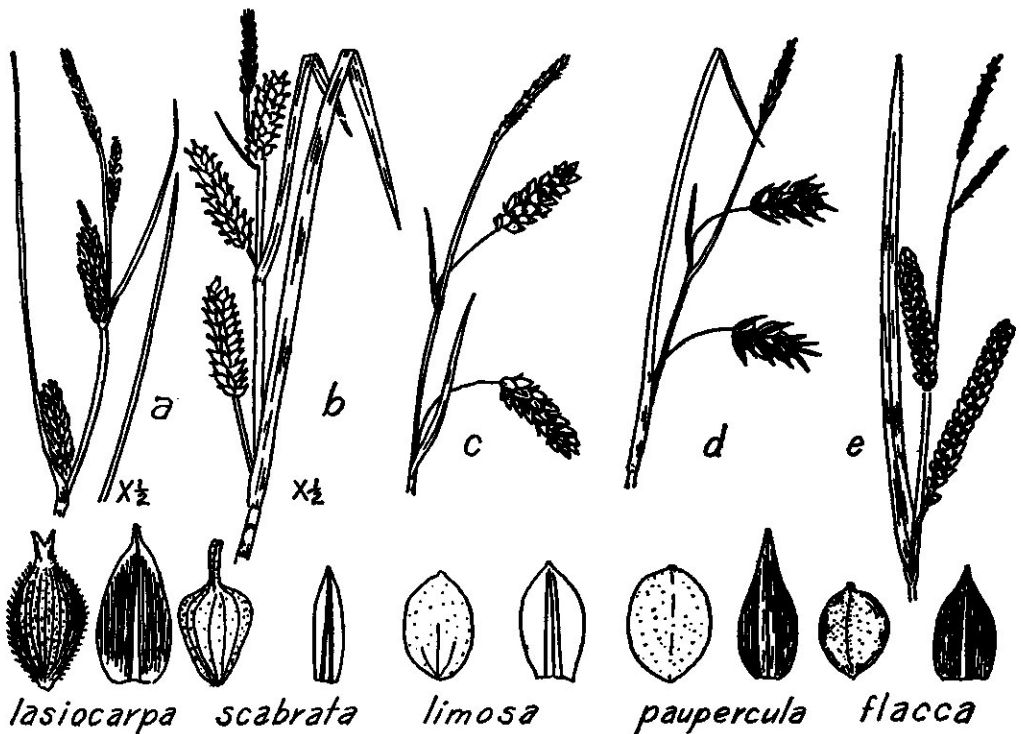


Fig. 40.—*Carex*: inflorescences, x 1 and $\frac{1}{2}$; perigynia and scales, x 5.

SECT. 23. HIRTAE

Three tall, rather coarse species with the perigynia densely hairy or hirtellous.

- a. Foliage glabrous with the leaf-sheaths not pilose at the mouth; staminate scales not long-ciliate.
- b. Perigynia 5-6 mm long, conspicuously 15-20-ribbed, with the beak half as long as the body; teeth prominent, strongly pubescent within; leaves 2.5-4 mm wide; sandy soils. 64. *C. Houghtonii*
- b. Perigynia 3-4.5 mm long, the ribs obscured by dense pubescence; teeth of the short beak erect, glabrous within; leaves less than 2 mm wide, involute; wet or swampy areas. 65. *C. lasiocarpa*
- a. Foliage usually soft-hairy with the leaf-sheaths pilose at the mouth; perigynia 5-9 mm long, thinly pubescent; staminate scales long-ciliate. 66. *C. hirta*

64. *C. Houghtonii* Torr. Fig. 41.

Sandy soil or on gravelly roadside embankments; once common along new pavement near Alton south of Truro; common on sandy soil around Oxford in Cumberland Co.; and roadside at Caledonia, Queens Co.

N.S. to Sask. south to N.Y., Mich. and Minn.

65. *C. lasiocarpa* Ehrh., var. *americana* Fern. Fig. 40. Map 146.

Common throughout; peaty meadows, swales, borders of lakes and bogs; characteristic of bog-marsh formations about the head of the Fundy marshes (Ganong); typical of lakes, ponds and swamps in northern C.B. The American variety.

Nfld. to B.C. south to N.J., Iowa and Wash.

66. *C. hirta* L.

Abundantly naturalized on a sandy railway bank, Annapolis Royal; formerly collected in a pastured field at Charlottetown, P.E.I. (Fernald, 1922).

Introduced from Eu.; locally established N.S. to Mich. south to D.C.; Ore.

SECT. 24. VIRESCENTES

- a. Terminal spike staminate; perigynia glabrous. 67. *C. pallescens*
- a. Terminal spike pistillate above and staminate at the base; perigynia white-hirsute. 68. *C. Swanii*

67. *C. pallescens* L. var. *neogaea* Fern. Fig. 41.

Common throughout; grassy meadows, sunny banks, fields and open thickets. This small neat species with the green spikes is very characteristic of damp fields. The American variety.

Nfld. to Wisc. south to N.J. and Ohio.

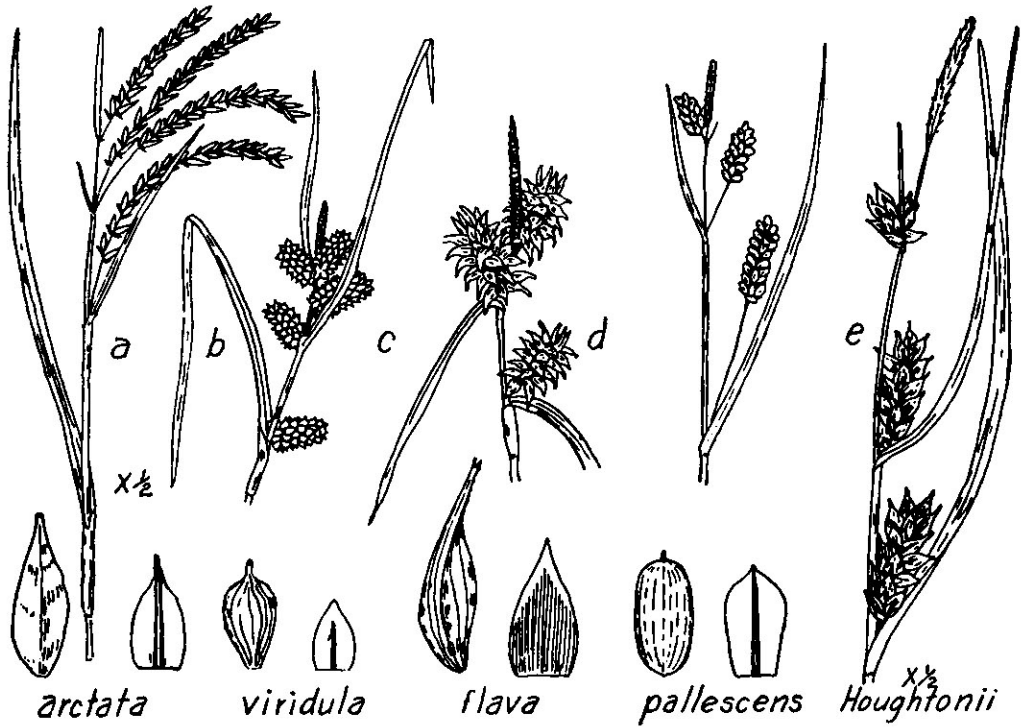


Fig. 41.—*Carex*: inflorescences, x 1; perigynia and scales, x 5.

68. *C. Swanii* (Fern.) Mackenz. Map 153.

Local in Yarmouth Co.; dryish peaty barrens, Yarmouth; boggy pasture, Central Chebogue; scattered east to Annapolis Co.

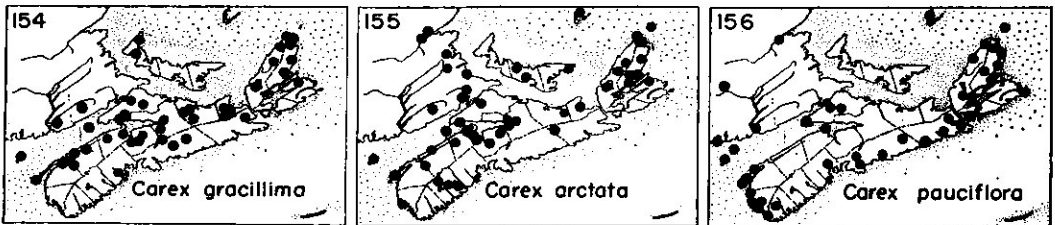
Dry woodlands and thickets; N.S. to Wisc. south to Tenn.

SECT. 25. GRACILLIMAE

69. *C. gracillima* Schwein. Fig. 42. Map 154.

Dry to moist woods and thickets, wet meadows and along roadsides throughout. It is common in the northern counties, becomes rarer southwestward and is absent in southwestern N.S. This species is usually distinguished in the field from similar species by the terminal spike being pistillate for the upper half.

Nfld. to Man. south to Va., Ky. and Mo.



SECT. 26. SYLVATICAE

The preceding species and the two common ones of this section are common woodland plants with long, drooping, linear spikes. *C. gracillima* does not have the perigynia beaked and the terminal spike is usually partly pistillate.

- a. Pistillate spikes oblong-cylindric, 8-25 mm long; leaves soft-hairy; pistillate scales light chestnut-brown. 70. *C. castanea*
- a. Pistillate spikes linear, the larger 2.5-8 cm long; leaves not pubescent except sometimes towards the base and at the mouth of the sheaths; pistillate scales greenish (Fig. 41, a).
- b. Achenes sessile or barely stalked; pistillate scales with the mid-rib extending to and projecting at the tip, usually more than half the length of the perigynia; basal leaves 6-10 mm wide. 71. *C. arctata*
- b. Achenes slenderly stalked; pistillate scales mostly obtuse, the mid-vein not extending to the tip, about half as long as the perigynia; basal leaves 2-7 mm wide. 72. *C. debilis*

70. *C. castanea* Wahlenb. Map 143.

A specimen was collected by Macoun near Black Brook, C.B.; known now from a number of stations in northern C.B.; swamp at pond edge, Cape St. Lawrence (Smith and Schofield, 1952); damp cliff crevices, Indian Brook, Big Intervale, and cliff ledges, Big Southwest Brook. Nfld to Minn. south to Conn., N.Y. and the Great Lakes.

71. *C. arctata* Boott Map 155. Fig. 41.

Common from Digby and Cumberland Cos. to C.B.; rare in Digby and Yarmouth Cos.; almost absent from Halifax to Richmond Co. Characteristic of woods, rich thickets and shaded banks.

Nfld. to Minn. south to Penn. and Ohio.

72. *C. debilis* Michx., var. *Rudgei* Bailey

Scattered to common throughout in open thickets and on meadows. The variety is the more northern form. (*C. flexuosa* Muhl.).

Dry woods and acid soils; Nfld. to Wisc. south to Penn.

SECT. 27 CAPILLARES

73. *C. capillaris* L. Map 142.

Tiny plants forming rounded cushions on seepy exposed slope at cliff-top, Cape d'Or, Cumberland Co. The typical variety is readily distinguished from var. *major* by its possession of darker-green leaves, shorter stature and in its formation of very dense tussocks rather than single erect clumps (Schofield, 1955). Arctic America south to Mt. Washington, Colo. and Utah.

Var. *major* Blytt is characteristic of calcareous rocks, in cool shaded locations on the upper reaches of the northern brooks in C.B.: crevices

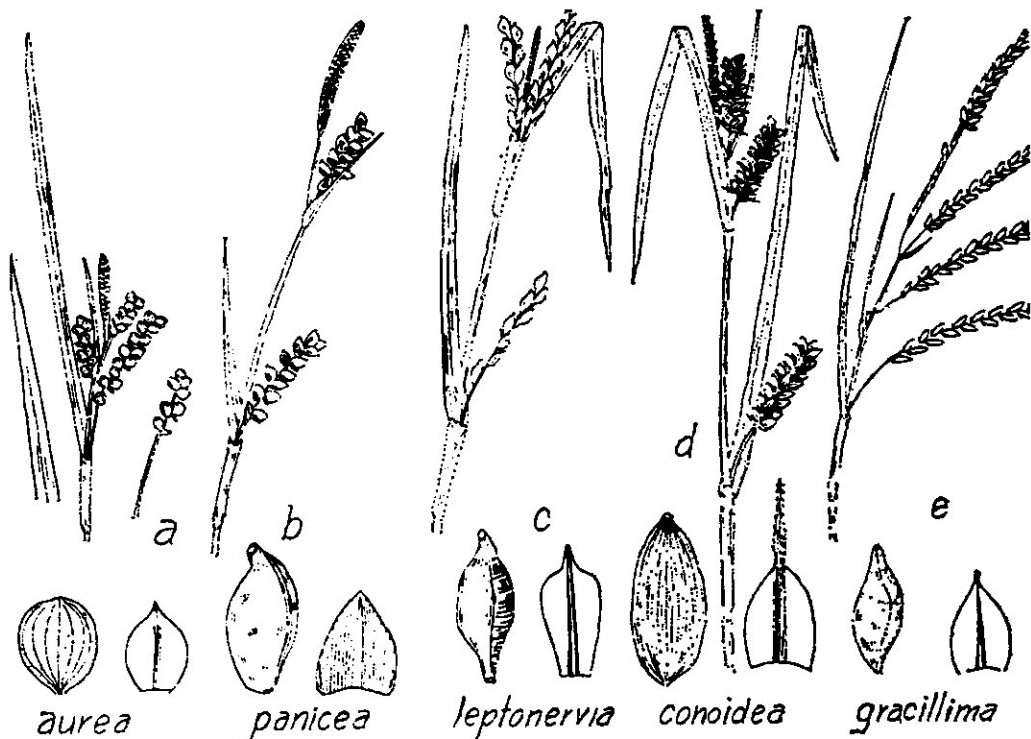


Fig. 42.—*Carex*: inflorescences, $\times \frac{1}{2}$; perigynia and scales, $\times 5$.

in rock cliff, South Blair River; and abundant on damp mud and wet ledge of calcareous cliff, Gray Glen Brook, north branch; abundant in rock crevices of cliff, Big Southwest Brook.

Nfld. to Sask. south to N.Y. and Mich.

SECT. 28. OLIGOCARPAE

74. *C. conoidea* Schkuhr Fig. 42. Map 152.

Sterile or peaty fields and meadows, often near the coast; frequent from Yarmouth to Antigonish and Pictou Cos. Abundant in meadow, Strathlorne; wet meadow, Iona (Smith and Schofield, 1952) and at Breton Cove, Corney Brook and Bay St. Lawrence in northern C.B.

Nfld. to Minn. south to N.C., Ohio and Iowa.

SECT. 29. PANICEAE

- a. Leaves and perigynia strongly glaucous; leaves quickly becoming folded or involute; perigynia without a beak, filled by the achene. 75. *C. livida*
 a. Leaves and perigynia not glaucous, bluish-green; leaves flat; perigynia with a minute beak, loose over the achene. 76. *C. panicea*

75. *C. livida* (Wahlenb.)Willd., var. *Grayana* (Dew.)Fern.

Mackenzie lists it from Louisburg and from near Windsor; collected in a bog by Point Michaud Road, Richmond Co. (Erskine, 1951). The main American variety.

Calcareous bogs and meadows; Lab. to Alaska south to N.J., Mich. and Calif.; Eu.

76. *C. panicea* L. Fig. 42.

Damp, grassy or peaty slopes; local and perhaps introduced; abundant in Yarmouth Co.; scattered in other places east to Antigonish and Cape Breton Cos. Var. *microcarpa* Sonder (Fernald, 1922) with small perigynia is included here with the species.

Nat. from Eu.; Nfld. to Conn.; Minn.

SECT. 30. LAXIFLORAE

Tall woodland species with the perigynia rather spaced in the short erect spikes.

a. Culms without green leaves but with numerous purplish sheaths; basal leaves evergreen, 15-30 mm wide, the new ones appearing after the fruits are ripe.

77. *C. plantaginea*

a. Culms with green leaves; leaves not evergreen.

b. Leaves 7-20 mm wide; sterile shoots merely a tuft of leaves; perigynia 3-4.25 mm long, the beak conspicuous and nearly straight, strongly 25-45-nerved.

78. *C. laxiflora*

b. Leaves 3-10 mm wide; sterile shoots forming short culms; beak of the perigynia very short, usually twisted; perigynia not strongly nerved, 2.5-4 mm long.

c. Lower leaf-sheaths almost smooth on the edges; perigynia 15-20-nerved.

79. *C. ormostachya*

c. Lower leaf-sheaths serrulate on the edges; perigynia with the nerves absent or very faint.

80. *C. leptoneuria*

77. *C. plantaginea* Lam.

Scattered on dry, hardwood hillside, Brookside, near Truro, Colchester Co. This is the only known location.

Rich hardwoods: N.S.; N.B. to Man. south to Ala.

78. *C. laxiflora* Lam.

Annapolis Co.; damp clearings and open rocky woods, North Mt., Granville; the first authentic record from east of southern Maine (Fernald, 1922). Earlier records belong to *C. leptoneuria*.

N.S.; Me. to Wisc. south to N.C.

79. *C. ormostachya* Wieg.

Scattered in beech woods, South Mt. west of Kentville, Kings Co.

Dry woods: N.S. to Minn. south to Mass. and Penn.

80. *C. leptonervia* Fern. Fig. 42.

Throughout, but rarer southwestward; rich woods and thickets, and often one of our more common woodland species.

Nfld. to Minn. south to N.J., N.C. and Wisc.

SECT. 31. EXTENSÆ

The *Extensæ* comprises two groups of plants found in wet and poorly-drained soil, each of which is quite variable and difficult to classify. Each group is very common and readily recognized (Fig. 41 c, d). For a discussion of this section see: Raymond, Marcel. *Cyperacees de l'Île Anticosti*. Can. Jour. Res. 28, Sect. C. 425. 1950.

a. Perigynia 3.5-6 mm long, at least the lower conspicuously reflexed, the beak about as long as the body (Fig. 41, d); plants relatively large, mostly 20-40 cm high.

b. Staminate spike sessile or nearly so; pistillate spikes clustered at the tip; lowest bract twice to four times the length of the inflorescence.

c. Beak of the perigynium serrulate, reddish-tinged at the tip; perigynia yellowish, conspicuously reflexed, 4-6 mm long; scales conspicuous and brown.

81. *C. flava*

c. Beak of perigynium smooth or nearly so, whitish or with age slightly tawny-tinged at the tip; perigynia greenish, little deflexed, 3.5-4 mm long.

C. flava var. *fertilis*

b. Staminate spike conspicuously long-peduncled; lowest bract one-half to one and one-half times the length of the inflorescence; pistillate spikes separated, the lowest often widely spaced; perigynia about 4 mm long, greenish and little deflexed.

82. *C. lepidocarpa*

a. Perigynia 2-3.5 mm long, not at all or but little deflexed, the beak small, smooth or nearly so; plants small, mostly under 20 cm high, often decumbent.

d. Stems often decumbent; leaves 2-4.5 mm wide; beak of perigynium as long as the body; female spikes usually in two groups, three surrounding the staminate one and one much lower on the culm.

83. *C. demissa*

d. Stems erect; leaves narrow, 1-3 mm wide; beak of the perigynium about half the length of the body.

84. *C. virtidula*

81. *C. flava* L. Fig. 41, d.

Frequent to common throughout; swamps, bogs, meadows, around the inner parts of salt marshes and in ditches and on poorly-drained soil. Meadows, swales and shores, Nfld. to Alaska south to N.J. and Ohio. Including *C. laxior*.

Var. *fertilis* Peck is scattered at the edges of bogs, ponds and swales; Lunenburg and Kings Co. east to Guysborough Co. (*C. cryptolepis* Mackenz.).

Wet meadows, Nfld. to Minn. south to N.J.

82. *C. lepidocarpa* Tausch

Mentioned by Mackenzie from N.S. It is probably characteristic of alkaline bogs. The only specimens which fit this species are from the