



Figure 14.—*Potamogeton*. a, *P. bupleuroides*, x $\frac{1}{2}$. *Zannichellia*. b, part of plant, x 1. *Ruppia*. c, fruiting part of plant, x 1. *Najas*. d, branches, x $\frac{1}{2}$. *Scheuchzeria*. e, upper part of plant showing fruits, x 1.

14. NAJADACEAE NAIAD FAMILY

1. NAJAS L. NAIAD

Rather tufted plants of fresh water, with fine, opposite leaves; female flower consisting only of a pistil in the axil of a leaf and forming a small elongated achene.

a. Leaves 0.2-2 mm wide, each margin with 20-40 one-celled denticles; fruit 3-5 mm long, pointed at the tip. 1. *N. flexilis*

a. Leaves almost capillary, less than 0.5 mm wide, each margin with only 3-5 denticles on the upper half; fruit 2.3 mm long, rounded at the tip, slightly curved.

2. *N. gracillima*

1. *N. flexilis* (Willd.) Rostk. & Schmidt Fig. 14, d. Map 53.

Marginal water of ponds, lakes, and in the shallows and on mud bottoms of rivers: common in C.B. and the north-central counties, rarer in the southeastern and southwestern counties (Smith, 1959).

Nfld. to Minn. south to Va.; B.C. to Ore.; Eu.

2. *N. gracillima* (A.Br.) Magnus

Collected from but two locations in the Province; marginal shallows of Cameron Lake in Hants Co.; and from marginal shallows of Charlotte Lake in Queens Co. These collections are the first from north of southern Maine.

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

15. JUNCAGINACEAE ARROW-GRASS FAMILY

Erect herbs of salt or fresh marshes and peat bogs; flowers small and greenish.

- a. Flowers numerous in a long linear raceme; ovaries united until maturity; rootstock but little developed. 1. *Triglochin*
- a. Flowers 3-8, in a loose short raceme; ovaries 3, nearly separate; rootstock creeping. 2. *Scheuchzeria*

1. TRIGLOCHIN L. ARROW-GRASS

- a. Fruit oblong, with a rounded base, separating into 6 sections; scape stout, 2-4 mm in diameter. 1. *T. elata*
- a. Fruit linear or club-shaped, with a tapering base, separating into 3 sections; scape slender, 1 mm in diameter. 2. *T. palustris*

1. *T. elata* Nutt. Map 54. Fig. 15, a. ARROW-GRASS

Scattered to common in salt marshes, especially on the older or mown areas; occasionally found in highly acid peat around lakes or pools; throughout. June-July. (See Love. Nat. Can. 85: 162. 1958).

Lab. to Alaska south to N.J. and Mex.; Eurasia, Patagonia.

2. *T. palustris* L. Fig. 15, b. Map 55. MARSH ARROW-GRASS

Characteristic of the inner brackish marshes or on brackish sand flats, in swampy marshes, open springy or damp areas along streams or more rarely in acid peat; scattered throughout but rather rare and little noticed. July-Aug.

Greenland to Alaska south to R.I., Ill. and Calif.; Eurasia and southern S.A.

2. SCHEUCHZERIA L.

1. *S. palustris* L., var. *americana* Fern., Rhodora 25: 178. 1923. Fig. 14, e. Map 56.

Quagmires of Shelburne Co. (Fernald, 1922); reported by Nichols as associated with the sphagnum mat of undrained swamps on the Cape

Breton plateau. Since that time it has been found to be scattered but rather rare in quaking bogs, floating mat or edges of lakes from Yarmouth to northern C.B. (Smith, 1959). June. The American variety of the Eurasian plant.

Nfld. to Alaska south to Penn., Wisc. & Calif.

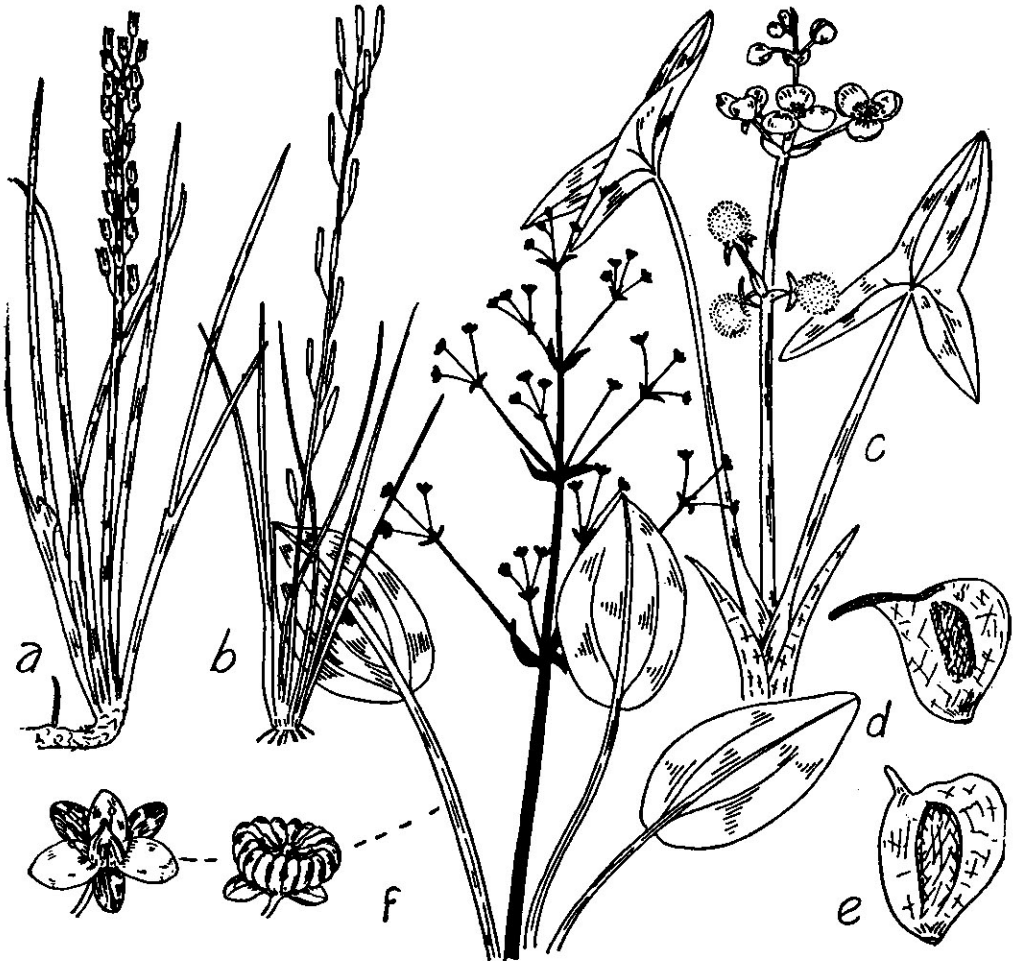
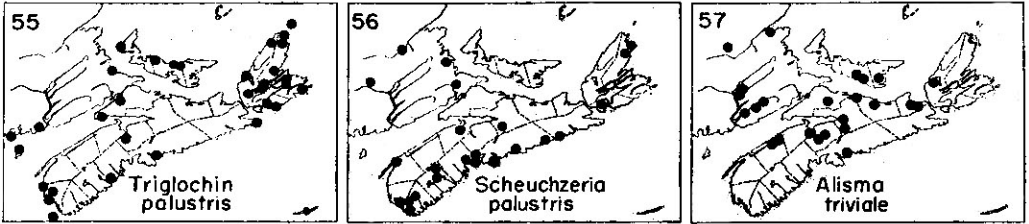


Fig. 15.—*Triglochin elata*. a, plant, $\times \frac{1}{4}$. *T. palustris*. b, plant, $\times \frac{1}{3}$. *Sagittaria cuneata*. c, plant, $\times \frac{1}{4}$; e, achene, $\times 8$. *S. latifolia*. d, achene, $\times 8$. *Alisma*. f, plant, $\times \frac{1}{4}$; flower and fruit.

16. ALISMATACEAE WATER-PLANTAIN FAMILY

Marsh plants, usually growing in shallow water, with small showy white flowers; pistils many so that the fruits are in a dense head or ring.

- a. Leaves usually ovate or oblong, never sagittate; lower flowers all perfect; stamens usually 6; achenes in a thick dense ring (Fig. 15, f). 1. *Allisma*
- a. Leaves sagittate or lanceolate; lowest flowers with stamens only or carpels only; stamens many; achenes forming a dense spherical head. 2. *Sagittaria*

1. ALISMA L. WATER-PLANTAIN

1. *A. triviale* Pursh Fig. 15, f. Map 57. See Fernald, *Rhodora* 48: 86-88. 1946.

Muddy ditches, pond and stream edges; rather common from Annapolis to Cumberland and Pictou Counties; Bayfield and Monastery, Antigonish Co., and common at the edge of a gypsum sink-hole at Hillsborough, Inverness Co. (Smith, 1959); and northward into N.B.

N.S. to B.C. south to Md., Mich. & Calif.

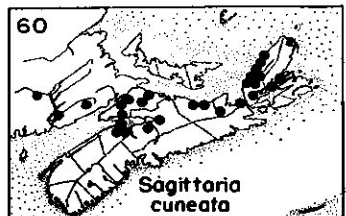
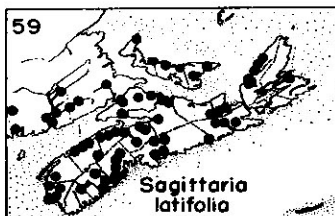
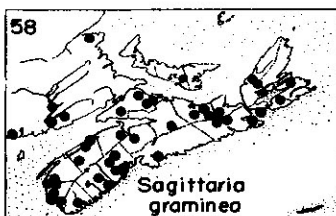
2. SAGITTARIA L. ARROW-HEAD

- a. Blades all elliptical to lanceolate, without basal lobes; bracts at the base of each whorl of flowers united, the uppermost for over half their length; filaments pubescent. 1. *S. graminea*
- a. Blades sagittate; bracts separate; filaments smooth. (Submersed forms may have the blades of the leaves lacking).
- b. Beak of the achene 0.5-2 mm long, arising from the inner margin of the top and pointing inward, making the fruiting head smoothish (Fig. 15, d); flower bracts 1 cm long or less; leaf blades 10-30 cm long.
- c. Tip of the leaf sharp; body of the leaf blade usually narrower than long; pedicels of the fruiting head less than twice as long as the heads. 2. *S. latifolia*
- c. Tip of leaf obtuse or rounded; leaves with body as wide as long; pedicels more than twice as long as the heads. *S. latifolia* var. *obtusata*
- b. Beak of the achene short, less than 0.5 mm long, erect so that the fruiting heads are roughened (Fig. 15, e); leaves with blades mostly 4-15 cm long. 3. *S. cuneata*

1. *S. graminea* Michx. Map 59.

Sandy or silty margins of ponds or on fresh tidal mud at various places from Yarmouth Co. to C.B.; relatively common in the central and eastern counties and in C.B. on muddy lake shores, in shallow ponds or more rarely along rivers. (Smith, 1959).

Nfld. to Sask. south to Fla. and Tex.



2. *S. latifolia* Willd. Fig. 15, c, d. Map 59. COMMON ARROW-HEAD.

Common throughout the mainland, found around the margins of lakes, in mucky stream-bottoms and around pools; rarer eastward. The leaf-blade is very variable in proportions. The narrow extreme, forma *gracilis* (Pursh)Robins., with the leaves and their lobes less than 1 cm wide, is often seen in running water. N.S. to B.C. south to Fla. & Calif.

Var. *obtusa* (Muhl.)Wieg. is not as common as the species but is occasionally seen growing with it, as at St. Andrews, Antigonish Co. and south of Maitland, Hants Co.

N.S. to Minn. south to La.

3. *S. cuneata* Sheldon Fig. 15, c. e. Map 60.

Shallow water at the edges of ponds and brooks, marshes, usually in muck and occasionally in alkaline ponds; Kings and Cumberland Cos. east to Inverness Co. and central C.B. (Smith, 1959) where it appears to be a common species. It is common around the sink-holes in the gypsum area and in rich alluvial areas as at Grand Pre, Truro and Pictou.

Nfld. to Sask. south to Fla. and Tex.

17. HYDROCHARITACEAE FROG'S-BIT FAMILY

A small family with one rare and one introduced aquatic species, both with rarely-present and inconspicuous flowers.

- a. Stem elongate, branched, floating or attached, growing in masses with leaves small and in whorls of threes. 1. *Elodea*
- a. Stem basal or very short; leaves long, ribbon-like and submersed; flowers on long spiral peduncles reaching to the surface of the water. 2. *Vallisneria*

1. ELODEA Michx. ELODEA

1. *E. canadensis* Michx.

Common in pond and along brook south of Camp Debert, masses in gravel-pit pools in west end of Truro, several large colonies in marginal waters of Earltown L., all in Colchester Co. Introduced at Wolfville, and undoubtedly originally introduced as a food plant for wild fowl.

Que. to Sask. and B.C. south to N.C. and Ky.

2. VALLISNERIA L. TAPE-GRASS

1. *V. americana* Michx.

Growing on the bottom of quiet waters, to be expected in the northern part of the Province; in a small lake at Sydney (Macoun); and Friar's Head, C.B. (Robinson, 1906); locally abundant in marginal water, Shortt's Lake, Brookfield, Colchester Co. and collected in the Musquodoboit River at Gibraltar by D. S. Erskine.

N.S. and s. N.B., south to Fla. and west to S.D. and Tex.

18. GRAMINEAE GRASS FAMILY

The grasses are among the most difficult of all the flowering plants to classify. This is due to their great variety, variability and the relatively small size of the reproductive parts. They are annual or perennial herbaceous plants with fibrous roots and slender, jointed stems called culms. The leaves alternate in two ranks up the culm and have long sheaths which envelop the culm for some distance above the nodes. At the junction of the sheath and blade is a small appendage, the ligule, which projects upward around the culm and may be scale-like and membranous or represented by a row of hairs.

The inflorescence is composed of spikelets which may be arranged in a panicle, a spike, or a raceme of spikes on the axis, or rachis, of the inflorescence. Each spikelet consists of two lower scale-like bracts called glumes, and enclosed within these one or more florets arranged in alternating manner on opposite sides of the axis of the spikelet, the rachilla. Each floret has a membranous or indurated scale on the outside called the lemma, in the axil of which is a generally membranous, two-nerved scale, the palea, which is greatly reduced in size or even lacking in a few species. The lemma and palea enclose the three stamens and the pistil with its plumose stigmas; or, in a few cases, the stamens, pistil, or both, may be reduced in number or absent. To a great extent this treatment follows that of: *The Grasses of Nova Scotia*, W. G. Dore and A. E. Roland, *Proc. N.S. Inst. of Sci.* 20: 4: 177-288. 1942.

KEY TO TRIBES

- a. Spikelets 1- to several-flowered; spikelets generally break apart just above the glumes and between the florets at maturity; spikelets usually flattened from the sides.
- b. Spikelets arranged in true spikes, that is, sessile on the axis of the inflorescence.
- c. Spike solitary and terminal on the culm; spikelets single, or in groups of 2 or 3, alternating along opposite sides of the axis (Fig. 21).

TRIBE II. *Hordeae* (p. 89)

- c. Spikes several; spikelets attached singly, flattened and closely overlapping along one side of the axis of the spike (Fig. 26).

TRIBE V. *Chlorideae* (p. 113)

- b. Spikelets in open, contracted, or occasionally spike-like panicles but not in true spikes, the individual spikelets having a short or long stalk.
- d. Spikelets unisexual in different portions of the same panicle, the staminate pendent on the lower spreading branches, the pistillate on the upper erect branches and long awned; tall aquatic grasses (Fig. 25, c).

TRIBE VIII. *Zizanieae* (p. 119)

- d. Spikelets bisexual, although some florets in the spikelet may lack stamens, pistils or both (if spikelets unisexual their appearance not greatly different)

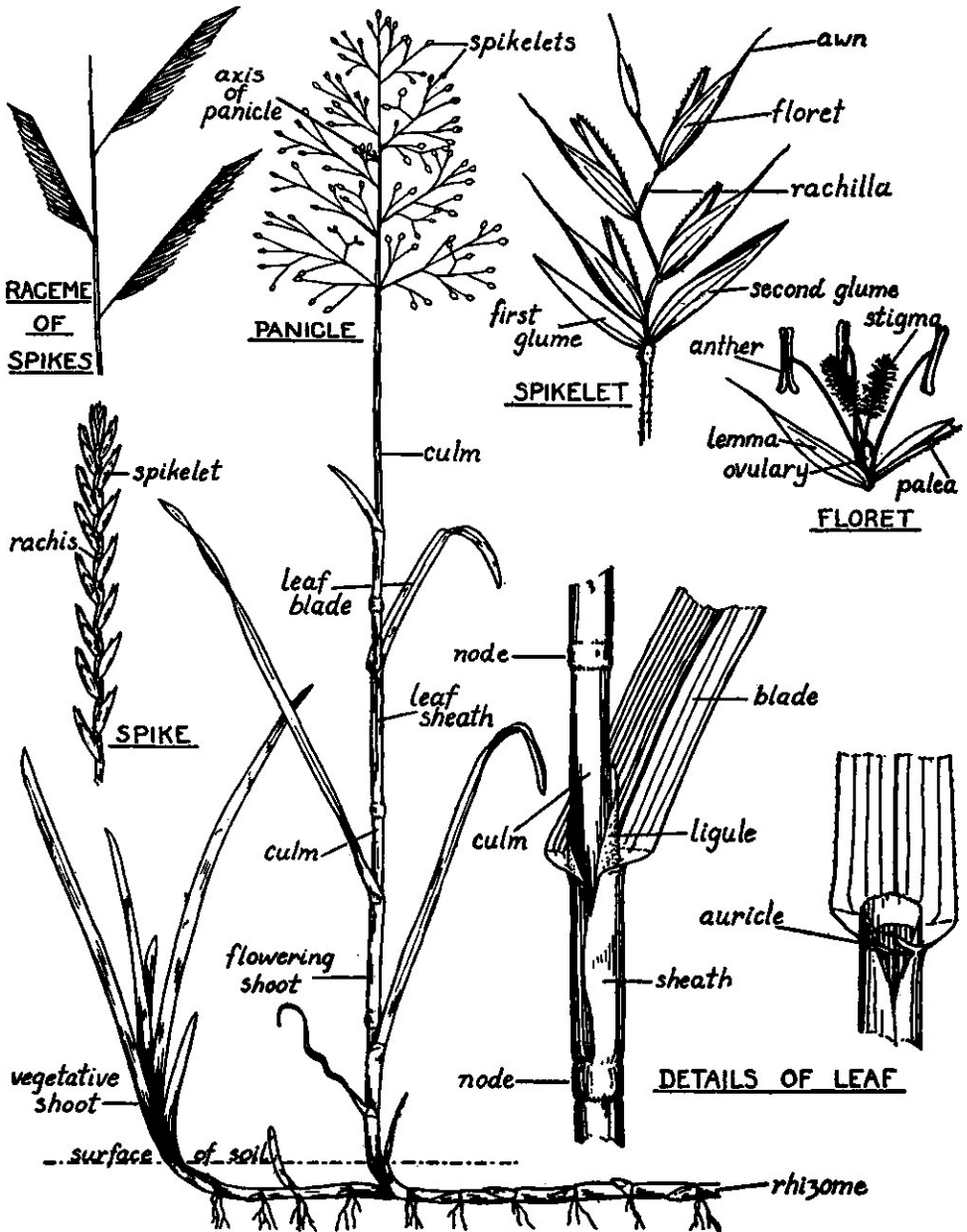


Fig. 16.—The Grass Plant, Inflorescence and Flower.

- e. Spikelets with 2 or more florets which produce fruit.
- f. Glumes shorter than the body of the first lemma; lemmas, if awned, with the awn arising from the tip or from between the two terminal teeth (Fig. 17-20). TRIBE I. *Festuceae* (p. 69)
- f. Glumes as long as the body of the lemma or longer, frequently enclosing all the florets; the awn of the lemma, if present, arising from the back below the tip (Fig. 22). TRIBE III. *Aveneae* (p. 96)
- e. Spikelets with only 1 fruit-producing floret; sterile or staminate florets, if present, being below the pistillate floret.
- g. Glumes present, one may be greatly reduced in size.
- h. Spikelets with only one floret, this perfect; glumes longer or shorter than the spikelet (Fig. 23-24). TRIBE IV. *Agrostideae* (p. 101)
- h. Spikelets with 1 fruit-producing floret, the 2 florets below it being staminate or represented by lemmas only; glumes longer than the spikelet (Fig. 27, a-c). TRIBE VI. *Phalarideae* (p. 116)
- g. Glumes absent; lemmas broad and flattened; plant very rough, retrorse-scabrous (Fig. 27, d). TRIBE VII. *Oryzeae* (p. 118)
- a. Spikelets with 1 fruit-producing floret, the lemma of the sterile floret beneath it similar to the second glume in size and texture, the lemma and palea of the fertile floret being smooth and hard, encasing the fruit at maturity; the spikelets fall away entire, sometimes with a cluster of bristles attached; spikelets usually flattened from the back (Fig. 28-29). TRIBE IX. *Panicaceae* (p. 119)

TRIBE 1. FESTUCEAE

This tribe contains a large number of our most common grasses. Those with diffuse panicles and with spikelets containing many florets and rather short glumes belong here.

- a. Plants slender, generally less than 1.7 m high; inflorescence not plume-like; spikelets without conspicuous silky hairs at maturity.
- b. Panicle open or contracted, but not spike-like.
- c. Ligule membranous; top of the sheath free from pilose hairs.
- d. Sheath closed in the throat to near the top, round in cross-section; awns generally present and arising between the two teeth terminating the lemma, or just below the tip; spikelets 2 cm long, or longer.
- e. Callus of the lemma not fringed with hairs; ligule not sheathing the culm; sheaths and blades generally short-pubescent; grain pubescent at the summit (Fig. 17). 1. *Bromus*
- e. Callus of lemma with a ring of short stiff hairs; ligule encircling the culm and continuous with the membranous front of the sheath (Fig. 17); sheaths and blades glabrous; grain glabrous. 2. *Schizachne*
- d. Sheaths open in the throat or splitting readily down the front; awns generally absent, if present then merely continuations of the tips of the lemmas; blades and sheaths glabrous or, at least, not conspicuously hairy.
- f. Spikelets diffuse in the inflorescence, not crowded in dense-one-sided clusters.
- g. Lemmas rounded on the back, at least below, usually glabrous, and lacking a cottony tuft at the base.
- h. Lemmas acute, awned from the tapering tip in most species; nerves converging towards the tip (Fig. 17, e). 3. *Festuca*
- h. Lemmas obtuse, rounded or acutish at the apex, never awned; nerves not strongly converging towards the tip of the lemma.

- i. Lemma not as broad as long, the margins extending little, if at all, beyond the margins of the palea; florets ascending to spreading in the spikelet; common.
- j. Nerves of lemma faint, generally 5; plants of saline or brackish soils only (Fig. 18). 4. *Puccinellia*
- j. Nerves of lemma prominent and sometimes raised, generally 7; plants of moist or wet, but not of saline, soils (Fig. 19). 5. *Glyceria*
- i. Lemma as broad as long, the margins produced far beyond the palea; florets spreading horizontally in the spikelet; rare, introduced grasses. 7. *Briza*
- g. Lemmas keeled on the back along the mid-rib; awns always absent.
- k. Spikelets 4-6 mm, rarely to 8 mm long, on slender pedicels in erect or spreading panicles; lemma with a cottony pubescence generally present at the base, and frequently pubescent also on the keel and other nerves; ligule membranous with no hairs at the top of the leaf-sheath (Fig. 20). 6. *Poa*
- k. Spikelets 6-10 mm long in erect clusters; lemmas entirely free of hairs; ligule less than 1 mm long with a few hairs present at the top of the sheath; plants of salt or brackish places, with firm narrow blades and scaly rhizomes (Fig. 20, e). 13. *Distichlis*
- f. Spikelets on very short pedicels, crowded in dense one-sided clusters at the ends of stiff, naked panicle-branches (Fig. 20, d). 8. *Dactylis*
- c. Ligule a row of hairs less than 1 mm long; tufts of hairs present at the top of the sheath.
- l. Annual grass with lead-colored spikelets of more than 10 florets; lemmas strongly 3-nerved; minute glands present in a ring at the nodes, and on the keels of the glumes and lemmas. 9. *Eragrostis*
- l. Perennial grasses; spikelets with fewer than 10 florets; lemmas faintly nerved; glands absent.
- m. Glumes nearly equalling to slightly exceeding the spikelets; lemmas bluntly toothed at the apex. 11. *Sieglingia*
- m. Glumes much shorter than the spikelets; lemmas not toothed, acute.
- n. Spikelets with 2-4 florets; lemmas 3-nerved; florets loosely arranged, smooth and shiny; plants with tough fibrous roots, growing in tussocks in peaty-acid soils; C.B. 10. *Molinia*
- n. Spikelets with 5 to 9 florets; lemmas with 5 or more faint nerves; florets unisexual, staminate and pistillate inflorescences on separate plants; plants with scaly rhizomes, forming zones in salt or brackish areas (Fig. 20, e). 13. *Distichlis*
- b. Spikelets in pairs in a slender one-sided spike-like inflorescence, a sterile and a fertile spikelet together, the sterile one short-stalked, the fertile one sessile. 12. *Cynosurus*
- a. Plants stout and reed-like, 2 m or more tall; inflorescence large and plume-like; silky hairs from the rachilla of the spikelet long and conspicuous at maturity; leaves broad. 14. *Phragmites*

1. BROMUS L. BROME GRASS

The large, 5- to 10-flowered spikelets will generally serve to identify these plants; in addition the leaf sheaths are also closed to near the top.

- a. First glume 1-nerved, the second 3-nerved; lemmas 10-12 mm long.
- b. Plants perennial; awns much shorter than the lemmas.

- c. Rhizome absent, the plants growing singly or spaced with the branches of the panicle flexuous and drooping; lemmas awned, densely villous along the margins but glabrous up the middle of the back; native. 1. *B. ciliatus*
- c. Rhizomes present, the plant growing in dense leafy masses with an erect inflorescence; lemmas not awned or with the rudiments of awns less than 2 mm long, appressed-hispid across the back especially towards the base; introduced. 2. *B. inermis*
- b. Plants annual; awns about as long as or exceeding the lemmas in length. 7. *B. tectorum*
- a. First glume 3- to 5-nerved; plants annual.
- d. Panicle contracted with erect or ascending branches with the spikelets usually borne singly.
- e. Lemmas glabrous, about 7 mm long. 4. *B. racemosus*
- e. Lemmas softly pubescent. 6. *B. mollis*
- d. Panicle open, with the branches, the lower at least, spreading widely.
- f. Sheaths glabrous, or the lowest slightly pubescent; lemmas 5-8 mm long. 3. *B. secalinus*
- f. Sheaths pubescent; lemmas about 9 mm long. 5. *B. commutatus*

1. *B. ciliatus* L. Fig. 17, c. Map 61.

Found in all parts of the Province; common in open cut-over areas, stream banks and old meadowlands, but never in cultivated ground. Most of our plants are var. *genuinus* Fern. with glabrous sheaths. A specimen of Macoun's from Bridgewater, 1910, having strongly pubescent sheaths is var. *intonsus* Fern. *Bromus Dudleyi*, described by Fernald as having much the same range, is doubtfully distinct and is included with this species.

Nfld. to B.C. south to N.C.

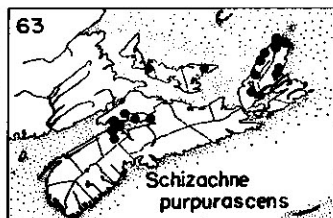
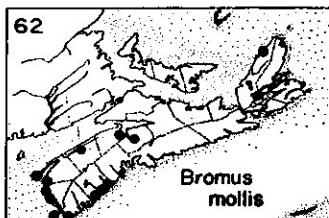
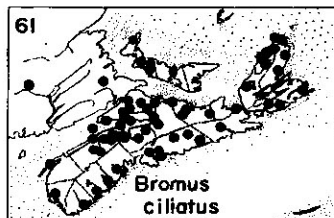
2. *B. inermis* Leyss. Fig. 17, a. SMOOTH BROME-GRASS

A valuable forage grass now extensively cultivated and planted on running dykes. The plant has been noticed to persist and spread into large colonies at many widely scattered locations. Found in waste ground or along roadsides. All these plants appear to be the forma *villosus* (Mert. & Koch) Fern., with pubescent lemmas.

Introduced from Eu.; Nfld. to B.C. south to Va.

3. *B. secalinus* L. CHESS

This has been found only on "Railroad gravel along Five-Mile River, Hants Co. (Fernald, 1921); and in meadow grass at Sable Island in 1899 by Macoun. It has not been collected in recent years. A weed introduced from Europe and very troublesome in some parts of North America.

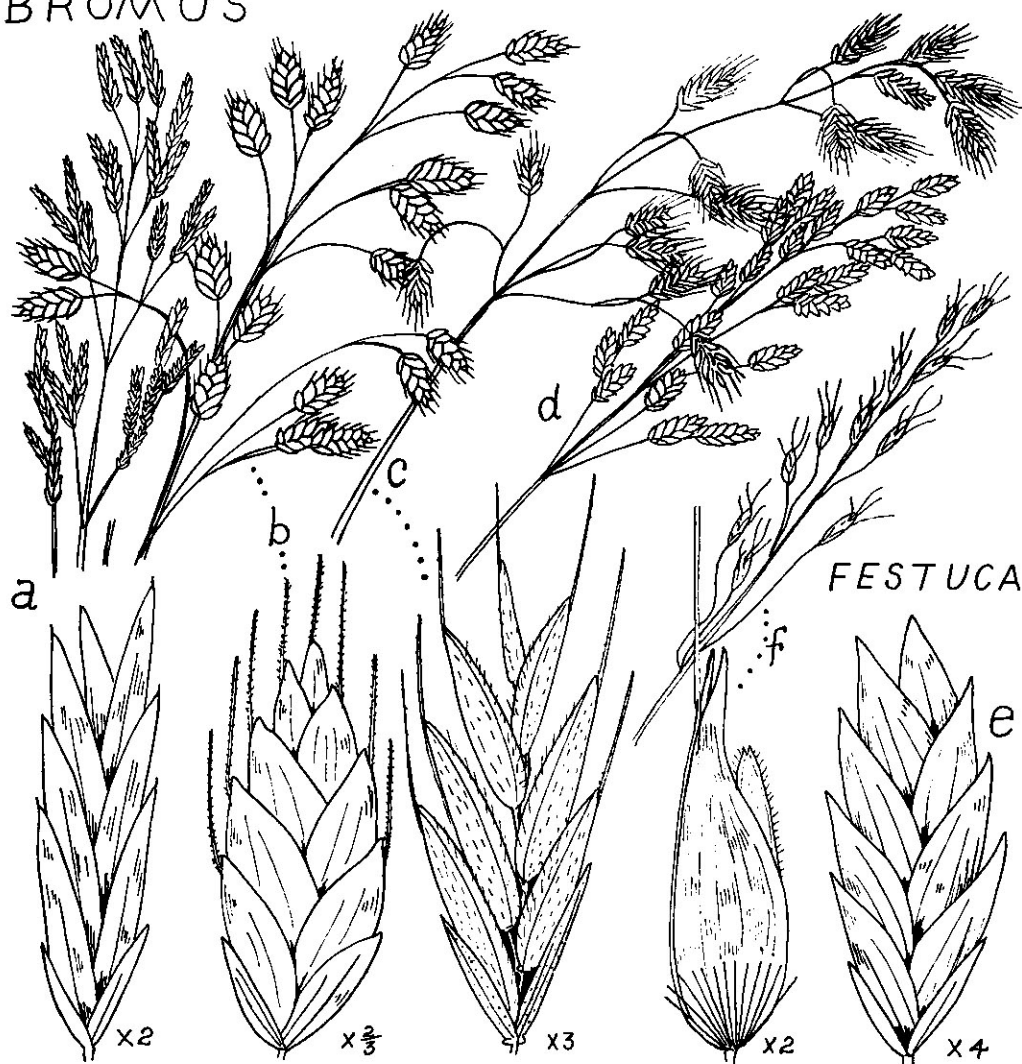


4. *B. racemosus* L.

Rare; scattered plants collected from Grand Pre, Brooklyn, Windsor, Woodville and Cape George. Specimens collected by Macoun at Bridgewater and by Groh at Kentville and Yarmouth were referred to *B. commutatus*, since depauperate plants of this species greatly resemble *B. racemosus* and it may be that the two plants are not distinctly different.

Adventive from Eu.; N.S. to Minn. south to N.C.

BROMUS



inermis *commutatus* *ciliatus* *SCHIZACHNE*

Fig. 17.—a, *Bromus inermis*. b, *Bromus commutatus*. c, *Bromus ciliatus*. d, e, *Festuca elatior*. f, *Schizachne purpurascens*. Inflorescences x 1/3.

5. **B. commutatus** Schrad. Fig. 17, b. HAIRY CHESS

A common weed in vacant lots in towns, along roadsides and in waste places in all sections of the Province. Along some roads in meadows and dykelands it may form large patches. The spikelets shatter very readily.

N.S. to B.C. south to La.

6. **B. mollis** L. Map 62. SOFT CHESS

Found in open soil, gardens, along roadways and railroad embankments mainly in the southern and western counties. No plants that could be definitely placed with the forma *leiostachys* (Hartm.) Fern., which has smooth spikelets, have been seen from the Province so that the softly pubescent spikelets is a distinguishing mark.

Introduced from Eu.; Nfld. to B.C. south to N.C.

7. **B. tectorum** L.

First collected by J. S. Erskine: "common on railway ballast around the railway station at Berwick, King's County. Confirmed by W.G. Dore of the Dominion Experimental Farm, Ottawa who says: 'This approaches var. *glabratus* Spenner in its glabrous glumes and scabrous lemmas. . . . It would appear that your collection, which is the first I know of from Nova Scotia, has been an introduction from a source not in the interior of Canada. Our two collections from New Brunswick (St. Andrews 1936 and Fredericton 1934) are both of the typical hairy kind.' " Later collections are by D. S. Erskine from a gravelly parking lot in Halifax; and by D. H. Webster from an old chicken range at Cambridge, Kings Co.

N.S. to B.C. south to Calif. and Va.

2. **SCHIZACHNE** Hack. FALSE MELIC1. **S. purpurascens** (Torr.) Swallen Fig. 17, f. Map 63.

Locally abundant in northern C.B. and south to Whycomagh on dripping cliffs or ledges; occasionally on a wet river bank, in rich woods or even in open clearings; Moore's Falls near Kentville, Kings Co.; occasional on Cape Blomidon and Cape Split (Schofield, 1955); rare along West Moose River and Five Island's River in Cumberland and Colchester Cos.

Forma *albicans* Fern., which is whitish in color, forms a large percentage of the plants along Salmon River and Big Southwest Brook in northern C.B.; also found north of Cheticamp in clearing in the woods at 500 feet altitude.

Nfld. to Alaska south to W. Va.

3. FESTUCA L. FESCUE

Perennials with several-flowered spikelets in panicles, glabrous, or with a minute pubescence on lemmas or lower sheaths only; lemma firm, rounded on the back, obscurely nerved, tapering to a sharp or awn-tipped point; ligules less than 1 mm long and sometimes obsolete.

- a. Blades narrow and permanently folded; claw-like auricles absent at the top of the sheath; lemmas usually awned.
 - b. Basal leaf sheaths split to near their base, whitish and cartilaginous, glabrous; dead sheaths whitish or light brown, not readily breaking up into fibrillose material. Plants densely tufted, without spreading off-shoots.
 - c. Lemmas more than 3.0 mm long, awned or mucronate-tipped; leaves coarser and stiffer, often glaucous. 1. *F. ovina*
 - c. Lemmas 2.5-3.5 mm long, awnless or with sharp tips less than 0.5 mm long; leaves very slender, hair-like, flexuous and green. 2. *F. capillata*
 - b. Basal sheaths closed to near the top, often purplish, generally reflex-hirsute; dead sheaths at base of plant dark brown or reddish brown, becoming fibrillose due to the splitting of tissue between the tough veins. Plants generally forming a dense uniform sod by growth from short spreading basal off-shoots in the surface soil.
 - d. Spikelets bearing only normal florets; common. 3. *F. rubra*
 - d. Spikelets with florets largely replaced by leafy tufts; inflorescence simple and flexuous; plants northern and rare. 4. *F. prolifera*
- a. Blades flat, 3 mm or more wide; claw-like auricles present at the top of the leaf-sheaths; lemmas awnless.
 - e. Spikelets 6- to 10-flowered, about 10 mm long, borne throughout the panicle; lemmas 5-7 mm long, thin with membranous margins; rich meadows and pastures. 5. *F. elatior*
 - e. Spikelets 3- to 5-flowered, about 6 mm long, borne on the panicle-branches only above the middle; lemmas 4 mm long, firm and shining; rich woodlands. 6. *F. obtusa*

1. *F. ovina* L. SHEEP FESCUE

Scattered in the Province; it persists and forms clumps on sterile, sandy and poor dry soils: Kentville, Wolfville, Truro, Antigonish and undoubtedly elsewhere. Naturalized from Europe; sometimes appearing as a lawn weed.

Forma *hispidula* (Hack.) Holmb., with hispid lemmas, has been found at Kentville, Wolfville and Antigonish Harbour growing with typical plants and with plants with pubescence of an intermediate type.

Nfld. to Minn. south to W. Va.

2. *F. capillata* Lam. Fig. 18, b. HAIR FESCUE

Growing in tufts in dry or sterile soils of pastures, lawns, along roadsides and old fields. This weedy grass has increased very rapidly and is now common in most areas; on the sandy soils of Kings Co., in the interior of Lunenburg, and on poorly-drained soils in Cumberland. This grass is so short and wiry that it has no commercial value. It matures early and whole fields may then be a reddish-brown color.

Nfld. to Mich. south to S.C.; mostly nat. from Eu.

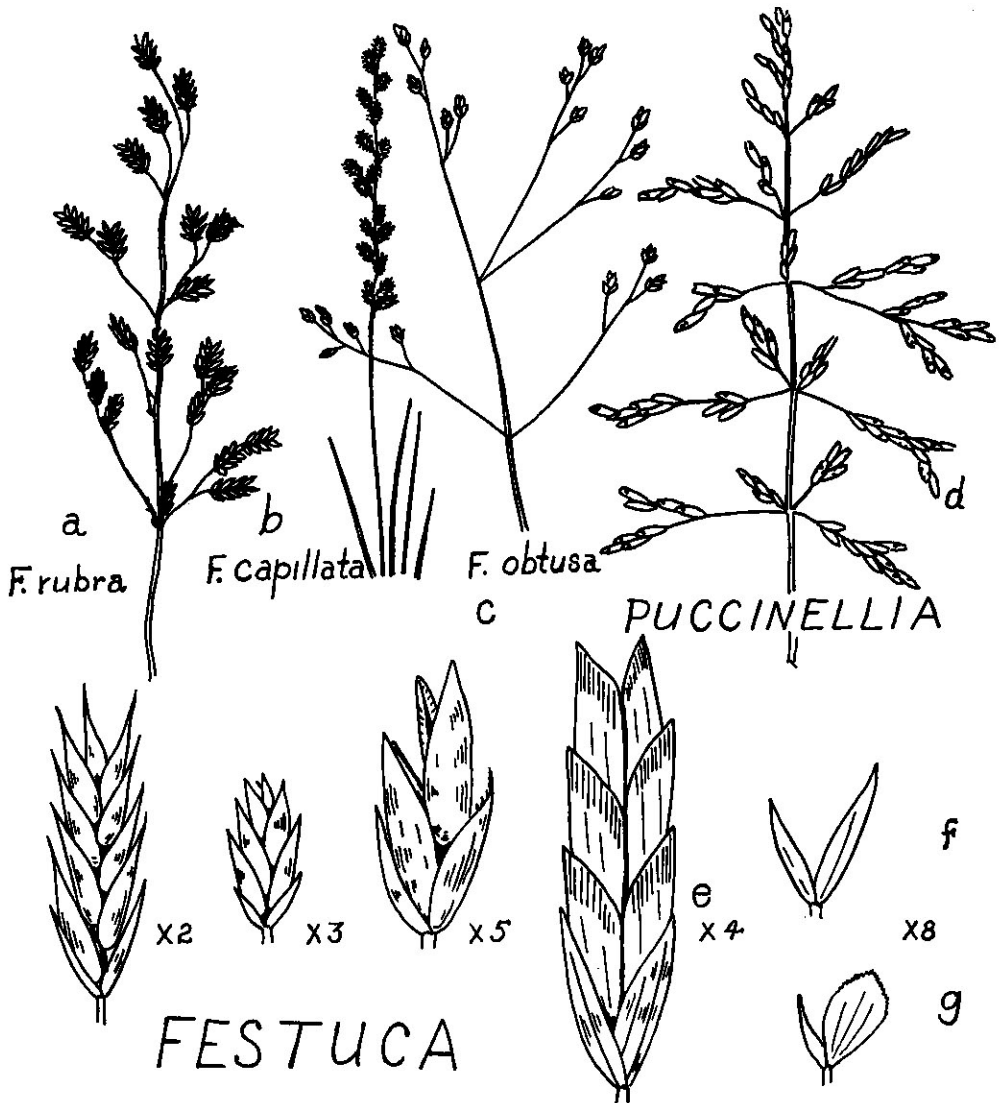


Fig. 18.—a, *Festuca rubra*. b, *Festuca capillata*. c, *Festuca obtusa*. d, e, *Puccinellia americana*. f, glumes of *P. pumila*. g, glumes of *P. distans*. Inflorescences x 1/3

3. *F. rubra* L. Fig. 18, a. RED FESCUE

A common grass throughout, along roadsides, in pastures particularly those in exposed situations and close to the coast, in sand and gravel along sea beaches, the upper zone of salt marshes, and sometimes even in boggy soils. The plant shows as great variability in its morphological characters as in the habitats in which it grows. Many subspecific types have been described by various authors; coastal types may be native, many inland types are introduced. The following, with their distinctive characteristics as given in Fernald's key (*Rhodora* 35: 132, 1933), are represented in the Province.

Typical variety, spikelets 7-10 mm long, 3- to 7-flowered; second glume 3.0-4.5 mm long; body of first lemma 4.0-6.0 mm long, glabrous; foliage green. Common throughout. Forma *glaucescens* (Hartm.) Holmb. is similar but the leaves are whitish. Found mainly on dry soil, sandy or gravelly areas by sea beaches. Forma *megastachys* (Gaudin.) Holmb. differs from the typical form in having spikelets over 10 mm long, 6- to 10-flowered, second glume 4-6 mm long, lemma 6-8 mm long. Found particularly in the tidal marshes. Forma *squarrosa* (Fries) Holmb. has pubescent lemmas. Located in many places and reported from St. Paul Island (Perry, 1931) under var. *arenaria* (Osbeck) Fries.

Var. *multiflora* (Hoffm.) Aschers. & Graebn.: blades flat; spikelets 10-17 mm long, 6- to 10-flowered; body of lowest lemma 5.5-7.0 mm long. Reported from Dartmouth (Fernald, 1922).

Var. *juncea* (Hack.) Richter, leaves stiff and strongly whitened; spikelets 9-20 mm long, 6- to 10-flowered; body of first lemma 5-7.5 mm long. Found along the sea coast, mainly on dry beach and dune sand.

Greenland to Alaska south to N.C.; Eurasia.

4. *F. prolifera* (Piper) Fern.

A viviparous northern form; very rare on wet slope near large waterfall, Big Southwest Brook, south-west branch, Inverness Co. (Smith and Schofield, 1952); and on dripping cliffs, LeBlanc Brook on the Cheticamp R., growing with the variety.

Var. *lasiolepis* Fern. has the lemmas pilose; very abundant in cliff crevices near waterfall, Gray Glen Brook, north branch, Victoria Co. (Smith and Schofield, 1952).

Nfld., Gaspe and Lake Mistassini south to N.S. and Mt. Katahdin and Mt. Washington.

5. *F. elatior* L. Fig. 17, d, e. MEADOW FESCUE

An important forage grass frequently included in meadow and pasture seedings. It readily becomes established and persists in rich soil in fields, along roadsides and in meadows in most parts of the Province.

Var. *arundinacea* (Schreb.) Wimm. is a much taller and stouter plant with tough, strongly-ridged blades, the spikelets only 4- to 5-flowered and the lemmas awn-tipped. Two records are known: collected by Macoun at Baddeck in 1898; rare in rock crevices along brook, Glendyer, Inverness Co., 1951 by Smith et al. for the second record.

Nat. from Eu.; Nfld. to B.C. south to La.

6. *F. obtusa* Biehler Fig. 18, c. Map 64. NODDING FESCUE

Alluvial woods, Five-Mile River, Hants Co. (Fernald, 1921); abundant on hardwood slope, New Prospect; very abundant on rich hardwood slope about one mile east of Refuge Cove, Cumberland Co.

(Schofield, 1955); occasional among small trees at base of high cliff, Cape Blomidon, where it was collected by Schofield and Webster.

N.S. to Man. south to Fla.

4. PUCCINELLIA Parl.

Annual or perennial salt-marsh grasses, often with narrow involute leaves. This genus has a distinctive habitat and appearance but the distinguishing characteristics are rather technical or difficult to describe. The number of species here is kept to a minimum but further careful study will be necessary in order to adequately understand the variation and distribution, particularly around the Gulf of St. Lawrence. Fernald, M. L. and C. A. Weatherby, The genus *Puccinellia* in eastern North America. *Rhodora* 18: 1-23. 1916.

a. Plant coarse, 2-8 dm high; spikelets 5-11-flowered, 5-12 mm long; anthers 1.5-2.5 mm long; lemmas 3.5-4.5 mm long, often pubescent towards the base.

1. *P. americana*

a. Plants usually smaller and more slender; spikelets 3-6-flowered; anthers 0.5-1.2 mm long; lemmas glabrous or nearly so.

b. First glume 1.5 mm long or longer, the second 2-4 mm long; lemmas 2.6-3.5 mm long, pointed and not ciliate.

c. Glumes about 1.5 and 2.0 mm long; spikelet firm, with reddish coloration on the lemmas.

3. *P. pumila*

c. Glumes about 2.5 and 3.0-3.7 mm long; spikelets and inflorescence soft, light green to straw-colored.

4. *P. ambigua*

b. First glume about 1 mm long; second glume 1.3-2.0 mm long; lemmas 2.0-2.5 mm long.

d. Panicle stouter, dense, the branches ascending, with spikelets nearly to the base; glumes and lemmas minutely serrulate towards the tip, but not ciliate.

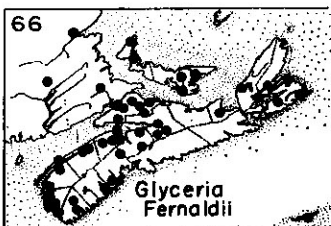
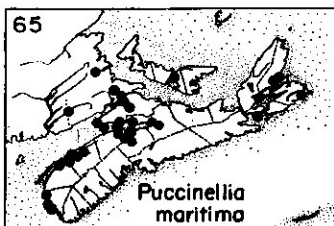
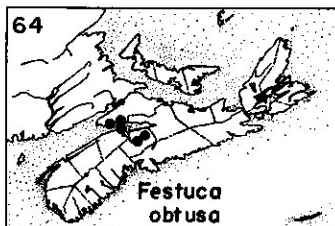
2. *P. fasciculata*

d. Panicle slender, the spreading or reflexed branches with spikelets mostly above the middle; glumes and lemmas erose-ciliate, the lemmas truncate.

5. *P. distans*

1. *P. americana* Sorensen Fig. 18, d. Map 65.

Saline and brackish marshes, and one of the first plants to colonize bare areas on new dykelands and running dykes; common from Shelburne County up along the shore of the Bay of Fundy and about the marshes at its head; not found along the Atlantic shore or else very rare and no collections exist from along the North Shore; there is a record from Louisburg (Macoun, 1888); and it has been found also at Petit



de Grat and Englishtown Ferry in Cape Breton. This is the American relative of *P. maritima* of Europe (Sorensen, Medd. om Gronl. 136: 67. 1953).

Bonaventure Co. Que. to R.I. along the sea-shores.

2. *P. fasciculata* (Torr.)Bickn.

A smaller, more densely-flowered species found rarely at the heads of salt marshes or dykelands on the Fundy side of the Province. Collected at Kentville and at Grand Pre.

Sandy seashores, N.S. to Va.; Utah; Eu.

3. *P. pumila* (Vasey)Hitchc. Fig. 18, f.

Widespread along the sea-shores and also found inland around salt marshes, as at Oxford, Cumberland Co. This is our most common species and it is quite variable in the size of the spikelets and florets. Var. *longiglumis*, described as a variety of *P. paupercula* (Holm)Fern., is a form with the glumes about three times longer than normal. This was common on the salt marshes at Louis Head, Shelburne Co. This was first described from P.E.I. Erskine (1960) suggests that it may be due to nematode infection.

Nfld. south to Conn.; Alaska to B.C.

4. *P. ambigua* Sorensen, Medd. on Gronl. 136: 64. 1953.

Described from plants originally collected by M. L. Fernald on a salt marsh at Alberton, P.E.I. Plants growing on the salt marsh near the road at Port Howe, Cumberland Co. are thought to be this new species.

5. *P. distans* (L.)Parl. Fig. 18, g.

Scattered and appearing in waste places as well as on salt or brackish mud around the towns of Sydney, Pictou, Windsor, and near Port Howe, growing with the previous species. This plant is somewhat weedy, appearing as if introduced from the Old World in ballast.

N.S. to Dela. and occasionally inland; nat. from Eu.

5. GLYCERIA R. Br. MANNA-GRASSES

One or more of the following characteristics will distinguish these grasses from related genera; the several-flowered spikelets with glumes shorter than the lemmas; the 7, often prominently raised, nerves of the round-backed lemmas; and the moist but never brackish habitats (Fig. 19).

- a. Spikelets elongate, 10 mm long or longer, lying closely along the branches of the panicle on short pedicels.
- b. Leaves 2-4 mm wide, rarely to 6 mm; lemmas 3-4 mm long, smooth or nearly so between the slightly roughened nerves.
 1. *G. borealis*
 2. *G. fluitans*
- b. Leaves 4-8 mm wide; plant coarser; lemmas 5.0-6.5 mm long, minutely roughened between the nerves.

- a. Spikelets ovate or oblong, less than 7 mm long, on more diffused branchlets.
- c. Panicle contracted with closely ascending branches.
- d. Panicle linear, rather open and often nodding, 15-25 cm long; lemmas 2.0-2.3 mm long. 3. *G. melicaria*
- d. Panicle oblong and dense, erect, 12 cm long or less; lemmas 3-4 mm long. 4. *G. obtusa*
- c. Panicle loose with more or less spreading or drooping branches.
- e. Nerves of the lemmas not prominently raised; edges of the bowed-out palea visible beyond the edges of the lemma.
- f. Spikelets with 5-10 florets; lemma 3-4 mm long. 5. *G. canadensis*
- f. Spikelets with 3-6 florets; lemma 2.0-2.5 mm long. *G. canadensis* var. *laxa*
- e. Nerves of the lemmas prominent; palea not bow-shaped.
- g. Stem usually stout, erect.
- h. Panicle mostly less than 20 cm long; spikelets 3-4 mm long, with the first glume 1 mm long or less.
- i. Leaves flat, to 7 mm wide; panicle 10-30 cm long; spikelets mostly greenish, with the smaller lemmas mainly 1.5-1.8 mm long and merely scarious-tipped. 6. *G. striata*
- i. Leaves mostly folded, to 4 mm wide; panicle 5-15 cm long; spikelets mostly purplish with the larger lemmas 2.0-2.2 mm long and rounded with broad rounded tips. *G. striata* var. *stricta*
- h. Panicle large and ample, 15-40 cm long; leaves 7-12 mm wide; spikelets 5-6 mm long, with the first glume 1.2-1.5 mm long. 7. *G. grandis*
- g. Stems soft and weak, lying partly on the ground; spikelets pale green and scabrous.
- j. Plant 3-10 dm high; leaves mostly 4-8 mm wide; spikelet 4- to 7-flowered, 6-7 mm long; anthers 1 mm long. 8. *G. pallida*
- j. Plant 2-4 dm high; leaves 1-3 mm wide; spikelet 3-5-flowered, 4-5 mm long; anthers 0.4-0.6 mm long or less. 9. *G. Fernaldii*

1. *G. borealis* (Nash)Batchelder Fig. 19. NORTHERN MANNA-GRASS

Growing in quiet shallow water in pools and streams, around the margins of lakes, in ditches, the long narrow leaves often floating on the surface of the water; also in very wet soil. Common throughout.

A plant with larger stalks and broader spikelets collected in a shallow ditch at Meteghan, Digby Co. (Dore, no. 745) has been found by G. L. Church of Brown University to have 40 chromosomes, twice the number of *G. borealis*, but the same as *G. septentrionalis* Hitchc. The specimen, however, lacks the distinct scarbridity of the lemmas which typifies *G. septentrionalis*.

Nfld. to Alaska south to Penn., Ill. and Calif.

2. *G. fluitans* (L.)R. Br. FLOATING MANNA-GRASS

Abundant in swales, ditches and wet meadows around the marshes near Truro; above Tatamagouche, five miles up the Waugh's River, Colchester Co.; dry sand of the lake shore at Kenloch, Inverness Co. (Smith and Schofield, 1952). Also at Bass River, N.B.

Nfld.; Gaspe; and Nantucket Is. in Mass.; possibly native; Eurasia.

GLYCERIA

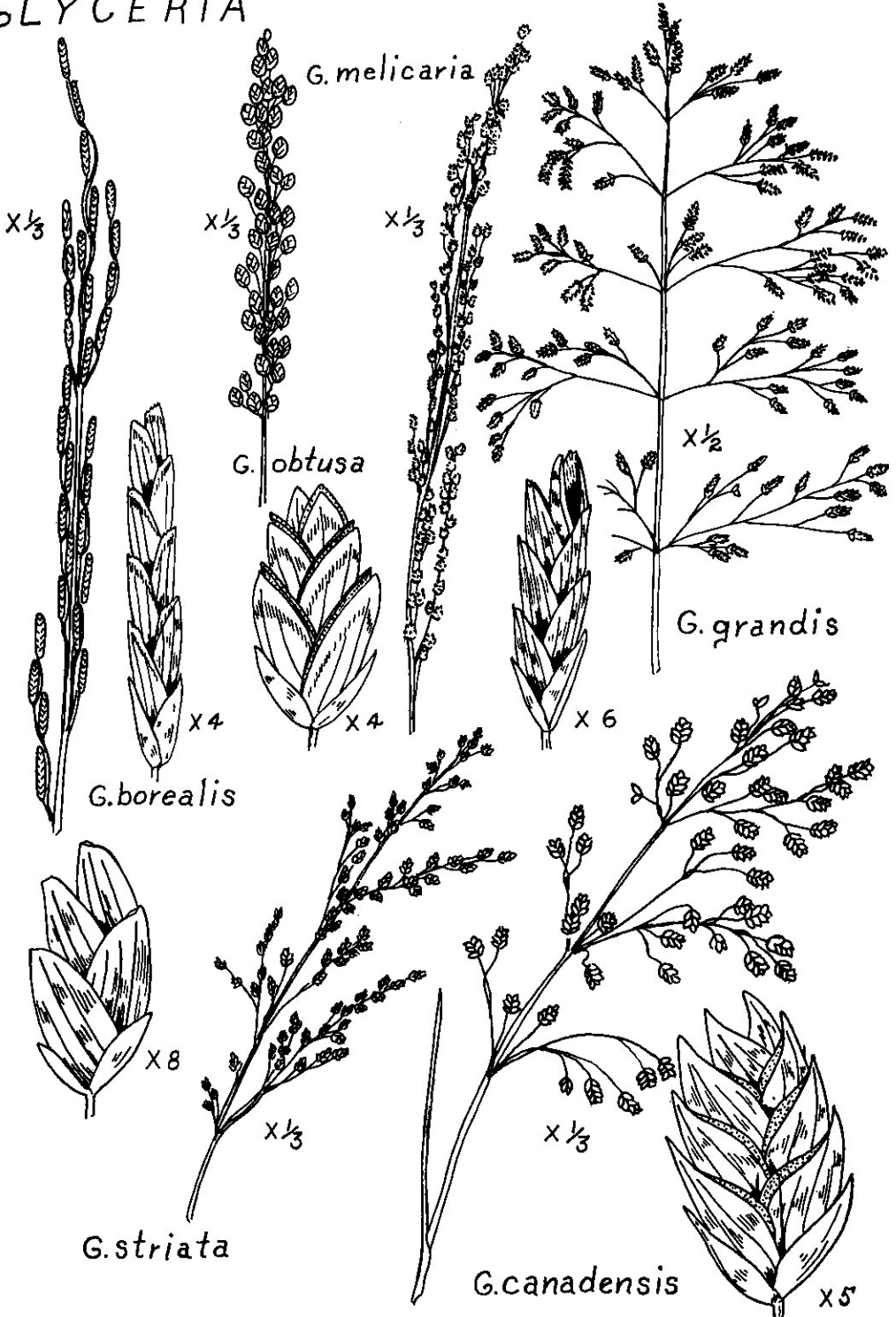


Fig. 19.—Glyceria.

3. *G. melicaria* (Michx.)F. T. Hubbard Fig. 19. Map 67.

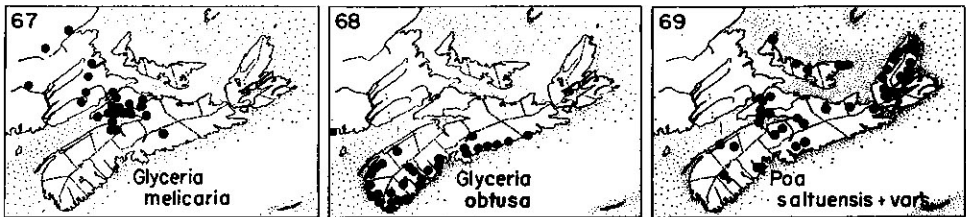
Dominant in small areas in rich wet woods, damp thickets and along shady brooksides; Cape Blomidon and along the Cobequids to north of Truro; throughout Cumberland Co. It is very rare outside this area and unknown in the southwestern counties. This plant is rather distinctive, since it usually grows in pure stands with bright-green leaves and long, narrow erect panicles.

N.S. south to the mts. of N.C. and Tenn. and to Ohio.

4. *G. obtusa* (Muhl.)Trin. Fig. 19. Map 68.

Common in Yarmouth and southern Digby Counties, east at least to Lunenburg Co. and scattered and local to Grand Lake and Musquodoboit Harbour in Halifax Co.; Marie Joseph in Guys. Co. Swales, wet mucky soils, on floating mat of lake-edge and boggy margins of streams and lakes. This is another distinctive species because of its stiffly-erect compact panicles of large spikelets.

Near the coast from N.S. south to N.C.



5. *G. canadensis* (Michx.)Trin. Fig. 19. RATTLESNAKE-GRASS

Common throughout, in swamps, boggy land, springy woods and ditches, wet meadows and grassy borders of streams and ponds, sometimes even in sphagnous bogs. Nfld. to Minn. south to N. Eng. and Tenn.

Var. *laxa* (Scribn.)Hitchc. is much taller than the species with more ample panicles and smaller spikelets. The stout plants are usually erect and it may grow in large pure colonies. Scattered from Digby and Yarmouth Counties to Hants and Guysborough; dry roadside, French Mt., Inverness Co. This plant appears distinct in southwestern N.S. but northward it occurs much more sporadically and is difficult to separate from luxuriant stands of *G. canadensis*.

P.E.I. to Md. and W. Va.

6. *G. striata* (Lam.)Hitchc. Fig. 19. FOWL MANNA-GRASS

Common throughout in moist rich soils in meadows, ditches, along streams and in wet open woods. Nfld. to Alta. south to Fla.

Var. *stricta* (Scribn.) Fern. is a smaller and stiffer form with a purplish tinge to the sheaths and panicle. Found in similar or more open and drier situations than the species, often more common and general in moist meadows and wet pastures.

Lab. to Alaska south to N. Eng. and along the Rocky Mts.

7. *G. grandis* S. Wats. Fig. 19. REED MANNA-GRASS

Found throughout in wet meadows, banks of streams and in marshes, often conspicuous in swales and along ditches, particularly in the northern counties. This plant is the largest of the genus and may grow up to 2 m high. Forma *pallescens* Fern., with yellowish spikelets instead of purplish ones, has been reported from Yarmouth (Fernald, 1921); and has since been found in numerous places in Kings and Colchester Cos.

Nfld. to Alaska south to Va.

8. *G. pallida* (Torr.) Trin. PALE MANNA-GRASS

A pale green, lax, medium-sized grass known at present only from collections from "boggy swales and savannahs of the Tusket River, Yarmouth Co." (Fernald, 1921). A collection from near Amherst is intermediate in some respects between this and the next species.

N.S. and s. Me. to southern Ont. south to Tenn.

9. *G. Fernaldii* (Hitchc.) St. John Map 66. SMALL MANNA-GRASS

Found often reclining in the bottom of cat-tail marshes, swales, margins of ponds and ditch bottoms; abundant in its proper habitats throughout. These last two species are now usually separated off from *Glyceria* under the name *Torreyochloa*. The more southern plant found in eastern N.A. and in a small area in Japan is then *Torreyochloa pallida* (Torrey) Church; and the smaller more northern plant is *T. pallida* var. *Fernaldii* (Hitchc.) Dore, Can. Jour. Bot. 42: 874. 1964. This reference contains a discussion by Koyama and Kawano of the Asiatic and North American varieties.

Nfld. to Minn. south to Penn.

6. POA L. BLUEGRASS

This group includes a number of our most common and valuable forage grasses in addition to the native species. Many of the members are very variable and extremely difficult to classify. The main more constant characters are found in the spikelets. The glumes and lemmas are flattened so that there is a keel along the mid-nerve. The lemmas are always awnless and generally have a coiled tuft of long, webby hairs arising from the callus.

a. Low annuals or winter-annual, less than 25 cm high, with light-green leaves; webby hairs at base of lemma lacking or, rarely, short and scant; panicle branches arising singly or in pairs; keel and marginal nerves of lemma pubescent; common weed. 1. *P. annua*

a. Perennial, usually much taller; webby hairs present at the base of lemma in all our common species.

- b. Plants with long running rhizomes, not forming a clump or a sod; culms flattened, 2-edged; leaf-blades short and a bluish or glaucous green color; webby hairs at base of lemma scant; panicle branches usually in pairs.
 - 2. *P. compressa*
- b. Plants tufted and lacking rhizomes or else with short numerous rhizomes so that they form a sod.
- c. Lemmas with long cobwebby hairs at the base.
- d. Marginal nerves of the lemma, and the keel, pubescent.
 - e. Ligule shorter than wide, less than 1.5 mm long.
 - f. Lemmas distinctly 5-nerved, the intermediate nerves strong and glabrous.
 - 3. *P. pratensis*
 - f. Lemmas appearing 3-nerved, with the intermediate faint and obscure.
 - 7. *P. nemoralis*
 - 8. *P. palustris*
 - e. Ligule longer than wide, 2.0-5 mm long.
 - 8. *P. palustris*
- d. Marginal nerves of the lemma not pubescent, the keel glabrous or pubescent.
 - g. Ligule of lower leaves 2-6 mm long; spikelets numerous; panicle branches several at each node; sheaths of leaves usually scabrous, clinging when drawn through the hand.
 - 4. *P. trivialis*
 - g. Ligule 1 mm long or less; spikelets few at the ends of slender nodding branches of the panicle; sheaths not scabrous.
 - h. Keel of the lemma glabrous; panicle branches in pairs or solitary.
 - 5. *P. saltuensis*
 - h. Keel of the lemma pubescent; panicle branches more than 2 at each node; panicle very diffuse with very long, spreading capillary branches.
 - 6. *P. alsodes*
- c. Lemmas not webbed at the base, keel and marginal nerves pubescent; rare, or northern species, not in open fields.
 - i. Plant stiff with panicle tending to be pyramidal; first glume ovate, more than half as wide as long; leaves 2-6 mm wide.
 - 9. *P. alpina*
 - i. Plant usually slender with the panicle narrow, the whole plant with a bluish tinge; first glume lanceolate; leaves narrow, up to 2.5 mm wide.
 - 10. *P. glauantha*

1. *P. annua* L. Fig. 20, c. ANNUAL BLUEGRASS

This weedy species, easily recognized by its light green foliage, low-growing habit and abundant panicles, is common in gardens, lawns, dooryards, along pasture roads and in areas where heavy trampling keeps down the taller-growing species. Common throughout.

Intro. from Eu.; Nfld. to Alaska south to Fla.

2. *P. compressa* L. CANADA BLUEGRASS

Restricted to aerated soils such as can be found in sod over-hanging a ditch or road-cut, in pockets on rocks where frost-heave has loosened up the ground, or on sands and gravels. The sheaths soon become whitish and become conspicuous against the green culms and blades. This, together with the distinctly flattened culms, longer ligule, later flowering and more open growth readily distinguishes this from *P. pratensis*. Found in most regions but not nearly as common as the next species.

Intro. from Eu.; Nfld. to Alaska south to Ga.

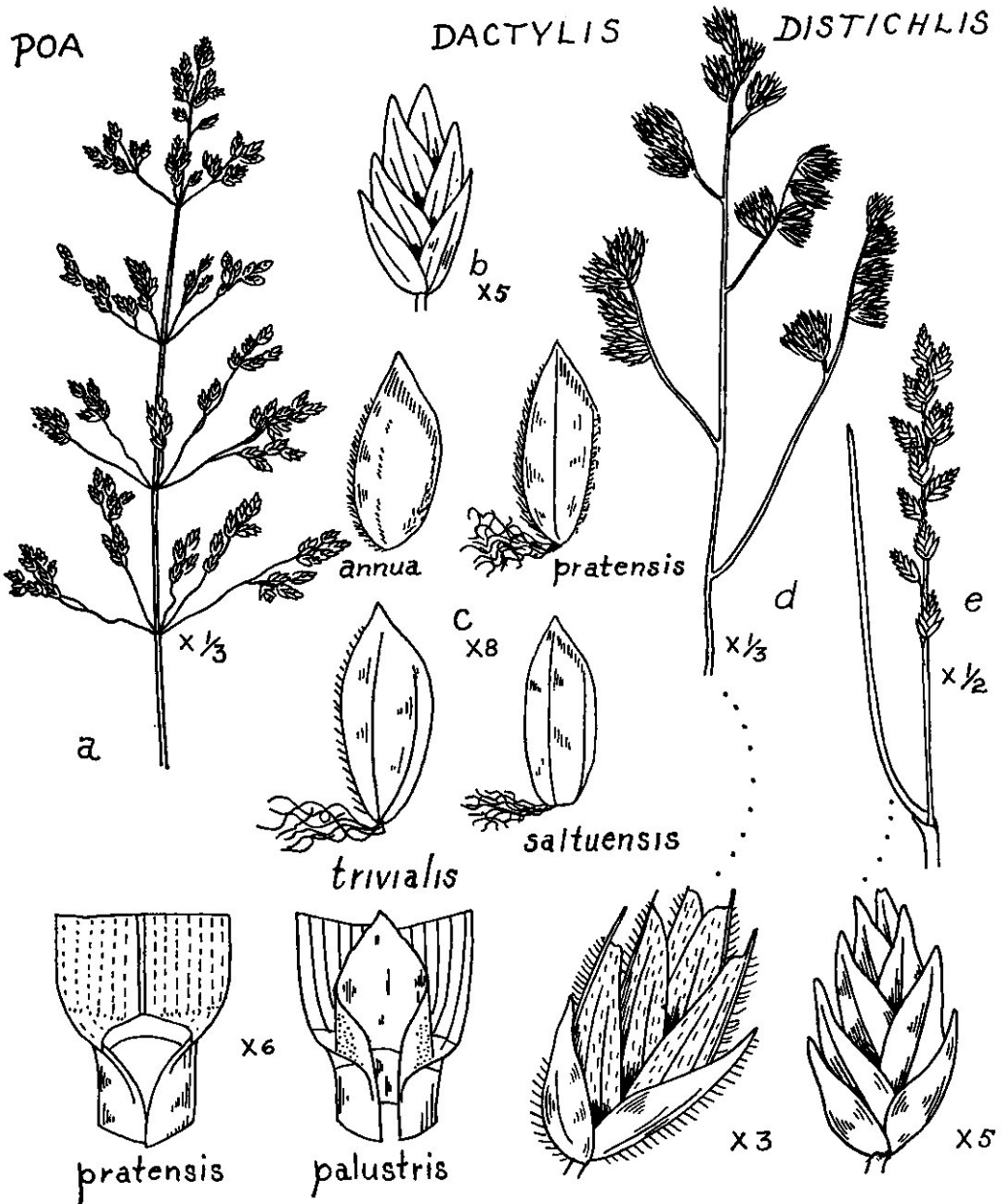


Fig. 20.—a, b, *Poa pratensis*, inflorescence, spikelet and leaf sheath. c, lemmas of *Poa annua*, *pratensis*, *trivialis* and *saltuensis*. d, inflorescence and spikelet of *Dactylis glomerata*. e, inflorescence and spikelet of *Distichlis spicata*.

3. *P. pratensis* L. Fig. 20, a, b. KENTUCKY BLUEGRASS

One of the commonest species in pastures, meadows, lawns and roadsides throughout.

There is a great variation in the habit and morphology of this species. Development of the seed is known to take place asexually

so as to preserve the same combination of genetic characters unchanged from generation to generation. A great variety of habit types have therefore been preserved as races or forms, their appearance showing some correspondence to ecological conditions. Many types have narrow blades. (var. *angustifolia* (L.) Sm.). Large coarse plants in bogs and humid uplands are related to the northern variety *alpigena* Fries. Plants with abnormally large spikelets due to nematodes were earlier reported as *P. costata*. *Poa subcaerulea* appears to be a native, coastal type with bluish-tinged spikelets.

Intro. from Eu.; Lab. to Alaska south.

4. *P. trivialis* L. Fig. 20, c. ROUGH-STALKED BLUEGRASS

An abundant species in moist soil throughout; often appearing as if native to the Province. Individuals in shaded or excessively moist situations are weak and sprawling with 1- or 2-flowered spikelets and narrow glumes, appearing very different from the typical plants. Meadows, along brooks and moist runs, in the bottom of cat-tail marshes. The culms are usually rough below the panicle.

Intro. from Eu.; Nfld. to Ont. south to Ga.

5. *P. saltuensis* Fern. & Wieg. Fig. 20, c. Map 69.

Plants typical of the species have panicles 10-20 cm long, spikelets 3-flowered, 4.5-5 mm long, and lemmas 3.5-4.0 mm long. Plants with smaller panicles 6-10 cm long, spikelets 2-flowered, 3.5-4.0 mm long, and lemmas about 3.0 mm long have been segregated as var. *microlepis* Fern. & Wieg. Much of the Nova Scotian material appears to be this variety but the separation is not clear-cut. Scattered in rich and mossy hardwoods, in brookside thickets and on rocky shaded banks; rarer in southwestern N.S.

Nfld. to Minn. south to W. Va.

6. *P. alsodes* Gray Map 70.

One of the rarer grasses of the Province: river banks and thickets on rich alluvial soil. Damp margin of McGahey Brook, near Parrsboro, Cumb. Co. (Schofield, 1955), where it grows abundantly on the shaded flood plain; St. Andrew's River, and along the Salmon River at Kemptown in Colchester Co.; rich thicket, Judique, MacIntosh Brook, and by the Cheticamp River in Inverness Co.; and by a brook in a meadow at Cape North Village in Victoria Co. (Smith and Schofield, 1952; Smith and Erskine, 1954). The very large panicle with the long capillary branches presents an appearance quite different from that of any other *Poa*.

St. Pierre and Miq. to Ont. south to N.C.

7. *P. nemoralis* L. Map 70. WOOD BLUEGRASS

Scattered from Annapolis Co. to C.B., probably widely distributed; collected by Dore from a shady lawn at Antigonish and dry wooded

bank at Kentville; now known from woods on Cape Split, Kings Co.; talus slope at New Prospect near Parrsboro, Cumb. Co.; Truro, Pictou and under trees at Sydney.

Introduced from Eu.; Nfld. to Minn. south to Dela.

8. *P. palustris* L. Fig. 20. MEADOW-GRASS

The extreme variations that occur in this species due to habitat and stage of growth have led to much taxonomic confusion. The plant is best developed in moist meadows and along stream banks. In drier sites and pastures it has a stricter growth with sparser panicles; in deep shade the plant is weak and the panicle reduced to a few small spikelets; autumnal forms are decumbent, sending up numerous flowering tillers. The spikelets are frequently 3-flowered with the tips of the lemmas bronze-tinged. Common in all parts of the Province.

Nfld. to Alaska south to N.C.; Eurasia.

9. *P. alpina* L.

Reported in Britton and Brown from "calcareous shores and ledges, Cape Breton Island", but it does not seem to be common. A collection from Cibaux Island, Victoria Co. has been identified as this species.

Local, Nfld. to Oregon; Eurasia.

10. *P. glauca* Gaudin. Map 71.

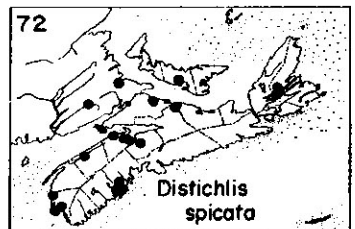
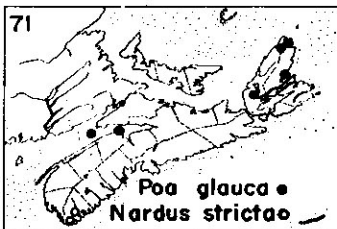
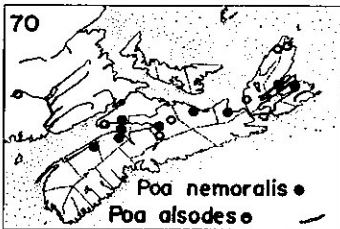
Closely related to the more northern *P. glauca* Vahl.; cliffs and talus slopes, rare in northern C.B.; found in cliff crevices, Amethyst Cove, on the outer edge of Cape Blomidon (Smith and Erskine, 1954); and common Isle Haute (Schofield, 1955), for the only records west of C.B. This grass is rather slender with narrow leaves and the whole plant has a decidedly bluish tinge.

7. BRIZA L.

1. *B. media* L. QUAKING-GRASS

Small perennial with open panicle and large orbicular spikelets pendulous from the ends of flexuous capillary branches. Reported by Macoun in 1910 from ditches at Digby; abundant around King's College School, Windsor (Erskine, 1951); boggy road-edge, Pubnico, collected by J. F. Donly.

Intro. from Eu.; local in N.S. and from N.Eng. to Ont. and Mich.



8. DACTYLIS L. ORCHARD-GRASS

1. *D. glomerata* L. Fig. 20, d.

This grass may be found in most parts growing wild in fields around towns, along roadsides and in orchards. Numerous varieties have been proposed by European workers. In N.S. the *typical* variety, with the backs of the glumes and the lemmas essentially glabrous, is the most common. Var. *ciliata* Peterm., with pubescent glumes, lemmas and sheaths; and var. *detonsa* Fries, with the keels of the glumes and lemmas merely scabrous rather than long-ciliate, are also found.

Widely introduced from Eurasia as a forage grass.

9. ERAGROSTIS Beauv.

Introduced annuals with erect neat panicles or rather lead-colored spikelets; spikelets elongated, many-flowered.

- a. Glumes and lemmas glandular-warty on the keels; leaf blades glandular-warty along the margins.
 - b. Spikelets 2-3.5 mm wide; lemmas 2-2.6 mm long. 1. *E. megastachya*
 - b. Spikelets 1.5-2 mm wide; lemmas 1.7-1.9 mm long. 2. *E. poaeoides*
- a. Glumes, lemmas and leaves not warty; spikelets only 1-1.5 mm wide. 3. *E. pectinacea*

1. *E. megastachya* (Koel.)Link STINK-GRASS

A weedy annual; collected in 1938 in waste land about Halifax Harbour and in 1951 at the edge of the beach, Hall's Harbour, Kings Co. (Smith and Erskine, 1954). To be expected in similar places elsewhere. (*E. cilianensis*).

Introduced from Eu. and becoming a common weed.

2. *E. poaeoides* Beauv.

Very similar to but more slender than the preceding; found growing in railway ballast at Truro, Windsor and Wolfville (Erskine, 1953).

Introduced from Eu. and widely distributed.

3. *E. pectinacea* (Michx.)Nees

Very abundant in cinders around wharves and railway, Pictou; and a railway-yard weed at Kentville.

A weed throughout much of N.A.; introduced.

10. MOLINIA Schrank

1. *M. caerulea* (L.)Moench Map 74. MOOR-GRASS

A common grass of the upland moors of northern Eu.; introduced into North America in only a few locations in the eastern U.S. and

Nfld. Collected for the first time in Canada in 1940 around the town of Louisburg where the extensive stands indicate its establishment there for a long time (Roland and Dore, 1942). The plant grows in large tussocks with extremely tough and persistent fibrous roots.

11. SIEGLINGIA Bernh.

1. *S. decumbens* (L.) Bernh. Map 74. HEATH-GRASS

Rather common in old pastures, peaty swales and moist soils in Digby, Yarmouth and Shelburne Counties. This is a common species of the upland heaths in Eu. It has been considered native but is undoubtedly introduced from Eu. It is closely related to *Danthonia* which it resembles in many vegetative and reproductive characters. Southeastern Nfld. and N.S.

12. CYNOSURUS L.

1. *C. cristatus* L. CRESTED DOG'S-TAIL

Collected by H. Groh on a roadside at Baddeck in 1936; later found abundant in an old pasture field west of Kentville; and in fields at Glendyer and at Sydney in C.B. The spikelets are nearly sessile so that the inflorescence is tail-like.

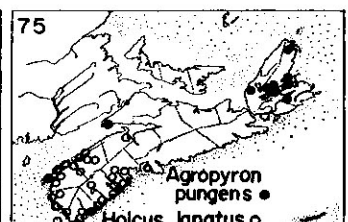
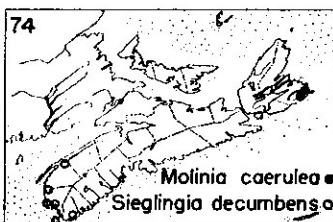
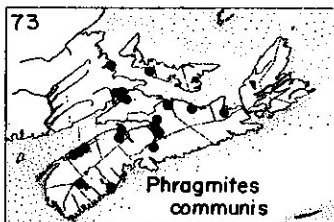
Introduced from Eu.; Nfld. to Ont. south to N.C.

13. DISTICHLIS Raf.

1. *D. spicata* (L.) Greene Fig. 20, e. Map 72. SEASHORE SALT-GRASS.

Found only along the coast where the soil is affected by salt or brackish water, generally forming extensive colonies in the upper parts of the marshes or just above high-tide on the sandy shores. Not common but scattered and local along the coast from Lunenburg Co. around the southwest and up to Hants Co.; salt marsh at Brule and near Pugwash in Cumberland Co.; MacKinnon Harbour and near Baddeck in Victoria Co.

Around much of the coast of North and South America and inland around salt springs or in saline soil.



14. PHRAGMITES Trin.

1. *P. communis* Trin. Map 73. COMMON REED.

This is the largest grass in the Province with an average height of 6 to 7, and sometimes attaining as much as 10 feet. The American plants, including all those found in N.S., have been separated as var. *Berlandieri* (Fourn.) Fern.

Found along the upper borders of salt marshes, or just behind them in wet partly brackish situations or in boggy areas: an extensive stand has been known just west of Annapolis Royal for a long time; heads of the marshes around Amherst along ditches or in boggy situations, also rather common in similar situations along Cobequid Bay. On the North Shore it is found at the head of a salt marsh at Brulé, and on a marsh behind the beach at Abercrombie. One station inland in the vicinity of Heatherton, Antigonish Co., is found in a swampy spot marked on the geological map as a salt spring. An extensive stand exists at Indian Point, Northwest Bay, in the Medway Estuary where it was found by J. F. Donly.

Known around the world on all continents.

TRIBE II. HORDEAE BARLEY TRIBE

The *Hordeae* comprise all the grasses in which the spikelets are arranged in a single spike at the top of the culm. Those plants with several spikes or with the spikelets crowded with very short pedicels will be found elsewhere. (Fig. 21).

- a. Leaves involute, tough, slender and bristle-like, arising from a tuft of whitened, hard sheaths; spikelets turned to one side forming a slender one-sided spike; glumes absent or obsolete. 15. *Nardus*
- a. Leaves not tough and bristle-like; spikelets two-ranked forming a two-sided to a cylindrical spike.
- b. Spikelets occurring singly at each node of the axis, sometimes in pairs at the lower nodes.
- c. Perennials; spikes slender, with spikelets 4- to 12-flowered.
- d. Spikelets with the edges of the florets towards the axis of the spike; both glumes present (Fig. 21, a). 16. *Agropyron*
- d. Spikelets with the back of one row of florets towards the axis of the spike; lower glume in each spikelet absent, except in the terminal spikelet (Fig. 21, d). 17. *Lolium*
- c. Annual or winter-annual cultivated cereals; spikes denser and stouter, with the spikelets 2- to 5-flowered.
- 3. Glumes broad, 3-nerved; lemmas awnless or long-awned; spikelets generally 3- to 5-flowered; wheat. 18. *Triticum*
- e. Glumes narrow, bristle-like, 1-nerved; lemmas long-awned; spikelets generally 2-flowered; rye. 19. *Secale*
- b. Spikelets more than one at each node.
- f. Spikelets 3 at each node, the lateral pair short-stalked and sometimes reduced to awns (Fig. 21, e). 20. *Hordeum*

f. Spikelets two at each node of the axis, both alike.

g. Glumes well-developed; spike dense with appressed or ascending spikelets (Fig. 21, b, c). 21. *Elymus*

g. Glumes obsolete, or present as slender bristles; spike very open, with spikelets spreading horizontally at maturity. 22. *Hystrix*

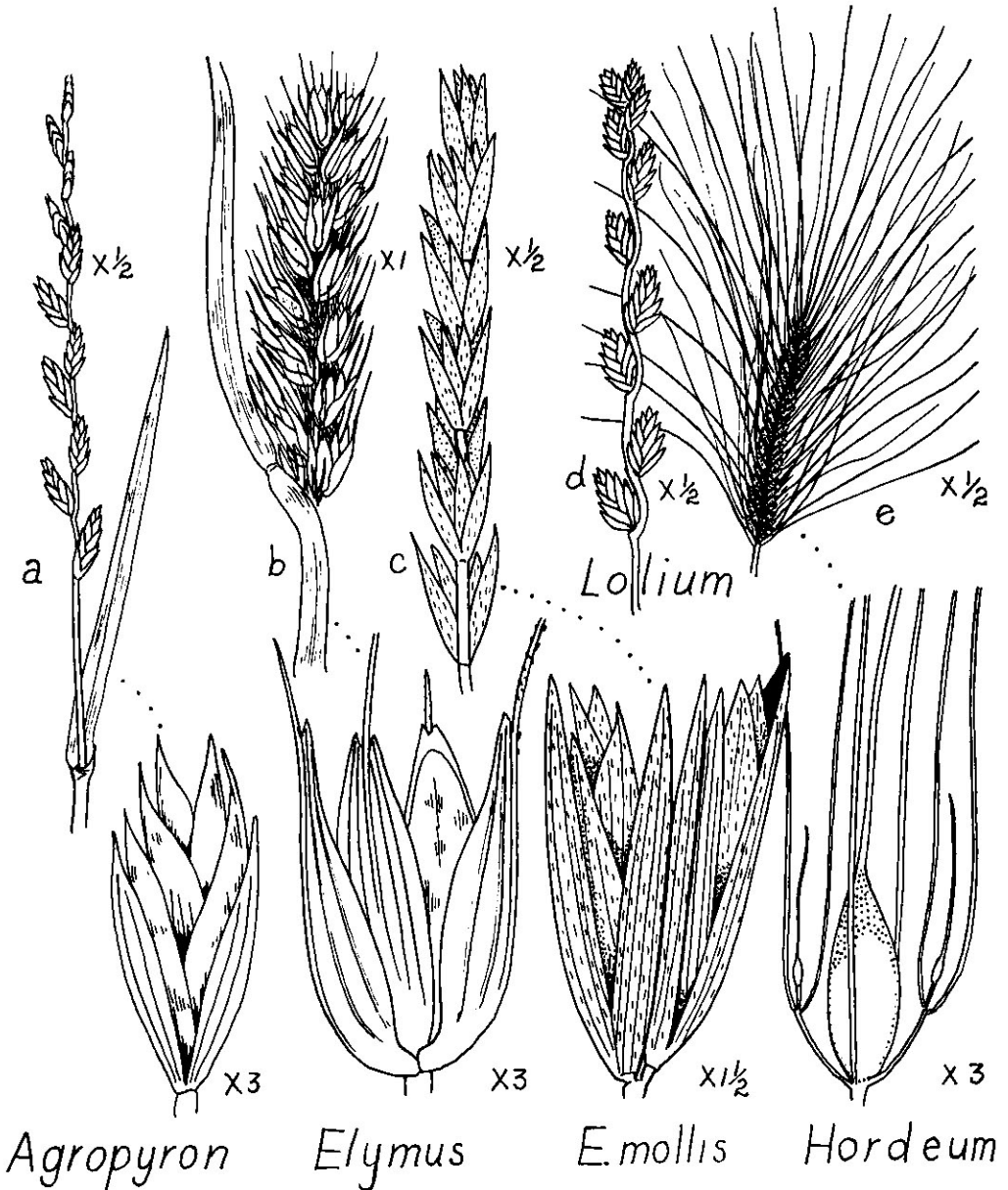


Fig. 21.—a, inflorescence and spikelet of *Agropyron repens*. b, *Elymus virginicus*. c, *Elymus mollis*. d, *Lolium perenne*. e, *Hordeum jubatum*.

15. NARDUS L.

1. *N. stricta* L. MOOR MAT-GRASS

Rare in southwestern N.S.: in an old pasture at Clyde River, Shelburne Co. and probably also at Tusket in Yarmouth Co.

Northern Eu. and southeastern Nfld.; introduced at scattered places west to Mich.

16. AGROPYRON Gaertn.

Tall grasses with erect, narrow spikes and the many-flowered spikelets alternating along and pressed flat against the axis of the spike. *A. repens* is a very troublesome weed. Other species from western Canada have been planted on the running dykes and may possibly persist.

a. Spikelets breaking up readily at maturity, leaving the glumes attached to the rachis; rachilla pilose; anthers 1-2 mm long; rhizomes absent.

1. *A. trachycaulum*

a. Spikelets not separating readily between the florets at maturity but dropping from the rachis intact with the glumes; rachilla not pilose; anthers 3-7 mm long; long creeping rhizomes present.

b. Blades firm, stiff, glabrous and glaucous, with a few broad ribs; culms completely or almost filled with pith towards the top; spike nearly square in cross-section; internodes of rachis thick and usually 4-angled.

2. *A. pungens*

b. Blades softer, flat, generally sparsely pilose on the upper surface, green or sometimes somewhat glaucous, with many narrow ribs; culms hollow at the top; spike not conspicuously 4-angled; internodes of rachis thin and rounded on the back.

3. *A. repens*

1. *A. trachycaulum* (Link)Malte SLENDER WHEAT-GRASS

This is a very variable species represented in N.S. by the following varieties as according to Fernald, M. L. *Agropyron*, Sect. *Goularda* in eastern North America. *Rhodora* 35: 161-182. 1933.

a. Awns wanting or very short.

b. Glumes (excluding awns) 10-16 mm long, averaging 12.5 mm; fruiting spikes narrow, 5-12 mm thick.

Var. *majus*

b. Glumes (excluding awns) 7-10 mm long, averaging 8 mm; fruiting spike narrower, 3-6 mm thick.

Var. *novae-angliae*

a. Awns nearly equalling to much longer than the body of the lemma.

Var. *glaucum*

Var. *majus* (Vasey)Fern. Found on gravelly beaches of lakes or bordering marshes in Shelburne, Yarmouth and Digby Cos.; around the Bras d'Or Lakes and on St. Paul Island. Lab. to B.C. south to Maine.

Var. *novae-angliae* (Scribn.)Fern. is found in a variety of habitats: along dry or gravelly beaches of brackish lakes or sea shores, gypsum talus, rocky flood plains or turf mats on sea cliffs. Queens,

Halifax and Hants Cos. and around the coast on Cape Breton Island. Lab. to B.C. south to Conn. and Wisc.

Var. **glaucum** (Pease and Moore)Malte Thickets, along gravelly beaches of brackish or salt shores, or on drier banks along streams. Nfld. to B.C. south to Penn. and Calif.

2. *A. pungens* (Pers.)R. & S. Map 75.

Closely related to *A. repens*; found in the Province along the brackish shores in Cape Breton, mainly along the Bras d'Or Lakes, with specimens from a number of areas around the northern parts of the lakes, at Englishtown and Ross ferries and at Aspy Bay. One collection by Schofield from Burke Brook, Advocate, Cumberland Co. has been placed here.

Some of the plants of this species have fewer, only 3-5, florets in the spikelets and shorter and more involute leaves and more open inflorescences. These are known as var. **acadiense** (F. T. Hubbard) Fern. Known only from the beaches of Cape Breton and growing with the typical species, and grading into it.

Sandy coast, C.B. to Cape Cod.

3. *A. repens* (L.)Beauv. Fig. 21, a. COUCH-GRASS, QUACK-GRASS

Very variable and many varieties and forms have been described. The following segregations based on characters of the flowering parts may be found throughout. Each is represented by numerous collections which show no correlation with habitat or geographical regions. Fernald, M.L. The American variations of *Agropyron repens*. *Rhodora* 35: 182-185. 1933.

The typical variety has the glumes oblong, rounded or abruptly narrowed to the tip, with broad scarious margins; rachis glabrous except for the ciliate edges; glumes and lemmas not definitely awned. Forma **aristatum** (Schum.)Holmb. differs in having the glumes and lemmas awned. Forma **trichorrachis** Rohlena differs in having the rachis pilose. Forma **pilosum** (Scribn.)Fern. has both the glumes and lemmas awned, and also the rachis pilose.

Var. **subulatum** (Schreb.)Reichenb. in its typical form has the glumes lanceolate, tapering gradually from near the middle to near the apex; the margin narrow or inrolled; rachis glabrous except for the ciliate margins; glumes and lemmas not awned. Its forma **Vaillantianum** (Wulf. & Schreb.)Fern. differs in having the glumes and lemmas awned. Forma **heberachis** Fern. has the rachis pilose. Forma **setiferum** Fern. has awned glumes and lemmas, and the rachis pilose.

Native along the coast from Nfld. to Maine; and intro. from Eu.; N.S. to N.J. westward.

17. **LOLIUM L.**

Easily identified since the spikelets are edge-wise to the axis of the spike.

- a. Lemmas awnless; rachis glabrous on the back; leaves folded in the bud. 1. *L. perenne*
 a. Lemmas usually awned; rachis rough on the side opposite the spikelet; leaves rolled in the bud. 2. *L. multiflorum*

1. **L. perenne L.** Fig. 21, d. **PERENNIAL RYE-GRASS**

Found in numerous places, particularly in new lawns sown to English seed mixtures. It gives rapid growth the first year but is susceptible to winter-killing.

Introduced from Eu.

2. **L. multiflorum Lam.** **ITALIAN RYE-GRASS**

An annual grass; collected at Wolfville and Windsor, and on ballast at Halifax (Smith and Erskine, 1954).

Eu.; widely introduced in fields and roadsides.

18. **TRITICUM L.**1. **T. aestivum L.** **WHEAT**

Cultivated to some extent; also found growing as an escape in farm yards, city dumps, around grain elevators, railroad stations, wharves, etc.

19. **SECALE L.**1. **S. cereale L.** **COMMON AND WINTER RYE**

Cultivated but volunteering in waste places or in fields the year following cropping. Scattered clumps of rye are often very conspicuous in new hay-fields in early summer since the rye is much taller and matures earlier than the grasses.

20. **HORDEUM L.**

Spikelets arranged three at each node, sometimes the two lateral ones reduced and abortive; glumes and lemmas with long awns.

- a. Body of lemma about 10 mm long; rachis not breaking up at the joints; annual cultivated cereal. 1. *H. vulgare*
 a. Body of lemma less than 8 mm long; rachis disarticulating readily at maturity; slender biennial or perennial grasses.
 b. Lateral spikelets abortive and represented by three awns; central spikelet 1-flowered without a prolongation of the rachilla; awns 4-8 cm long. 2. *H. jubatum*
 b. Lateral spikelets well-developed; central spikelet 2-flowered, or with a reduced second floret at the tip of the rachilla; awns 1-4 cm long. 3. *Elymordeum*

1. *H. vulgare* L. CULTIVATED BARLEY

This common cereal, extensively cultivated in the Province is generally of the 2-rowed type. Found as a casual weed on dumps, in waste places, farm yards and along roadsides.

Origin unknown; introduced from Eu.

2. *H. jubatum* L. Fig. 21, e. FOX-TAIL BARLEY

A weedy grass, easily recognized by its squirrel-tail type of spike with the long green or purplish awns. Scattered throughout around farm-yards or along roadsides; common to locally abundant along the upper limits of the salt marshes and along roads on the dyke-lands, usually growing where competition from other vegetation is weak.

Lab. to Alaska south to Va. and Mexico.

3. X *Elymordeum montanense* (Scribn.)Bowden, Canadian Journ. of Botany. 36: 109. 1958.

A single colony of this plant was located in 1941 on the bank of a brook near the dykeland at Lower Onslow, Colchester Co. Living plants from this colony were sent to Ottawa in 1951 and were found by Bowden to be a hybrid between *Hordeum jubatum* and typical *Elymus virginicus*. A cross was also made by Bowden between plants of the two parents collected in the vicinity and one plant identical to the original colony was obtained.

Scattered natural hybrids where the two parents are found growing together; mostly in western N.A.

21. ELYMUS L.

Perennial native grasses with the spikelets found in pairs at each node of the spike; most near the sea-shore.

a. Glumes not awned, 2-4 mm wide, lanceolate, not thickened nor bowed-out at the base; blades broad, coarse and glaucous; culms densely short-pubescent towards the top. Stout plants with tough rhizomes, growing only on sandy or gravelly sea-beaches. 1. *E. mollis*

a. Glumes less than 2 mm wide, slender, stiff and long-awned; plants without underground rhizomes.

b. Glumes conspicuously indurated and bowing-outward at the base; awns straight, mostly the length of the glumes and lemmas or shorter. 2. *E. virginicus*

b. Glumes not indurated nor bowed-out at the base; awns much longer than the lemmas and glumes, bowed outward and twisted. 3. *E. Wiegandii*

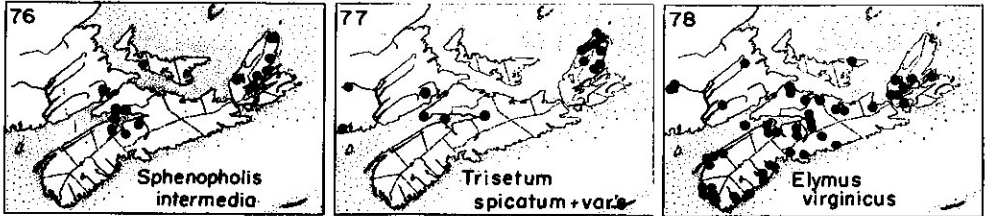
1. *E. mollis* Trin. Fig. 21, c. Map 79. AMERICAN DUNE-GRASS

Bowden, Wray M. Cytotaxonomy of Section *Psammelymus* of the genus *Elymus*. Can. Jour. Bot. 35: 951-993. 1957.

Found on sandy beaches all along the coast. The plants are now considered to be specifically distinct from the European *E. arenarius* L. The habit and general appearance is very similar to the American Beach-grass, *Ammophila breviligulata*, which grows in similar locations.

Forma *scabrinervis* Bowden differs from the species in the almost glabrous glumes, with only short scabrous hairs on the midrib and often on the lateral nerves. Common on the shores of P.E.I. and the adjacent coasts.

Cape Cod northward; Lake Superior, Hudson Bay; south to Calif. and to Japan and Korea.



2. *E. virginicus* L. Fig. 21, b. Map 78. WILD RYE

Common, showing great variability in the size of the spikes, their exertion above the uppermost sheath, the length of the awns and the pilosity of the lemmas. Various forms and varieties based on such characteristics have been named.

- a. Upper sheath inflated, enclosing the base of the spike; spikes coarse and green; leaves flat, to 12 mm wide.
- b. Lemmas and glumes glabrous or scabrous-ciliate. *Var. virginicus*
- b. Lemmas and glumes hairy. *Forma hirsutiglumis*
- a. Upper sheath not inflated with the spike normally well exerted; spikes pale; leaves often involute, 3-8 mm wide.
- c. Lemmas and glumes glabrous or scabrous-ciliate. *Var. halophilus*
- c. Lemmas and glumes hairy. *Forma lasiolepis*

The typical variety is found in moist or shaded places in various parts of the Province, usually growing in wet runs, often with other tall grasses, as is forma *hirsutiglumis* (Scribn.) Fern.

Var. halophilus (Bickn.) Wieg. is found around estuaries in western N.S. along with forma *lasiolepis* Fern.

Nfld. to Alta. south to N.C.

3. *E. Wiegandii* Fern.

Collected near Sydney by G. C. Warren; beside river at Alma in Pictou Co. (Smith and Erskine, 1954); found abundant, growing up to six feet high, on river banks at River John. This appears to be a northeastern segregate of *E. canadensis*.

N.S. and Gaspe south to Penn. and west to Mo.

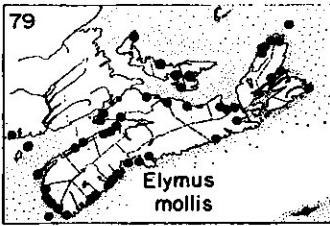
22. HYSTRIX Moench

1. *H. patula* Moench BOTTLE-BRUSH GRASS

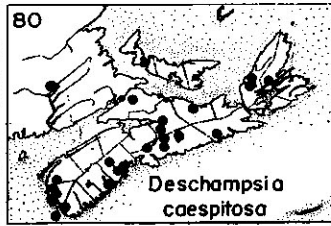
A rare grass of wooded bottom-lands. Collections from along the Five-Mile River, Hants Co. (Fernald, 1921); and by St. John in

the valley of the East River at Charcoal, Pictou Co. are the only ones recorded to date from the Province. They belong to the more northern var. *Bigeloviana* (Fern.) Deam with pilose lemmas.

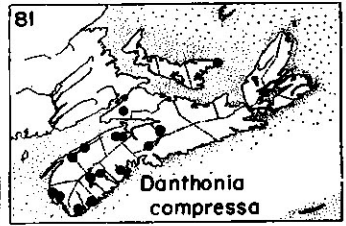
N.S. to N.D. south to Georgia.



Elymus
mollis



Deschampsia
caespitosa



Danthonia
compressa

TRIBE III. AVENEAE

The *Aveneae*, or Oat Tribe, includes the grasses with the spikelets in panicles and each spikelet generally 2-flowered, with the glumes as long as the lowest lemma. The awns, when present, are borne on the backs of the lemmas and in many species they are twisted and exserted sideways (Fig. 22).

- a. Ligule membranous; no tuft of hairs at the top of the sheath.
 - b. Perennial, or small annual grasses with the spikelets less than 10 mm long.
 - c. Awns absent; glumes very unequal in width, the second much broader than the first; slender grasses on gypsum or limestone. 25. *Sphenopholis*
 - c. Awns usually present; glumes essentially of equal widths.
 - d. Panicle very strongly contracted, spike-like; or else with the branches very short and ascending to form a dense, contracted, velvety inflorescence.
 - e. Plants 1-4 dm high; panicle spike-like; each lemma with a straight slender awn.
 - f. Perennial native grasses, northern, on rock outcrops and cliff faces; more or less hairy; spikelets 4-5 mm long. 26. *Trisetum*
 - f. Annual introduced, rare coastal in Yarmouth Co.; slender and slightly scabrous; spikelets 2.5-3.3 mm long. 29. *Aira*
 - e. Plants 5-10 dm high, velvety grass of open fields; panicle crowded, more elliptical, velvety; only the upper lemma awned, with a short, hooked awn (Fig. 22, a). 24. *Holcus*
 - d. Panicle not spike-like nor very strongly contracted.
 - g. Florets not alike, the lower staminate and long-awned, the upper perfect and not awned; second glume longer than the first; spikelets 7-9 mm long; blades 5-10 mm wide. 23. *Arrhenatherum*
 - g. Florets alike and both perfect.
 - h. Lemmas with awns arising from near the base; leaves mostly less than 3 mm wide, in one species involute. 28. *Deschampsia*
 - h. Lemmas with awns from near the apex, or else awnless; leaves flat, 3-8 mm wide. 26. *Triticum*
- b. Annual cultivated grasses with large spikelets more than 12 mm long; lemmas awned or awnless; oat. 27. *Avena*
- a. Ligule a row of fine hairs; tufts of hairs present at the top of the sheath.
 - i. Lemma with a twisted awn arising from between the two sharp teeth. 30. *Danthonia*
 - i. Lemma awnless, with three small teeth at the apex. 11. *Sieglingia*

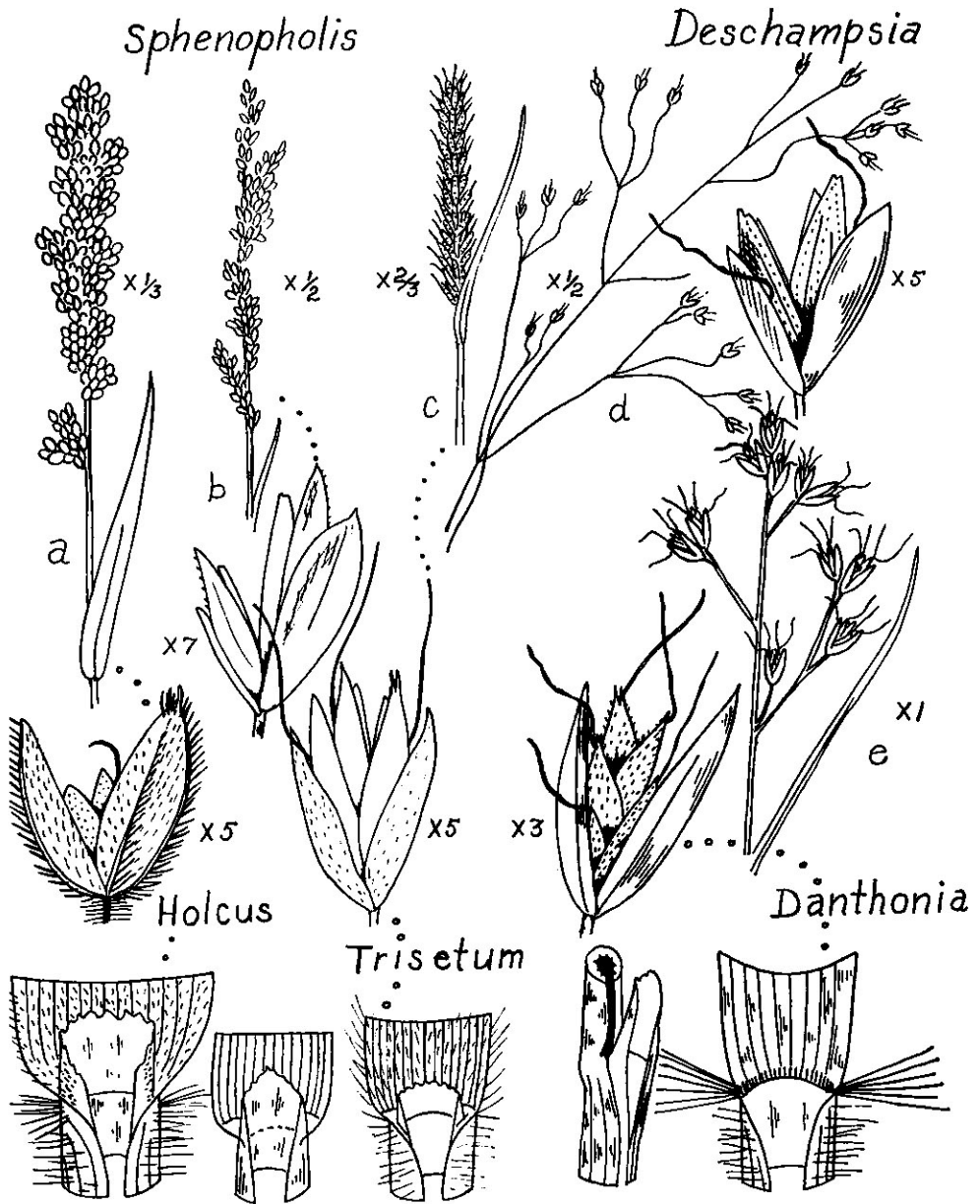


Fig. 22.—a, *Holcus lanatus*, inflorescence, spikelet and leaf sheath. b, *Sphenopholis intermedia*. c, *Trisetum spicatum*. d, *Deschampsia flexuosa*. e, *Danthonia spicata*.

23. **ARRHENATHERUM** Beauv.

1. ***A. elatius* (L.)Mert. & Koch** TALL OAT-GRASS

Occasionally found as an escape or established around the edges of fields where it has been introduced: Sydney; East River, Lunenburg

Co.; Lake George, Kings Co.; and near the North Light, Brier Island, Digby Co.; to be expected widely scattered elsewhere.

Introduced from Eu. and escaped from cultivation.

24. HOLCUS L.

1. *H. lanatus* L. Fig. 22, a. Map 75. VELVET-GRASS

Conspicuous on account of its striking pale or purplish appearance and soft felted pubescence; one of the more abundant grasses throughout Shelburne, Yarmouth and Digby Counties in meadows, pastures, roadsides and waste places; scattered east near the coast to Halifax and Kings Cos.

Intro. from Eu.; abundant also in southern coastal B.C. but not well-established elsewhere in Canada.

25. SPHENOPHOLIS Scribn.

1. *S. intermedia* Rydb. Fig. 22, b. Map 76. SLENDER WEDGE-GRASS

Collected at scattered sites, in every case growing on cliff-faces or in locations where its roots were in contact with limestone, basalt or gypsum; central Hants Co.; Cape Blomidon, Kings Co. and Moose Island, Cumberland Co. (Schofield, 1955); upper falls on Jeffer's Brook, Cumberland Co. where it is abundant on the vertical cliffs; and more common in central and northern C.B.

Nfld. to Alaska south to Fla.

26. TRisetum L.

a. Panicle dense and spike-like; spikelets grayish-green; awns prominent, nearly straight and not twisted.

b. Glumes glabrous except for the ciliolate keels. 1. *T. spicatum* var. *molle*

b. Glumes pubescent. *T. spicatum* var. *pilosiglume*

a. Panicle looser and somewhat open with the spikelets on elongate branches.

c. Lemmas 2-toothed, with long, strongly-twisted awns; panicle rather compact, tinged with brown or purple. 2. *T. flavescens*

c. Lemmas entire, without awns; panicle loose and silvery-green.

3. *T. mellicoides*

1. *T. spicatum* (L.)Richter Fig. 22, c. Map 77.

Var. *molle* (Michx.)Beal is generally distributed across Arctic and temperate N.A. This has been found only in northern C.B.: Lockhart Brook, Big Southwest Brook, Barrachois River, Cheticamp R., and at Cape St. Lawrence and on gypsum at Cape North Village (Smith and Schofield, 1952).

Var. **pilosiglume** Fern. is more wide-ranging in N.S.: in cliff crevices and on ledges, Amethyst Cove, Cape Blomidon, Kings Co. (Smith and Erskine, 1954); frequent on exposed cliff headlands, Cape d'Or, Cumberland Co. (Schofield, 1955); abundant on a rock-cut along the railway east of Truro, Colchester Co.; and in numerous locations in northern C.B.; usually found on rocky outcrops along streams, on dripping cliffs or rock crevices as at Cheticamp R., Clyburne Brook, and Salmon River (Smith and Schofield, 1952).

Lab. to Lake Superior south to N.S. and the alpine regions of northern N. Eng.

2. **T. flavescens** (L.) Beauv.

An introduced forage grass found persisting in old pastures in the town of Meteghan, Digby Co.

Naturalized from Eu.; scattered west and south.

3. **T. melicoides** (Michx.) Vasey

This has been found at only one station: occasional on damp shaded ledges of Indian Brook, Victoria Co.

Nfld. to Mich. south to central Me. and northern N. Y.

27. AVENA L. OAT

a. Lemmas with long, slender and twisted hairs on the back, and a ring of stiff, brown, bristle-like hairs from around the callus; awns strong and stiff, the lower part twisted and extending beyond the tip of the lemma, upper part about twice as long as the lower part; florets readily separating from the spikelet.

1. *A. fatua*

a. Lemmas glabrous; awns entirely absent, or, if present, not twisted or twisted but a few times at the base; florets not separating readily from the spikelet nor from each other.

2. *A. sativa*

1. **A. fatua** L. WILD OAT

Very similar to the cultivated oat in appearance; sometimes found as a weed in fields of cultivated oats, arising from impurities in seed; or in waste places around farms or towns.

Intro. from Eu.; and brought in from Western Canada.

2. **A. sativa** L. CULTIVATED OAT

Common cereal plant grown extensively in the Province for grain or for green fodder; frequently found as an escape but not persisting.

28. DESCHAMPSIA Beauv.

Perennial grasses with ample, open panicles and shining spikelets with a bronze or purplish tinge.

a. Leaves filiform, involute, less than 1 mm in diameter; awns twisted, extending well beyond the glumes; lemmas and sheaths scabrous.

1. *D. flexuosa*

- a. Leaves flat or folded, 1-5 mm wide; awns straight, not much longer than the lemmas, not conspicuously exerted; lemmas and sheaths glabrous.
- c. Culms stout, in large tufts, 7-15 dm high; spikelets 2-3.3 mm long; introduced.
2. *D. caespitosa* var. *parviflora*
- c. Culms slender, 1-7 dm high; spikelets 3-4.5 mm long; native on wet shores.
- Var. *glauca*

1. *D. flexuosa* (L.) Trin. Fig. 22, d. HAIR-GRASS

Common throughout, in dry barren soils such as on the top of exposed granitic hills, on sandy plains in Kings and Annapolis Counties, sea-cliffs and barren headlands. This is a common and very conspicuous grass in more sterile locations.

A northern variation of this plant (var. *montana* (L.) Ledeb.), with slightly larger spikelets, has been reported (Perry, 1931) from St. Paul Island off the tip of Cape Breton. This variation, however, does not seem to be distinct. Both our species of *Deschampsia* exhibit great variation in their stature, size and shape of leaves, panicles and spikelets and are decidedly polymorphous.

Greenland to Alaska south to Ga.; Eurasia.

2. *D. caespitosa* (L.) Beauv. Map 80.

Var. *parviflora* (Thuill.) Richter is scattered as an occasional introduction from Europe about towns: near the railroad at Stewiacke and by fair grounds, New Glasgow (Erskine, 1951); and also reported from St. John, N.B. This plant is much coarser and taller than our native variety and grows with basal tufts of stiff coarse leaves.

Var. *glauca* (Hartm.) Lindm. is rather local, growing on riverbanks in moist rocky soil, on lake shores and in damp soil in various places from Yarmouth to C.B. Common along the Salmon River above Truro.

Nfld. to the Yukon south to Va. and Calif.

29. AIRA L.

1. *A. praecox* L. HAIRGRASS

J. S. Erskine (1958) mentions that the most interesting introduced plant of Seal Island, off the southwestern coast of N.S., was *Aira praecox*. This grass was not uncommon on the Island. "The explanation of its presence is probably that its seeds came ashore in the sand-ballast of ships driven up on the beach."

Intro. from Eu.; dry sandy soils from N.S., and N.Y. to Va.; also on the Pacific Coast.

30. DANTHONIA DC.

Tufted perennial grasses, the most common being the poverty-grass, wire-grass or wild oat-grass of old fields and sterile areas. The

ligule consists of a row of hairs; and there is a tuft of long hairs on each side at the top of the sheath. The spikelets are 3- to 8-flowered, with a long twisted awn on the back of the lemma between the two long teeth.

- a. Basal leaf-blades usually less than 15 cm long; ligule less than 1 mm long at the center but 2-3 mm long at the edges; sheaths, at least the lower, spreading-pilose; teeth of lemma sharply acute, but without long slender points, generally less than 2 mm long; branches of panicle ascending except during anthesis, giving a spike-like appearance. 1. *D. spicata*
- a. Basal leaf-blades 15-50 cm, averaging 30, cm long, not curling greatly when dry; ligule of long silky hairs, 3-5 mm long; sheaths, except for the tuft of hairs at the throat, and blades glabrous; teeth of lemma slender and awn-like, 2 mm long or longer; lower branches of panicle spreading and generally reflexed during and after anthesis. 2. *D. compressa*

1. *D. spicata* (L.) Beauv. Fig. 22, e. WIRE-GRASS

One of the most abundant grasses, found everywhere on poor and sterile soils; common in dry cliff crevices and in cut-over areas; depleted pastures may have a matted covering of this species. It shows considerable variation in stature, pubescence of leaves, and in other characters and it probably reproduces to a large extent by the closed-fertilized grains that are borne inside the sheaths, especially at the base of the clumps.

Fernald in *Rhodora* 45: 239-245. 1943, separates off a wide-ranging northern form as var. *pinetorum* Piper. This is marked by wider glumes with obscure lateral nerves, with the glumes covering all but the summit of the column of florets; throughout N.S.

Quite different-appearing plants with larger spikelets, over-stimulated growth, stiff erect habit and more crowded autumnal inflorescences are grouped together as *D. Alleni* Aust. Canso, Bridgewater, Digby Neck and elsewhere when late, wet autumn growing conditions exist.

Nfld. to B.C. south to Fla. and N.M.

2. *D. compressa* Aust. Map 81.

Rather rare; found in thickets, borders of woods, along woodland paths, generally in moister soils than the preceding and sometimes difficult to distinguish from luxuriant specimens of it. Most common in southwestern N.S., becoming scattered north and east to Cumberland, Kings and Halifax counties.

N.S. to Que. and Ohio south to N.C. and Ga.

TRIBE IV. AGROSTIDEAE

The *Agrostis* tribe comprise those grasses which have one fertile floret only, which readily separates and falls away from the glumes. Many of the plants have ample panicles or crowded spike-like inflorescences with a large number of very small spikelets. (Fig. 23, 24).

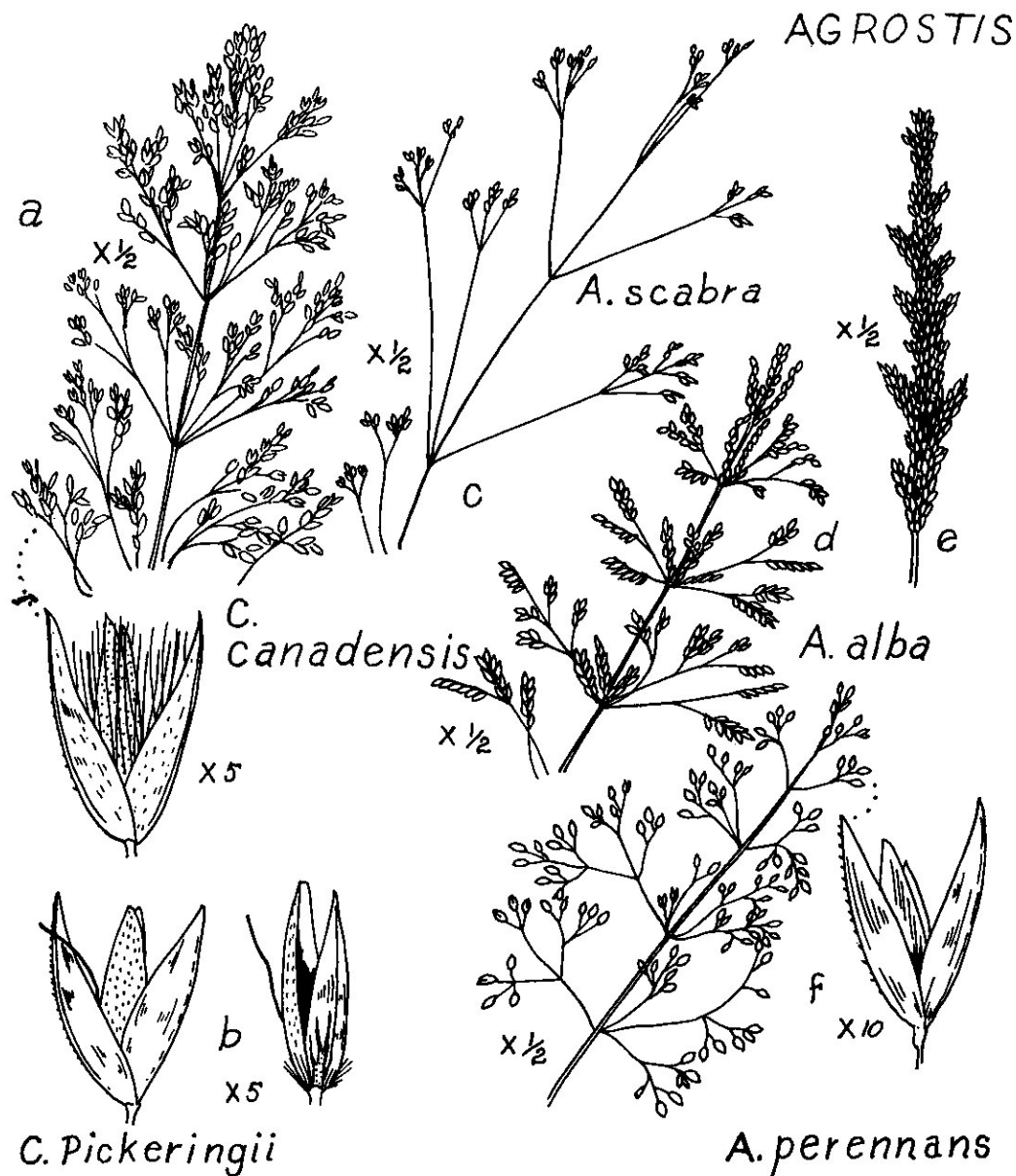


Fig. 23.—a, *Calamagrostis canadensis*, inflorescence and spikelet. b, spikelet and floret of *Calamagrostis Pickeringii*. c, *Agrostis scabra*. d, *Agrostis alba*. e, *Agrostis palustris*. f, *Agrostis perennans*, inflorescence and spikelet.

- a. Lemma as thin or thinner than the glumes; spikelets laterally compressed or sub-terete.
- b. Spikelets, exclusive of the awns, 1-7 mm long.
- c. Inflorescence an open or contracted panicle, if very contracted and spike-like then with the spike more or less interrupted.
- d. Spikelet disarticulating above the glumes, the empty glumes remaining on the branches after maturity; floret (not the spikelet) not stalked; palea 2-nerved; stamens 3.

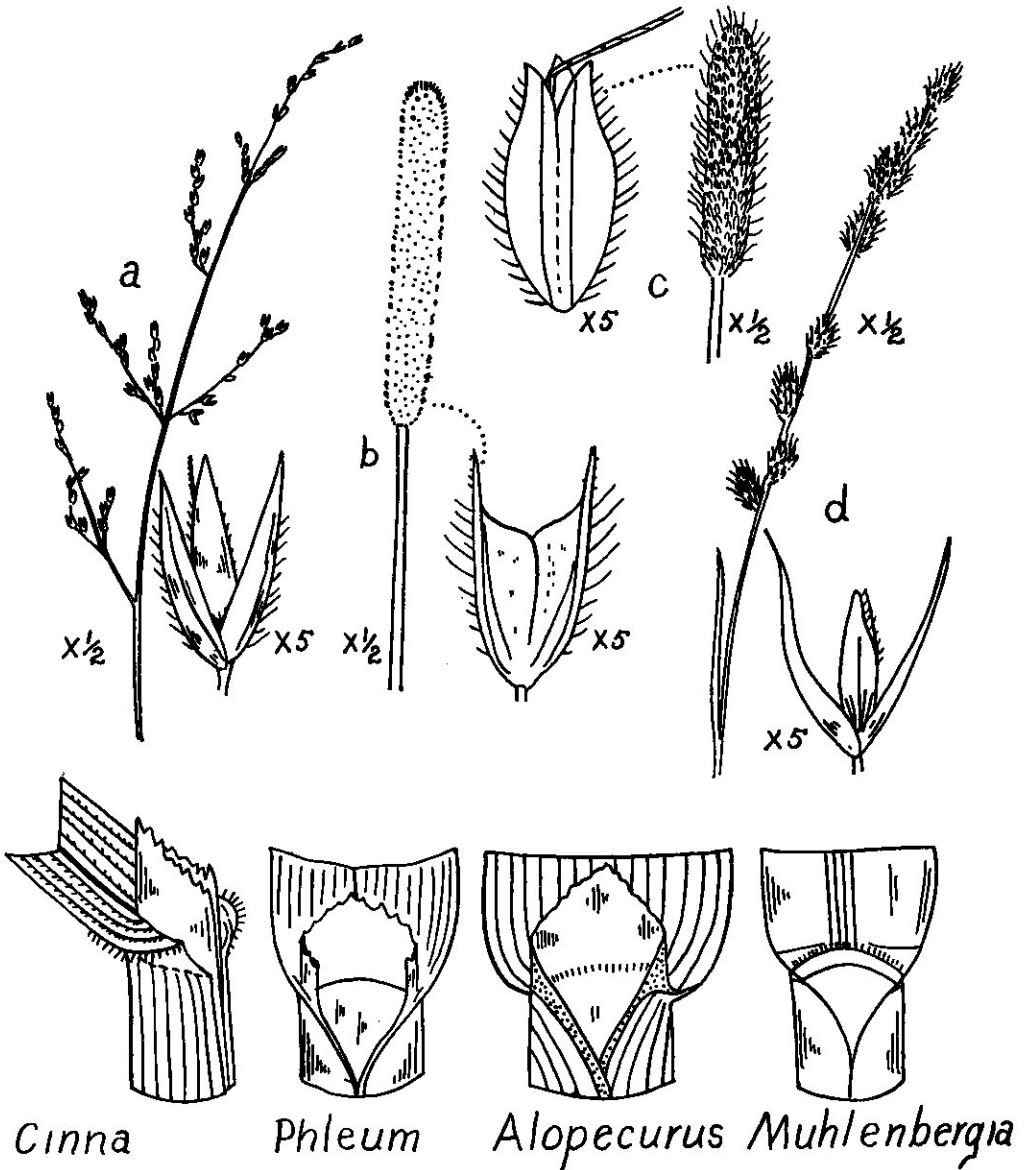


Fig. 24.—a, *Cinna latifolia*, inflorescence, spikelet and leaf-sheath. b, *Phleum pratense*. c, *Alopecurus pratensis*. d, *Muhlenbergia glomerata*.

e. Callus of floret with a tuft of fine hairs at least one-fourth as long as the lemma; rachilla hairy, prolonged behind the palea; second glume 3-nerved (Fig. 23). 32. *Calamagrostis*

e. Callus of floret glabrous or with very short hairs; rachilla not prolonged; second glume 1-nerved.

f. Perennials; blades glabrous; ligule membranous.

g. Rhizomes not short and scaly (underground rhizomes or long leafy stolons may be present); glumes equal or longer than the lemma, not awntipped; lemma awnless or awned from the back. (Fig. 23).

34. *Agrostis*

- g. Rhizomes short, shallow, branching, scaly and knotty (absent in *M. uniflora*); body of glumes shorter than the lemma, the long-awned tip, if present, surpassing the lemma (Fig. 24, d). 38. *Muhlenbergia*
- f. Annuals; margin of blade long-ciliate; ligule a row of short hairs. 31. *Sporobolus*
- d. Spikelets disarticulating below the glumes, falling away entire; floret short-stalked; palea appearing 1-nerved; stamen 1 (Fig. 24). 35. *Cinna*
- c. Inflorescence a dense, cylindrical spike-like panicle with the spikelets on very short stalks.
- h. Inflorescence harsh to the touch; glumes long-pointed; lemmas awnless; timothy (Fig. 24). 36. *Phleum*
- h. Inflorescence soft to the touch; glumes not long-pointed; lemmas awned from the back, the awns often conspicuous (Fig. 24). 37. *Alopecurus*
- b. Spikelets, exclusive of the awns, 8 mm or more in length.
- i. Lemma awnless or very short-awned; glumes as long as the lemma; panicle densely-flowered and spike-like; sandy sea-shores and dunes. 33. *Ammophila*
- i. Lemma tapering into a long awn; glumes minute or absent; panicle lax with a few early-deciduous spikelets; damp woodlands (Fig. 25, b). 39. *Brachyelytrum*
- a. Lemmas thicker and firmer than the glumes, hard and shining, firmly enclosing the palea and grain; spikelets dorsally compressed or terete.
- j. Lemma awned but the awn deciduous, pubescent at the base and generally over much of the back; spikelet almost terete; culms tufted, with fibrous roots (Fig. 25, d). 40. *Oryzopsis*
- j. Lemma awnless, glabrous, smooth; spikelets dorsally compressed; culms tall, in patches from spreading rhizomes. 41. *Milium*

31. SPOROBOLUS R.Br.

1. *S. vaginiflorus* (Torr.)Wood SHEATHED DROP-SEED

This grass has been collected only in a dry, sandy pasture at Nic-taux, Annapolis Co.; and in an old pasture north of Aylesford, Kings Co. It is probable that these specimens belong to var. *inaequalis* Fern., which has a slightly more northern range than has the typical species.

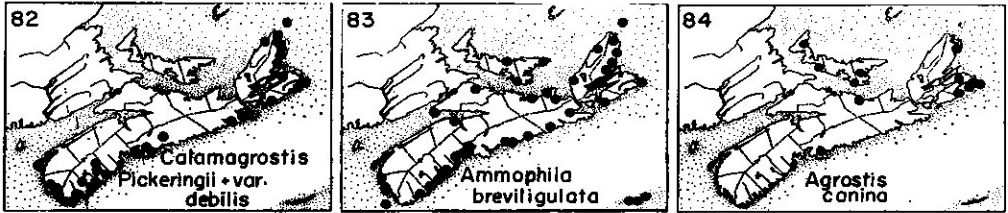
N.S. to N. Dak. south to Ga.

32. CALAMAGROSTIS Adans.

Tall plants of meadows, swales and bogs; the distinguishing feature is the tuft of hairs on the lemma.

- a. Awn slightly twisted, curved so that the tip sticks out from between the glumes; callus hairs scant and short; lemma firm and scabrous.
- b. Spikelets 4-5 mm long. 1. *C. Pickeringii*
- b. Spikelets 2.8-3.6 mm long. Var. *debilis*
- a. Awn straight; callus hairs abundant and about as long as the lemma; lemma thin and transparent.
- c. Panicle loose and open, particularly at flowering time although the branches ascend later; lemma translucent in the upper part; callus hairs about as long as the lemma, copious; leaves 4-8 mm wide. 2. *C. canadensis*

- c. Panicle with short branches, more or less contracted into a narrow inflorescence; leaves often involute or rolled, 2-4 mm wide.
- d. Spikelets 6-7 mm long; rachilla conspicuously prolonged with a tuft of hairs at the top; awn inserted well above the middle of the lemma.
3. *C. cinnoides*
- d. Spikelets less than 5 mm long; rachilla prolongation short; awn attached near the middle of the lemma.
- e. Leaves hard and scabrous, flat or involute; ligule 3-7 mm long.
4. *C. inexpansa*
- e. Leaves smooth, involute; ligule 1-2.5 mm long.
5. *C. neglecta*



1. *C. Pickeringii* Gray. Fig. 23, b. Map 82.

This plant is found at numerous stations at widely separated points, mainly along the Atlantic coast in bogs, boggy barrens, swales, and heathy meadows in the highlands of Cape Breton.

Var. *debilis* (Kearney) Fern. & Wieg., with smaller spikelets, is much more common in similar habitats. Plants growing in bogs have a glaucous appearance, while along some damp river-bottoms the plants may be green and grow in colonies. It is doubtful if this is a true variety.

Nfld. to Mass., N.J. and the mts. of N.Y.

2. *C. canadensis* (Michx.) Nutt. Fig. 23, a. BLUE-JOINT

A common grass of ditches, swales and fresh-water marshes throughout. The size of the spikelets has been taken as the basis for the segregation of several varieties but this variation does not seem to be discontinuous and it is not correlated with other morphological characteristics. It seems best to consider the varieties as intergrading components of a highly polymorphous species.

Var. *Macouniana* (Vasey) Stebbins has spikelets 2.2-2.8 mm long; found on Lark Hill barren, Port Medway by J. F. Donly.

Var. *typica*, with spikelets 2.8-3.8 mm long, is common in the Province and grades into var. *robusta* Vasey with spikelets 3.5-4.5 mm long. This also is common throughout. Specimens which might be classed definitely as var. *scabra* with spikelets 4.5-6 mm long and scabrous glumes, have not been found.

Nfld. to Alaska south to W. Va. and Calif.

3. *C. cinnoides* (Muhl.) Bart.

There is but one report in the literature (Stebbins, G. L. *Rhodora* 32: 35-57. 1930) of a collection of this species: at Halifax, by Lunt, 1912.

N.S.; southern Me. to Ga. and Ala.

4. *C. inexpansa* Gray, var *brevior* (Vasey)Stebbins

Only one station known, from Victoria Co., C.B.: glaucous in appearance, single plants scattered on the wet cliff face of Lockhart Brook, Salmon River; collected by Smith et al.

This species ranges from Greenland to Alaska south to northern N. Eng. and N.M.

5. *C. neglecta* (Ehrh.)Gaertn.

Rare; collected at Beaver Lake, Yarmouth Co. (*Rhodora* 46: 297-8. 1944); in a larch bog, Big Baddeck in Cape Breton; swales south of Amherst. It is common around some of the lakes just across the N.B. border and Erskine reports it as local in fresh to brackish marshes near the coast in P.E.I.

Greenland to Alaska south to N.S., Wisc. and Calif.

33. *AMMOPHILA* Host.1. *A. breviligulata* Fern. Map 83. AMERICAN BEACH-GRASS

Common around the shores of the Province wherever sandy beaches or low dunes occur; frequently growing with *Elymus mollis* and *Agropyron repens*. Common on Sable Island.

Along the coast; Nfld. to N.C. and around the Great Lakes.

34. *AGROSTIS* L. BENTGRASS

Perennial grasses with many small one-flowered spikelets; glumes almost equal, longer than the membranous lemmas. Malte, M.O. The commercial bent grasses (*Agrostis*) in Canada, Nat. Mus. Can. Bull. 50, Ann. Rpt. 1926: 105-126, 1928 Philipson, W. R. A revision of the British species of the genus *Agrostis* Linn. Linn. Soc. Journ. Bot. LI: 73-151, 1937.

- a. Palea at least one-third as long as the lemma; panicle-branches more rigid; rhizomes or stolons present.
- b. Ligule longer than broad, generally 2-4 mm long on the lower leaves, frequently whitish and translucent, membranous, pointed or rounded at the apex; spikelets on short branchlets, numerous towards the axis of the panicle, the branchlets appressed or ascending after flowering.
- c. Introduced forage grass; culms stout, erect; rhizomes usually present; panicle ovoid, reddish, with branches 3-10 cm long, spreading to sub-erect in fruit.
 1. *A. alba*
- c. Grasses of native habitats; culms slender, decumbent at the base, usually with abundant leafy stolons; panicle long-cylindrical, greenish to purplish, densely compact with branches short, crowded and less than 4 cm long; branches densely contracted in fruit.
 2. *A. palustris*
- b. Ligule broader than long, generally 0.5-1 mm long on the lower leaves, transparent, brownish or somewhat hyaline, truncate; spikelets not more crowded at the base of the branches, the branches divaricate-spreading after flowering.
 3. *A. tenuis*

- a. *Palea* obsolete or absent; panicle-branches slender or capillary; rhizomes or stolons absent.
- d. Panicle diffuse, the capillary branches re-branching at or above the middle. 4. *A. scabra*
- d. Panicle not diffuse, or the branches re-branching below the middle.
- e. Panicle somewhat lax; several culm-leaves present; lemmas awnless, or rarely with a straight short awn; culms upright from the base; stolons absent. 5. *A. perennans*
- e. Panicle branches more rigidly spreading; leaves mainly in a basal tuft; lemmas with a twisted geniculate, but sometimes short and straight, awn; stolons and basal decumbent part of the culm rooting at the nodes. 6. *A. canina*

1. *A. alba* L. Fig. 23, d. RED-TOP

This is rather inappropriate name for the common red-top of cultivated fields and roadsides but there is such a diversity of opinion regarding the status of this plant that each treatment gives a different scientific name. This species and the next are often regarded merely as extremes of one very variable species, *A. stolonifera*. Red-top is often sown as a forage grass and it is found also along roadsides and in waste areas, or persisting for a short time in well-drained soil.

Introduced from Eu. throughout N.A., perhaps native northwards.

2. *A. palustris* Huds. Fig. 23, e. CREEPING BENT-GRASS

Common in moist fields and pastures, in ditches, and on the upper part of salt and brackish marshes as well as in fresh-water marshes and swales. Along the margins of pools and streams the stolons often grow out a considerable distance into the water. This plant shows a great variation in the habit of growth, length of stolons, form of panicle, color of spikelets and in other characteristics. On exposed sand and gravel-flats along the sea-shore occur somewhat dwarfed plants with broad and short (about 1.8 mm long) glumes and short leaves with purplish sheaths. These have been called *A. maritima* Lam.

Greenland to B.C. south to Va. and Calif.; Eu.

3. *A. tenuis* Sibth. BENT-GRASS, BROWN-TOP

A very abundant grass species, making up the majority of the cover in pastures, meadows and lawns. Forma *aristata* (Sincl.) Wieg., with most of the lemmas awned, has been found at Lawrencetown, Halifax Co. and at Purcell's Cove. Plants with enlarged floral parts due to infection with nematodes are abundantly found in western N.S.

It is a plant naturally suited to maritime and cool humid climates. Going westward it tends to run out in Quebec in the lowlands about Quebec City and in the uplands about the Champlain Valley; in Ontario it does not persist well, even after seeding; abundant again on south-eastern Vancouver Is. All our plants belong to var. *hispida* (Willd.) Philipson, according to Philipson.

Lab. to B.C. south to N.C.

4. *A. scabra* Willd. Fig. 23, c. TICKLE-GRASS, HAIR-GRASS

The typical variety has spikelets 2.0-3.0 mm and lemmas 1.3-2.0 mm long. This is a weedy plant common throughout in a variety of soils, but particularly in places which have been laid bare by cultivation, burning, or flooding. The very diffuse panicle with the long capillary branches makes this plant easy to identify. Forma **Tuckermani** Fern., with awned lemmas, is said to occur throughout the range of the typical awnless plants. Most of the N.S. specimens show the lemmas awnless. Lab. to Alaska south to N.C. and Ariz.

Var. **septentrionalis** Fern. is a northeastern form with larger spikelets; spikelets 3.2-4.3 mm long with the lemmas 2.0-2.5 mm long. Found at many places, especially in the southern and south-western areas. Forma **setigera** Fern., with awned lemmas, is reported from St. Paul Island, Canso and Markland (*Rhodora* 35: 210. 1933).

Lab. to Que. and south to N.S.

5. *A. perennans* (Walt.)Tuckerm. Fig. 23, f.

Probably common throughout in woodlands, thickets, moist roadsides, lake margins and along the banks of streams. Considerable variation occurs and our plants seem to resemble more closely the woodland variety with a more diffuse panicle and spikelets on longer, more divergent pedicels, named var. **aestivalis** Vasey. Awned forms have not been seen.

N.S. to Minn. south to Fla.

6. *A. canina* L. Map 84. VELVET BENT-GRASS

Rare in natural habitats; known from Sydney, Louisburg, Forchu and Scatari Island in northeastern C.B., scattered to Yarmouth Co. Certain strains may be found throughout in special locations such as golf greens, for owing to its fine, bright green dense growth it has excellent turf qualities. Plants at Louisburg show the lemmas awnless, or occasionally with a short awn in some of the spikelets, mixed with typical long-awned plants. Plants without purple coloration were also found at New Glasgow and may be named var. **varians** Asch. & Graebn. (Erskine, 1951).

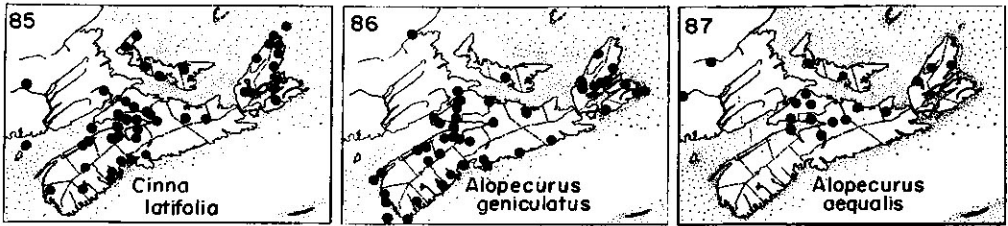
Nfld. to e. Me.; and introduced to Minn. and Tenn.; Eu.

35. CINNA L.

1. *C. latifolia* (Trev.)Griseb. Fig. 24, a. Map 85. WOOD-REED

Scattered to common in wet woods, wooded swamps and along alluvial ground throughout, usually growing as single plants up to 1.5 m high. The floret is short-stalked within the glumes.

Nfld. to Alaska south to N.C. and Calif.



36. PHLEUM L. TIMOTHY

- a. Panicle cylindrical, normally 5-10 cm long; awns about half as long, or less, than the bodies of the glumes; plants stout, widely cultivated. 1. *P. pratense*
- a. Panicle oval to short-cylindrical, 1-3 cm long; awns two-thirds to three-quarters the length of the lemma body; plant low and slender, northern. 2. *P. alpinum*

1. *P. pratense* L. Fig. 24, b. TIMOTHY

A most abundant and valuable hay grass, grown extensively in fields and meadows and found equally abundant along roadsides and in waste places; grading into a more slender form, often with leafy tufts at flowering time, which has been named var. **nodosum** (L.)Huds. Nat. from Eu.; Nfld. to James Bay south to N.C.

2. *P. alpinum* L. MOUNTAIN TIMOTHY

This slender, more northern species is rare in northern Cape Breton; collected as locally abundant, river ledges along the Cheticamp River and a tributary, LeBlanc Brook, Inverness Co.

Greenland to Alaska south to alpine regions of Me. and N.H.

37. ALOPECURUS L. MEADOW FOX-TAIL

Perennials with densely-flowered spike-like panicles very similar to those of timothy, but differing in being softer and by having conspicuous exerted awns.

- a. Panicle large, 7-10 mm thick; spikelets about 5 mm long; awns long and conspicuous. 1. *A. pratensis*
- a. Panicle smaller, 2-6 mm thick; spikelets 2-3.5 mm long.
- b. Awns arising from near the base of the lemmas, extending 2-3 mm beyond the glumes; plants decumbent. 2. *A. geniculatus*
- b. Awns arising from near the middle of the lemma, barely extending beyond the glumes; plants erect. 3. *A. aequalis*

1. *A. pratensis* L. Fig. 24, c. MEADOW FOX-TAIL

Extensively naturalized and common in rich meadow lands and along roadsides in many parts of the Province, often making up a considerable proportion of the grasses in such locations. This is one of our earliest grasses and the panicles are conspicuous in early June.

Nfld. to Ont. south to Ga.; Alaska to Ore.; Eu.

2. *A. geniculatus* L. Map 86. WATER FOX-TAIL

Common throughout in wet pastures and fields, in ditches or around the edges of ponds, sometimes growing into shallow water. It is often one of the first grasses to occupy the bare muddy areas along ditches and dyke roads, where the soil is sticky, and drainage and soil aeration is poor. The report of Var. *microstachyus* Uechtr. from roadside ditches is considered to be based on depauperate plants.

Lab. to Minn. south to N.J.; nat. from Eu.

3. *A. aequalis* Sobol. Map 87.

Rather rare and local; muddy edges of shallow ponds, spring pools, mucky river-edges or occasionally on gravel in similar locations. Isolated stations are known: top of Cape Blomidon; and from Urbania, Hants Co. and Cumberland Co. to Strathlorne and Margaree in Cape Breton.

Nfld. to Alaska south to Penn.; Eurasia.

38. *MUHLENBERGIA* Schreb.

Fernald, M. L. Rhizomatous Species of Muhlenbergia. *Rhodo* 45: 221-239. 1943.

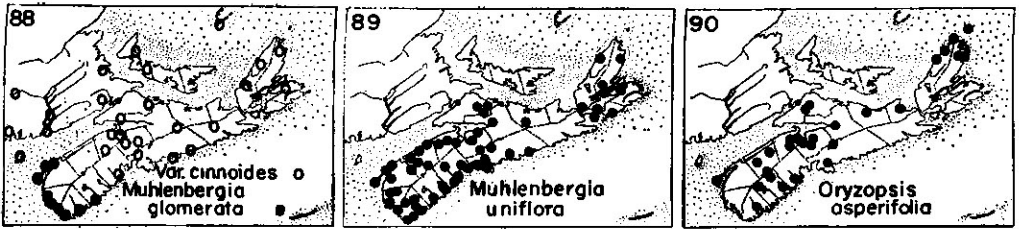
- a. Rhizomes short, scaly and knotted; culms erect at the base and stouter; panicles contracted and densely-flowered, the spikelets on short pedicels; glumes about the length of the lemma or longer.
- b. Glumes acuminate, about the length of the lemmas; panicle with the lower branches 1-4 cm long and somewhat spreading; spikelets about 3 mm long.
 - 1. *M. mexicana*
- b. Glumes with stiff awn-like tips, their tips much exceeding the awnless lemmas; panicle interrupted at the base, with the branches short and appressed; spikelets 4-6 mm long.
 - 2. *M. glomerata*
- a. Rhizomes lacking; culms slender, often decumbent at the base and rooting at the nodes; panicles loose and open, the spikelets on long capillary pedicels; glumes less than half the length of the lemmas.
 - 3. *M. uniflora*

1. *M. mexicana* (L.)Trin.

Grand Lake, Halifax Co.; from the Gaspereau, Halfway and Ste. Croix Rivers of the Minas Basin drainage in Kings and Hants Cos.: crevices in rock cliff, Wallbrook; moist gravelly river bank at White Rock, and dryish soil along the Gaspereau River above Gaspereau (Smith and Erskine, 1954). Cumberland Co.: common at moist base of cliff and in crevices at New Prospect; and banks of Wallace River, Wentworth.

The specimens from the rocky margin of the Ste. Croix shows the lemmas with awns 4-10 mm long, typical of forma *setiglumis* (S.Wats.) Fern.

N.S. to B.C. south to N.C. and Calif.



2. *M. glomerata* (Willd.) Trin. Fig. 24, d. Map 88.

Peaty swales, cobbly shores and brook margins with rock crevices; often common in swales in the southwestern counties, rarer eastward. (*M. racemosa*).

The more slender plant with 5-8 leaves instead of 7-15 on the culm, and with the heads of the inflorescence greener and hispid, and much more separated in the panicle, has been separated as var. *cinnoides* (Link) F. J. Herm. The species shows a range from Mass. and southern Maine to southwestern N.S. while the variety ranges northward through N.S. to Anticosti and Nfld.

Nfld. to B.C. south to Va.

3. *M. uniflora* (Muhl.) Fern. Fig. 25, a. Map 89.

A delicate, neat perennial 2-4 dm high with open panicles; common in peaty swales, bogs and sandy moist sterile soils in the southern and western section of the Province east to Halifax Co. with isolated stations from Cumberland to northern C.B.

In some plants a few spikelets towards the tips of the branches may be 2-flowered. These show a transition to var. *terrae-novae* Fern., the common variety of Nfld.

Nfld. to western Ont. south to N.J., Mich. and Wisc.

39. BRACHYELYTRUM Beauv.

1. *B. erectum* (Schreb.) Beauv., var. *glabratum* (Vasey) Koyama & Kawano, Can. Jour. Bot. 42: 866. 1964. Fig. 25, b.

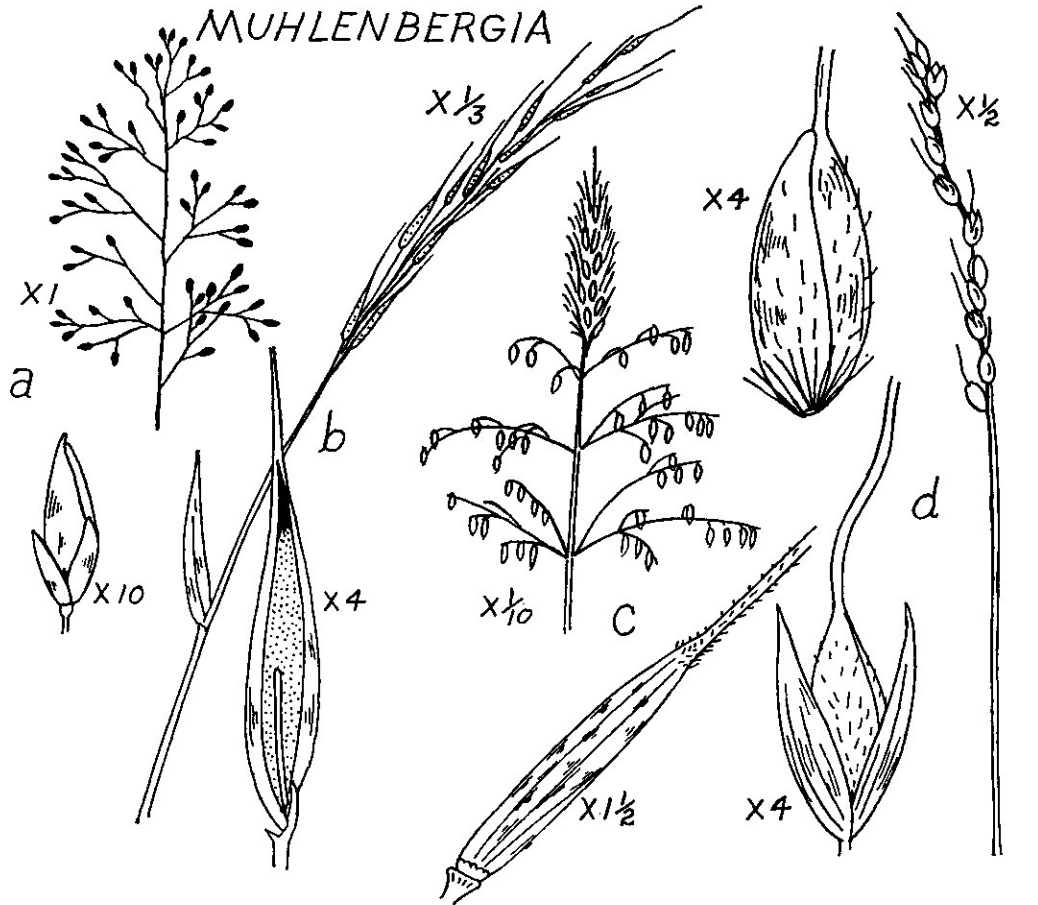
A scattered but never abundant grass, usually growing in wet rocky areas, along shaded streams, in rich moist woods, or occasionally even in open places after the trees or shrubs have been cut off. It usually grows in patches from short, knotted rhizomes. Our plants belong to the northern variety. (Var. *septentrionale* Babel).

Nfld. to Minn. south to Ga.

40. ORYZOPSIS Michx.

Native perennial grasses growing in dry woods or in open sandy soils; lemmas awned from the tip, hard and shiny.

- a. Spikelets, excluding awns, 6-8 mm long, in a narrow contracted panicle; blades mostly basal, flat when fresh, 4-8 mm wide. 1. *O. asperifolia*
- a. Spikelets, excluding awns, 3-5 mm long, in small diffuse panicles; blades mainly on the stem, mostly involute, less than 3 mm wide.
- b. Awn less than 3 mm long, almost straight; panicle 3-6 cm long. 2. *O. pungens*
- b. Awn 8-15 mm long, twisted in two places; panicle larger, 5-10 cm long. 3. *O. canadensis*



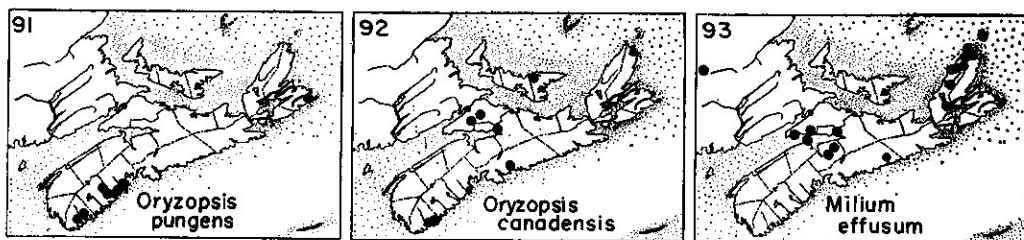
BRACHYELYTRUM ZIZANIA ORYZOPSIS

Fig. 25.—a, *Muhlenbergia uniflora*, inflorescence and spikelet. b, *Brachyelytrum erectum*. c, *Zizania aquatica*. d, *Oryzopsis asperifolia*.

1. *O. asperifolia* Michx. Fig. 25, d. Map 90. RICH-GRASS

The tufts of rigid, long broad leaves are characteristic of the dry woods or sterile bushy barrens; scattered to common but never abundant and rarer from Halifax County to northern C.B. Flowering from late May to early June.

Nfld. to B.C. south to W. Va.



2. *O. pungens* (Torr.) Hitchc. Map 91.

Characteristic of dry barrens of Shelburne and southwestern Lunenburg Counties, occasional in Queens Co.; also at Mira Bay, Cape Breton Co. This plant is smaller than the next species and very similar to it.

N.S. to B.C. south to N.J. and Ind.

3. *O. canadensis* (Poir.) Torr. Map 92.

Extending into the Province on the dry and barren soils in Cumberland and central Colchester Cos.; found also in dry pine woods near Jordan Falls, Shelburne Co. and in dry woods near Porter's Lake, Halifax Co.

Nfld. to Alta. south to N.S., N.Y. and northern Mich.

41. MILIUM L.

1. *M. effusum* L., var. *cisatlanticum* Fern., *Rhodora* 52: 218. 1950. Map 93.

One of our rarer grasses, confined mainly to rich or alluvial hardwoods: top of Cape Blomidon in sugar maple woods, Kings Co.; Five-Mile River in Hants Co.; in the hardwood forests of Cape Chignecto the species flourishes, occasional under hardwoods at base of cliff, New Prospect and in damp woodland margin of McGahey Brook in Cumberland Co. (Schofield, 1955); fairly frequent in rich hardwood stands in northern C.B. The American variety.

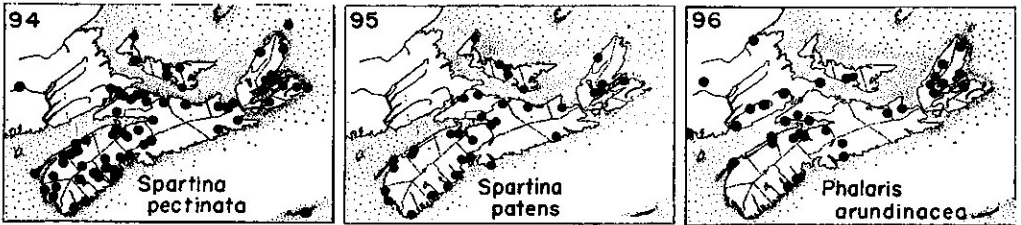
Nfld. to Minn. south to Dela.; Eurasia.

TRIBE V. CHLORIDEAE

Perennial grasses of salt marshes, or occasionally around swales, with extensively creeping, scaly rhizomes; spikelets arranged in two to many spikes, along one side of the axis, sessile, much compressed and closely overlapping; ligule a row of hairs. Represented in N.S. by only one genus.

42. *SPARTINA* Schreb.

- a. Blades of leaves more than 5 mm wide, flat towards the base and inrolled towards the tip when fresh; plants with stout upright culms 3 or more mm in diam., 10-20 dm high.
- b. First glume as long as the lemma, very rough-ciliate on the keel; second glume tapering to an awn-like tip as long again as the lemma; inflorescence open, purplish and slender-waving; brackish to fresh water. 1. *S. pectinata*
- b. First glume about half as long as the lemma, rarely smooth; second glume without the long awn-like tip, barely exceeding the lemma; inflorescence erect, crowded, yellowish; growing only next to salt water or in very brackish soil. 2. *S. alterniflora*
- a. Blades less than 3 mm wide, and involute even when fresh; plants with slender decumbent culms less than 2 mm in diam., growing in dense leafy mats, mostly 3-6 dm high. 3. *S. patens*

1. *S. pectinata* Link Fig. 26. Map 94. BROAD-LEAF

This, the tallest of our cord-grasses, is not restricted to saline soils but is also common bordering salt marshes or along the ditches and drains where fresh water has carried away most of the salts; very common around the heads of the salt marshes, often dominant over extensive areas; scattered elsewhere wherever open ditches, streams and sloughs occur.

The extreme variation with narrow, slender spreading spikes and appressed awns, var. *Suttiei* (Farw.) Fern., is reported as ranging from P.E.I. and N.S. southward and westward. Most of the N.S. collections appear intermediate between this variety and the typical species.

Across the continent; along salt marshes from Nfld. south.

2. *S. alterniflora* Loisel. Fig. 26. CORD-GRASS

This is the characteristic grass of our salt marshes and it is frequently the single seed-plant colonizing the inter-tidal zone.

Var. *pilosa* (Merr.) Fern, with lemmas sparsely pilose, is reported by Fernald to occur "apparently frequently on salt marshes from Yarmouth County to Annapolis County and presumably beyond". Although this is undoubtedly distinct, since it differs also in certain cytological characteristics, the lemmas show all degrees of pubescence from a sparse pilosity to a scabrous or glabrous condition even in the same inflorescence. Var. *pilosa* is a taller, more robust plant with more spikes composing the inflorescence and flowering later than the typical

form. It seems to be confined to brackish flats rather than to saline tidal marshes.

Nfld. and Que. along the tidal marshes to Tex.; locally introduced into Eu.

3. *S. patens* (Ait.)Muhl. Fig. 26. Map 95.

A low grass forming dense matted dark-green patches on parts of the salt marshes above the *Spartina alterniflora* zone; found around the coast wherever suitably protected shore areas are present. When cut for hay, the *Spartina* is replaced by a more sparse vegetation of *Puccinellia* and *Limonium*.

Along the coast from Que. and Nfld. to Texas and in saline marshes inland.

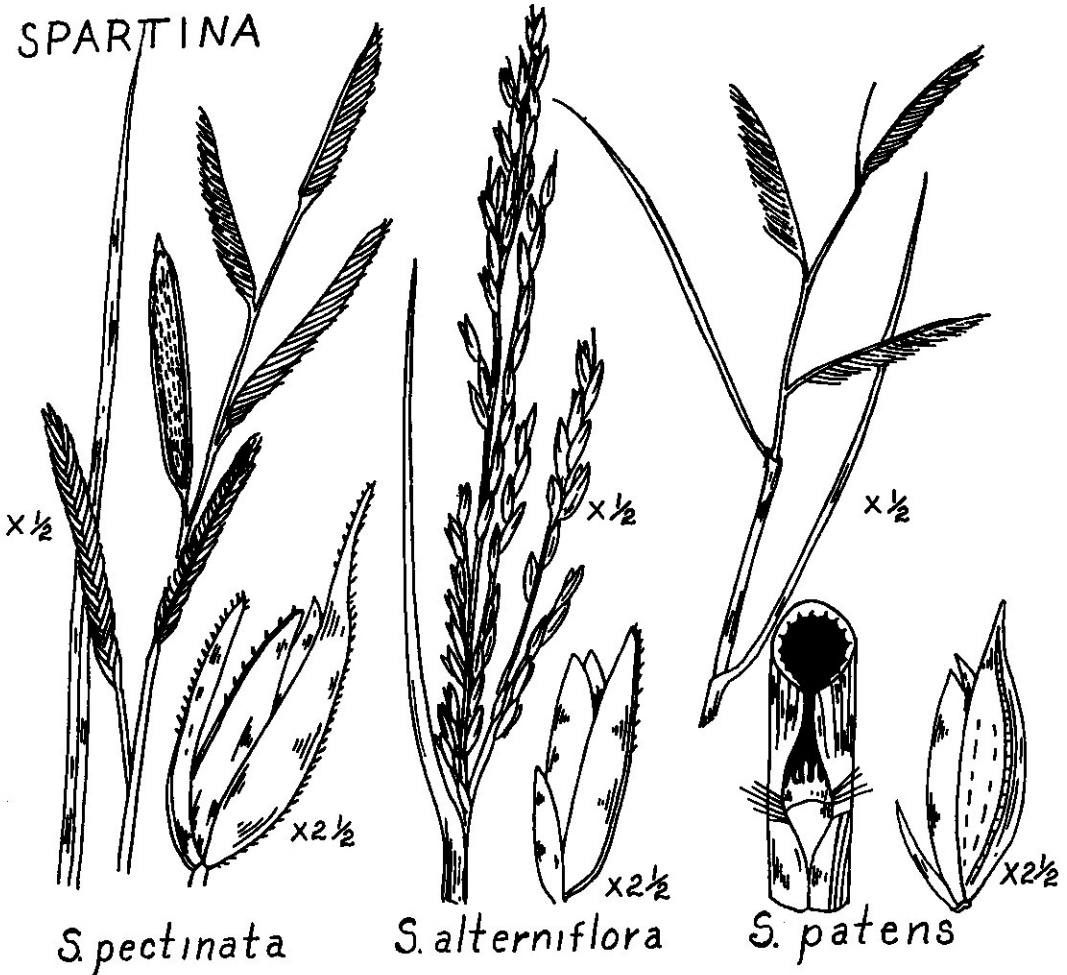


Fig. 26.—*Spartina*, inflorescence, spikelet and leaf-sheath.

TRIBE VI. PHALARIDAE

Grasses with the spikelets containing one fertile, fruit-producing floret and two sterile florets below the fertile one; glumes longer than the florets (Fig. 27).

- a. Lemmas of the sterile florets much shorter than the fertile floret, or reduced to hairy scales; plants not bitter nor scented; inflorescence greenish, appearing in middle or late summer; to 2 m high. 43. *Phalaris*
- a. Lemmas of the sterile florets larger than the fertile one; plants bitter-tasting and sweet-scented when dry; inflorescence brownish; flowering early in the summer; low.
- b. Glumes very unequal, the second much longer and broader, generally enclosing the floret; lower florets neuter, their lemmas awned, slender and 2-lobed at the apex; inflorescence spike-like, borne on leafy culms. 44. *Anthoxanthum*
- b. Glumes equal in size and shape; lower florets staminate, their lemmas awnless, broad and acute; inflorescence an open panicle; long tough basal leaves appear much after flowering. 45. *Hierochloa*

43. PHALARIS L.

- a. Plants annual; panicle oval, dense and spike-like; lemmas broad-winged, white with green stripes. 1. *P. canariensis*
- a. Plants perennial; panicle elongated, branched, contracted after flowering; lemmas pale, not broad-winged. 2. *P. arundinacea*

1. *P. canariensis* L. CANARY-GRASS

Introduced in the form of canary and bird-seed, this attractive species is sometimes encountered along roadsides, on ballast or on city dumps: Pictou, Wolfville and Halifax. It does not persist nor become weedy.

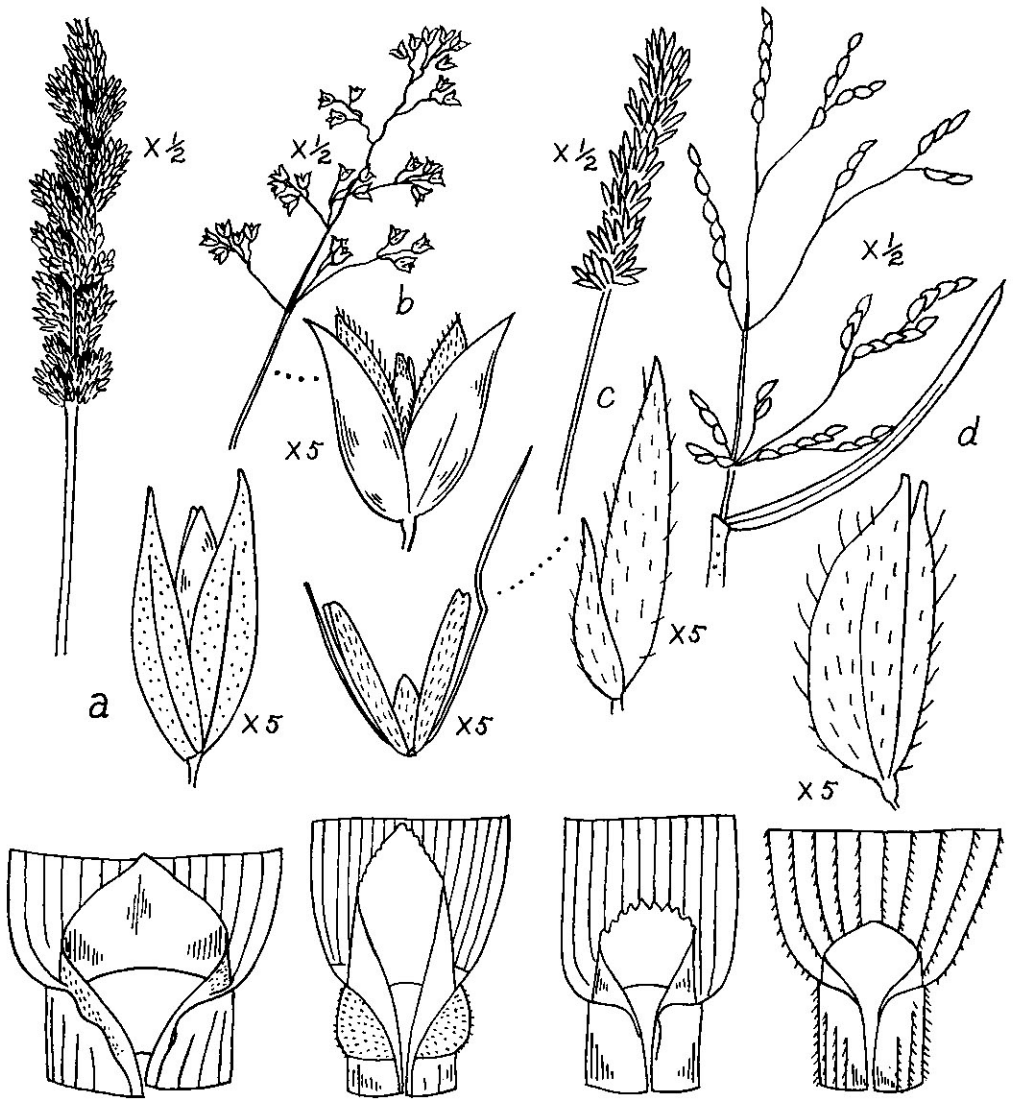
Adventive from Eu.; widely distributed.

2. *P. arundinacea* L. Fig. 27, a. Map 96. REED CANARY-GRASS

This tall, broad-leaved species of mucky soils, wet meadows and along streams is not of common occurrence, although it has been found at widely-separated points and in its proper habitat, as along the rivers above Kentville and Parrsboro, it may form a considerable part of the grass in the wetter areas. It tends to form large clumps and may grow in shallow water. An European form is being introduced and sown in poorly-drained soils and this may occasionally appear along wet roadsides.

Forma variegata (Parnell) Druce is the Ribbon Grass of gardens, where it is frequently grown for its white-striped ornamental leaves; common and persistent but only rarely seen as an escape.

Nfld. to Alaska south to N.C.



Phalaris *Hierochloa* *Anthoxanthum* *Leersia*

Fig. 27.—a, *Phalaris arundinacea*, inflorescence, spikelet and leaf-sheath. b, *Hierochloa odorata*. c, *Anthoxanthum odoratum*. d, *Leersia oryzoides*.

44. ANTHOXANTHUM L.

1. *A. odoratum* L. Fig. 27, c. SWEET VERNAL-GRASS

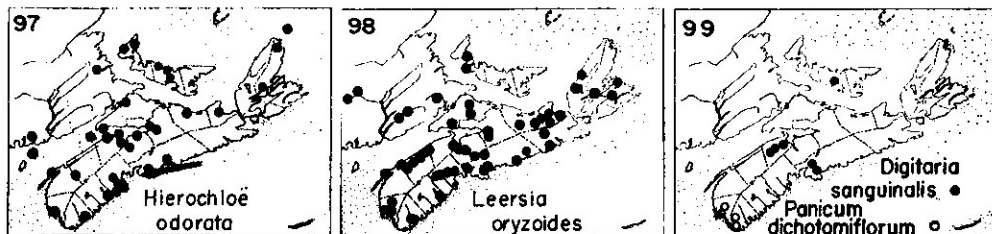
An early-maturing grass common in old fields, along roadsides, in waste places and widely distributed elsewhere throughout. This grass is short and flowers early in June. Its short, spike-like yellowish-green to brown panicles are distinctive.

Widely introduced from Eurasia.

45. *HIEROCHLOË* R.Br.1. *H. odorata* (L.)Beauv. Fig. 27, b. Map 97. SWEET-GRASS

One of the earliest flowering grasses, with the panicles becoming conspicuous in early May and flowering before June. The long green leaves arise later from separate basal off-shoots. They contain coumarin which tastes bitter and later gives the persistent pleasant fragrance for which the plant is noted. The plant is found in many places, growing on low-lying, moist, heavy soil, generally in the proximity of or on the upper areas of the tidal marshes around the entire coast; occasionally introduced inland.

Lab. to Alaska south to Penn., Eurasia.



TRIBE VII. ORYZEAE

46. *LEERSIA* Sw.1. *L. oryzoides* (L.)Sw. Fig. 27, d. Map 98. RICE CUT-GRASS

Bright-green broad-leaved grasses with very rough sheaths and blades, growing in wet soil or in shallow water, sometimes forming dense, tangled, clinging masses of foliage in ditches, swamps and wet waste lands. The culms are frequently a meter or more long with the panicle exserted 10 cm or more from the upper sheath when in flower. Scattered throughout but not nearly so common as the following form.

Forma **inclusa** (Wiesb.)Dörfler has part of the inflorescence enclosed in the inflated sheaths or breaking out the sides, never exserted far beyond the top of the sheath. Found in many places, frequently in shallow water or in the wet soil along the margin of lakes. It is readily identified by its sharp scabridity and the dense fringe of reflexed white hairs at the nodes of the culm. Forma **glabra** A. A. Eat. occurs when the leaves are submerged in the water and are smooth. Plants may have the submerged leaves smooth but the leaves above the water-line rough.

N.S. to Wash. south to Fla.

- a. Lower blades and sheaths pilose; plants erect; panicle-branches 4 to 6, joined at nearly the same point to the main axis; second glume only half the length of the spikelet, the first one very tiny. 2. *D. sanguinalis*

1. *D. Ischaemum* (Schreb.)Muhl. Fig. 29. SMALL CRAB-GRASS

Rather scattered and local as yet but becoming a weed in gardens around town, in waste places, and found more commonly on the sandy soil of the Annapolis Valley.

Introduced from Eu.; and widespread.

2. *D. sanguinalis* (L.)Scop. Fig. 29. Map 99. CRAB-GRASS

Occasionally found in lawns, gardens and waste places, as around Halifax, Bedford, Sydney, Liverpool, and in the Annapolis Valley. As yet, the weed is only of sporadic occurrence and there is little indication as to how aggressive it may be here.

Introduced from Eu. throughout the U.S. and southern Canada.

49. PANICUM L. PANIC-GRASS

This large genus is very common with a number of species in southwestern N.S., but it becomes rarer to northern Cape Breton where *P. boreale* is the only one as yet found (Fig. 28).

- a. Basal leaves similar to the stem-leaves, not forming a winter rosette; spikelets mostly longer than 2.0 mm; plants relatively large, 2-20 dm high.
- b. Plants annual, without rootstocks but arising from fibrous roots; sheaths pilose or glabrous.
- c. Sheaths glabrous; panicle diffusely branched; spikelets 2.5-3.0 mm long; first glume blunt, one-quarter the length of the spikelet (Fig. 28). 1. *P. dichotomiflorum*
- c. Sheaths densely pilose.
- d. Spikelets 3 mm or less in length, not smooth and shining.
- e. Panicle about half the length of the plant or more and as wide as long, with capillary branches; spikelets 2.3-3.0 mm long.
- f. Panicle-branches erect and crowded, only at length spreading; leaves scattered on the stem; spikelets up to 2.5 mm long (Fig. 29). 2. *P. capillare*
- f. Panicle branches more exserted, the lower reflexed; leaves mostly near the base of the plant; spikelets pointed, about 3 mm long. *P. capillare* var. *occidentale*
- e. Panicle generally less than one-third the length of the plant; spikelets 1.8-2.0 mm long. 3. *P. philadelphicum*
- d. Spikelets 4-5 mm long, smooth and shining; panicle drooping, one-third or less the length of the plant; plants tall and erect. 4. *P. millaceum*
- b. Plants perennial, growing in tufts from short rootstocks or from a knotty crown; first glume half the length of the spikelet or longer; sheaths glabrous; southwestern N.S. only.
- g. Plants stout, 10-20 dm high; spikelets 3.2-4.0 mm long, short-pedicelled in diffuse panicles (Fig. 28). 5. *P. virgatum*
- g. Plants more slender, 2-8 dm high; spikelets short-pedicelled along one side of the nearly unbranched panicle-branches.