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THE GENUS *PUCCINELLIA* IN EASTERN NORTH  
AMERICA.

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(Plates 114–117.)

THE essentially halophytic genus *Puccinellia* of Parlatores<sup>1</sup> has always been one of the least understood and, even to agrostologists, one of the most perplexing groups of grasses. The species superficially so closely simulate one another that by many experienced botanists they are merged; while the generic status of the plants is often questioned. Thus by some European botanists (for instance, Druce and Ostenfeld) the plants are included under *Glyceria*, by others (as Ascherson & Graebner) treated as a section of *Festuca*, while Britten & Rendle include them in *Sclerochloa*. In some characters species of *Puccinellia* certainly approach all three of these genera, yet as a whole the plants seem to constitute a good genus for which *Puccinellia* is the earliest unequivocal name.

In Europe, however, the name *Puccinellia* is not generally in use; but those who treat the group as a genus (for instance, Briquet, Richter or Rouy) call it *Atropis*. The status of *Atropis* as a generic name is, nevertheless, open to serious doubt. It is commonly cited as dating from Trinius in Ruprecht's *Flores Samojedorum Cisuralensium*,<sup>2</sup> and Grisebach in Ledebour's *Flora Rossica*, but in the enumera-

<sup>1</sup> Parl. Fl. Ital. i. 366 (1848).

<sup>2</sup> Rupr. Beitr. zur Pflanzenk. des Russischen Reiches, ii. 61, 64 (1845).



tion of plants Ruprecht included it, as Trinius<sup>1</sup> had previously done, under *Poa*, indicating *Atropis*<sup>2</sup> as well as *Phippsia*, *Catabrosa*, *Arctophila* and *Dupontia* as sections or subgenera, thus:

- "311. *Poa* (*Phippsia*) *algida* (R. Br.)."
- "312. *Poa* (*Catabrosa*) *airoides* Koel."
- "313. *Poa* (*Atropis*) *distans* L."
- "314. *Poa* *arctica* R. Br."
- "315. *Poa* *alpina* L."
- "316. *Poa* *pratensis* L."
- "317. *Poa* (*Arctophila*) *deflexa*\*."
- "325. *Poa* (*Dupontia*!) *psilosantha*\*."

On a succeeding page, in a note under *Poa* (*Dupontia*) *pelligera*, Ruprecht made the observation that these various sections differed from one another in certain characters: "*Atropis* Trin. (*P. distans*) *Catabrosae* quoad glumas proxima, spiculas habet (saltem in statu virgineo) lineares, fere teretes;"<sup>3</sup> and "From the condition of the glumes perhaps a series of genera as follows: *Dupontia*, *Arctophila*, *Poa*, *Atropis*, *Catabrosa*, *Phippsia*, *Coleanthus*." The enumeration of these plants as species of *Poa*, *Poa* (*Atropis*) *distans*, etc. by Ruprecht (or Trinius through Ruprecht) and then the giving on a subsequent page of brief, inadequate characterizations with the suggestion that these sections of *Poa* are "perhaps" genera, does not, it seems to us, clearly establish *Atropis* and others so treated as well published genera dating from 1845. And it is noteworthy that most authors who take up *Atropis* cite not only the Ruprecht reference but the later reference to Grisebach in Ledebour (1853)<sup>4</sup> as validating the genus. Grisebach, in Ledebour, certainly gave a clear generic characterization and treated the species unequivocally as species of *Atropis*, so that *Atropis* as a well published genus should date from Grisebach's treatment in 1853. In 1848, however, Parlature, with equal clarity and completeness had characterized *Puccinellia* as a genus to include some of the species, *P. distans* and *P. maritima*, later placed by Grisebach under *Atropis*: and it seems to us that the cause of sound nomenclature is best served by maintaining the fully and definitely published *Puccinellia* Parlature (1848) rather than the inadequately and uncertainly published *Atropis* Trinius in Ruprecht (1845, validated by Grisebach in 1853).

<sup>1</sup> Trin. Gram. Suppl. 68 (1836).

<sup>2</sup> Rupr. l. c. 61 (1845).

<sup>3</sup> Rupr. l. c. 64 (1845).

<sup>4</sup> Griseb. in Ledeb. Fl. Ross. iv. 388 (1853)



In attempting to determine the large collections of *Puccinellia* which have accumulated at the Gray Herbarium, especially from the shores of the Gulf of St. Lawrence, the writers have found it impossible to place many of the plants with the species commonly recognized as occurring in eastern America. It has consequently been necessary, in order to make the identifications of these plants as certain as possible, to study with some thoroughness all the species to which they are nearly related or with which they may be conspecific. This study has been greatly facilitated by the loan, through Dr. J. M. Macoun, of the large northern collections of the Geological Survey of Canada, by Dr. M. O. Malte of his private collections, and, through Mr. Bayard Long, of the representation in the herbarium of the Academy of Natural Sciences of Philadelphia; and we here express our appreciation of the opportunity to examine this most important material which, with the collections of the Gray Herbarium and of the New England Botanical Club, has been the chief basis of our work.

It quickly became apparent that much of the difficulty heretofore experienced in efforts to differentiate the species of *Puccinellia* has arisen through attempts to divide the plants too generally upon the habit of the inflorescence. Many species which in full maturity have the branches of the panicle widely divergent, in the young condition have close inflorescences with ascending or even appressed branches; so that attempts to use this character often lead to confusion. In searching for more fundamental characters which should be constant in all the material of seemingly identical plants many fruitless experiments were made; but finally the results resolved themselves into a series of differential points which seem to be reasonably definite and to divide the complex of material upon natural and geographically consistent lines. These characters have been tested through a prolonged study, which has occupied portions of three years, and although here indicated chiefly for the species which occur in eastern North America (south of Hudson Straits) they will prove important, we are sure, in the differentiation of the species of northwestern North America, Eurasia and the Arctic, in each of which areas there are several species not here discussed.

In the region specially covered by this paper (the area south of Hudson Straits) there are eleven well defined species of *Puccinellia*, each, as already implied, occupying a consistent geographic area. In two species, *P. maritima* and *P. phryganodes*, the anther is 1.5-



2 mm. long, about twice as long as in our other species. The first of these, *P. maritima*, is a plant of the Atlantic coasts of Europe and of eastern America (from Cape Breton to Pennsylvania); the second an Arctic species which extends southward to Labrador and the shores of Hudson Bay.

The remaining species have conspicuously smaller anthers, 0.5–1 mm. long, in only one species very slightly exceeding this measurement. In some of the plants with small anthers the mature caryopsis (and in good specimens of *Puccinellia* some inflorescences are usually mature while others are just expanding) is large, ordinarily more than 2 mm. long, while in others the grains are about 1.5 mm. in length. The measurements of the mature grain, like the measurements of the anthers, prove to be essentially constant in all material which is otherwise consistent and we have consequently used this character as an important one. Another character of as great importance is found in the margin of the lemma; in some species the lemma is entire or with at most one or two coarse teeth, while in others it is as definitely erose-ciliolate or serrulate. Good characters are also found in the palea, especially in the degree of ciliation; and other characters, often less readily described and more subject to variation, in the aspect of the panicle, the smoothness or hispidity of the rhachis and panicle-branches, the length of the glumes, etc.

The present paper, presenting our conclusions regarding the species of *Puccinellia* in northeastern North America obviously does not cover all the species which may possibly be found in the area. This will be apparent from the fact that one Arctic species alone, *P. phryganodes*, has yet been found on the little-explored Labrador Peninsula, but that in Greenland and Arctic America several other distinct species are found, *P. angustata* (R. Br.) Rand & Redfield, *P. arctica* (Hook),<sup>1</sup> *P. Vahlia* (Liebm.) Scribn. & Merrill, etc., any of which may be expected to reach the Labrador Peninsula or Newfoundland. Furthermore, such very limited collecting as has been done at remote points about the Gulf of St. Lawrence and the eastern coast of Newfoundland has brought together five very distinct plants which are unknown elsewhere in the East, and future exploration of the complex flora of these areas will doubtless extend the ranges of these plants and possibly bring to light other localized species.

<sup>1</sup> *PUCCINELLIA arctica* (Hook.), n. comb. *Glyceria arctica* Hook. Fl. Bor.-Am. ii. 248, t. 229 (1840).



In the following synopsis of the species of *Puccinellia* of eastern North America only those species which we know from south of Hudson Straits are included, but in the citation of specimens stations in western North America are often indicated, especially in the cases of newly described or newly interpreted species and varieties. The plates which have been most kindly prepared for us by Mr. R. E. Torrey illustrate details of all the species here included and some which have heretofore been ascribed to the region.

KEY TO THE SPECIES AND VARIETIES OF PUCCINELLIA IN EASTERN NORTH AMERICA.

- A. Anther 1.5–2.2 mm. long.
  - Flowering culms tall, 2–8 dm. high: branches of the panicle scabrous: lemmas 4–5 mm. long, pubescent on the nerves below
    - 1. *P. maritima*.
  - Flowering culms low, 0.4–1 dm. high: branches of the panicle smooth: lemmas 2.8–3 mm. long, glabrous. . . . . 2. *P. phryganodes*.
- A. Anther 0.5–1 mm. long (1–1.2 mm. in *P. lucida*). B.
  - B. Grain 1.4–1.7 mm. long. C.
    - C. Lower branches of the comparatively short panicle (0.2–1.6 dm. long) densely flowered nearly to the base or at least below the middle: lemmas thick and coriaceous, without a broad hyaline tip; the midnerve reaching the apex, often excurrent as a very short mucro.
      - 3. *P. fasciculata*.
    - C. Lower branches of the panicle floriferous chiefly above the middle, or, if much below, loosely flowered and the panicle much elongated (2–3 dm. long): lemmas thin and membranaceous in texture (firm in *P. laurentiana* and sometimes in *P. paupercula*), or at least with a broad hyaline tip; the midnerve not excurrent. D.
      - D. Lemmas erose-ciliolate or serrulate under a lens. E.
        - E. Glumes and lemmas truncate, erose-ciliolate under a lens.
          - Mature panicle broadly ovoid, loose, its branches spreading or reflexed.
            - Leaves of the culm 2–6 mm. wide, flat: panicle 0.8–2 dm. long: lemmas 2–2.5 mm. long. . . . . 5. *P. distans*.
            - Leaves of the culm 2 mm. wide or less, becoming more or less involute: panicle 4–9 cm. long: lemmas 1.5–2 mm. long. . . . . (5.) *P. distans*, var. *tenuis*.
            - Mature panicle slender-cylindric to ellipsoid, dense, its branches erect or ascending. . . . . 6. *P. coarctata*.
  - E. Glumes and lemmas tapering to an acute or obtusish tip, not truncate, erose-serrulate: panicle-branches erect or ascending, rarely spreading.



- Panicle-branches smooth or nearly so: lemmas 2.3–2.8 mm. long, firm in texture. . . . . 7. *P. laurentiana*.  
 Panicle-branches strongly scabrous: lemmas thin in texture.  
 Lemmas 2.5–3 mm. long: grain 1.4–1.6 mm. long.  
 8. *P. macra*.  
 Lemmas 2 mm. long or less: grain 1–1.2 mm. long.  
 9. *P. airoides*.  
 D. Lemmas essentially entire. . . . . 11. *P. paupercula*.  
 B. Grain 1.8–2.5 mm. long. F.  
 F. Flowering culms stout: leaves 2.5–6 mm. wide: lower panicle-branches densely floriferous nearly to the base: midrib of the coriaceous lemma prolonged to the apex, often excurrent as a short mucro. . . . . 4. *P. rupestris*.  
 F. Flowering culms slender: leaves 0.5–2 mm. wide: lower panicle-branches floriferous chiefly above the middle: lemma with hyaline margin; its midrib not excurrent. G.  
 G. Glumes and lemmas serrulate and erose-ciliolate under a lens.  
 Gray-green: panicle-branches ascending or spreading, not reflexed, smooth or nearly so: lemmas firm, 2.3–2.8 mm. long. . . . . 7. *P. laurentiana*.  
 Bright-green: panicle-branches at length reflexed, scabrous: lemmas thin and lustrous, 3–4 mm. long.  
 10. *P. lucida*.  
 G. Lemmas essentially entire, not ciliolate.  
 Lemmas 2–4 mm. long, tapering to a blunt point or obtusish: second glume 2–3 mm. long: panicle 0.2–1.8 dm. long.  
 Lemmas 2–2.5 mm. long: panicle 1–6 cm. long.  
 11. *P. paupercula*.  
 Lemmas 3–4 mm. long: panicle 0.3–1.8 dm. long.  
 (11.) *P. paupercula*, var. *alaskana*.  
 Lemmas 4.5–6 mm. long, acute or acuminate: second glume 7–9 mm. long: panicle 1–2.5 dm. long.  
 (11.) *P. paupercula*, var. *longiglumis*.

\* *Anther* 1.5–2.2 mm. long: *perennials*, often *stoloniferous* late in the season (usually after anthesis).

1. *P. MARITIMA* (Huds.) Parl. FIGS. 1–6. Coarse; the smooth culms 2–8 dm. high, forming dense clumps: leaves pale, firm, usually involute in age, 0.25–1.7 dm. long; ligule 1–3 mm. long, entire, blunt-pointed: panicle 0.45–2.7 dm. long, usually somewhat exserted; the ascending or finally spreading, but not reflexed, branches and the pedicels scabrous: spikelets 0.5–1.2 cm. long, 4–11-flowered: 1st glume 2.2–3.4 mm. long, 3-nerved, acute; 2d glume ovate, 3–4.5 mm. long, 3-nerved, tapering abruptly to a short apex: lemma 4–5 mm.



long, thick, somewhat coriaceous, 5-nerved, minutely serrulate, obtuse or tapering abruptly to a blunt apex; midnerve prolonged to the apex and with the lateral nerves pubescent below: palea 3.2–3.7 mm. long, lanceolate, tapering to a bidentate tip, ciliate on the nerves; the cilia longest below: anther 1.5–2.2 mm. long: grain 2–2.2 mm. long: repent stolons coarse, rigid, often prolonged to 3–6 dm., developed chiefly from late summer to spring.—Fl. Ital. i. 370 (1848); Watson & Coulter in Gray, Man. ed. 6, 668 (1890); Britton & Brown, Ill. Fl. i. 214 (1896). *Poa maritima* Huds. Fl. Ang. 35 (1762); Eaton, Man. Bot. North. States, ed. 2, 366 (1818); Bigelow, Fl. Bost. ed. 2, 34 (1824); Torrey, Fl. North. U. S. i. 108 (1824); Beck, Bot. U. S., 409 (1833); Wood, Class-book, 447 (1845). *Glyceria maritima* Wahlenb. Fl. Gothob. 17 (1820), *fide* Aschers. & Graebn. Syn. Mitteleur. Fl. ii. Abt. 1, 460; Mert. & Koch in Röhling, Deutschl. Fl. i. 588 (1823); Gray, Man. ed. 2, 560 (1856); Wood, Class-book, ed. of 1877, 799 (1877). *Sclerochloa arenaria*, var. *maritima* Gray, Man. 594 (1848). *Diachroa maritima* Nutt. ex Steud. Nom. ed. 2, i. 497 (1840). *Atropis maritima* Griseb. in Ledeb. Fl. Ross. iv. 389 (1853). *Panicularia maritima* Scribn. Mem. Torr. Bot. Cl. v. 54 (1894).—Coast of Europe; salt marshes and saline or brackish shores, Nova Scotia; and southern Maine to Pennsylvania. NOVA SCOTIA: Louisburg, Cape Breton Island, August 18, 1898, *J. Macoun*, herb. Geol. Surv. Can. no. 21,056; saline marshes, Annapolis, June 26 and 27, 1883, *J. Macoun*, herb. Geol. Surv. Can. no. 29,582. MAINE: salt marsh, Cumberland Foreside, July 6, 1906, *E. B. Chamberlain*, no. 825; brackish shore, Great Chebeague Island, Casco Bay, July 2, 1909, *Fernald*, no. 1,346; salt marsh, Pine Point, Scarborough, June 30, 1909, *Fernald*, nos. 1,344, 1,345; Ocean Park, Old Orchard, July 1, 1901, *Kate Furbish*; salt marsh, Wells Beach, July 14, 1894, *J. C. Parlin*, 1898, *Kate Furbish*; sandy shore, Kittery, July 13, 1891, *Fernald*, July 3, 1903, *W. P. Rich*. NEW HAMPSHIRE: Rye, June 14, 1903, *E. F. Williams*, *B. L. Robinson*, no. 683: marsh at Hampton Beach, June 23, 1896, *A. A. Eaton*. MASSACHUSETTS: coast of Essex County, *Oakes*; in sand, Plum Island, Newbury, July, 1890, *Raynal Dodge*, June 25, 1912, *A. S. Pease*, no. 13,672; salt marsh back of dunes, Ipswich, July 13, 1913, *F. T. Hubbard*, no. 642; salt marsh, West Manchester, June 20, 1913, *F. T. Hubbard*, no. 577; Beverly, June 15, 1846, *J. A. Lowell* in herb. Bost. Soc. Nat. Hist.; Medford, June 23, 1879, *C. E. Perkins*; Somerville, June 11, 1879, *C. E. Perkins*, July 12, 1887, *F. S. Collins*; salt marshes along the Charles River, Cambridge, *Nuttall et al.*; salt marshes and sandy embankments, Revere, *H. A. Young et al.*; salt marsh and mill pond, Charlestown, June 5, 1889 and June 19, 1883, *C. E. Perkins*; Boston, *Faxon et al.*; Soldier's Field, Brighton, June 11, 1902, *A. S. Pease*, no. 1,712; Dorchester, June 5, 1865, *G. G. Kennedy*, June 12, 1887, *J. R. Churchill*; salt marsh, North Scituate, July 3, 1899, *G. G. Kennedy*; near high-tide mark, Arey's Pond, Orleans, August 10, 1913, *J. Murdoch, jr.*, no.



5,235; Barnstable, C. S. Williamson in herb. Phil. Acad. RHODE ISLAND: Newport, J. W. Robbins in herb. Bost. Soc. Nat. Hist. NEW JERSEY and DELAWARE: very doubtful. In herb. Phil. Acad. there is a mixed sheet containing three labels and collections: (1) an Alaskan species, (2) *P. maritima* from Cambridge, Massachusetts, and (3) several culms of *P. maritima* and a label marked, not in Nuttall's hand, "'P. [oa] maritima? sea-coast N. Jersey & Delaware' (Nutt.)"; but the species does not now seem to be known from south of Rhode Island. PENNSYLVANIA: ballast ground with *P. distans*, Navy Yard, Philadelphia, June 1, 1865, C. E. Smith in herb. Phil. Acad.; ballast, Philadelphia, July, 1870, I. C. Martindale in herb. Phil. Acad.

The name *Puccinellia maritima* has been applied to various plants in North America, but in its essential characters the coarse species, which abounds on the marshes from southern Maine to Rhode Island (and locally in Nova Scotia and formerly as a ballast plant at Philadelphia), is the only American plant which closely matches the typical British material of *P. maritima*. Our plant is often taller and has larger panicles than the British material, in these characters approaching the large continental extreme which has been called *Atropis Foucaudi* Hackel. The American plant, however, varies so greatly in stature and in size of panicle and of spikelet that we have been unable satisfactorily to divide the material. The species appears to be undoubtedly indigenous on the coasts of Nova Scotia and New England, although sometimes also introduced on ballast; but south of New England it is apparently only a casual plant of ballast lands.

2. *P. PHRYGANODES* (Trin.) Scribn. & Merr. FIGS. 7-11. Low and slender, forming close mats; the decumbent culms 0.4-1 dm. high: leaves slender, 2-4 cm. long, flat or becoming involute, 0.5-1 mm. wide; ligule 0.5 mm. or less long, truncate: panicle 2-3.5 cm. long, barely exserted, with few smooth short erect branches and pedicels: spikelets 4-6 mm. long, 3-4-flowered: 1st glume 1.3-2 mm. long; the 2d 2.5-3.5 mm. long, obtuse or acutish, entire: lemma 2.8-3 mm. long, firm in texture, 5-nerved, broadly obtuse, entire, or lacerate above, glabrous: palea barely shorter, subtruncate or emarginate, smooth or slightly ciliate-scabrous; the nerves somewhat excurrent: anthers 1.5 mm. long: repent flagelliform bulblet-bearing stolons 1-3.5 dm. long, freely developed especially on sterile plants.—Contrib. U. S. Nat. Herb. xiii. 78 (1910). *Poa phryganodes* Trin. Mém. Acad. St. Pétersb. sér. VI. Math. Phys. Nat. i. 389 (1830 or 1831). *Catabrosa vilfoidea* Anders. in Malmgr. Öfv. Vet. Akad. Förh. xix. 254 (1862). *Molinia distans*, var. *reptans* Hartm. Excursions-fl. 17 (1846). *Glyceria vilfoidea* Fries, Öfv. Vet. Akad. Förh. xxvi. 139



(1869). *G. reptans* Krok, Bot. Not. 140 (1899). *G. maritima*, var. *reptans* Simmons, Vasc. Pl. Ellesmereland, 159 (1906). *Atropis vilfoidea* Rowlee & Wiegand, Bot. Gaz. xxiv. 422 (1897).—Arctic regions, south to Labrador, Keewatin, and the Bering Sea region. LABRADOR: Nain, August 11, 1897, *J. D. Sornborger*, no. 237. KEEWATIN: Cape Henrietta Maria, Hudson Bay, August 18, 1904, *W. Spreadborough*, herb. Geol. Surv. Can. no. 62,742. ALASKA: abundant on saline mud flats, but no flowering plants found, St. Paul Island, July 31, 1897, *J. M. Macoun*, herb. Geol. Surv. Can. no. 16,223; originally described from Kotzebue Sound, and recently collected (acc. to Scribner & Merrill, Contrib. U. S. Nat. Herb. xiii. 78) on the Seward Peninsula.

The numerous flagelliform stolons are very characteristic of this northern species, but they should not be taken as an absolute diagnostic character since *P. paupercula* and its var. *alaskana* occasionally have stolons which in all characters appear inseparable from those of *P. phryganodes*. The identification of these plants by the stolons alone is not final and the difficulty of accurate determination is rendered greater since the stoloniferous colonies are so frequently destitute of inflorescences.

\* \* *Anther* 0.5–1 (rarely 1.2) mm. long.

— *Lemma* thick and coriaceous; its mid-nerve often excurrent: lower branches of the panicle densely-flowered to below the middle: annuals or biennials.

3. *P. FASCICULATA* (Torr.) Bicknell. FIGS. 12–16. Rather coarse; the smooth mostly geniculate culms 1.5–8 dm. high: leaves 2–6 mm. broad, flat, or finally involute: panicle long-exserted, ellipsoid to ovoid, 0.2–1.6 dm. long, contracted; the ascending or slightly spreading sparingly scabrous branches floriferous nearly to the base: spikelets 3–4 mm. long, 2–5-flowered: glumes minutely serrulate but not ciliate; the 1st 0.75 mm. long, oblong-ovate, acutish, 1-nerved; 2d 1.5 mm. long, broadly ovate, acutish, with 3 prominent nerves: lemma 2–2.5 mm. long, firm, ovate, obtuse, or acutish, minutely serrulate, pubescent at base, 5-nerved: palea slightly shorter, oblong, blunt and erose at the slightly narrowed apex, ciliate on the nerves: anther 0.5–0.8 mm. long: grain 1.4 mm. long.—Bull. Torr. Bot. Cl. xxxv. 197 (1908); Nash in Britton & Brown, Ill. Fl. ed. 2, i. 268 (1913). *P. Borreri* Hitchc. RHODORA, x. 65 (1908); Nash in Britton & Brown, l. c. (1913). *Poa fasciculata* Torr. Fl. North. U. S. i. 107 (1824); Eaton, Man. ed. 5, 333 (1829); Beck, Bot. North. and Mid. States, 409 (1833); Wood, Class-book, 447 (1845). *P. delawarica* Link, Hort. Berol. i. 174 (1827). *P. Borreri* Hook. & Arn. Brit. Fl. ed. 8, 549 (1860). *Festuca* (?) *delawarica* Kunth, Gram. i. 129 (1829).



*F. Borreri* Bab. Trans. Linn. Soc. xvii. 565 (1837). *Glyceria Borreri* Bab. in Engl. Bot. Suppl. iii. t. 2797 (1837). *G. distans* Gray, Man. ed. 2, 560 (1856), as to synonym *Poa fasciculata* Torr., not as to description; Wood, Class-book, ed. of 1877, 799 (1877), at least in part. *Sclerochloa Borreri* Bab. Man. Brit. Bot. 370 (1843). *S. arenaria*, var. *fasciculata* Gray, Man. 594 (1848). *Atropis Borreri* Richter, Pl. Eur. i. 92 (1890).—Coasts of Europe; Massachusetts to Delaware, indigenous, and sometimes adventive from Europe; Utah. MASSACHUSETTS: salt marshes, Massachusetts, *C. Pickering* in herb. Phil. Acad.; Plum Island, Newbury, *Oakes*; beach, Brant Point, Nantucket, June 22, 1909, *N. F. Flynn* in herb. Bost. Soc. Nat. Hist. RHODE ISLAND: salt marsh, East Providence, May 30, 1911, *K. M. Wiegand*, no. 931; Wickford, June 17, 1908, *G. G. Kennedy*, *E. F. Williams*. CONNECTICUT: sandy place by salt marsh, West Haven, June 23, 1912, *A. E. Blewitt*, no. 339; edge of salt marsh, Woodmont, June 13, 1908, *Eames & Godfrey*, no. 5,922; salt marsh coated with sand, Orange, June 23, 1912, *C. H. Bissell*; moist sand bordering salt marsh, Stratford, June 12, 1908, *E. H. Eames*, no. 5,915, July 6, 1912, *A. E. Blewitt*, no. 355; sandy shores of Cedar Creek, Bridgeport, June 29, 1899, *Eames*; sandy border of salt meadows, within tidal influence, Westport, June 19, 1901, *Eames*, no. 160. NEW YORK: salt marshes in vicinity of New York, *Torrey* (TYPE of the species); New Lots, Long Island, June 11, 1887, *N. L. Britton*. NEW JERSEY: coast, *Nuttall*; coast, August, 1833, *A. Gray*; Hoboken, *Thurber*; Somer's Point, June, 1865, *C. E. Smith* in herb. Phil. Acad.; salt marsh, Cape May, May–July, *A. H. Smith et al.* in herb. Phil. Acad.; Swedesboro, June 2, 1895, *C. D. Lippencott* in herb. Phil. Acad.; Kaighn's Point, *D. Burke* in herb. Phil. Acad. PENNSYLVANIA: Philadelphia (various stations), *Leidy et al.* in herb. Phil. Acad. DELAWARE: coast, *Nuttall* in herb. Phil. Acad.; Cape Henlopen, *A. H. Smith* in herb. Phil. Acad.; salt marshes, Woodland Beach, June 30, 1898, *A. Commons* in herb. Phil. Acad. UTAH: Hot Springs, June 19, 1908, *Mrs. Joseph Clemens* (distributed as *Agrostis stolonifera*).

Though occasionally found on ballast and there presumably a recent introduction from Europe, *P. fasciculata* is clearly indigenous upon our coast as well as in Europe. Its status in Utah is yet to be determined, but there it is probably a recent introduction.

4. *P. rupestris* (With.), n. comb. FIGS. 17–22. Resembling *P. fasciculata*; the decumbent culms 1–4.2 dm. high: leaves 2.5–6 mm. wide, flat: panicle ellipsoid, glaucous, 2–7 cm. long; the branches stiff and approximate, 1–2.5 cm. long, closely flowered nearly to base, distichous, scabrous: spikelets 5–8 mm. long, 3–5-flowered: 1st glume 1.5–2 mm. long, ovate, acutish, 3-nerved; the midnerve scabrous: 2d glume 2–2.5 mm. long, oval, obtuse, 3-nerved, hyaline and erose-serrulate above: lemma 3–3.5 mm. long, ovate, obtuse, thick and firm except at the narrow hyaline summit, essentially entire or minutely



serrulate at summit; the midnerve often excurrent and minutely scabrous at tip, with a few hairs at base: palea slightly shorter, linear-oblong, scarcely tapering to the bidentate or fimbriate summit, ciliate to the base with slender hairs of about uniform length: anther 0.8–1 mm. long: grain 2 mm. long.—*Poa rupestris* With. Arr. Brit. Pl. ed. 3, ii. 146, t. 26 (1796). *Poa procumbens* Curtis, Fl. Lond., fasc. vi. t. 11 (Exact date of publication not known but probably later than Withering's species. See note below). *Sclerochloa procumbens* Beauv. Agrost. 98 (1812). *S. rupestris* Britten & Rendle, Journ. Bot. xlv. 107 (1907). *Glyceria procumbens* Sm. Engl. Fl. i. 119 (1824). *Festuca procumbens* Kunth, Gram. i. 129 (1829). *Atropis procumbens* Thurb. Bot. Cal. ii. 309 (1880); Beal, Grasses Am. ii. 575 (1896).—Atlantic coast of Europe; adventive in America. Occasionally reported on ballast. Seen by us only from NEW YORK: ballast, New York, June, 1880, Addison Brown. NEW JERSEY: ballast, Kaign's Point, D. Burke in herb. Phil. Acad.; Petty's Island, July 3, 1867, Burke in herb. Phil. Acad.

Britten & Rendle give excellent reasons for concluding that *Poa rupestris* With. was published earlier than *P. procumbens* Curtis:—see Journ. Bot. xlv. 107 (1907). In addition to their reasoning it may be noted that Withering, in his original description (ed. 3) states merely that the plant was "Gathered on St. Vincent's Rocks, near Bristol, by Mr. Milne, who observed to me that Mr. Curtis first found it there." In his 4th edition, ii. 147 (1801) he adds, "Sir THOMAS FRANKLAND found this plant growing on the waste ground near the Dock, betwixt Bristol and the Hotwells. Also on the new Pier at Scarborough." This additional information is given in Curtis's publication and presumably taken from it by Withering (though he makes no acknowledgment) and the natural inference is that Curtis's species was published after Withering's 3rd edition and before the 4th. Also, Withering cites "Curt." in edition 4, not in edition 3.

+ + *Lemma not coriaceous; its midnerve not excurrent: lower branches of the panicle floriferous chiefly above the middle, if below loosely flowered and the panicle much elongated (2–3 dm. long): plants mostly perennial.*

++ *Lemmas and glumes erose-serrulate or ciliolate.*

= *Lemmas truncate-obtuse and erose-ciliolate at the broad tip, with a few hairs at base.*

5. *P. DISTANS* (L.) Parl. FIGS. 23–27. Culms 2–6 dm. high, rather slender: leaves green, rarely glaucous, 3.5–10 cm. long, 2–6 mm. broad, flat: panicle green or violet-tinged 0.8–2 dm. long, ovoid, lax; the



lower branches 0.3–1.3 dm. long, at first ascending, then divergent, finally deflexed, floriferous chiefly above the middle; pedicels scabrous or smoothish: spikelets 4–5 mm. long, 4–6-flowered: 1st glume 1 mm. long, 1-nerved, ovate, acutish to obtuse, minutely erose-ciliolate; 2d 2 mm. long, broadly ovate, erose-ciliolate, 3-nerved, the lateral nerves short and faint: lemma 2–2.5 mm. long, broadly ovate, faintly 5-nerved, hyaline above, obtuse or subtruncate, with a few hairs at base: palea slightly shorter, ciliate in the upper half on the marginal nerves, truncate-emarginate and erose-ciliolate at apex: anther 0.7–0.9 mm. long: grain 1.4 mm. long.—Fl. Ital. i. 367 (1848); Watson & Coulter in Gray, Man. ed. 6, 668 (1890); Britton & Brown, Ill. Fl. i. 214 (1896). *Poa distans* L. Mant. i. 32 (1767). *Glyceria distans* Wahlenb. Fl. Ups. 36 (1820); Gray, Man. ed. 2, 560 (1856), as to description. *Festuca distans* Kunth, Gram. i. 129 (1829). *Sclerochloa distans* Bab. Man. Brit. Bot. 370 (1843). *Atropis distans* Griseb. in Ledeb. Fl. Ross. iv. 388 (1853); Beal, Grasses Am. ii. 572 (1896). *Panicularia distans* Scribner, Mem. Torr. Bot. Cl. v. 54 (1894).—Eurasia and northern Africa; adventive and rapidly becoming naturalized in North America; less pronouncedly halophytic than most species. QUEBEC: damp magnesian gravel and mud about the asbestos quarries, Black Lake, Megantic County, August 26, 1915, Fernald & Jackson, no. 12,022. NEW BRUNSWICK: waste ground, Pointe du Chêne, July 12, 1912, Bartram & Long, no. 6,919; St. John, August, 1877, J. Fowler in herb. Phil. Acad.; salt marshes, Carleton, September, 1877, Fowler. NOVA SCOTIA: damp roadside, Sydney, Cape Breton Island, August 17, 1902, Fernald; ballast-heaps, Pictou, July 24, 1883, J. Macoun, herb. Geol. Surv. Can. no. 29,598; brackish soil, Windsor, August 22, 1902, Fernald. MAINE: wharves and roadsides, Rockland, August 22, 1909, Fernald, no. 1,343. MASSACHUSETTS: Oak Island, Revere (only 1 bunch), June 15, 1908, G. G. Kennedy; Charlestown, June 5, 1880 and June, 1883, C. E. Perkins; Boston, June 28, 1879, Faxon; waste wet ground, South Boston, June 18, 1900, W. P. Rich; roadsides, North Adams, June 23 and 25, 1913, Fernald & Long, no. 8,798. CONNECTICUT: borders of marshes, Orange, July 25, 1894 and June 20, 1899, C. H. Bissell; meadow on coast, in rather dry soil, Bridgeport, June 14, 1912, E. H. Eames, no. 8,528. NEW YORK: on refuse from chemical works, flats along Onondaga Lake, Syracuse, July 13, 1915, Bissell, Ware & Weatherby. NEW JERSEY: wet soil near edge of marsh, Cape May, May 27 and June 10, 1911, O. H. Brown in herb. Phil. Acad. PENNSYLVANIA: Navy Yard, Philadelphia, June 1, 1865, C. E. Smith in herb. Phil. Acad. DELAWARE: waste places, Wilmington, June 4, 1897, A. Commons in herb. Phil. Acad. NEVADA: meadow near Sparks, Washoe County, June 28, 1907, A. A. Heller, no. 8,655 (distributed as *P. Lemmoni*); Glendale, Washoe County, June 28, 1907, P. B. Kennedy, no. 1,577.

Var. **tenuis** (Uechtritz), n. comb. Leaves of the culm 2 mm. wide



or less, becoming more or less involute: panicles 4–9 cm. long: lemmas 1.5–2 mm. long.—*Glyceria distans*, forma or var. *tenuis* Uechtritz in Crépin, Notes Pl. Rar. Belg. 229 (1865). *Atropis distans*,  $\beta$ . *tenuis* Rouy, Fl. France, xiv. 195 (1913).—Eurasia; naturalized in North America. NEW BRUNSWICK: ballast-wharf, St. John, June 27, 1904, *Fernald*. MASSACHUSETTS: dry banks of Lynnway, West Lynn, June 18, 1913, *F. T. Hubbard*, no. 565. ONTARIO: Galt, August 24, 1901, *W. Herriot*, herb. Geol. Surv. Can. no. 26,161; along the Canadian Pacific Railway, Owen Sound, September 2, 1901, *J. Macoun*, herb. Geol. Surv. Can. no. 26,228; marshes, Sandwich, July 28, 1901, *J. Macoun*, Herb. Geol. Surv. Can. no. 26,219. ALBERTA: Calgary, August 7, 1915, *M. O. Malte*. IDAHO: roadsides, Boise, August 18, 1911, *June A. Clark*, no. 250, *Nelson & Macbride*, no. 250. WASHINGTON: in alkali soil, Yakima City, July 10, 1897, *Piper*, no. 2,590.

6. *P. coarctata*, n. sp. FIGS. 28–32. Caespitosa perennis 0.8–3 dm. alta glaucescens; culmis glabris tenuibus; foliorum caulinarum laminis planis 1–2 mm. latis 0.2–1 dm. longis; paniculis in anthesi coarctatis 2–7 cm. longis deinde subaxis ramis inferioribus 1–3 cm. longis laxe adscendentibus, pedicellis paullo scabris; spiculis 3.5–5 mm. longis laxe 3–4-floris; glumis ovatis, inferiore 0.5–1 mm. longa 1-nervata, superiore lata 1.5–2 mm. longa 3-nervata supra hyalina ciliolata; lemmatibus ad basim sparse pilosis 2–2.5 mm. longis late ovatis obtusis supra hyalinis ciliolatis obscure 4–5-nervatis; palea 2 mm. longa oblongo-lanceolata ad apicem latum subtruncata vel bidentata, nervis sparse ciliatis; antheris 0.5–0.8 mm. longis; caryopsibus 1.4–1.7 mm. longis.

Caespitose perennial 0.8–3 dm. high, somewhat glaucous: culms glabrous, slender: cauline leaves with flat blades 1–2 mm. wide, 0.2–1 dm. long: panicles dense in anthesis, 2–7 cm. long, finally somewhat lax; the lower branches 1–3 cm. long, loosely ascending; pedicels slightly scabrous: spikelets 3.5–5 mm. long, loosely 3–4-flowered: 1st glume 0.5–1 mm. long, 1-nerved, ovate; 2d 1.5–2 mm. long, 3-nerved, broadly ovate, hyaline and ciliolate above: lemma sparsely pilose at base, 2–2.5 mm. long, broadly ovate, obtuse, hyaline and ciliolate above, obscurely 4–5-nerved: palea 2 mm. long, oblong-lanceolate, subtruncate or bidentate at the broad apex, sparingly ciliate on the nerves: anthers 0.5–0.8 mm. long: grain 1.4–1.7 mm. long.—Coasts of Labrador, Newfoundland and eastern Quebec. LABRADOR: Seal Island, August 12, 1892, *Waghorne*, herb. Geol. Surv. Can. no. 13,161; waste places near salt water and rocks by sea, Battle Harbor, August 6–13, 1911, *C. S. Williamson*, no. 681 in herb. Phil. Acad. NEWFOUNDLAND: brackish shore of Dildo Run, Notre Dame Bay, July 7, 1911, *Fernald, Wiegand & Bartram*, no. 4,655 (TYPE in Gray Herb.); Barred Islands, Notre Dame Bay, August 12, 1903, *J. D. Sornborger*: Funk Island, August 1, 1908, *H. S. Forbes*; crevices of damp sea-cliff, Torbay, August 21–26, 1901, *Howe & Lang*, no. 1,370;



conglomerate limestone and calcareous sandstone cliffs and ledges, Cow Head, July 23, 1910, *Fernald & Wiegand*, no. 2,615a. QUEBEC: rocky shore, Pointe Jones, Brest, Saguenay County, July 29, 1915, *St. John*, herb. Geol. Surv. Can.; rocky bank, Romaine, Lagordendière, Saguenay County, July 7, 1915, *St. John*, herb. Geol. Surv. Can.

Superficially resembling the Greenland *P. vaginata* (Lange), n. comb. = *Glyceria vaginata* Lange, Fl. Dan. t. 2583 (1858); but differing in its shorter spike (in *P. vaginata* 5-6-flowered), shorter nearly glabrous lemmas, which in *P. vaginata* are 3 mm. long and distinctly appressed-pubescent along the lower half of the nerves, and in the shorter and broader-tipped palea.

= = Lemmas narrowed to an acute or obtuse tip, not truncate, appressed-pubescent on the nerves below.

° Plant whitish-green: panicle-branches smooth or nearly so: lemmas firm.

7. *P. laurentiana*, n. sp. FIGS. 33-38. Laxe caespitosa perennis 1-3 dm. alta rigida glauca; foliorum caulinarum laminis 3-6 cm. longis involutis, vaginis basilaribus albo-brunneis; ligula 1.5 mm. longa acutiuscula; panicula 0.6-1.3 dm. longa, ramis rigidis glabriusculis adscendentibus deinde divergentibus vix deflexis; spiculis 4-6.5 mm. longis 3-5-floris albescentibus; gluma inferiore 1-2 mm. longa anguste ovata acuta 1-nervata eroso-serrulata, superiore 2-2.5 mm. longa late ovata ad apicem subacutum abrupte angustata eroso-serrulata 3-nervata nervis lateralibus brevibus; lemmatibus ovatis supra hyalinis 2.3-2.8 mm. longis abrupte acuminatis eroso-ciliolatis, nervis basim versus valde pubescentibus, nervo medio ad apicem plerumque scabriusculo; palea paullo brevior lanceolata ad apicem latum bidentata supra scabra basi ciliata; antheris 0.7-0.9 mm. longis; caryopsibus 1.5-1.8 mm. longis.

Loosely caespitose perennial 1-3 dm. high, rigid, glaucous: cauline leaves with the blades 3-6 cm. long, involute; the basal sheaths whitish-brown; ligule 1.5 mm. long, acutish: panicle 0.6-1.3 dm. long; its branches rigid, nearly glabrous, ascending or finally divergent but not deflexed: spikelets 4-6.5 mm. long, 3-5-flowered, whitish: 1st glume 1-2 mm. long, narrowly ovate, acutish, 1-nerved, erose-serrulate; the 2d 2-2.5 mm. long, broadly ovate, abruptly narrowed to the acute apex, erose-serrulate, 3-nerved, the lateral nerves short: lemmas ovate, hyaline above, 2.3-2.8 mm. long, abruptly acuminate, erose-ciliolate, very pubescent on the nerves below; the midnerve often finely scabrous toward the apex: palea a little shorter, lanceolate, bidentate at the broad apex, scabrous above, ciliate at base: anthers 0.7-0.9 mm. long: grain 1.5-1.8 mm. long.—Coasts of Bona-



venture and Rimouski Counties, QUEBEC: gravelly beach, Tracadigash Point, Carleton, July 22, 1904, *Collins & Fernald* (TYPE in Gray Herb.), July 25, 1904, *Collins & Pease* (Pease, no. 4,326); gravelly shore, Pointe aux Corbeaux, Bic, July 6–10, 1905, *Williams, Collins & Fernald*.

Superficially resembling *P. coarctata* and *P. vaginata*. Differing from both in the abruptly acuminate firm whitish lemmas and stiff involute leaves, and from *P. coarctata* also in the pubescent nerves of the lemmas.

°° *Plant bright-green or only slightly glaucous: panicle-branches strongly scabrous: lemmas thin.*

8. *P. macra*, n. sp. FIGS. 39–43. Caespitosa perennis (?) 4.5–6 dm. alta viridis; foliorum caulinarum laminis tenuibus planis 3–6.3 mm. latis 0.4–1.4 dm. longis superioribus longioribus, vaginis basilaribus purpurascens, ligula 1.5 mm. longa obtusa; panícula lineari-cylindrica 2–3 dm. longa ante et post anthesin erecta basi vagina superiore incluso, ramis filiformibus arcte adscendentibus scaberrimis; spiculis 4–7 mm. longis 4–6-floris purpurascens; gluma inferiore 1.5–2 mm. longa hyalina acuta 1-nervata paullo serrulata, superiore 2–2.5 mm. longa anguste ovata obtusa eroso-serrulata 3-nervata, nervo medio ad apicem minute scabro; lemmatibus 2.5–3 mm. longis ovatis obtusis tenuibus supra hyalinis minute eroso-serrulatis 5-nervatis, nervis basin versus pubescentibus; palea 2.5–3 mm. longa oblanceolata bidentata nervis ciliatis, ciliis imis longioribus; antheris 0.9–1 mm. longis; caryopsibus 1.4–1.6 mm. longis.

Caespitose perennial (?) 4.5–6 dm. high, green: cauline leaves with blades thin, flat, 3–6.3 mm. wide, 0.4–1.4 dm. long; the upper longer than the lower; basal sheaths purplish; ligule 1.5 mm. long, obtuse: panicle linear-cylindric, 2–3 dm. long, before and after anthesis erect, the base included in the upper sheath; the branches filiform, strongly ascending, very scabrous: spikelets 4–7 mm. long, 4–6-flowered, purplish: 1st glume 1.5–2 mm. long, hyaline, acute, 1-nerved, slightly serrulate; 2d 2–2.5 mm. long, narrowly ovate, obtuse, erose-serrulate, 3-nerved, the mid-nerve minutely scabrous above: lemmas 2.5–3 mm. long, ovate, obtuse, thin, hyaline above, minutely erose-serrulate, 5-nerved, the nerves pubescent toward the base: palea 2.5–3 mm. long, oblanceolate, bidentate, ciliate on the nerves, the cilia longer below: anthers 0.9–1 mm. long: grain 1.4–1.6 mm. long.—Known only from the type station near the tip of the Gaspé Peninsula, QUEBEC: wet springy place, Bonaventure Island, August 7 and 8, 1907, *Fernald & Collins*, no. 891 (TYPE in Gray Herb.).

A rather unique plant, perhaps nearest to the local *P. nutkaensis* of Vancouver Island, from which it differs in its softer and more pubescent lemmas.



9. *P. AIROIDES* (Nutt.) Wats. & Coult. FIGS. 44-48. Caespitose, green or slightly glaucous; the culms slender, 2-9 dm. high: cauline leaves flat or becoming involute, 1-2 mm. wide, 2-12 cm. long: panicle 0.4-3 dm. long, from narrow and close to broad and open, the branches and pedicels strongly scabrous; the lower branches (up to 1.2 dm. long) ascending to spreading: spikelets 3.5-7 mm. long, 3-6-flowered: glumes thick, erose-ciliate; the 1st 1.2-1.5 mm. long, narrowly ovate, acutish, 1-nerved; the 2d 1.5-2 mm. long, 3-nerved, broadly ovate, obtuse or subacute: lemmas 1.5-2 mm. long, ovate, rather abruptly contracted to a blunt or subacute apex, not truncate, thin, hyaline above, erose-serrulate, 5-nerved; the nerves pubescent below the middle: palea lanceolate, about equaling the lemma or slightly longer, ciliate on the nerves chiefly of the upper half; the lower cilia longer: anthers 0.6-0.7 mm. long: grain 1-1.2 mm. long.—Watson & Coulter in Gray, *Man.* ed. 6, 668 (1890); Britton & Brown, *Ill. Fl.* i. 215 (1896); Rydberg, *Fl. Col.* 48 (1906); Coulter & Nelson, *Man. Bot. Rocky Mts.*, 74 (1909); Wootton & Standley, *Contrib. U. S. Nat. Herb.* xix. 104 (1915). *P. Nuttalliana* Hitchc. in Jepson, *Fl. Cal.* pt. 3, 162 (1912). *Poa airoides* Nutt. *Gen.* i. 68 (1818); Eaton, *Man.* ed. 5, 335 (1829). *Poa Nuttalliana* Schultes, *Mant.* ii. 303 (1824). *Festuca* (?) *Nuttalliana* Kunth, *Gram.* i. 129 (1829). *Glyceria montana* Buckley, *Proc. Acad. Sci. Phila.* 1862, 96 (1863). *G. airoides* Gray, *Proc. Acad. Sci. Phila.* 1862, 336 (1863). *G. distans* Torr. *Bot. Wilkes Exped.* 490 (1874); Coulter, *Man. Bot. Rocky Mts.* 423 (1885); not Wahlenb. *Panicularia distans airoides* Scribn. *Mem. Torr. Bot. Cl.* v. 54 (1894). *Atropis airoides* Holm, *Bot. Gaz.* xlv. 427 (1908).—Widely distributed in the western and west-central sections of North America; adventive eastward to New England. MAINE: around wool-waste, North Berwick, June and July, 1897-1903, *J. C. Parlin*. VERMONT: Canadian Pacific Railway yards, Newport, July 26, 1904, *A. A. Eaton*, no. M226.

The synonym *Glyceria montana* is here ascribed to Buckley as author, although it is well known<sup>1</sup> that Buckley appropriated an unpublished herbarium-name of Nuttall's. This historical fact does not, of course, alter the bibliographic fact that the name, wisely left unpublished by Nuttall, was actually published by Buckley and as a published name should consequently be cited from his publication and not as of Nuttall.

10. *P. lucida*, n. sp. FIGS. 54-58. Laxe caespitosa 1.5-7 dm. alta viridis; foliorum caulinarum laminis 4.6-12 cm. longis involutis flaccidis, vaginis basilaribus plus minusve purpurascens; ligula 1.7-2.5 mm. longa acuta; panícula diffusa 1-2.5 dm. longa, basi vagina supe-

<sup>1</sup> See Gray, *Proc. Acad. Sci. Phila.*, 1862, 336 (1863).



riore plerumque inclusa, ramis filiformibus scabris laxe divergentibus deinde deflexis; spiculis 5–9 mm. longis 3–5-floris pallide viridibus; glumis tenuibus lucidis, inferiore 2–3.5 mm. longa ovata acuta supra hyalina minute serrulata nervo medio scabro, superiore 2.5–4 mm. longa 3-nervata nervis evidentibus; lemmatibus 3–4 mm. longis 5-nervatis late ovatis acutis eroso-ciliolatis basin versus valde pubescentibus, pilis longis; palea 2.5 mm. longa lanceolata ad apicem latum bidentata supra scabra basi ciliata; antheris 1–1.2 longis; caryopsibus 1.8–2 mm. longis.

Loosely caespitose, 1.5–7 dm. high, green: cauline leaves with blades 4.6–12 cm. long, involute, flaccid; the basal sheaths more or less purplish; ligule 1.7–2.5 mm. long, acute: panicle diffuse, 1–2.5 dm. long, the base commonly included in the upper sheath; branches filiform, scabrous, loosely divergent, finally deflexed: spikelets 5–9 mm. long, 3–5-flowered, pale-green: glumes thin, lustrous; the 1st 2–3.5 mm. long, ovate, acute, hyaline above and minutely serrulate, with the midnerve scabrous; 2d 2.5–4 mm. long, 3-nerved; the nerves evident: lemmas 3–4 mm. long, 5-nerved, broadly ovate, acute, erose-ciliolate, strongly pubescent toward the base with long hairs: palea 2.5 mm. long, lanceolate, bidentate at the broad apex, scabrous above, ciliate below: anthers 1–1.2 mm. long: grain 1.8–2 mm. long.—Sea shores and damp (presumably alkaline) soil, Quebec, Wyoming and British Columbia. QUEBEC: brackish gravelly shore, Cacouna, August 8, 1902, *Fernald* (TYPE in Gray Herb.); mouth of Rivière du Loup, 1860, *Chas. Pickering*: salt marsh near the wharf, Ste. Anne, Kamouraska County, July 21, 1907, *F. F. Forbes*; Murray River, August 14, 1905, *J. Macoun*, herb. Geol. Surv. Can. no. 69,217 (material under no. 69,217 in Gray Herb. from "Vicinity of Cap à l'Aigle" is partly *P. lucida*, partly *P. paupercula*, var. *alaskana*). WYOMING: in the margins of ponds, Mammoth Hot Springs, July 30, 1899, *A. & E. Nelson*, no. 6,017; damp soil, Washington Ranch, June 29, 1901, *Merrill & Wilcox*, no. 63. BRITISH COLUMBIA: salt marshes, Newcastle Island, Departure Bay, July 10, 1908, *J. Macoun*, herb. Geol. Surv. Can. no. 81,001.

In some characters related to each of the three species, *P. laurentiana*, *P. macra* and *P. airoides*. From *P. laurentiana* and *P. airoides* separated at once by the longer, thin, lustrous lemmas; from the former also by its capillary widely divergent and very scabrous panicle-branches and the softer greener foliage; from the latter by the longer grain and the commonly less exerted panicle. From *P. macra* at once distinguished by the diffuse panicle, pale spikelets, involute leaves and longer lemmas and achenes.

++ ++ Lemmas entire or at most remotely few-toothed, not ciliolate.



11. *P. paupercula* (Holm), n. comb. FIGS. 63-67. Densely caespitose; culms slender, often geniculate, 0.2-2 dm. high: cauline leaves with blades 1-4 cm. long, soft, flat, 0.5-1.5 mm. wide; ligule less than 1 mm. long, acutish: panicle 1-6 cm. long; the few smooth or smoothish branches ascending, in age slightly spreading: spikelets 3-5 mm. long, 2-5-flowered: 1st glume 1-1.5 mm. long, 1-nerved, obtuse or acutish, entire; 2d 2-2.5 mm. long, 3-nerved, entire or obscurely dentate, tapering to a blunt apex: lemmas 2-2.5 mm. long, 5-nerved, tapering to a blunt apex, entire, minutely pubescent at base: palea about equaling the lemma, linear-lanceolate, truncate or somewhat bidentate at apex, slightly scabrous on the nerves above: anthers 0.5-0.7 mm. long: grain about 2 mm. long.—*P. maritima*, var. (?) *minor* Watson in Gray, Man. ed. 6, 668 (1890), as to description and Labrador plant. *Glyceria paupercula* Holm in Fedde, Repert. Spec. Nov. iii. 337 (1907).—Coasts of Labrador, Keewatin, Newfoundland and Quebec.—LABRADOR: Mansfield Island, 1884, *R. Bell* in herb. Geol. Surv. Can., no. 34,782 (TYPE of the species); Hopedale, August 4-6, 1897, *J. D. Sornborger*, no. 238 (transitional to var. *alaskana*); dry rocks, Battle Harbor, August 6, 1911, *C. S. Williamson*, no. 552 in herb. Phil. Acad.; on rocks by the sea, Blanc Sablon, July 30, 1910, *Fernald & Wiegand*, no. 2,616. KEEWATIN: Rankin Inlet, lat. 62° 45', August 30, 1910, *J. M. Macoun*, herb. Geol. Surv. Can. nos. 79,116, 79,117. NEWFOUNDLAND: gravelly beach, Norris Arm, August 21, 1911, *Fernald & Wiegand*, no. 4,657; forming extensive turf-areas, salt marsh, Killigrew's, August 3, 1911, *Fernald & Wiegand*, no. 4,656. QUEBEC: Salmon Bay, "Labrador," July 28, 1882, *J. A. Allen* (type of *P. maritima*, var. (?) *minor*); salt marsh, Ile du Petit Rigolet, Archipel de Kécarponi, Saguenay County, August 10, 1915, *St. John*, herb. Geol. Surv. Can.; rocky beach, Pointe au Maurier, Charnay, Saguenay County, July 16 and August 24, 1915, *St. John*, herb. Geol. Surv. Can.; strand, Vieille Romaine, Archipel Ouapitagone, Saguenay County, July 13, 1915, *St. John*, herb. Geol. Surv. Can.; salt water at mouth of Matane River, Matane County, August 6, 1904, *F. F. Forbes*. MAGDALEN ISLANDS: forming turf on sandy saline shore, Basin Island, July 20, 1912, *Fernald, Bartram, Long & St. John*, no. 6,914.

Var. *alaskana* (Scribn. & Merrill), n. comb. FIGS. 68-72. Usually larger throughout, occasionally stoloniferous; culms 0.5-4.5 dm. high: leaves up to 1.2 dm. long and 2 mm. broad; ligule about 2 mm. long: panicle 0.2-1.8 dm. long, the lower branches ascending or spreading, sometimes finally reflexed: spikelets 4.5-7 mm. long, 4-6-flowered: 1st glume 1.5-2 mm. long; 2d 2.5 mm. long: lemma 2.5-4 mm. long: anther 0.8-1 mm. long; grain 1.7-2.1 mm. long, readily separating from the palea; stolons flagelliform, resembling those of *P. phryganodes*, rarely developed at flowering season.—*P. alaskana* Scribn. & Merrill, Contr. U. S. Nat. Herb. xiii. 78 (1910). *P. maritima*, var. (?) *minor*, Watson in Gray Man. ed. 6, 668 (1890), as to Mt.



Desert plant, not as to description. *P. angustata* Rand & Redfield, Fl. Mt. Desert, 181 (1894) and later authors, as to plant, not as to name-bringing synonym, *Poa angustata* R. Br.—Coasts from western Newfoundland and the lower St. Lawrence to Connecticut; Alaska and British Columbia and "Oregon." NEWFOUNDLAND: conglomerate limestone and calcareous sandstone cliffs and ledges, Cow Head, July 23, 1910, *Fernald & Wiegand*, no. 2,615; damp sandy shores, St. George's, August 13, 1910, *Fernald & Wiegand*, no. 2,614. QUEBEC: rocky shore, Ile du Havre, Mingan Islands, September 16, 1915, *St. John*, herb. Geol. Surv. Can.; brackish shores above the mouth of Dartmouth River, Gaspé County, August 26 & 27, 1904, *Collins, Fernald & Pease*; L'Anse à Griffon, Gaspé County, July 28, 1882, *J. Macoun*, herb. Geol. Surv. Can. no. 29,529; salt marsh, Cape Rosier, July 28, 1882, *J. Macoun*, herb. Geol. Surv. Can. no. 29,529; salt marshes, Ste. Anne des Monts, August 10, 1882, *J. Macoun*, herb. Geol. Surv. Can. no. 29,580; Little Métis, August 4, 1906, *J. Fowler*; various saline and sub-saline habitats, Bic, July, 1904, 1906, and 1907, *Fernald & Collins*, nos. 168, 359, 888, 889, 890; crevices of wet rocks by the St. Lawrence, Rivière du Loup, July 6, 1905, *Collins & Fernald*, no. 33; shore, Tadousac, August 7, 1892, *G. G. Kennedy*; marshes, vicinity of Cap à l'Aigle, August 14, 1905, *J. Macoun*, herb. Geol. Surv. Can. no. 69,223. MAGDALEN ISLANDS: sand-spit, Amherst Island, August 25, 1914, *St. John*; salt marsh by the Narrows, Alright Island, August 21, 1912, *Fernald, Long & St. John*, no. 6,917; gravelly beaches and brackish sands, Grindstone Island, July 18 and 22, 1912, *Fernald, Bartram, Long & St. John*, nos. 6,911, 6,912. PRINCE EDWARD ISLAND: damp brackish sand, Alberton, July 11, 1912, *Fernald & St. John*, nos. 6,916, 6,913 (dwarf form with abundant long stolons resembling those of *P. phryganodes*); salt marsh, Brackley Point, August 4, 1888, *J. Macoun*, herb. Geol. Surv. Can., no. 29,534; salt marsh, Tracadie, July 30, 1914, *Fernald & St. John*, no. 10,919; wet sand by Britain Pond, August 8, 1914, *Fernald & St. John*, no. 10,920; salt marsh, Mt. Stewart, July 30, 1912, *Fernald, Bartram, Long & St. John*, no. 6,915; salt marsh, Rocky Point, July 6, 1912, *Fernald & St. John*, no. 6,918; dryish border of salt marsh, Wood Island, July 29, 1914, *Fernald & St. John*, no. 10,918. NEW BRUNSWICK: sand bar, Miscou Island, August 26, 1913, *S. F. Blake*, no. 5,554; Bass River, Kent County, July 30, 1872, *J. Fowler*, herb. Geol. Surv. Can. no. 29,530; Kouchibouguac, August 17, 1869, *Fowler*; sand at outer edge of salt marsh, Shediac Cape, July 4, 1914, *F. T. Hubbard*, no. 695; beach sand, Shediac Island, August 5, 1914, *F. T. Hubbard*, no. 726. NOVA SCOTIA: North Sydney, July 14, 1883, *J. Macoun*, herb. Geol. Surv. Can., no. 29,528; sea-beaches, Baddeck, July 27, 1898, *J. Macoun*, herb. Geol. Surv. Can., no. 21,045; LeHave River, August 6 and 10, 1910, *J. Macoun*, herb. Geol. Surv. Can. nos. 81,493, 81,494; beach, Barrington Passage, June 20 and 24, 1910, *J. Macoun*, herb. Geol. Surv. Can., nos. 81,495, 81,498; sandy



shore, Loch Broom, July 21, 1914, *Fernald & St. John*, no. 10,917. MAINE: (common along the coast; about 70 numbers examined, of which the following are representative): strand, Pleasant Point, Perry, August 16, 1909, *Fernald*, no. 1,348; gravelly shore, Cutler, July 2, 1902, *Kennedy, Williams, Collins & Fernald*; salt marsh, Roque Bluffs, July 19, 1913, *C. H. Knowlton*; Gott's Island, July 20, 1899, *J. H. Redfield*; Mt. Desert Island, *Rand et al* (specimen from Somesville, June 13, 1883, forming part of *P. maritima*, var. (?) *minor* Watson); beach sand, Rockland, July 11, 1903, *Kate Furbish*; salt marsh, South Thomaston, August 15, 1913, *Bissell, Fernald & Chamberlain*, no. 8,799; sandy shore, Squirrel Island, August 2, 1892, *Fernald*; Horn Cove, Southport, August 4, 1894, *Fernald*; Peaks Island, June 29, 1909, *E. B. Chamberlain*; salt marsh, Great Chebeague Island, July 2, 1909, *Fernald*, no. 1,360; salt marsh, Cape Elizabeth, July 23, 1889, *Fernald*; sea-shore, Biddeford Pool, July 29, 1901, *G. G. Kennedy*; Kennebunkport, August 23, 1888, *G. G. Kennedy*; sandy shore, York, July 15, 1891, *Fernald*. NEW HAMPSHIRE: Rye, June 14, 1903, *E. F. Williams*. MASSACHUSETTS: sandy soil, shore of Menansha Creek, branch toward Gay Head, Martha's Vineyard, August 2, 1897, *S. Harris*. CONNECTICUT: shore of salt creek, Old Lyme, June 13, 1912, *C. H. Bissell, A. E. Blewitt*, no. 347. ALASKA: hillsides, St. Paul Island, August 11, 1892, *J. M. Macoun*, herb. Geol. Surv. Can. no. 29,579 (part of the original material of *P. alaskana*); Bella-bella Island, *A. Kellogg*, no. 147 in herb. Phil. Acad.; Idaho Inlet, Cross Sound, *T. Meehan* in herb. Phil. Acad. BRITISH COLUMBIA: Skidgate, Queen Charlotte Islands, July 18, 1910, *Spreadborough*, herb. Geol. Surv. Can. no. 87,622; Comox, Vancouver Island, June 27, 1893, *J. Macoun*, herb. Geol. Surv. Can. no. 243; vicinity of Ucleulet, Vancouver Island, May 16, and July 20, 1909, *J. Macoun*, herb. Geol. Surv. Can. nos. 82,335, 82,334; salt marsh, Nanaimo, Vancouver Island, June 14, 1887, *J. Macoun*, herb. Geol. Surv. Can. no. 29,538; Victoria, June 24, 1887, *J. Macoun*; salt marshes, Burrard Inlet, July 27, 1889, *J. Macoun*, herb. Geol. Surv. Can. no. 29,533. "OREGON": old specimen without further data.

Var. **longiglumis**, n. var. FIGS. 73-77. Major; culmis 3.5-7 dm. altis, ligulis 2-2.5 mm. longis; paniculis 1-2.5 dm. longis, ramis longis inferioribus patentibus vel reflexis; spiculis 6-12 mm. longis laxae 4-6-floris, rhachi flexuosa inter lemmata evidente; gluma inferiore 3-4 mm. longa obtusa vel acutiuscula, superiore 7-9 mm. longa 3-5-nervata oblongo-lanceolata acuta vel acuminata lemma proximum subaequante vel quam id longiore; lemmatibus 4.5-6 mm. longis 7-nervatis elliptico-ovatis; palea 3-4 mm. longa: antheris 0.7-1 mm. longis; caryopsibus 2.2-2.6 mm. longis.

Larger: culms 3.5-7 dm. high: ligule 2-2.5 mm. long: panicle 1-2.5 dm. long; the long lower branches spreading or reflexed: spikelets 6-12 mm. long, loosely 4-6-flowered; the flexuous rhachis visible



between the lemmas at anthesis: 1st glume 3–4 mm. long, obtuse or acutish; 2d 7–9 mm. long, 3–5-nerved, oblong-lanceolate, acute or acuminate, about equaling or longer than the adjacent lemma: lemma 4.5–6 mm. long, 7-nerved, elliptic-ovate; palea 3–4 mm. long: anthers 0.7–1 mm. long: grain 2.2–2.6 mm. long.—PRINCE EDWARD ISLAND: salt marsh, Bunbury, August 9, 1912, *Fernald, Long & St. John*, no. 6,920; border of salt marsh, Bunbury, August 28, 1912, *Fernald, Long & St. John*, no. 6,921 (TYPE in Gray Herb.).

In its extreme development (no. 6921) var. *longiglumis* seems sufficiently unlike var. *alaskana* or the tiny-flowered typical *P. paupercula* for specific separation, but numerous collections not only from Prince Edward Island but from the mainland show clear intergradation.

Var. *alaskana*, as it occurs on the Pacific coast, often has the lemmas firmer and the panicle-branches more spreading than in much of the eastern material, but both these characters reappear in many eastern colonies, leaving no character upon which the Atlantic and Pacific coast plants seem to be distinguished.

In publishing *P. maritima*, var. (?) *minor* Watson cited two specimens: "Shore of Mt. Desert Island (*E. L. Rand*); Labrador (*J. A. Allen*)." The Mt. Desert plant labeled in the Gray Herbarium by Watson is var. *alaskana*, while the Labrador plant of Allen (from Salmon Bay, Saguenay County, Quebec) is the little northern plant subsequently published by Holm as *Glyceria paupercula*. The description of *P. maritima* var. (?) *minor*, is clearly based upon the Allen plant, having "spikelets 2–4-flowered, the flowers 1" long or less" so that the Allen plant stands as the type of var. *minor*.

Var. *alaskana* has been passing very generally in eastern America as *P. angustata*, based upon *Poa angustata* R. Br., but examination of a duplicate type of Brown's species, preserved in the Gray Herbarium, shows it to be a very distinct species, which is unknown to us from south of Arctic America. The plant is beautifully illustrated in *Flora Danica*, t. 3006, as *Glyceria angustata*; and it differs from all forms of the more southern *P. paupercula* in the erose-serrulate and coarsely toothed obtuse to subtruncate lemma pubescent on the nerves, and in the scabrous pedicels (FIGS. 59–62). Outside Greenland and Spitzbergen where the species has been frequently collected, it seems to be rare. We have examined American specimens from Goose Fjord, Ellesmereland, August 15, 1901, *H. G. Simmons*, no. 3,436 (herb. Geol. Surv. Can. no. 80,635); Beechy Island, Lancaster Sound,



August 24, 1908, *J. G. McMillan*, herb. Geol. Surv. Can. no. 77,271; and Melville Island, 1820, *Edwards* (original collection of *Poa angustata*).

Var. *alaskana* both in the East and the West has also been frequently identified with Presl's *Poa nutkaensis*, originally described from Vancouver Island. A fragment of the original Haenke material which was Presl's type, sent to Dr. Gray, shows, however that *Poa nutkaensis* has strongly scabrous branches and pedicels and that the glumes and lemmas are erose-ciliolate. The plant is more nearly related to *Puccinellia macra* than to any other species but differs in its firmer and less pubescent lemmas which are usually quite glabrous above the base. *Poa nutkaensis* seems to be a distinct species of the coast of Vancouver Island which should be called *Puccinellia nutkaensis*.<sup>1</sup>

#### EXPLANATION OF PLATES 114-117.

(Inflorescences  $\times 1$ ; details  $\times 10$ ).

*Puccinellia maritima*, from Rye, New Hampshire, *Robinson*, no. 683. 1. inflorescence; 2. glumes; 3. lemma and palea; 4. tip of lemma; 5. tip of palea; 6. anther.

*P. phryganodes*, from Disco, Greenland, *Berggren*. 7. inflorescence; 8. glumes; 9. lemma and palea; 10. tip of palea; 11. anther.

*P. fasciculata*, from East Providence, Rhode Island, *Wiegand*, no. 931. 12. inflorescence; 13. glumes; 14. lemma and palea; 15. tip of palea; 16. anther.

*P. rupestris*, from New York City, New York, *Addison Brown*. 17. inflorescence; 18. glumes; 19. lemma and palea; 20. tip of lemma; 21. tip of palea; 22. anther.

*P. distans*, from Boston, Massachusetts, *C. E. Faxon*. 23. inflorescence; 24. glumes; 25. lemma and palea; 26. tip of palea; 27. anther.

*P. coarctata*, from Dildo Run, Newfoundland, *Fernald & Wiegand*, no. 4,655 (TYPE). 28. inflorescence; 29. glumes; 30. lemma and palea; 31. tip of palea; 32. anther.

<sup>1</sup> *Puccinellia nutkaensis* (Presl), n. comb. FIGS. 49-53. *Poa nutkaensis* Presl, Rel. Haenk. i. 272 (1830). *P. nootkaensis* Scribn. Mo. Bot. Gard. Rep. x. 51, t. 51, fig. 1 (1899), excluding synonyms.—Coast of BRITISH COLUMBIA, chiefly on Vancouver Island: Nootka Sound, V. I., *Haenke* (fragment of TYPE in Gray Herb.); San Juan River, V. I., August 12, 1907, *Rosendahl*, no. 2062; marshes, Victoria, V. I., June 24, 1887, *J. Macoun*, herb. Geol. Surv. Can. no. 29,531; crevices of rocks, Oak Bay, V. I., June 18, 1887, *J. Macoun*, herb. Geol. Surv. Can. no. 29,526; salt marshes, Tuxedo Island, Gulf of Georgia, June 26, 1885, *Dawson*, herb. Geol. Surv. Can. no. 29,536; salt marshes, Nanaimo, V. I., July 12, 1893, *J. Macoun*, herb. Geol. Surv. Can., no. 247; vicinity of Comox, V. I., July 5, 1893, *J. Macoun*, herb. Geol. Surv. Can. no. 245; Kitsilano, near Vancouver, August 21, 1911, *M. O. Malte*.



*P. LAURENTIANA*, from Tracadigash Point, Carleton, Quebec, *Collins & Fernald* (TYPE). 33. inflorescence; 34. glumes; 35. lemma and palea; 36. tip of lemma; 37. tip of palea; 38. anther.

*P. MACRA*, from Bonaventure Island, Quebec, *Fernald & Collins*, no. 891 (TYPE). 39. upper  $\frac{2}{3}$  of inflorescence; 40. glumes; 41. lemma and palea; 42. tip of palea; 43. anther.

*P. AIROIDES*, from Doyle's, Colorado, *C. F. Baker*, no. 637. 44. inflorescence; 45. glumes; 46. lemma and palea; 47. tip of palea; 48. anther.

*P. NUTKAENSIS*, from San Juan River, Vancouver Island, *Rosendahl*, no. 2,062. 49. inflorescence; 50. glumes; 51. lemma and palea; 52. tip of palea; 53. anther.

*P. LUCIDA*, from Cacouna, Quebec, *Fernald* (TYPE). 54. middle half of inflorescence; 55. glumes; 56. lemma and palea; 57. tip of palea; 58. anther.

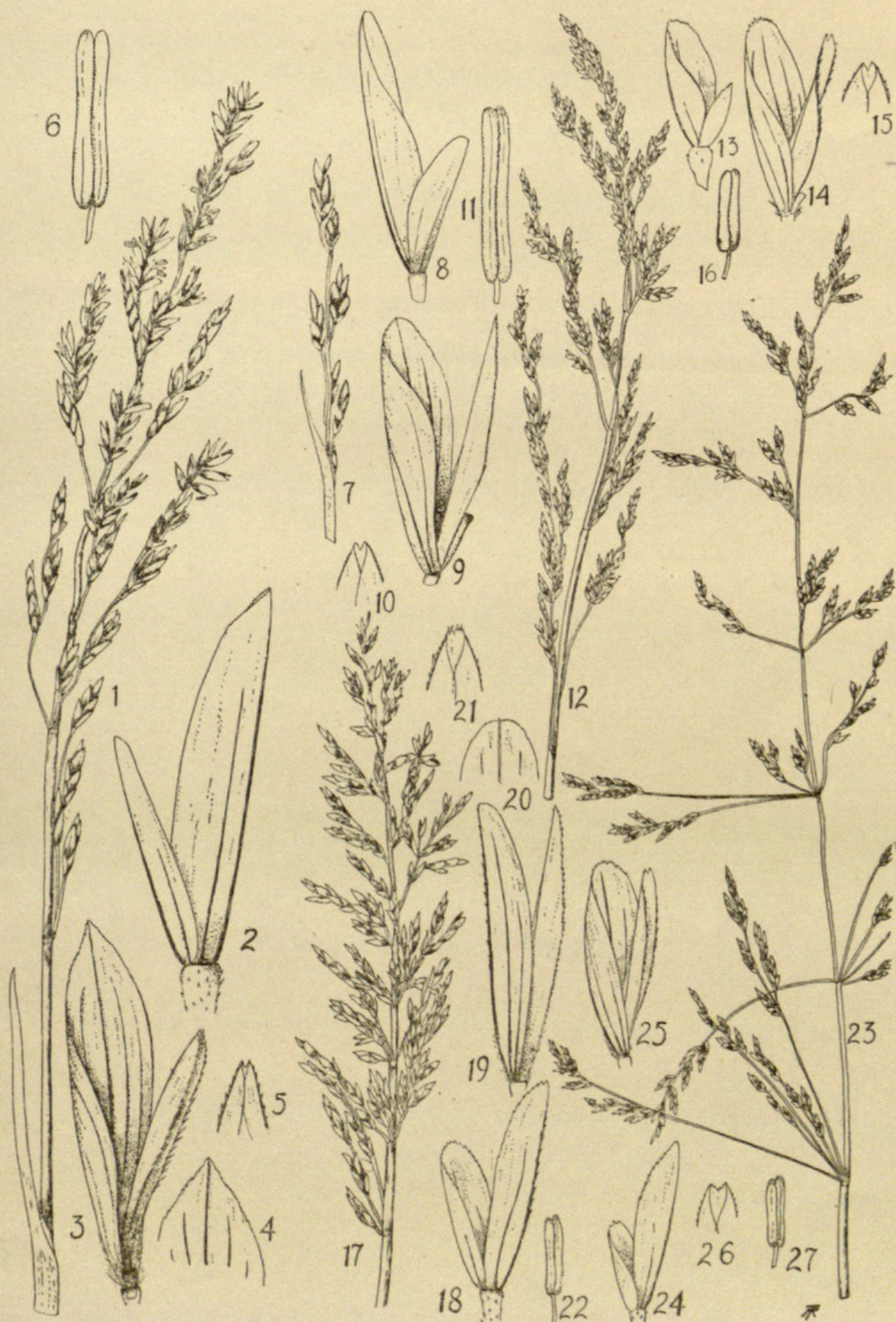
*P. ANGUSTATA*, from Disco, Greenland, *T. M. Friës*. 59. inflorescence; 60. glumes; 61. lemma and palea; 62. anther.

*P. PAUPERCULA*, from Salmon Bay, Saguenay County, Quebec, *J. A. Allen* (type of *P. maritima*, var. (?) *minor*). 63. inflorescence; 64. glumes; 65. lemma and palea; 66. tip of palea; 67. anther.

*P. PAUPERCULA* var. *ALASKANA*, from Burrard Inlet, British Columbia, *John Macoun*. 68. young inflorescence; 68a. mature inflorescence; 69. glumes; 70. lemma and palea; 71. tip of palea; 72. anther.

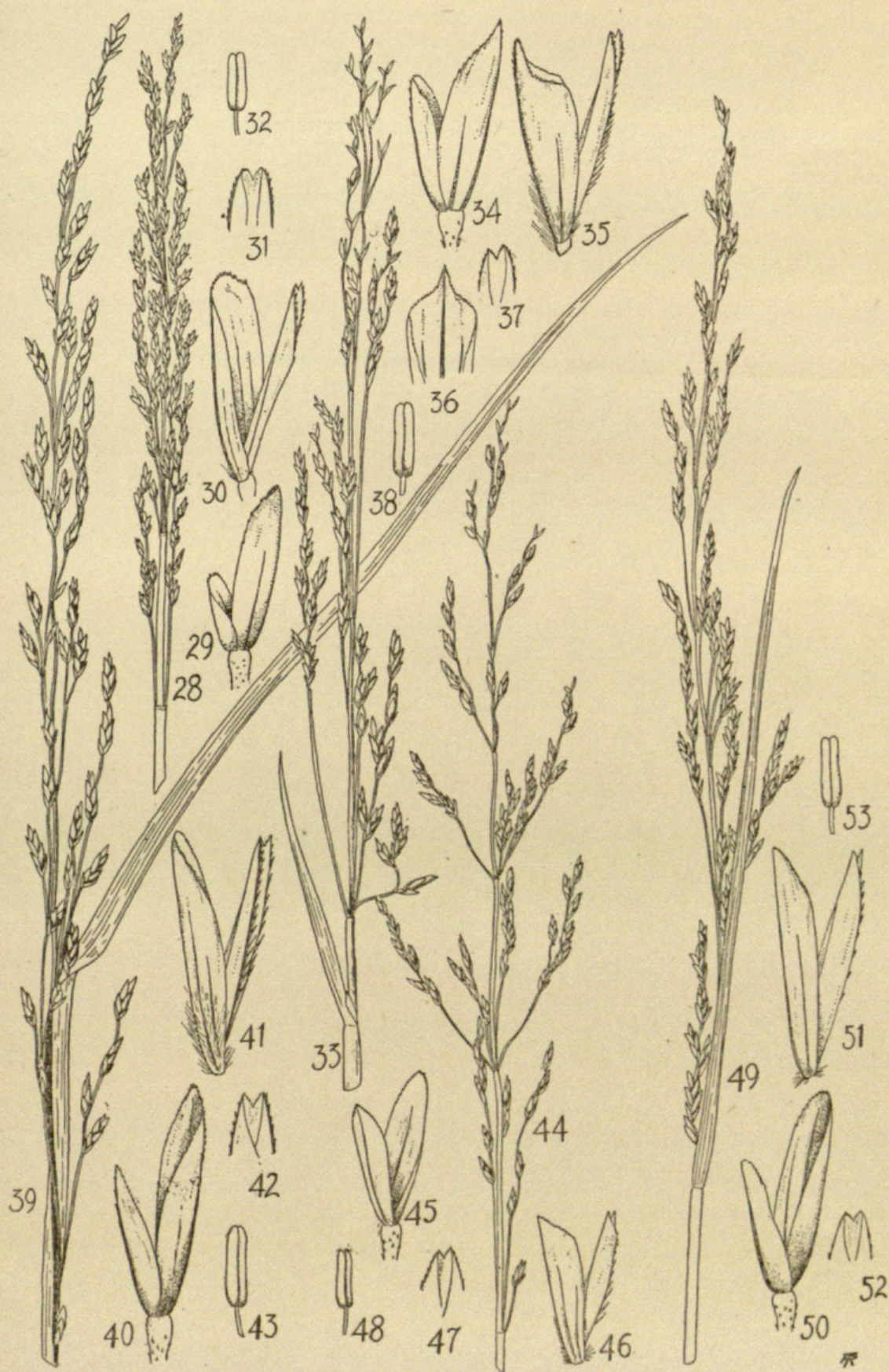
*P. PAUPERCULA*, var. *LONGIGLUMIS*, from Bunbury, Prince Edward Island, *Fernald, Long & St. John*, no. 6,920. 73. small inflorescence; 74. glumes; 75. lemma and palea; 76. tip of palea; 77. anther.





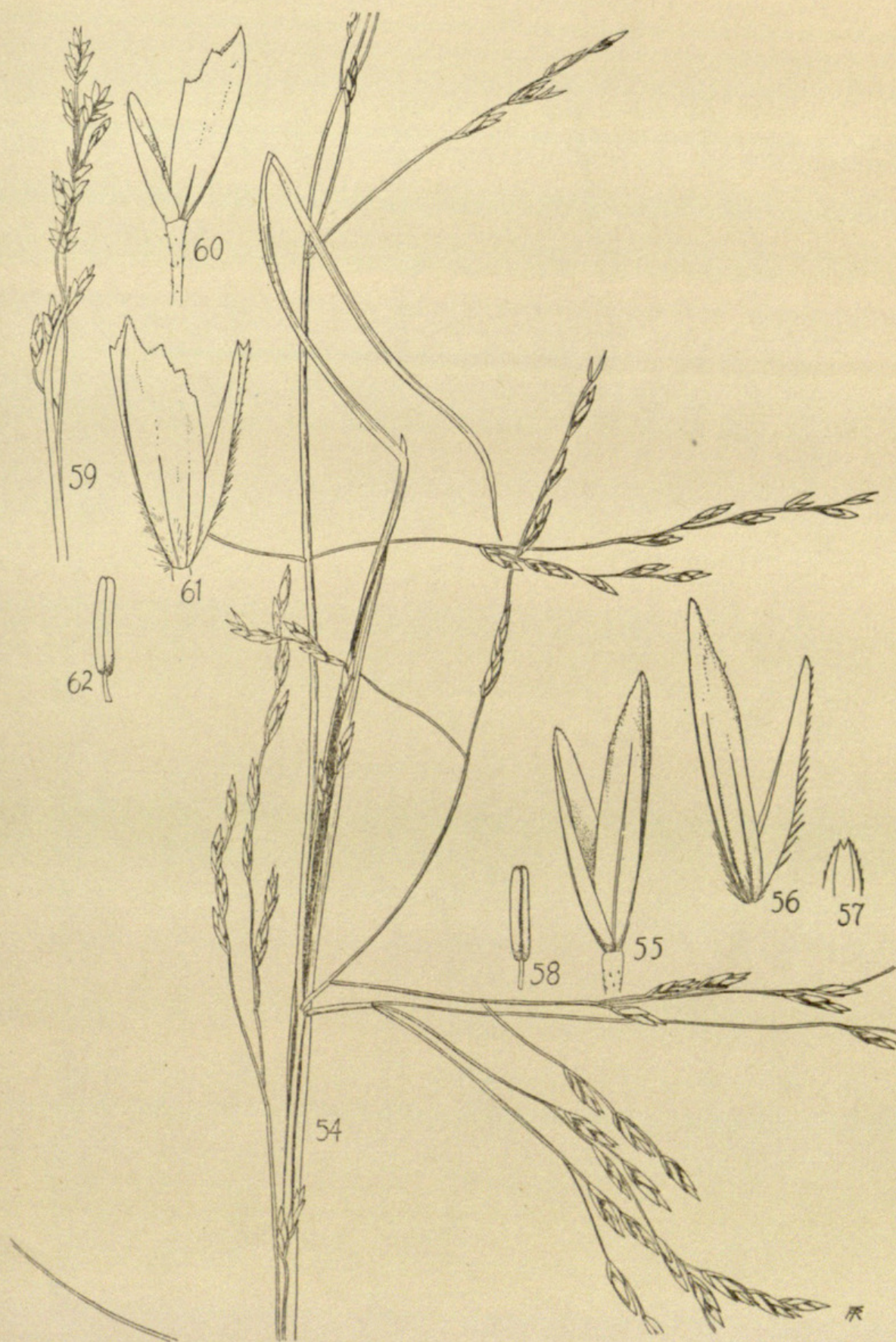
Figs. 1-6, *Puccinellia maritima*; 7-11, *P. phryganodes*; 12-16, *P. fasciculata*; 17-22, *P. rupestris*; 23-27, *P. distans*.





Figs. 28-32, *Puccinellia coarctata*; 33-38, *P. laurentiana*; 39-43, *P. macra*; 44-48, *P. airoides*; 49-53, *P. nutkaensis*.





Figs. 54-58, *Puccinellia lucida*; 59-62, *P. angustata*.





Figs. 63-67, *Puccinellia paupercula*; 68-72, *P. paupercula*, var. *alaskana*; 73-77, *P. paupercula*, var. *longiglumis*.





Fernald, Merritt Lyndon and Weatherby, Charles Alfred. 1916. "The genus *Puccinellia* in eastern North America." *Contributions from the Gray Herbarium of Harvard University* (46), 1–23. <https://doi.org/10.5962/p.335986>.

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