

THE GRASSES OF ALASKA.

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INTRODUCTION.

In the present paper all the species of grasses which have been credited to Alaska are noted, but it has been impossible to identify positively some of those described by the older authors. In some of the published lists of Alaskan grasses there are species credited to the territory which certainly do not occur in that region. This has resulted from erroneous determinations or misconceptions of the species. In some cases it has been possible properly to refer these, as the material on which several of the lists were based is in the National Herbarium; in others, however, we have been unable even to conjecture what an author had at hand. In cases where the species are well authenticated they have been admitted here even though we have seen no Alaskan material representing them.

In 1830 Presl published the first volume of his "*Reliquiae Haenkeanae*," which contains the descriptions of many new species from Nootka Sound, Vancouver Island. This is practically the beginning of the systematic botany of the Pacific Northwest. In 1832 Bongard published his "*Observations sur la Vegetation de l'île de Sitcha*."^a Earlier in the same series Trinius described^b many species of grasses based on Alaskan material, although he had published a few Alaskan species in previous works. The next work of importance on the Alaskan flora, and the last one during the Russian occupancy, was Ledebour's "*Flora Rossica*," which contains many references to, and descriptions of, new species from Russian North America, the grasses of this work being by Grisebach, and contained in volume 4.^c With one or two exceptions, practically all the publications of the Alaskan grasses since that of Grisebach are by American botanists and consist of mere lists and miscellaneous descriptions of new species.

Comparatively little is known regarding the distribution of many of the species in Alaska, for some are represented in collections by only one or two specimens; then, too, nearly all our material is from the coast region, very few botanists having ventured into the vast and

^a See bibliography, p. 91.

^b *Mém. Acad. St. Pétersb. VI. Math. Phys. Nat.* 1: 54-93, 353-416. 1830.

^c Pages 324-466. 1853.

practically unknown regions of the interior. It is from the latter regions mainly that additions to the Alaskan flora are to be expected in the future. It has been impossible to determine the habitat of many of the species herein enumerated, as most collectors have neglected to furnish any data other than the locality and date of collection. Notable exceptions to this general lack of data are found in the fine collections made by W. H. Evans during the years 1897 and 1898, and by F. H. Walpole in 1901.

Under critical species are cited the specimens, found in the U. S. National Herbarium, upon which the enumeration is based. These include those from Alaska and also those from the adjacent Yukon Territory of the Dominion of Canada, the flora of which, by the course of the Yukon River, is rendered geographically continuous with the former. The following are some of the more important of the collections: C. Wright, 1853-1856; A. Kellogg, 1868; M. W. Harrington, 1871-72; L. M. Turner, 1880; C. L. McKay, 1881; Doctor Murdock, 1882; O. S. Bates, 1889; C. Hart Merriam, 1891; W. G. Wright, 1891; J. M. Macoun, 1891, 1896, 1897; B. W. Evermann, 1892; Frederick Funston, 1892; Thomas Howell, 1895; W. H. Evans, 1897, 1898; R. S. Williams, 1899; E. F. Glenn, 1899; F. C. Schrader, 1899; J. B. Tarleton, 1899; C. C. Georgeson, 1898, 1900; F. E. Blaisdell, 1900; J. B. Flett, 1900; F. A. Walpole, 1901; C. V. Piper, 1904; and the material secured by the Harriman Alaskan Exploring Expedition, 1899, by the following botanists: Frederick V. Coville and Thomas H. Kearney; William Trelease and De Alton Saunders; W. H. Brewer and W. R. Coe; T. Kincaid; and L. J. Cole. In addition to these collections, we have had a few specimens from the earlier Russian collectors, representing several of Trinius's species, and some from other collectors whose names are given wherever their specimens are cited.

The systematic distribution of the Alaskan grasses as a whole is very interesting. At this date not a native or introduced species of the series Panicaceae is known from Alaska, the tribes Maydeae, Andropogoneae, Osterdamieae, Tristegineae, Paniceae, and Oryzeae being thus eliminated, while on the other hand all the tribes of the series Poaceae are represented except the Bambuseae. Of these tribes Phalarideae has one genus, *Savastana*; Agrostideae, 9 genera, *Stipa*, *Phleum*, *Alopecurus*, *Phippsia*, *Arctagrostis*, *Cinna*, *Agrostis*, *Podagrostis*, and *Calamagrostis*; Aveneae, 3 genera, *Deschampsia*, *Trisetum* and *Avena*; Chlorideae one genus, *Beckmannia*; Festuceae, 10 genera, *Catabrosa*, *Melica*, *Dactylis*, *Poa*, *Colpodium*, *Dupontia*, *Panicularia*, *Puccinellia*, *Festuca*, and *Bromus*, while Hordeae has 3 genera, *Agropyron*, *Hordeum*, and *Elymus*. The genus *Poa* is represented by the greatest number of species. Under the 27 genera considered there are here enumerated and described 104 species and 18 subspecies. There are 10 species proposed as new to science.

SYSTEMATIC TREATMENT.

POACEAE (Grasses.)

Fibrous-rooted, annual or perennial, herbaceous (rarely woody) plants, with usually hollow, cylindrical (rarely flattened), and jointed stems (culms), the internodes for more or less of their length enveloped by the sheath-like basal portion of the two-ranked and usually linear, parallel-veined leaves; flowers without any distinct perianth, hermaphrodite or rarely unisexual, solitary or several together, in spikelets, which are arranged in panicles, racemes, or spikes; spikelets consisting of a shortened axis (the rachilla) and two or more chaff-like, distichous, imbricated bracts (glumes), of these the first two, rarely one or none or more than two, empty (empty glumes); borne in the axil of each of the succeeding bracts (excepting sometimes the uppermost) a flower (the bracts hence named flowering glumes or lemmas); opposed to each lemma, with its back turned toward the rachilla, usually a two-nerved, two-keeled bract or prophyllum (the palea), this frequently enveloping the flower by its infolded edges; at the base of the flower, between it and its glume, usually two very small hyaline scales (lodicules), with rarely a third lodicule between the flower and the palea; stamens, usually three (rarely two or one, or more than three), with very slender filaments and two-celled, usually versatile, anthers; pistil with a one-celled, one-ovuled ovary, and one to three, usually two, styles, with variously branched, most frequently plumose, stigmas; embryo small, lying at the front and base of the seed, covered only by the thin pericarp; fruit a caryopsis, rich in albumen.

The characters employed in defining the tribes and genera are usually those presented by the spikelets or inflorescence. While the characters of the order are well defined the establishment of the several subdivisions is very difficult, and in no case can be based upon a single character, but only upon a combination of them. There is no one tribe or large genus which can be separated absolutely from all others, there are always exceptions or intermediate forms connecting them, and the same statement is largely true of many of the species, especially in the genera *Poa* and *Festuca*.

KEY TO THE TRIBES AND GENERA.

- Spikelets distinctly pedicellate, racemose or paniculate; panicles sometimes contracted and spike-like.
 - The first and second florets in each spikelet staminate or imperfect..... Tribe I. **PHALARIDEAE.**
 - The lowest florets perfect, the imperfect flowers, if any, uppermost.
 - Spikelets one-flowered..... Tribe II. **AGROSTIDEAE.**
 - Spikelets two to many-flowered.
 - Lemmas awned on the back; glumes longer than the lemmas..... Tribe III. **AVENEAE.**
 - Lemmas awnless or with a terminal awn, glumes usually shorter than the lemmas. Tribe V. **FESTUCEAE.**
 - Spikelets sessile in spikes.
 - Spikes unilateral..... Tribe IV. **CHLORIDEAE.**
 - Spikes not unilateral..... Tribe VI. **HORDEAE.**
- Tribe I. **PHALARIDEAE.**
- Glumes nearly equal, scarcely exceeding the lemmas, which are awnless or very short-awned..... I. **SAVASTANA.**

Tribe II. **AGROSTIDAE.**

Lemmas awned or mucronate-pointed.

Awn terminal.

Awn much exceeding and articulated with the lemma. 2. STIPA.

Awn very short, not articulated with the lemma 7. CINNA.

Awn dorsal.

Rachilla prolonged behind the palea into a slender, usually plumose or hairy bristle.

Awn very minute, attached near the apex of the lemma 9. PODAGROSTIS.

Awn longer, attached at or below the middle of the lemma 10. CALAMAGROSTIS.

Rachilla not prolonged behind the palea.

Inflorescence an open panicle 8. AGROSTIS.

Inflorescence a dense cylindrical spike-like panicle. 4. ALOPECURUS.

Lemmas awnless.

Rachilla prolonged behind the palea into a short, naked bristle 6. ARCTAGROSTIS.

Rachilla not prolonged behind the palea.

Lemmas mostly shorter than the glumes.

Glumes abruptly awn-pointed; inflorescence a dense cylindrical panicle 3. PHLEUM.

Glumes acute; inflorescence not in dense cylindrical panicles 8. AGROSTIS.

Lemmas much exceeding the minute glumes 5. PHIPPSIA.

Tribe III. **AVENEAE.**

Lemmas awned from below the middle 11. DESCHAMPSIA.

Lemmas awned from above the middle.

Rachilla prolonged as a sterile pedicel, lemma bearing a dorsal, twisted awn 12. TRISETUM.

Rachilla not prolonged, lemma bearing a straight awn just below the apex 13. AVENA.

Tribe IV. **CHLORIDAE.**

Spikelets sessile, closely imbricated in two rows along the short branches of the panicle, the glumes equal, inflated, and rounded on the back 14. BECKMANNIA.

Tribe V. **FESTUCEAE.**

Lemmas 1 to 3-nerved or nerveless.

Callus or base of the lemma hairy or barbate; glumes glabrous, acute 19. COLPODIUM.

Callus and base of the lemma glabrous; glumes obtuse, scarious 15. CATABROSA.

Lemmas 5 to many-nerved.

- Spikelets nearly sessile in dense one-sided clusters at the ends of the few panicle branches..... 17. **DACTYLIS.**
- Spikelets not in dense one-sided clusters at the ends of the panicle branches.
 - Callus barbate or pilose.
 - Panicles erect, strict, the rigid branches usually divergent..... 20. **DUPONTIA.**
 - Panicles nodding, the spreading branches usually capillary..... 19. **COLPODIUM.**
 - Callus naked.
 - Lemmas rounded on the back.
 - Nerves of the lemmas prominent.
 - Lemmas long acuminate pointed..... 16. **MELICA.**
 - Lemmas obtuse..... 21. **PANICULARIA.**
 - Nerves of the lemmas obscure or manifest only near the apex.
 - Lemmas obtuse, awnless.
 - Glumes usually small and distinctly shorter than the lemmas. Grasses of alkali plains and the seashore.... 22. **PUCCINELLIA.**
 - Glumes usually about as long as the nearest lemma, the latter more or less pubescent..... 18. **POA.**
 - Lemmas acute or obtuse, often awned.
 - Lemmas acute or awned from the apex..... 23. **FESTUCA.**
 - Lemmas obtuse, usually awned just below the apex..... 24. **BROMUS.**
 - Lemmas compressed-keeled.
 - Spikelets 1 to 2 cm. or more in length, short-awned..... 24. **BROMUS.**
 - Spikelets less than 1 cm. long, awnless; lemmas usually with a tuft of cobwebby hairs at the base..... 18. **POA.**

Tribe VI. **HORDEAE.**

- Spikelets solitary at each node of the rachis..... 25. **AGROPYRON.**
- Spikelets 2 or 3 at each node of the rachis.
 - Spikelets 3 at each node of the rachis, 1-flowered..... 26. **HORDEUM.**
 - Spikelets 2 at each node of the rachis, several-flowered.... 27. **ELYMUS.**

1. **SAVASTANA** Schrank.

Savastana Schrank, Baier. Fl. 1: 100. 337. 1789.

Hierochloë J.G. Gmelin, Fl. Sibir. 1: 101. 1747.

Spikelets 3-flowered, the terminal flower hermaphrodite, the others staminate; rachilla articulated above the glumes; glumes subequal, glabrous, equaling the spikelet; lemmas awnless or short-awned. Fragrant perennial grasses with flat leaves and terminal panicles.

- First and second lemmas awned..... 1. *S. alpina.*
- First and second lemmas awnless.
 - Lemmas entire; culms 30 to 60 cm. high; panicles ample..... 2. *S. odorata.*
 - Lemmas erose-truncate; culms 15 cm. high or less; panicles very narrow, few-flowered..... 3. *S. pauciflora.*

1. *Savastana alpina* (Liljeb.) Scribn. Mem. Torrey Club 5: 34. 1894.*Aira alpina* Liljeb. Utk. Svensk Fl. ed. 2. 41. 1798.*Hierochloë alpina* Roem. & Schult. Syst. Veg. 2: 515. 1817.

A slender, glabrous, erect grass 15 to 45 cm. high with narrow, flat leaves, and contracted panicles 1.5 to 3 cm. long; glumes subequal, glabrous; lemmas ciliate on the margins, the first bearing an awn about 2 mm. long, the second with a more or less bent and twisted awn about 6 mm. long.

Seward Peninsula and the islands of Bering Sea to the Shumagin Islands and White Pass in southeastern Alaska, and eastward and southward to Greenland and the mountains of New England and New York; also in northern Europe and Asia.

2. *Savastana odorata* (L.) Scribn. Mem. Torrey Club 5: 34. 1894. VANILLA GRASS.*Holcus odoratus* L. Sp. Pl. 1048. 1753.*Hierochloë borealis* Roem. & Schult. Syst. Veg. 2: 513. 1817.

A slender stoloniferous grass, 30 to 60 cm. high with short culm leaves and brownish, open panicles 4 to 10 cm. long; spikelets 4 to 6 mm. long; glumes glabrous, subequal; lemmas hairy, acute, not awned. The flat leaves of the sterile shoots are 10 to 30 cm. long.

In damp soil, Seward Peninsula and the Aleutian Islands to southeastern Alaska; also on the upper Yukon, thence to Newfoundland, New York, and Minnesota, and in the Rocky Mountains to Mexico.

3. *Savastana pauciflora* (R. Br.) Scribn. Mem. Torrey Club 5: 353. 1894.*Hierochloë pauciflora* R. Br. Suppl. App. Parry's Voy. 293. 1824.

A slender, erect, glabrous species, 10 to 20 cm. high, with short leaves, small, few-flowered panicles, and awnless spikelets; sheaths mostly at the base of the culm, overlapping; basal leaves 2 to 5 cm. long or less; spikelets few, 3 to 4 mm. long; lemmas scabrous, erose-truncate, the third shorter than the others, obtuse, villous at the apex.

Seward Peninsula and the Pribilof Islands; also in the arctic region of both North America and Asia.

SPECIMENS EXAMINED: Port Clarence, tundra near Teller Reindeer Station, Walpole 1781; St. Paul Island, Bering Sea, in marshes, Macoun in 1892.

2. *STIPA* L.*Stipa* L. Sp. Pl. 78. 1753.

Spikelets 1-flowered; rachilla articulated above the glumes and produced below the lemma into a strong, bearded, obconical and sharp-pointed callus; glumes thin subequal, acuminate, exceeding the lemma, this narrow and closely rolled around the flower, and terminating in a twisted, geniculate, simple awn articulated with its summit. Tufted perennial grasses with narrow involute leaves and usually open panicles.

1. *Stipa comata* Trin. & Rupr. Mém. Acad. St. Pétersb. VI. Sci. Nat. 5: 75. 1842.

PORCUPINE GRASS.

An erect, caespitose species, 30 to 90 cm. high, with involute leaves and loosely flowered panicles 15 to 25 cm. long; glumes long attenuate pointed, about 24 mm. long; lemma thinly pubescent, about 12 mm. long, bearing a slender flexuous awn 8 to 10 cm. in length.

In dry or sandy soil in the upper Yukon valley, thence to California and Nebraska.

SPECIMEN EXAMINED: Five Finger Rapids, Yukon River, Tarleton 85.

3. *PHLEUM* L.*Phleum* L. Sp. Pl. 59. 1753.

Spikelets 1-flowered, hermaphrodite; rachilla articulated above the glumes, not prolonged beyond the floret; glumes 2, compressed-carinate, usually ciliate on the keels and abruptly mucronate-pointed; lemma shorter than the glumes, thin, truncate, awnless. Annual or perennial grasses with simple erect culms and dense cylindrical or oblong spike-like panicles.

Panicles elongated, cylindrical; awns less than one-half the length of the glumes; upper sheath not inflated; culm from a bulbous base. . . 1. *P. pratense*.
 Panicles not elongated, ovoid or oblong; awns about one-half the length of the glumes; upper sheath inflated; culms not bulbous at the base 2. *P. alpinum*.

1. **Phleum pratense** L. Sp. Pl. 59. 1753. TIMOTHY.

A simple, erect, tufted perennial, 30 to 120 cm. high with dense, cylindrical, spike-like panicles 2.5 to 10 cm. long.

Kodiak Island to Juneau and Wrangell in southeastern Alaska, east to Newfoundland and southward, also in Asia. Widely cultivated and completely naturalized in fields and waste grounds.

Dr. Kellogg states that this grass was growing luxuriantly at Fort Simpson, in thick-lodged masses, without care or culture.

2. **Phleum alpinum** L. Sp. Pl. 59. 1753. MOUNTAIN TIMOTHY.

Phleum haenkeanum Presl, Rel. Haenk. 1: 245. 1830.

A glabrous, erect perennial 15 cm. high, with ovoid or oblong spike-like panicles 1 to 5 cm. long.

Moist soils on the Pribilof and Aleutian islands, and on the main land from Nušhagak to southeastern Alaska, eastward to Labrador, and southward in the mountains to New England, Arizona, and California; also in Europe, Asia, and South America.

Mr. Nash^a doubtfully refers a specimen collected by R. S. Williams at Dawson to *Phleum haenkeanum* Presl, but we can find no valid characters by which this species can be distinguished from *Phleum alpinum*, and here consider it only as a synonym of the latter species.

4. **ALOPECURUS** L.

Alopecurus L. Sp. Pl. 60. 1753.

Spikelets 1-flowered, strongly flattened; rachilla articulated below the equal glumes, more or less ciliate, especially along the keels, usually connate at the base; lemma hyaline, obtuse, usually awned on the back. Annual or perennial grasses, with erect or ascending culms, flat leaves, and densely flowered cylindrical or ovoid, spike-like panicles.

Plants slender; panicles cylindrical, 5 to 7 mm. in diameter; spikelets somewhat pubescent, 2 mm. long.

- Awn exerted, exceeding the glumes. 1. *A. geniculatus*.
- Awn not exerted, equaling or shorter than the glumes. 1a. *A. geniculatus fulvus*.

Plants stout; panicles ovate, 10 to 15 mm. in diameter, spikelets 4 to 6 mm. long, densely villous.

- Panicles about 1 cm. in diameter; spikelets 4 mm. long; glumes obtuse. 2. *A. alpinus*.
- Panicles 1.5 cm. in diameter; spikelets 6 mm. long; glumes acute. 3. *A. stejnegeri*.

1. **Alopecurus geniculatus** L. Sp. Pl. 60. 1753.

A slender perennial 15 to 50 cm. high, with culms decumbent and branched at the base, often inflated sheaths, spreading leaves, and slender spike-like panicles 2.5 to 7.5 cm. long, spikelets 2 mm. long, silky-hairy on the keels; lemma awned from near the base, the awn slender, about twice as long as the glumes.

Wet meadows, banks of streams, and ditches at Kodiak Island and Yakutat Bay, eastward to Newfoundland, and throughout the United States; also in Asia.

SPECIMENS EXAMINED: Kodiak, *Evans* 377, *Cole* in 1899, *Trelease & Saunders* 2899; Yakutat, *Trelease & Saunders* 2898.

^a Bull. N. Y. Bot. Gard. 2: 150. 1901.

- 1a. ***Alopecurus geniculatus fulvus*** (J. E. Smith) Richter, Pl. Eur. 1: 38. 1890.
Alopecurus fulvus J. E. Smith in Sowerby, Engl. Bot. pl. 1467. 1793.
Alopecurus aristulatus Michx. Fl. Bor. Amer. 1: 43. 1803.
Alopecurus howellii merrimani Beal, Grasses N. Amer. 2: 278. 1896.
Alopecurus howellii merriami Macoun in Jordan, Fur Seals North Pacif. 3: 573. 1899.
 Distribution similar to that of the species.

SPECIMENS EXAMINED: Kodiak, *Evans* 377a; Fort Selkirk, *Tarleton* 121; St. George Island, *Merriam* in 1891; St. Paul Island, *Macoun* 16636, *Palmer*; Unga, *Piper* 4718.

The specimens collected by Merriam and Macoun cited above represent the form described by Beal as *Alopecurus howellii* var. *merrimani*, which differs from typical *Alopecurus geniculatus fulvus* only in its low stature and shorter spikes, characters due only to habitat, as both specimens cited above were collected in bare dry soil.

2. ***Alopecurus alpinus*** J. E. Smith in Sowerby, Engl. Bot. pl. 1126. 1793.

A glabrous, erect perennial 10 to 60 cm. high, with flat leaves and cylindrical or ovoid, densely flowered spike-like panicles 1 to 3 cm. long; spikelets 4 mm. long with obtuse, densely villous glumes, about the length of the lemma, this bearing on the back just below the middle a slender awn that equals or somewhat exceeds it in length.

Arctic Alaska and the islands of Bering Sea to Cook Inlet and the upper Yukon, thence eastward to Labrador; also in the arctic regions of Europe and Asia.

3. ***Alopecurus stejneri*** Vasey, Proc. U. S. Nat. Mus. 10: 153. 1887.

A stout perennial 15 to 30 cm. high, the culms decumbent and geniculate below, with inflated sheaths, conspicuous ligule, and ovoid or oblong, densely pubescent, spike-like panicles 2 to 4 cm. long; glumes lanceolate, densely villous, about one-third longer than the lemma, this 4 mm. in length and bearing an awn near the base which equals or slightly exceeds the glumes.

The type specimens were collected at South Rookery, Bering Islands, and at Karabelnij on Copper Island, in Russian territory, by L. Stejneger, August 21, 1882, and the species will doubtless be found within the American limits.

5. PHIPPSIA R. Br.

Phippsia R. Br. Suppl. App. Parry's Voy. 275. 1824.

Spikelets 1-flowered, hermaphrodite, very small; glumes minute, unequal, or the first sometimes wanting; lemma thin-membranaceous, somewhat carinate, with the apex irregularly dentate, awnless. A dwarf perennial, with narrow, flat leaves, which are scarcely exceeded by the very slender, few-flowered panicles.

1. ***Phippsia algida*** (Soland.) R. Br. Suppl. App. Parry's Voy. 275. 1824.

Agrostis algida Soland. in Phipps, Voy. 200. 1774.

A low, tufted, glabrous grass 2 to 10 cm. high, with narrow, soft leaves and contracted simple panicles; spikelets 1 to 1.5 mm. long; glumes minute, unequal, acute, the lemma broad and obtuse or erose-truncate.

Islands of Bering Sea, arctic North America, and on the highest mountain peaks of Colorado; also in northern Europe and Asia.

SPECIMENS EXAMINED: St. Paul Island, *Palmer* 459; St. Matthew Island, *Coville & Kearney* 2106; St. Lawrence Island, *Coville & Kearney* 1994.

6. ARCTAGROSTIS Griseb.

Arctagrostis Griseb. in Ledeb. Fl. Ross. 4: 434. 1853.

Spikelets 1-flowered, hermaphrodite; glumes 2, usually unequal, acute, awnless; lemmas usually a little longer than the glumes, obtuse or subdentate at the apex, imperfectly 5-nerved, awnless. Perennial caespitose grasses, with flat leaves and contracted or open, terminal panicles of rather large spikelets.

- Plants 15 to 40 cm. high with contracted, densely flowered panicles..... 1. *A. latifolia*.
 Plants 60 to 120 cm. high with usually open, loosely flowered panicles..... 2. *A. arundinacea*.

1. **Arctagrostis latifolia** (R. Br.) Griseb. in Ledeb. Fl. Ross. 4: 434. 1853.

Colpodium latifolium R. Br. Suppl. App. Parry's Voy. 286. 1824.

A rather stout, erect, glabrous grass with erect or ascending leaves and contracted, usually purplish, rather densely flowered panicles 3 to 10 cm. long, the appressed branches 3 to 5 cm. long, and mostly flower-bearing to the base; leaf blades 10 to 15 cm. long, 6 to 12 mm. wide; spikelets 3 to 5 mm. long; glumes unequal, shorter than the obtuse, scabrous lemma.

In damp soils, arctic Alaska, and the islands of Bering Sea to Cook Inlet, and eastward to Labrador and Greenland; also in northern Europe and Asia.

2. **Arctagrostis arundinacea** (Trin.) Beal, Grasses N. Amer. 2: 317. 1896.

Vilfa arundinacea Trin. Gram. Unifl. 157. 1824.

A stout, erect perennial, 60 to 120 cm. high with flat leaves and usually open, diffusely flowered panicles, 15 to 35 cm. long; leaves scabrous, 15 to 25 cm. long, about 10 mm. wide; panicles pale or purplish, the branches fasciculate, spreading or ascending, often 6 to 10 cm. long, spikelets 2.5 to 6 mm. long.

In wet soils throughout Alaska and in British America and northeast Asia.

Trinius has an excellent illustration of this species^a and there can be no doubt as to the identity of the plant. It is, however, an exceedingly variable species, especially in vegetative characters. We have been unable to distinguish *Arctagrostis angustifolia* Nash. The specimen in the National Herbarium collected by R. S. Williams is certainly *A. arundinacea*, although it is cited in the original description of *A. angustifolia*.

7. CINNA L.

Cinna L. Sp. Pl. 5. 1753.

Spikelets 1-flowered; rachilla distinctly articulated below the glumes as well as above them, produced below the floret into a short smooth stipe, and usually extending behind the palea as a slender naked bristle; lemma similar to the glumes, 3-nerved, usually with a short, subterminal awn. Tall perennial grasses with numerous flat leaves and many-flowered, nodding panicles.

1. **Cinna latifolia** (Trev.) Griseb. in Ledeb. Fl. Ross. 4: 435. 1853.

Agrostis latifolia Trev. in Göpp. Beschr. Bot. Gart. Breslau 82. 1830.

Muhlenbergia pendula Bong. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 172. 1832.

Cinna pendula Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 4: 280. 1841.

Cinna arundinacea pendula A. Gray, Man. ed. 2. 435. 1853.

A rather slender and smooth perennial 60 to 120 cm. high, with erect, simple culms, long, flat leaves 4 to 12 mm. wide, and open nodding panicles 10 to 20 cm. long; spikelets about 3 mm. long, with nearly equal, acute glumes and short-awned or nearly awnless lemma raised on a short stipe.

Thickets and moist woodlands, Kodiak Island and Cook Inlet to southeastern Alaska, eastward to Newfoundland, and southward to North Carolina and Colorado; also in northern Europe and Asia.

SPECIMENS EXAMINED: Revillagigedo Island, *Howell* 1712a; Seldovia, *Trelease & Saunders* 2097; Juneau, *Corville & Kearney* 2477, *Cole* in 1899; Yakutat, *Piper* 4702, 2714; Homer, *Piper* 4713; Kodiak, *Piper* 4712.

^a Gram. Icon. 1: pl. 55. 1828.

8. AGROSTIS L.

Agrostis L. Sp. Pl. 61. 1753.

Spikelets 1-flowered; rachilla articulated above the glumes, not produced beyond the floret; glumes 2, subequal, usually exceeding the floret; lemma less firm in texture than the glumes, awnless, or with a slender dorsal awn; palea hyaline, shorter than the lemma, or wanting. Mostly perennial grasses with small spikelets in open, usually diffuse panicles.

- Palea conspicuous, about one-half the length of the lemma 1. *A. alba*.
 Palea minute or wanting.
 Panicle diffuse, the branches capillary, scabrous 2. *A. hyemalis*.
 Panicle usually contracted, or if spreading the branches glabrous.
 Spikelets awnless 3. *A. exarata*.
 Spikelets awned.
 Awn straight, included 4. *A. melaleuca*.
 Awn geniculate, exserted 5. *A. borealis*.

1. ***Agrostis alba*** L. Sp. Pl. 63. 1753.

REDTOP.

An erect, glabrous perennial 30 to 80 cm. high, sometimes decumbent and stoloniferous at the base, with numerous plane scabrous leaves and contracted or open green or purplish panicles 5 to 15 cm. long, the branches ascending or erect; ligule 6 mm. long or less; spikelets 2 to 2.5 mm. long, the glumes subequal, acute, scabrous on the keel; lemmas obtuse or acute, awnless.

Kodiak Island and Cook Inlet. Extensively introduced throughout North America and perhaps native northward.

SPECIMENS EXAMINED: Kodiak, *Georgeson* 1 in 1898, an old specimen doubtfully referred to this species; Homer, *Piper* 4619.

2. ***Agrostis hyemalis*** (Walt.) B. S. P. Prel. Cat. N. Y. 68. 1888.

Cornucopiae hyemalis Walt. Fl. Carol. 73. 1788.

Agrostis scabra Willd. Sp. Pl. 1: 370. 1798.

A slender, tufted, glabrous perennial 30 to 60 cm. high, with ample, spreading, capillary, usually purplish panicles, often 40 cm. long, with strongly scabrous branches and numerous small awnless spikelets; spikelets 1.5 to 2 mm. long; glumes subequal, acute, scabrous on the keels.

The Shumagin Islands, Prince William Sound, and the valley of the Yukon to Newfoundland and southward.

SPECIMENS EXAMINED: Apollo, *Piper* 4632, 4636; Yukon River, *Funston* 148; Kenai, *Piper* 4633, 4635; Nagai Island, *Harrington* in 1871; Homer, *Evans* 497, *Piper* 4634; Valdez, *Piper* 4631.

An exceedingly variable species which presents many interesting forms, of which the extremes in habit and vegetative characters are very distinct from each other, but on account of the many intergrading forms can not be readily separated.

2a. ***Agrostis hyemalis nutkaensis*** (Kunth).

Trichodium album Presl, Rel. Haenk. 1: 244. 1830.^a

Agrostis nutkaensis Kunth, Enum. Pl. 1: 222. 1833.

Slender, 15 to 40 cm. high, with comparatively small, pale or rarely purplish panicles 4 to 10 cm. long; spikelets as in the species.

Aleutian Islands to southeastern Alaska and southward.

SPECIMENS EXAMINED: Unalaska, *Piper* 4225; Shumagin Islands, *Popof, Trelease & Saunders*, 2902, 2904, 2905, *Saunders & Kincaid* in 1899; Yes Bay, Behm Canal, *Howell* 1711; Kodiak, *Trelease & Saunders* 2901, *Piper* 4624.

A subspecies distinguished from the species only by its smaller size and smaller, more or less contracted, and usually pale panicles.

^a See also Scribn. Rep. Mo. Bot. Gard. 10: 54. pl. 34. 1899.

2b. *Agrostis hyemalis geminata* (Trin.) Hitchc. U. S. Dept. Agr. Bur. Pl. Ind. Bull. 68: 44. 1905.

Agrostis geminata Trin. Gram. Unifl. 207. 1824.

A low subspecies, 20 to 40 cm. high, with ample, diffuse panicles and awned spikelets; awn slender, straight, about equaling the lemma.

Aleutian Islands and Kodiak Island.

SPECIMENS EXAMINED: Kodiak, *Piper* 4622; Unalaska, *Eschscholtz*; Yakutat, *Piper* 4630 in part; Ratz Harbor, Prince of Wales Island, *Flett* 2014; Juneau, *Cole*, in 1899, *Coville & Kearney* 2461, 2509, *Brewer & Coe* 574, *Trelease & Saunders* 2900; Sitka, *Piper* 4623.

The specimen collected by *Brewer & Coe*, no. 574, exactly matches the duplicate type and *Trinius's* plate and description of the species; the other specimens cited are larger and more robust, but are evidently the same.

3. *Agrostis exarata* Trin. Gram. Unifl. 207. 1824.

A rather stout, erect, nearly glabrous perennial, 30 to 80 cm. high, with flat, linear-lanceolate, somewhat scabrous leaves 3 to 8 mm. wide, and elongated, narrow, many-flowered, green or pale panicles 10 to 25 cm. long, 1 to 3 cm. in diameter, the branches fasciculate, flower-bearing throughout, appressed or ascending, the lower ones sometimes 8 cm. long; spikelets 3 to 4.5 mm. long; glumes lanceolate, acuminate, scabrous, much exceeding the glabrous lemma, the latter about 2 mm. long; palea very small or wanting.

In wet soils, the Aleutian Islands to southeastern Alaska, thence to Wisconsin, Texas, and California.

SPECIMENS EXAMINED: Apollo, *Piper* 4645, 4638, 4643; Atka Island, *Macoun* 31, *Turner* 1210; Unalaska, *Evans* 518, *Applegate, Harrington* in 1871-72, *Piper* 4639, 4644. Juneau, *Cole* in 1899, *Coville & Kearney* 2473; Sitka, *Mertens* (from Herb. Acad. St. Petersb.), *Piper* 4640; Yakutat, *Piper* 4641, 4642; Yes Bay, *Howell* 1710; without locality, *Funston* 118.

4. *Agrostis melaleuca* (Trin.) Hitchc. U. S. Dept. Agr. Bur. Pl. Ind. Bull. 68: 51. 1905.

Agrostis canina melaleuca Trin. in Bong. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 170. 1832.

A slender, erect, glabrous species 40 to 50 cm. high, with linear soft leaves and slightly spreading, purplish, nodding panicles 5 to 7 cm. long; spikelets about 3 mm. long, glumes subequal; lemma acute, glabrous, awnless or usually with a short, straight dorsal awn arising from about the middle.

Unalaska to Cook Inlet and southeastern Alaska.

SPECIMENS EXAMINED: Ankow River, *Piper* 4626; Kodiak Island, *Georgeson* 2, 3, *Evans* 454; Sitka, *Piper* 4629, *Wright* in 1891; Seldovia, *Piper* 4627; Unalaska, *Mertens* (from Herb. Acad. St. Petersb.), *Kellogg* 119; Yakutat, *Piper* 4628, 4830 in part; Attu Island, *Macoun* 32126.

5. *Agrostis borealis* Hartm. Skand. Fl. ed. 3. 17. 1838.

Agrostis rubra Am. auct.

A caespitose species 15 to 40 cm. high with narrow, flat leaves, open panicles 5 to 10 cm. long, and awned spikelets 2.5 to 3 mm. long; glumes subequal, glabrous except on the keel above; lemma a little shorter than the glumes, ovate-oblong, truncate, awned on the back, the awn geniculate, at least when dry, exceeding the glumes in length.

Seward Peninsula to Kodiak Island and southeastern Alaska, eastward to Newfoundland and southward to the mountains of New England and North Carolina; also in Europe and Asia.

SPECIMENS EXAMINED: Nome City, *Flett* 1689; Unalaska, *Mertens, Piper* 4618; Kodiak, *Coville & Kearney* 2348, *Piper* in 1904; Sitka, *Wright* 1584.

9. **PODAGROSTIS** (Griseb.).

Agrostis section *Podagrostis* Griseb. in Ledeb. Fl. Ross. 4: 436. 1853.

Spikelets 1-flowered, rachilla prolonged behind the palea into a minutely pubescent rudiment which is a little less than half the length of the palea; callus naked; glumes 2, equal, as long as the floret; lemma usually with a minute awn which is attached near the apex; palea nearly equaling the lemma, less firm in texture and nearly hyaline.

A genus intermediate between *Agrostis* and *Calamagrostis*, differing from the former in having the glumes and lemma equal and the rachilla prolonged; from the latter in its minute terminal awn, equal glumes and lemma, and the absence of callus hairs.

1. **Podagrostis aequivalvis** (Trin.)

Agrostis canina aequivalvis Trin. in Bong. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 171. 1832.

A slender, erect, glabrous perennial 15 to 50 cm. high, with linear, plane leaves and exserted open, few-flowered, purplish panicles 5 to 10 cm. long; spikelets 3 to 3.5 mm. long, glabrous, ovate, acute; glumes equal; lemma equaling the glumes, acute, glabrous, sometimes with a very short awn near the apex; callus with a few short hairs; prolongation of the rachilla pilose, about two-thirds as long as the lemma.

In marshes and swamps, Unalaska to Yakutat Bay and southeastern Alaska, thence southward to the mountains of Oregon.

ALASKA SPECIMENS: Sitka, *Mertens* (specimen from the type collection from Herb. Acad. St. Petersb.), *Wright* 1579, *Piper* 4620; Helm Bay, Cleveland Peninsula, *Flett* 2015; Yes Bay, *Howell* 1712, *Gorman* 92; *Latouche*, *Piper* 4621.

A species readily recognized by its slender habit, by its lemma equaling the glabrous glumes, and by the pilose prolongation of the rachilla, in which character it approaches the genus *Calamagrostis*.

A specimen from Unalaska with the lemma one-third shorter than the glumes, was called *Agrostis aequivalvis obliqua* by Grisebach,^a but we have seen no specimens representing this variety.

10. **CALAMAGROSTIS** Adans.

Calamagrostis Adans. Fam. Pl. 2: 31. 1763.

Spikelets 1-flowered; rachilla produced above the floret into a short, usually hairy pedicel or bristle; glumes subequal, awnless and usually exceeding the lemma, this surrounded at the base with copious hairs and awned on the back, usually from below the middle. Tall, often reed-like, perennial grasses with small spikelets in many-flowered terminal panicles.

Awn strongly geniculate, exserted; callus hairs shorter than the lemma.

Low grasses, not exceeding 30 cm. in height; leaves glabrous.

Panicle densely flowered, 2 to 3 cm. long..... 2. *C. arctica*.

Panicle open, pyramidal, 4 to 9 cm. long..... 1. *C. deschampsoides*.

Tall stout grasses 30 to 140 cm. high; leaves scabrous.

Plant 60 cm. high or less; leaf blades involute or plane, 5 mm. wide or less; awn long-exserted..... 3. *C. purpurascens*.

Plant robust, exceeding 60 cm. in height, leaf blades 6 to 12 mm. wide; awn but slightly exserted..... 4. *C. aleutica*.

Awn straight or nearly so, not exserted; callus hairs mostly equaling the lemma.

^a Ledeb. Fl. Ross. 4: 436. 1853.

Panicles open, spreading; leaf blades flat.

Spikelets 4 to 6 mm. long; glumes strongly scabrous. . . 5. *C. langsdorffii*.

Spikelets 3 to 3.5 mm. long; glumes only slightly scabrous..... 6. *C. canadensis*.

Panicles narrow, contracted, often almost spike-like; leaf blades narrow, mostly involute.

Spikelets 3.5 mm. long or less; whole plant soft in texture..... 8. *C. neglecta*.

Spikelets 4 to 5 mm. long; plants mostly rigid.

Spikelets 5 mm. long; glumes minutely scabrous-pubescent..... 7. *C. lapponica*.

Spikelets 4 to 4.5 mm. long; glumes glabrous except on the scabrous keels..... 9. *C. hyperborea*.

1. ***Calamagrostis deschampsioides*** Trin. Gram. Icon. 3: pl. 354. 1836.

A slender, cespitose perennial, 15 to 30 cm. high, from creeping rootstocks, with narrow leaves 3 to 7 cm. long and open pyramidal panicles 4 to 8 cm. long; spikelets 4 mm. long, or in the subspecies 6 to 7 mm. long; glumes acute, about the length of the awned lemma; awn stout, exceeding the lemma.

Pribilof Islands to Cook Inlet and Prince William Sound; also in Kamchatka.

SPECIMENS EXAMINED: St. Paul, *Merriam* in 1891, *Macoun* 16224; Prince William Sound, near Orca, *Coville & Kearney* 1336a; Kasilof, *Evans* 683, 742.

1a. ***Calamagrostis deschampsioides macrantha*** Piper, subsp. nov.

Spikelets 6 to 7 mm. long, otherwise as in the species.

Type U. S. National Herbarium no. 592345 collected July 25, 1904, Kodiak, Alaska, by C. V. Piper (no. 4688).

2. ***Calamagrostis arctica*** Vasey, U. S. Dept. Agr. Div. Bot. Bull. 13: pl. 55. 1892.

A glabrous perennial, 20 cm. high or less, with short flat leaves and small purplish panicles 2 to 3 cm. long, barely 1 cm. in diameter; spikelets 4 to 5 mm. long; glumes lanceolate, scabrous on the keels and minutely scabrid throughout; lemma 4 mm. long, smooth; awn attached near the base, 6 to 7 mm. long, exserted; callus hairs about one-fourth as long as the lemma.

Pribilof and Shumagin Islands.

SPECIMENS EXAMINED: St. Paul Island, *Macoun* 38; Shumagin Islands, Popof, *Kincaid* in 1899.

This species is recognized by its small size, small panicles, spikelets smaller than in *Calamagrostis purpurascens*, and by its perfectly glabrous leaves and sheaths.

3. ***Calamagrostis purpurascens*** R. Br. in Richards. Bot. App. Frankl. Journ. 731. 1823.

Calamagrostis sylvatica A. Gray, Proc. Amer. Acad. 6: 80. 1868.

Calamagrostis yukonensis Nash, Bull. N. Y. Bot. Gard. 2: 154. 1901.

A rather rigid, densely cespitose, erect perennial 30 to 60 cm. high, with firm flat or involute leaves scabrous beneath, densely short-pubescent above, and densely flowered, purple, spike-like panicles 5 to 15 cm. long; spikelets 5 to 6 mm. long; glumes hispidulous; lemma hispidulous, 4 to 5 mm. long, the geniculate awn attached near the base, 5 to 8 mm. long, exserted, twisted below the geniculation.

In dry rocky soils, arctic Alaska and the upper Yukon, eastward to Greenland and southward in the mountains to Colorado and California.

SPECIMENS EXAMINED: Port Clarence, *Walpole* 1629; Yukon River, *Funston* in 1893; Five Finger Rapids, *Funston*, *Tarleton* 84; Fort Yukon, *McDonald* in 1864; Eagle, *Georgeson* 31; Chandlar (Gens de Large) and Koyukuk Rivers, *Schrader* in 1899; Dawson, *Williams* in 1899; without locality, *McGrath* in 1890.

Calamagrostis yukonensis Nash is stated by the author to be related to *Calamagrostis tweedyi*, but a most minute examination and comparison fails to reveal any points on which *C. yukonensis* can be separated from *C. purpurascens*. The narrow leaves of the plant described as *Calamagrostis yukonensis* do not form a valid distinguishing character, since in the specimens collected by McGrath, cited above, both narrow and relatively broad leaves are found in the same innovation. In no other respect have we been able to find any differential characters between *Calamagrostis yukonensis* and *C. purpurascens*.

4. *Calamagrostis aleutica* Trin. in Bong. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 171. 1832.

A stout, erect perennial, 60 to 150 cm. high, with long, rather stiff, flat leaves and densely many-flowered, narrow panicles 15 to 30 cm. long; spikelets 5 to 6 mm. long; glumes acuminate, somewhat exceeding the lemma; awn barely equaling the lemma; callus hairs few and short.

In rocky or marshy places in the Aleutian Islands to southeastern Alaska, and along the coast to California.

SPECIMENS EXAMINED: Unalaska, *Mertens* (from Herb. Acad. St. Petersb.), *Kellogg* 111, *Applegate*, *Evans* 515, *Harrington* in 1871-72; Sitka, *Mertens* (from Herb. Acad. St. Petersb.), *Evans* 790; Wrangell, *Evans* 149; Yes Bay, Behm Canal, *Howell* 1713.

5. *Calamagrostis langsdorffii* Trin. Gram. Unifl. 225. pl. 4. f. 10. 1824.

A stout, erect perennial 60 to 120 cm. high, with long, flat leaves and open, pyramidal panicles 4 to 12 cm. long; spikelets 4 to 6 mm. long; glumes lanceolate, strongly scabrous or strigose; callus hairs copious, soft, the longer ones exceeding the lemma.

In moist meadows throughout Alaska, eastward to Greenland and southward in the mountains to North Carolina and New Mexico; also in northern Europe and Asia.

6. *Calamagrostis canadensis* (Michx.) Beauv. Ess. Agrost. 157. 1812. BLUEJOINT. *Arundo canadensis* Michx. Fl. Bor. Amer. 1: 73. 1903.

An erect, glabrous, or scabrous perennial, 50 to 180 cm. high, with numerous leafy innovations and oblong-ovate, open or somewhat contracted panicles 10 to 20 cm. in length; spikelets 3 to 3.5 mm. long; glumes lanceolate, acute, scabrous; lemma about 2.5 mm. long, bearing a slender, straight awn 1 to 2 mm. in length.

Wet meadows and margins of lakes and streams on the upper Yukon, eastward to Labrador, and southward to North Carolina and New Mexico.

SPECIMENS EXAMINED: Dawson, *Williams* in 1899; Yukon River, *Funston* 159; Fort Yukon, *Georgeson* 27; Eagle, *Georgeson* 32; White River, *Gorman* 1149.

6a. *Calamagrostis canadensis acuminata* Vasey; Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 5: 26. 1897.

A doubtful subspecies with rather small, more flexuous, and more densely flowered panicles, narrowly acuminate glumes, and somewhat larger spikelets (3.5 to 4 mm. long), approaching *C. langsdorffii*.

Range of the species.

SPECIMENS EXAMINED: Alatna River, *Schrader* in 1899; Circle City, *Osgood* in 1899; Kodiak Island, Sturgeon River, *Coville & Kearney* 2252; Kukak Bay, Alaska Peninsula, *Coville & Kearney* 1195.

This subspecies represents a transition from *Calamagrostis canadensis* to *C. langsdorffii*, the extreme form being separated from the latter only by its slightly shorter spikelets, shorter awn, and less scabrous glumes.

CALAMAGROSTIS ALASKANA *Kearney*, U. S. Dept. Agr. Div. Agrost. Bull. 11: 32. 1898, can only be distinguished from *C. canadensis* by its more contracted panicles and shorter panicle branches. It is represented by the following specimens: Yukon River, *Funston* 157; Bennett City, *Williams* in 1899; Port Clarence, *Brewer & Coe* 395.

CALAMAGROSTIS ATROPURPUREA Nash, Bull. N. Y. Bot. Gard. **2**: 153. 1901, is a form intermediate between *Calamagrostis canadensis* and *C. langsdorffii*, differing from the former in its shorter panicles and more scabrous glumes, and from the latter in its smaller spikelets and less acute glumes. The following specimens are referred here: Dawson, *Williams* in 1899; and (doubtfully) 16 miles west of Nome City, *Flett* 1684. *C. perplexa* Scribn.^a belongs here.

7. *Calamagrostis lapponica* (Wahl.) Hartm. Skand. Fl. **1**: 46. 1820.

Arundo lapponica Wahl. Fl. Lapp. 27. 1812.

A slender, glabrous perennial 30 to 100 cm. high, with narrow, often involute leaves and dull brownish purple and contracted panicles 7 to 15 cm. long, interrupted below; spikelets about 5 mm. long; glumes acute, minutely scabrous-pubescent; lemma 4 to 4.5 mm. long; awn rather stout, about equaling the lemma, slightly geniculate and twisted.

In damp soils, valley of the Koyukuk; also in northern Europe and Asia.

SPECIMENS EXAMINED: Dall River, *O. A. Piper* in 1904.

Reported from Dawson ^b (*Williams* in 1899), with the statement that the Alaskan specimen exactly matches a specimen in the herbarium of Columbia University named *Arundo lapponica* by Wahlenberg. It is also reported from Unalaska by Grisebach.^c

8. *Calamagrostis neglecta* (Ehrh.) Gaertn. in Gaertn. Mey. & Scherb. Fl. Wett. **1**: 94. 1799.

Arundo neglecta Ehrh. Beitr. Naturk. **6**: 84. 137. 1791.

A slender, glabrous perennial 25 to 100 cm. high, of soft texture, with often numerous innovations, strongly involute, often nearly filiform leaf blades and narrow, contracted panicles 6 to 10 cm. long, of small spikelets; spikelets 2.5 to 3.5 mm. long; glumes not strongly keeled, glabrous except on the scabrous keels, thin-membranous; lemma 2.5 mm. long; awn about equaling the lemma, straight or slightly bent.

In damp soils, valley of the Koyukuk, the Porcupine River, and the upper Yukon, eastward to Labrador and southward to Maine, Colorado, and Oregon; also in northern Europe and Asia.

SPECIMENS EXAMINED: Dall River, *O. A. Piper* in 1904; Fort Yukon, *Bates* in 1889; Porcupine River, *Turner* in 1891.

9. *Calamagrostis hyperborea* Lange, Fl. Dan. **50**: pl. 3. 1880; Consp. Fl. Groenland. 160. 1880.

A rigid, erect perennial 40 to 70 cm. high, with flat or involute leaves and densely flowered, almost spike-like panicles 5 to 10 cm. long, usually somewhat interrupted below; spikelets about 4 mm. long, the glumes firm, scabrous, usually tinged with purple; lemma about 3.5 mm. long, punctate-scabrous, bearing a stout, nearly straight awn on the back which about equals it in length.

In damp soils, the Aleutian Islands to the upper Yukon, eastward to Greenland and southward in the mountains to Vermont, Arizona, and California.

SPECIMENS EXAMINED: Yukon River, *Dawson* 97; Shumagin Islands, *Trelease & Saunders* 2918, *Saunders* in 1899; Unalaska, *Harrington* in 1871-72.

11. *DESCHAMPSIA* Beauv.

Deschampsia Beauv. Ess. Agrost. 91. pl. 8. f. 3. 1812.

Spikelets 2 or rarely 3-flowered; rachilla hairy, articulated above the glumes and prolonged beyond the upper floret as a hairy bristle; glumes 2, subequal; lemmas subhyaline, 4-nerved, bearing on the back a slender, usually twisted and geniculate awn. Annual or perennial grasses with flat or convolute leaves and rather small shining spikelets in terminal, narrow, or open panicles.

^a U. S. Dept. Agr. Div. Agrost. Circ. **30**: 7. 1901.

^b Nash, Bull. N. Y. Bot. Gard. **2**: 154. 1901.

^c Ledeb. Fl. Ross. **4**: 429. 1853.

Glumes extending much beyond the lemmas.

Annual.

Panicle branches widely spreading 1. *D. calycina*.

Panicle branches erect, the panicle elongated..... 2. *D. elongata*.

Perennial; panicle short, branches spreading..... 3. *D. atropurpurea*.

Upper lemma equaling or extending beyond the glumes.

Spikelets 6 to 7 mm. long..... 4. *D. bottnica*.

Spikelets 3.5 to 5 mm. long.

Plants 60 to 100 cm. high..... 5. *D. caespitosa*.

Plants 40 cm. high or less.

Culm leaves very short, basal ones filiform, soft;

spikelets 3 to 4 mm. long..... 7. *D. curtifolia*.

Culm leaves elongated, basal ones firm, involute;

spikelets about 5 mm. long..... 6. *D. alpina*.

1. ***Deschampsia calycina*** Presl, Rel. Haenk. 1: 251. 1830.

A rather slender, erect, caespitose species, 10 to 70 cm. high, with very narrow leaves and spreading panicles; spikelets 6 to 8 mm. long with linear-lanceolate, 3-nerved, subequal glumes; lemmas 2 to 3 mm. long, awned just below the middle; awn twisted below, geniculate, 3 to 4 times as long as the lemma.

In damp soils, upper Yukon and Yakutat Bay, thence southward to Utah, California, Mexico, and Peru.

SPECIMENS EXAMINED: Yakutat Bay, *Piper* 4650; Dawson, *Williams* in 1899, probably introduced.

2. ***Deschampsia elongata*** (Hook.) Munro in Benth. Pl. Hartw. 342. 1857.

Aira elongata Hook. Fl. Bor. Amer. 2: 243. pl. 288. 1840.

A slender species 30 to 120 cm. high, with flat or involute, glabrous leaves and narrow elongated panicles; spikelets about 4 mm. long with nearly equal, very acute, 3-nerved glumes which exceed the florets in length; lemmas about 2 mm. long, bearing a slender awn near the base, which is at least twice as long as the lemma.

Introduced in Alaska at Yakutat Bay and in southeastern Alaska, and extending southward to Montana and Mexico.

ALASKA SPECIMENS: Yakutat, *Piper* 4737; reported from Chilkat, by F. Kurtz.^a

3. ***Deschampsia atropurpurea*** (Wahl.) Scheele, Flora 27: 56. 1844.

Aira atropurpurea Wahl. Fl. Lapp. 37. 1812.

MOUNTAIN HAIRGRASS.

A slender, alpine grass 15 to 40 cm. high, with flat leaves and few-flowered, nodding panicles 3 to 12 cm. long; spikelets about 5 mm. long with ovate-lanceolate, acute, glumes and erose-truncate, awned lemmas 2.3 mm. long; awns geniculate, exceeding the lemma.

In moist soil, the Aleutian Islands, Yakutat Bay, and southeastern Alaska eastward to Labrador and south in the mountains to New York and Colorado; also in Europe, Asia, and South America.

SPECIMENS EXAMINED: Juneau, *Cooley* in 1891; Latouche, *Piper* 4724, 4733; Unalaska, *Applegate*, viviparous form, *Kellogg* 98, *Piper* 4722; Atka Island, *Turner* 1189; Sitka, *Evermann* 229, *Piper* 4734, 4735; Iliuliuk, *Harrington* in 1871-72; Yes Bay, Behm Canal, *Gorman* 137.

4. ***Deschampsia bottnica*** (Wahl.) Trin. Fund. Agrost. 158. 1820.

Aira bottnica Wahl. Fl. Lapp. 36. 1812.

A rather stout, glabrous, caespitose perennial 60 to 100 cm. high, with numerous firm, very smooth, usually involute leaves, and elongated, mostly contracted, pale or purplish panicles 15 to 30 cm. long; ligule often 1 cm. in length; spikelets 6 mm. long, lanceolate; lemmas about 4 mm. long, the awn usually exerted.

^a Bot. Jahrb. Engler 19: 421. 1894.

In damp soils, the Pribilof and Aleutian islands to southeastern Alaska and southward to Oregon; also in northern Europe and Asia.

This species is closely related to *Deschampsia caespitosa* and in many cases the two forms can only be separated arbitrarily. In general, however, *Deschampsia bottnica* is distinguished by its narrower panicles, larger spikelets, often longer awn, and thicker, firmer leaves, which are usually involute.

5. *Deschampsia caespitosa* (L.) Beauv. Ess. Agrost. 91. 1812. HAIRGRASS.

Aira caespitosa L. Sp. Pl. 64. 1753.

A caespitose, glabrous perennial 60 to 100 cm. high, with usually flat leaves, glabrous beneath, scabrous above, and open panicles 10 to 20 cm. in length; spikelets 3 to 4 mm. long; awn slender, equaling or a little shorter than the lemma.

In damp soils, Shumagin Islands and Bristol Bay to the upper Yukon, eastward to Newfoundland and southward to New Jersey, Minnesota, New Mexico, and California; also in Europe and Asia.

SPECIMENS EXAMINED: Fort Yukon, *Georgeson* 21, *Bates* in 1889; White River, *Gorman* 1150; Dawson, *Williams* in 1899; Shumagin Islands, *Trelease & Saunders* 2928, *Harrington* in 1871-72; Unalaska, *Macoun* in 1891; Nushagak, *McKay* in 1881; without locality, *Bates* in 1889.

6. *Deschampsia alpina* (L.) Roem. & Schult. Syst. Veg. 2: 686. 1817.

Aira alpina L. Sp. Pl. 65. 1753.

A densely caespitose perennial 30 cm. high or less with numerous, flat or folded basal leaves, glabrous beneath, scabrous above, and pyramidal panicles 10 cm. long or less; panicles often rather densely flowered, the lower branches spreading or ascending, fasciculate, 5 to 6 cm. long, flower-bearing above the middle; spikelets about 5 mm. long, very similar to those of *Deschampsia caespitosa*.

In damp soil, islands of Bering Sea and Alaska Peninsula; also in northern North America, Europe, and Asia.

SPECIMENS EXAMINED: Cold Bay, *Piper* 4726; St. Paul Island, *Macoun* 128, *Palmer, Trelease & Saunders* 3005, *Dall's Expedition, Elliott* in 1872, *Merriam* in 1891; Seal Islands, *Bryant* in 1875; St. Matthew Island, *Coville & Kearney* 2103.

The species here recognized as *Deschampsia alpina* differs in some respects from the European specimens, but the points of difference are not sufficiently constant and distinct to warrant its recognition as a new species. It intergrades with both *Deschampsia caespitosa* and *D. bottnica*, but is distinguished by its small size, pyramidal panicles and more rigid panicle branches, and by its spikelets which are intermediate in size between those of *Deschampsia caespitosa* and *D. bottnica*.

7. *Deschampsia curtifolia* Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 30: 7. 1901.

Deschampsia brachyphylla Nash in Rydb. Mem. N. Y. Bot. Gard. 1: 37. 1900, not Philippi, Anal. Univ. Chile 94: 23. 1896.

A densely caespitose perennial 40 cm. high or less, with numerous very narrow involute basal leaves, short culm leaves, and exserted, contracted or spreading panicles 3 to 7 cm. long; spikelets 3 to 4 mm. long, similar to those of *Deschampsia caespitosa*.

Islands of Bering Sea to the Shumagin Islands and Alaska Peninsula, and southward in the mountains to Montana and Wyoming.

SPECIMENS EXAMINED: Cold Bay, *Piper* 4723, 4730; Shumagin Islands, *Kincaid* in 1899, *Trelease & Saunders* 2927, 2968, *Piper* 4732, 4731, 4728; Hall Island, *Macoun* in 1891; Kodiak, *Piper* 4727.

Deschampsia brevifolia R. Br. has been credited to Alaska by various authors and its range has been extended, erroneously, we believe, south to the mountains of Montana and Wyoming.^a It appears that this species was misinterpreted by Trinius^b

^a Rydberg, Mem. N. Y. Bot. Gard. 1: 37. 1900.

^b Gram. Icon. 3: pl. 256A. 1836.

and has been also by recent authors. *Deschampsia brachyphylla* Nash is distinct from the plant described as *Deschampsia brevifolia* by Robert Brown, which belongs to *Deschampsia arctica* (Spreng.) Merrill.

12. TRisetum Pers.

Trisetum Pers. Syn. Pl. 1: 97. 1805.

Spikelets 2-flowered or rarely 3 to 5-flowered; rachilla hairy or naked, articulated above the glumes and between the florets, produced beyond the upper floret as a (usually) hairy bristle; glumes 2, awnless, carinate, usually unequal; lemmas subhyaline, carinate, cleft or 2-toothed at the apex, the teeth sometimes produced into slender awns, bearing between them, or a little below the cleft, a straight or usually twisted and geniculate awn. Cespitose perennials with flat leaves and dense spike-like or loose and open panicles.

Inflorescence a lax, open, few-flowered panicle..... 1. *T. cernuum*.

Inflorescence a densely flowered spike-like panicle.

Plants glabrous or nearly so..... 2. *T. spicatum*.

Plants densely soft-pubescent throughout.

Spikelets about 5 mm. long..... 2a. *T. spicatum molle*.

Spikelets about 7 mm. long..... 3. *T. alaskanum*.

1. **Trisetum cernuum** Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 61. 1830.

A slender perennial 60 to 100 cm. high with rather broad, flat leaves and loosely flowered, nodding panicles 12 to 20 cm. long; spikelets 6 to 8 mm. long, 2 to 4-flowered; lemmas with a few hairs at the base, scabrous, cleft at the apex and bearing a slender awn 6 to 10 mm. long.

In damp soil and thickets, from Yakutat Bay to the southeastern boundary and southward to Montana, Idaho, and northern California.

ALASKA SPECIMENS: Yakutat, *Piper* 4650; Latouche, *Piper* 4648; Juneau, *Coville & Kearney* 2512; Yes Bay, Behm Canal, *Howell* 1716; Sitka, *Piper* 4649.

2. **Trisetum spicatum** (L.) Richter, Pl. Eur. 1: 59. 1890.

Aira spicata L. Sp. Pl. 64. 1753, not *A. spicata* L. op. cit. 63.

Aira subspicata L. Syst. Nat. ed. 10. 873. 1759.

A tufted, nearly glabrous perennial, 10 to 60 cm. high, with densely flowered, spike-like, usually purplish panicles 3 to 10 cm. long; spikelets 2 or 3-flowered, usually about 5 mm. long, the lemmas slightly exserted, each bearing a scabrous, usually flexuous awn about as long as the lemma.

In rocky places, Seward Peninsula to the Aleutian Islands and southeastern Alaska, eastward to Labrador and southward to North Carolina, New Mexico, and California; also in Europe, Asia, and Australia.

SPECIMENS EXAMINED: Port Clarence, *Walpole* 1790, 1714, 1991; Unalaska, *Harrington* in 1871-72; Kukak Bay, *Trelease & Saunders* 2934; Muir Glacier, *Trelease & Saunders* 2932.

An extremely variable and widely distributed species presenting many puzzling forms.

2a. **Trisetum spicatum molle** (Michx.)

Avena mollis Michx. Fl. Bor. Amer. 1: 72. 1803.

Trisetum molle Kunth, Rév. Gram. 1: 101. 1829.

A densely tufted form with habit and spikelet characters of the species, but differing in its densely pubescent culms, sheaths, and leaves.

Throughout Alaska and the same general range as the species.

3. *Trisetum alaskanum* Nash, Bull. N. Y. Bot. Gard. 2: 155. 1901.

A tufted perennial 20 to 50 cm. high, with villous culms, pubescent blades and sheaths, and densely flowered, spike-like, contracted panicles 4 to 10 cm. long; spikelets 6 to 7 mm. long, 2 or 3-flowered; lemmas not exserted, hispidulous, the lower one 5 to 6 mm. long; awn about as long as the lemma.

On open hillsides, Aleutian Islands, Alaska Peninsula, and southeastern Alaska.

A doubtful species closely related to *Trisetum spicatum molle*, from which it is distinguished only by its larger spikelets and included lemmas.

TRISETUM FLAVESCENS (L.) Beauv. is reported from Port Clarence ^a but evidently on an erroneous determination, the plant so named doubtless being *Trisetum cernuum*. *Avena subspicata* of Griseb. in Ledeb. Fl. Ross. is *Trisetum spicatum molle*, while *Avena sesquiflora* of the same work is true *Trisetum spicatum*. The range of *Trisetum canescens* Buckl. is extended to Alaska by Beal ^b sub *T. cernuum canescens*, but he cites no Alaskan material.

13. *AVENA* L.

Avena L. Sp. Pl. 79. 1753.

Spikelets 2 to 4-flowered, callus of the lemmas bearded; glumes membranaceous, exceeding the lemmas in length; lemmas rounded on the back, 5 to 9-nerved with a dorsal twisted awn. Native species, perennials with paniculate inflorescence and usually large spikelets.

1. *Avena striata* Michx. Fl. Bor. Amer. 1: 73. 1803.

A slender, erect, glabrous perennial 30 to 60 cm. high, with narrow, flat leaves, short ligules, and simple, racemose, open panicles; spikelets about 12 mm. long, 3 to 6-flowered, on slender pedicels; glumes acute, the first 1-nerved, the second 3-nerved; lemmas 7-nerved, about 8 mm. long, much exceeding the palea, bearing a twisted geniculate awn just below the acutely 2-cleft apex.

Collected at Cook Inlet and extending eastward to New England and New York.

SPECIMEN EXAMINED: Kenai, Piper 4715.

14. *BECKMANNIA* Host.

Beckmannia Host, Icon. Gram. Austr. 3: 5. pl. 6. 1805.

Spikelets 1 or 2-flowered, rather broad, compressed, closely imbricated in two rows along one side of the rachis of the short spikes; rachilla articulated below the glumes; glumes 2, inflated, boat-shaped. A rather tall, erect grass with flat leaves and a terminal, narrow, elongated inflorescence.

1. *Beckmannia erucaeformis* (L.) Host, Icon. Gram. Austr. 3: 5. pl. 6. 1805.

SLOUGH-GRASS.

Phalaris erucaeformis L. Sp. Pl. 55. 1753.

In sloughs and along the banks of streams, Porcupine River and the upper Yukon, southward to Ontario, Iowa, and California; also in Europe and Asia.

SPECIMENS EXAMINED: Fort Yukon, Bates in 1889; Porcupine River, Turner in 1891.

15. *CATABROSA* Beauv.

Catabrosa Beauv. Ess. Agrost. 97. 1812.

Spikelets small, usually 2-flowered, the rachilla articulated between the florets; glumes 2, much shorter than the lemmas, unequal, scarious, very obtuse, or the upper one crenulate at the apex; lemmas subcoriaceous, prominently 3-nerved, awnless. A creeping aquatic grass with thin flat leaves and open, pyramidal panicles.

^a Kjellman in Nordenskiöld, Vega-Exped. 2: 55. 1883.

^b Grasses N. Amer. 2: 380. 1896.

1. *Catabrosa aquatica* (L.) Beauv. Ess. Agrost. 97. 1812.*Aira aquatica* L. Sp. Pl. 64. 1753.

A glabrous, soft perennial, with creeping or ascending culms 20 to 60 cm. long, with open panicles, the spreading or ascending branches in whorls; spikelets 2.5 to 3.5 mm. long.

About springs and the margins of streams, often in shallow water, Alaska (?) to Newfoundland, south to Utah, Colorado, and Nebraska; also in Europe and Asia.

We have seen no specimen of this grass from Alaska. It is, however, credited to Sitka, by Grisebach.^a

16. **MELICA** L.*Melica* L. Sp. Pl. 66. 1753.

Spikelets 2 to several-flowered; rachilla articulated above the glumes and between the fertile florets, usually bearing several empty club-shaped or cucullate glumes at the apex; lemmas exceeding the glumes, awnless or short-awned. Perennial grasses with soft flat leaves, rather large spikelets in lax or dense, usually narrow panicles.

1. *Melica subulata* (Griseb.) Scribn. Proc. Acad. Phila. 1885: 47. 1885.*Bromus subulatus* Griseb. in Ledeb. Fl. Ross. 4: 358. 1853.*Festuca cepacea* Phil. Linnæa 33: 297. 1864-65.*Melica acuminata* Boland. Proc. Calif. Acad. 4: 104. 1870.*Melica cepacea* Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 30: 8. 1901.

An erect, leafy perennial 90 to 120 cm. high, from a bulbous base, with flat leaves and rather lax panicles 10 to 20 cm. long; spikelets 3 to 5-flowered, with unequal glumes and attenuate-pointed lemmas about 12 mm. long, ciliate on the margins and sparingly pilose on the back below.

In forests and along mountain streams, Unalaska, the type locality, to southeastern Alaska, and southward to Montana and California; also in Chile.

SPECIMENS EXAMINED: Howkan, *Evans* 128; Unalaska, *Piper* 4716.

There has been some confusion regarding this species, owing to the fact that *Festuca subulata* Bong. and *Bromus subulatus* Griseb. were both based on Alaskan material, the two species being considered identical by Gray and Thurber, although they are not at all related to each other. The very full description by Grisebach leaves no doubt as to the identity of his species, and it is an interesting fact that the type of *Festuca cepacea* Phil., from the mountains of Chile, now in the herbarium of the University of Chile, exactly matches the common form of *Melica subulata* from our western coast region.

17. **DACTYLIS** L.*Dactylis* L. Sp. Pl. 71. 1753.

Spikelets 3 to 5-flowered, nearly sessile, in dense fascicles; rachilla articulated above the glumes and between the florets; glumes unequal, 1 to 3-nerved; lemmas 5-nerved, short awn-pointed with a prominent ciliate-fringed keel. Perennial grasses with flat leaves and narrow glomerate panicles.

1. *Dactylis glomerata* L. Sp. Pl. 71. 1753.

ORCHARD GRASS.

A coarse, erect grass, 90 to 120 cm. high, forming dense tufts, with long, flat or slightly keeled leaf blades and 3 to 5-flowered spikelets, crowded in dense one-sided clusters at the ends of the panicle branches; lemmas short-awned, ciliate on the keels.

Southeastern Alaska, and extensively naturalized in fields and waste ground throughout the United States; also in Europe and Asia.

SPECIMENS EXAMINED: Howkan, *Evans* in 1897, "growing in a yard, probably seeded from packing."

18. **POA** L.*Poa* L. Sp. Pl. 67. 1753.

Spikelets 2 to 6-flowered; rachilla articulated above the glumes; glumes lanceolate or ovate, 1 to 3-nerved, keeled; lemmas lanceolate or ovate, awnless, 5-nerved, carinate,

^a Ledeb. Fl. Ross. 4: 388. 1853.

the dorsal and marginal nerves usually soft-hairy and often with a tuft of long, cobwebby hairs at the base, rarely glabrous. Annual or perennial grasses with usually open panicles.

- Annuals..... 1. *P. annua*.
- Perennials.
- Culms slender, rarely exceeding 30 cm. in height.
- Leaves short, 2 to 4 mm. wide, abruptly acute.
- Leaves firm, rigid; panicle branches short, spreading, densely flowered..... 2. *P. alpina*.
- Leaves thin, soft; panicle branches elongated, slender, ascending, few-flowered..... 4. *P. glacialis*.
- Leaves usually elongated, 2 mm. wide or less, gradually narrowed to the apex.
- Lemmas pubescent on the back below..... 3. *P. arctica*.
- Lemmas glabrous between the nerves.
- Basal leaves thin, soft, elongated, the panicle branches spreading..... 5. *P. paucispicula*.
- Basal leaves rather firm, short, often somewhat involute, the panicle branches ascending... 6. *P. laxa*.
- Culms usually much exceeding 30 cm. in height, mostly stout.
- Spikelets exceeding 6 mm. in length.
- Leaf blades narrow, 3 mm. wide or less.
- Panicles elongated, narrow, often nodding, the branches ascending..... 13. *P. stenantha*.
- Panicles ovate, open, erect, the branches spreading..... 14. *P. acutiglumis*.
- Leaf blades 4 to 10 mm. wide.
- Panicles ovate, densely flowered, 2 to 4 cm. in diameter, the branches short, ascending, flower-bearing throughout..... 17. *P. trini*.
- Panicles open, the branches naked below, spreading or ascending.
- Panicle branches straight, rigid..... 18. *P. eminens*.
- Panicle branches flexuous.
- Panicles erect..... 16. *P. lanata*.
- Panicles nodding, leaf blades rather soft; lemmas 7 mm. long..... 15. *P. turneri*.
- Spikelets 6 mm. or less in length.
- Lemmas 4 to 6 mm. long; panicles contracted; lemmas not webbed at the base..... 13. *P. stenantha*.
- Lemmas less than 4 mm. long.
- Pedicels commonly shorter than the spikelets.
- Lemmas obscurely nerved..... 7. *P. triflora*.
- Lemmas prominently nerved.
- Lateral nerves silky-villous..... 10. *P. pratensis*.
- Lateral nerves glabrous..... 9. *P. trivialis*.
- Pedicels equaling or much exceeding the spikelets.
- Spikelets 5 to 6 mm. long; panicle branches glabrous..... 12. *P. leptocoma*.
- Spikelets less than 5 mm. in length; panicle branches scabrous.
- Leaf blades thin, soft, flaccid; lemmas 3 mm. long..... 11. *P. rotundata*.
- Leaf blades firm; lemmas 2.5 mm. long. 8. *P. nemoralis*.

1. *Poa annua* L. Sp. Pl. 68. 1753.

ANNUAL BLUEGRASS.

A low tufted, pale green annual with erect or ascending, somewhat flattened culms, 5 to 30 cm. high, flat, thin, spreading leaves, and usually open, short-pyramidal panicles 2 to 5 cm. long; spikelets 3 to 6-flowered, about 4 mm. long; glumes slightly unequal, the second 3-nerved; lemmas obtuse, hairy on the nerves below and pilose at the base, about 2 mm. long, distinctly 5-nerved.

Fields and waste places, Aleutian Islands to southeastern Alaska, eastward to Labrador and southward; also in Europe and Asia.

2. *Poa alpina* L. Sp. Pl. 67. 1753.

MOUNTAIN BLUEGRASS.

A densely caespitose, glabrous, erect perennial, 5 to 30 cm. high, with rather broad, flat, firm leaves and spreading, densely flowered, usually purplish, pyramidal panicles 3 to 9 cm. long; spikelets 5 to 6 mm. long, 3 to 6-flowered; glumes broad, aculeolate, scabrous on the keels above, otherwise glabrous; lemmas about 4 mm. long, pilose on the keel and nerves below, pubescent between the nerves near the base.

Along cold mountain streams, open slopes, and canyons, Seward Peninsula to southeastern Alaska, eastward to Labrador, and southward in the mountains to Colorado; also in Europe and Asia.

2a. *Poa alpina vivipara* (Willd.)

Poa vivipara Willd. Enum. Pl. 105. 1809.

A form with many of the glumes developed into leaflets. Distinguished from *Poa stenantha vivipara* by its very firm rigid leaves.

SPECIMENS EXAMINED: Hall Island, *Trelease & Saunders* 2964; St. Matthew Island, *Trelease & Saunders* 2963, *Coville & Kearney* 2104; Kukak Bay, *Coville & Kearney* 1500 bis; Popof Island, *Kincaid* in 1899; Yakutat Bay, *Trelease & Saunders* 2966, 2971; Hidden Glacier, Yakutat Bay, *Coville & Kearney* 972; Glacier Bay, *Trelease & Saunders* 2965, *Coville & Kearney* 647; Juneau, *Cooley* in 1891.

3. *Poa arctica* R. Br. Suppl. App. Parry's Voy. 288. 1824.

Poa williamsii Nash, Bull. N. Y. Bot. Gard. 2: 156. 1901.

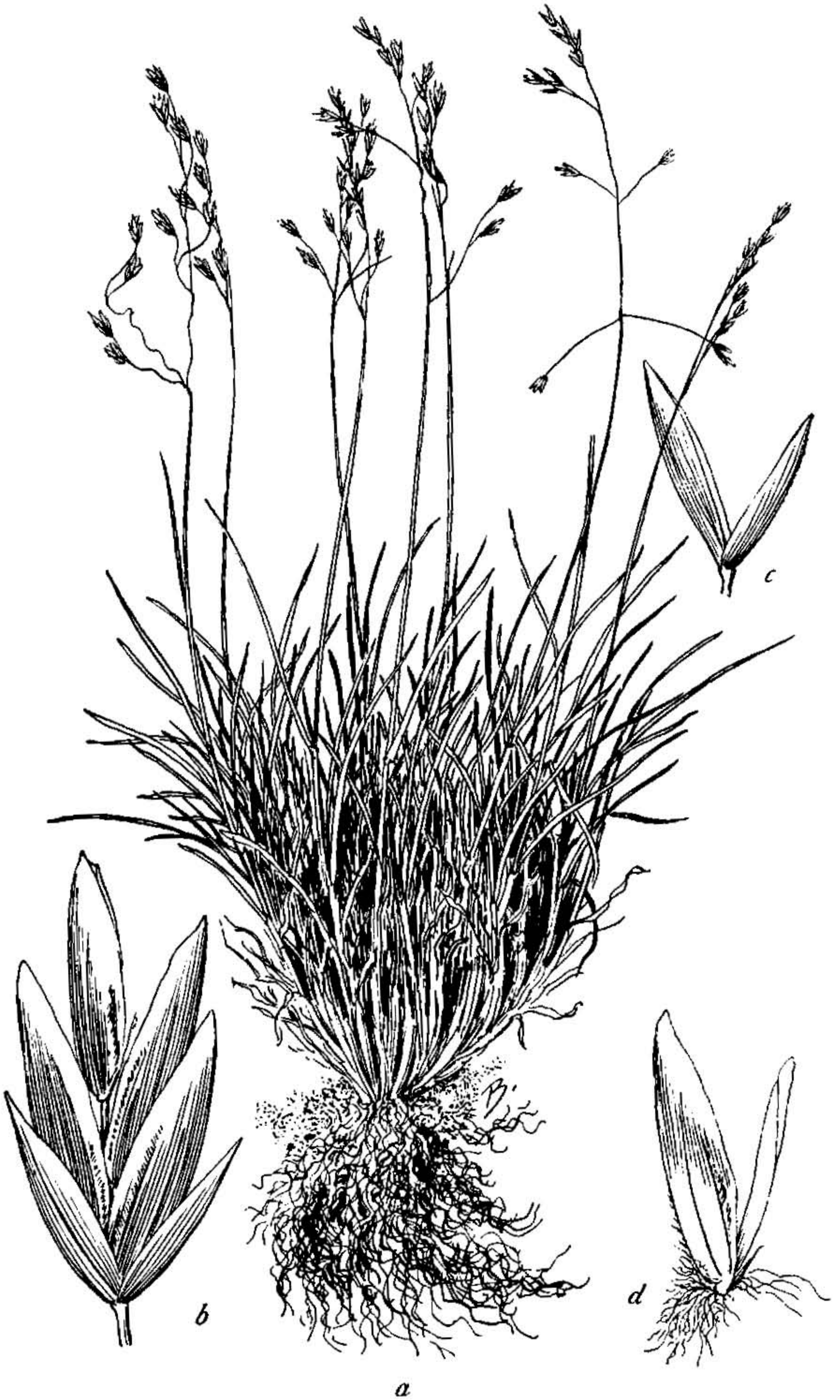
A slender, caespitose, glabrous, erect perennial 10 to 30 cm. high, with open, few-flowered, purplish panicles and short, narrow leaves, those of the culm 2 to 3 cm. long; panicles 3 to 6 cm. long, the glabrous branches mostly spreading, naked below, bearing 2 or 3 spikelets toward the apex; spikelets ovate, 2 to 4-flowered, about 4 mm. long; glumes subequal, slightly shorter than the lemmas, these silky-pubescent on the keel and nerves below, webbed at the base, pubescent between the nerves toward the base.

Throughout Alaska and eastward to Labrador, south to British Columbia and (?) Colorado; also in Siberia.

This species is widely distributed in the arctic regions and has been confused with *Poa cenisia* All., from which it differs in having the lemmas pubescent between the nerves below; in *P. cenisia* the lemma is pubescent only on the nerves. Our conception of *P. arctica* is based upon a portion of Robert Brown's type from Melville Island (from British Museum), and from the grass described by Nash under the name of *P. williamsii*, which is identical with Brown's specimen.

4. *Poa glacialis* sp. nov.

A densely caespitose, glabrous perennial 20 to 30 cm. high, with rather broad, thin, flat leaves and open panicles of few, large, deep purple spikelets; sheaths overlapping; ligule thin, hyaline, truncate, 2 mm. long; leaf blades glabrous throughout, ascending, pale green, 4 to 6 cm. long, 3 to 4 mm. wide, abruptly acute, those of the innovations usually longer and narrower; panicles 5 to 9 cm. long, the flexuous branches glabrous, naked below, bearing two or three spikelets above, the lower ones about 5 cm. long; spikelets about 7 mm. long, 5-flowered, broadly lanceolate; glumes unequal, broadly lanceolate, acute, the first 3 mm. long, the second 1 mm. longer,



POA PAUCISPICULA SCRIBN. & MERR.

3-nerved; lemmas lanceolate, acute, 5-nerved, 4 to 5 mm. long, with very few hairs on the keel and marginal nerves near the base, not webbed at the base.

A very distinct species, recognized by its low habit, broad, thin, glabrous leaves, open panicles, and large, ovate, deep purple spikelets, and by the absence of webby hairs at the base of the lemma.

Type U. S. National Herbarium no. 376363, collected June 21, 1899, Hubbard Glacier, Alaska, by Coville & Kearney (no. 1077.)

Southeastern Alaska.

SPECIMENS EXAMINED: Disenchantment Bay, Hubbard Glacier, *Coville & Kearney* 1077 (specimens immature); Glacier Bay, *Trelease & Saunders* 2951.

5. *Poa paucispicula* sp. nov.

PLATE 15.

A very slender, erect, densely cespitose perennial, 20 to 30 cm. high, from short, creeping rootstocks with numerous thin, narrow, basal leaves and very open panicles 5 to 10 cm. long; sheaths smooth, short, the lower ones marcescent; ligule about 1 mm. long, hyaline, entire, truncate; basal leaves and those of the innovations green, glabrous, 5 to 10 cm. long, about 2 mm. wide, acute and often slightly involute above, those of the culm shorter; panicles somewhat exerted, very lax, few-flowered; rachis glabrous, somewhat undulate; branches in pairs, the lower ones remote and often reflexed, slender, flexuous, glabrous, bearing from 1 to 3 spikelets near the apex, naked below; pedicels equaling or exceeding the spikelets, sparingly scabrous or nearly smooth; spikelets compressed, ovate or oblong, purple, 4 to 6 mm. long, 2 to 5-flowered; first glume 2.5 to 3 mm. long, 1-nerved; second glume 3 to 3.5 mm. long, 3-nerved, the first narrowly, the second broadly ovate-lanceolate, acute, smooth; lemmas 3 to 4 mm. long, 5-nerved, oblong, broadly obtuse, margins and apex subhyaline, pubescent on the keel and lateral nerves below, and slightly scabrous on the keel above, sparingly webby hairy at the base, otherwise smooth; palea purplish, lanceolate, equaling the lemma in length.

Type U. S. National Herbarium no. 376352, collected June 20, 1899, Hidden Glacier, Yakutat Bay, Alaska, by Coville & Kearney (no. 970).

In spikelet characters this plant approaches *P. cenisia* All., but it is at once distinguished from that species by its numerous thin, linear, basal leaves and very lax panicles.

EXPLANATION OF PLATE 15.—*a*, Plant; *b*, spikelet; *c*, glumes; *d*, single floret. *a*, Scale about $\frac{1}{2}$; *b*, *c*, *d*, scale 8.

6. *Poa laxa* Haenke in Jirasek, Beob. Riesengeb. 118. 1791.

A tufted, glabrous, lax perennial, 10 to 30 cm. high, with narrow leaves and open panicles 2 to 8 cm. long, the slender, usually ascending branches bearing a few spikelets above, naked below; spikelets 3 to 5-flowered, 4 to 5 mm. long; lemmas 3 to 4 mm. long, the keel and marginal nerves silky-pilose below, webbed at the base.

Seward Peninsula to Prince William Sound and eastward to Greenland, south in the mountains to New England and Colorado.

SPECIMENS EXAMINED: Port Clarence, *Trelease & Saunders* 2961, *Coville & Kearney* 1925; Prince William Sound, *Trelease & Saunders* 2972.

7. *Poa triflora* Gilib. Exerc. Phyt. 2: 531. 1790.

FOWL MEADOW GRASS.

Poa serotina Ehrh. Beitr. Naturk. 6: 83. 1791, nomen nudum.

An erect, glabrous perennial 40 to 120 cm. high, with narrow leaves and diffuse, usually open panicles 15 to 30 cm. long, the branches spreading or ascending, 5 to 12 cm. long, divided and spikelet-bearing above the middle; spikelets 3 to 5-flowered, 3 to 4 mm. long, usually exceeding their pedicels; lemmas 2 to 3 mm. long, the keel and marginal nerves silky-pubescent below, slightly webbed at the base, the intermediate nerves obscure or wanting.

In swampy places, July and August, southeastern Alaska to Nova Scotia, south to New Jersey, Nebraska, and Colorado; also in Europe and Asia.

SPECIMEN EXAMINED: Bella-bella Island (near Vancouver Island), *Kellogg* 97.

8. *Poa nemoralis* L. Sp. Pl. 69. 1753.

An erect, glabrous, tufted perennial, 20 to 60 cm. high, with narrow leaves, short ligules, and lanceolate panicles 5 to 12 cm. long, the branches naked below, erect or ascending, rarely spreading, 2 to 5 cm. long; spikelets 2 to 5-flowered, 3 to 4 mm. long; lemmas 2 to 2.5 mm. long, faintly 5-nerved, somewhat webbed at the base and silky-pubescent on the keel and marginal nerves below.

Aleutian Islands and Alaska Peninsula, eastward to Newfoundland and southward; also in Europe and Asia.

SPECIMENS EXAMINED: Unalaska, *Coville & Kearney* 1770, *Piper* 4770; Shumagin Islands, Popof, *Trelease & Saunders* 2975, *Saunders* in 1899; Kodiak Island, *Trelease & Saunders* 2940, *Piper* 4744, 4745, 4746, 4747, 4748, 4749, 4763; Kukak Bay, *Coville & Kearney* 1500.

The material here referred to *Poa nemoralis* is scarcely typical of that species, but in the present state of our knowledge concerning this extremely difficult genus we have considered it advisable so to refer it.

9. *Poa trivialis* L. Sp. Pl. 67. 1753.

An erect, usually slender, perennial, 30 to 90 cm. high, with flat leaves and open, many-flowered panicles, 6 to 15 cm. long; sheaths slightly scabrous; ligule 4 to 6 mm. long; culms usually rough below the panicle; spikelets 2 or 3-flowered, about 3 mm. long; glumes very acute; lemmas prominently 5-nerved, silky-pubescent on the keel below and with long, cobwebby hairs at the base.

In meadows and along roadsides, Aleutian Islands and southeastern Alaska to Newfoundland and southward; also in Europe and Asia.

SPECIMENS EXAMINED: Atka Island, *Turner* 1198, common; Sitka, *Wright* 1583, in drier places in shelter of young evergreen trees, *Piper* 4741; Wrangell, *Evans* 148, abundant in cleared ground.

10. *Poa pratensis* L. Sp. Pl. 67. 1753.

KENTUCKY BLUEGRASS.

An erect, stoloniferous perennial, 30 to 120 cm. high, with narrow, flat leaves and more or less spreading, usually pyramidal, panicles, 5 to 20 cm. long; spikelets 3 to 5-flowered, 4 to 5 mm. long, exceeding their pedicels; glumes acute; lemmas 3 mm. long, with abundant cobwebby hairs at the base, the keel and marginal nerves silky-pubescent below, the intermediate nerves naked.

Fields and meadows, from the Yukon valley southward and eastward to Newfoundland; also in Europe and Asia.

11. *Poa rotundata* Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 378. 1830.

A pale, slender, caespitose perennial, 30 to 70 cm. high, with elongated, linear, thin culm leaves and lanceolate few-flowered panicles 10 to 15 cm. long, the scabrous, slender, somewhat flexuous, ascending branches naked below, flower-bearing above; ligule 2 to 3 mm. long; culm leaves 10 to 15 cm. long; 1 to 1.5 mm. wide, plane, glabrous; spikelets 4 to 5 mm. long, 3 or 4-flowered; glumes lanceolate, acuminate, glabrous, the second about 0.5 mm. longer than the first, this 2.5 to 3 mm. in length; lemmas lanceolate, acute, about 3 mm. long, glabrous, except on the keel and marginal nerves, these silky-villous below but scarcely webbed.

Upper Yukon, Aleutian Islands, and southeastern Alaska.

SPECIMENS EXAMINED: Unalaska, *Mertens*, cotype (from Herb. Acad. St. Petersb.); Juneau, *Cole* in 1899, *Coville & Kearney* 2479; Eagle, *Georgeson* 28, a form with larger spikelets than in the type.

A valid species recognized by its lax habit, elongated, narrow leaves, and lax panicles. The spikelets in anthesis are somewhat circular in outline, whence the name.

12. *Poa leptocoma* Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 374. 1830.

Poa stenantha leptocoma Griseb. in Ledeb. Fl. Ross. 4: 372. 1853.

A lax, pale green, glabrous perennial 30 to 50 cm. high, with thin, glabrous leaves 5 to 12 cm. long and 2 to 4 mm. wide, and lax, flexuous panicles 5 to 10 cm. long, the

slender, glabrous branches naked below, bearing a few spikelets above the middle, the lower ones often 6 cm. long, spreading or ascending; spikelets 5 to 6 mm. long, 2 or 3-flowered, the glabrous pedicels exceeding the spikelets; glumes lanceolate, acuminate, glabrous, the first 2.5 mm. long, the second 3 mm. long, faintly 3-nerved; lemmas narrowly lanceolate, acuminate, about 3.5 mm. long, obscurely 5-nerved, somewhat villous on the keel and marginal nerves below, webbed at the base, the hairs as long as the lemma or longer, otherwise glabrous; palea nearly equaling the lemma, slightly scabrous on the keels.

Sitka and southward to Washington and (?) Colorado.

SPECIMEN EXAMINED: Sitka, *Mertens* (from Herb. Acad. St. Petersb.).

We have seen no Alaskan material representing this species other than the fragment in the U. S. National Herbarium from the type collection, and also a similar specimen in the Bernhardt Herbarium in the collections of the Missouri Botanical Garden. Both these specimens are of the form α , which we consider to represent the species, as the form β from Kamtchatka is evidently a different species, approaching *Poa arctica* R. Br. The present species is distinguished by its slender habit, thin, pale green leaves, lax few-flowered panicles, and narrow, acuminate lemma; in many respects it resembles *Poa reflexa* Vasey & Scribn.

12a. *Poa leptocoma elatior* subsp. nov.

A tall form 80 to 90 cm. high, with ample spreading panicles about 20 cm. long, the scabrous branches 7 to 10 cm. long, bearing few spikelets, these somewhat larger than in the species; leaf blades 10 to 15 cm. long, 5 mm. wide; spikelets 3-flowered, 6 mm. long, the lemmas distinctly nerved, 4.5 mm. long. Perhaps this may prove to be a good species.

Type U. S. National Herbarium no. 376602, collected July 26, 1899, Cape Fox, *Trelease & Saunders* (no. 2982).

Southeastern Alaska.

SPECIMENS EXAMINED: Cape Fox, *Trelease & Saunders* 2982; Hot Springs, *Howell* 1719.

13. *Poa stenantha* Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 376. 1830.

Poa flavicans Ledeb. Fl. Ross. 4: 373. 1853.

A slender, erect, glabrous perennial 30 to 70 cm. high, with thin, narrow, ascending leaves and elongated, narrow, pale or usually purplish, somewhat nodding, panicles 15 cm. long or less, the scabrous branches ascending, naked below, the lower ones often 8 cm. long; leaf blades 1 to 3 mm. wide, mostly glabrous; ligule 3 to 4 mm. long; lemmas 4 to 6 mm. long, lanceolate, acute, villous on the keel and marginal nerves below, not webbed at the base, slightly scabrous above and sometimes slightly pubescent between the nerves below.

The Aleutian Islands and Alaska Peninsula to southeastern Alaska; also in northeastern Asia.

A variable species, evidently common in Alaska, in general recognized by its elongated, contracted, somewhat nodding panicles and the absence of cobwebby hairs at the base of the lemmas. We have not been able satisfactorily to separate *Poa flavicans* from *P. stenantha*, even by comparison of typical material of each from the herbarium of the St. Petersburg Academy of Sciences, and have accordingly reduced the former to a synonym of the latter. Piper's no. 4739 is exactly *Poa flavicans* Griseb. in Ledeb. Fl. Ross.

13a. *Poa stenantha vivipara* Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 376. 1830.

A form with the habit and vegetative characters of the species, but with many of the lemmas developed into leaflets.

Norton Sound to the Aleutian Islands and southeastern Alaska.

14. *Poa acutiglumis* Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 9: 4. 1899.

A tufted, glabrous perennial, 50 to 70 cm. high, with rather short, narrow and soft radical leaves and open, pale or purplish, ovate panicles, about 10 cm. long, the scabrous, spreading, or ascending branches naked below, the lower ones 5 to 6 cm. long; spikelets lanceolate, remotely 4 to 6-flowered, 8 to 11 mm. long, glumes unequal, the second about 5 mm. long; lemmas about 5 mm. long, narrowly oblong-lanceolate, acute, rough-hispid on the back, and with a short crisp pubescence at the base and on the lower half of the nerves; palea conspicuously ciliate on the keels and sparsely pubescent near the base.

Southeastern Alaska and southward to Oregon.

SPECIMEN EXAMINED: Juneau, *Coville & Kearney* 2517.

The Alaska specimen cited is somewhat smaller than the type of *P. acutiglumis*, with slightly shorter ligule and less scabrous spikelets. It is the same as Henderson's no. 9 from Oregon, in U. S. National Herbarium.

15. *Poa turneri* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 8: 5. *pl. 1.* 1897.

A rather stout, glabrous, stoloniferous and apparently dioecious perennial 40 to 70 cm. high, with soft flat leaves and more or less spreading and nodding panicles 8 to 15 cm. long, of rather large, compressed 3 to 6-flowered spikelets about 9 mm. long; glumes subequal, both 3-nerved, about equaling the lowest lemma, this about 7 mm. long, densely pilose on the keel and marginal nerves below, and with a tuft of long cobwebby hairs at the base.

Aleutian Islands and Cook Inlet, Alaska.

SPECIMENS EXAMINED: Atka Island, *Turner* 1185 (type), 1200, 1206 in part; Kasilof, *Evans* 615.

A species similar to *Poa hispidula*, but distinguished by its more open and lax panicles, larger spikelets and longer, narrower, more acute glumes and lemmas.

16. *Poa lanata* sp. nov.

PLATE 16.

A slender, erect perennial 25 to 40 cm. high, from creeping rootstocks, with narrow, linear, rigid leaves and open, rather few-flowered panicles 5 to 7 cm. long; sheaths rather loose, the lower ones imbricate and marcescent, decidedly scabrous, or the upper one nearly smooth; ligule about 4 mm. long, hyaline, obtuse, and generally somewhat lacerate; basal leaves and those of the innovations 6 to 12 mm. long, 2 to 4 mm. wide, glaucous, glabrous except on the scabrous margin, folded or involute, acute and hooded at the apex, the culm leaves generally but one, shorter; panicle somewhat exserted, pyramidal, lax; branches mostly in pairs, spreading, the lower ones 2 to 3 cm. long, naked below, bearing from 1 to 3 spikelets near the apex; pedicels scabrous, spikelets ovate, acute, purple, compressed, 8 to 10 mm. long, 3 to 6-flowered; first glume 5.5 mm. long; second glume 6 to 6.5 mm. long, both acute, 3-nerved, scabrous on the keel, minutely and sparingly strigose throughout; lemmas 6 to 7 mm. long, purple, with broad hyaline margins, 5-nerved, obtuse, densely webby hairy in the lower half, strigose above, scabrous on the keel; palea nearly equaling the glume.

Type U. S. National Herbarium no. 376421, collected July 17, 1899, Aleutian Islands, by *Coville & Kearney* (no. 2191).

SPECIMENS EXAMINED: Unalaska, *Piper* 4764, 4752, 4755, 4758; Aleutian Islands, *Coville & Kearney* 2191. Differs from *Poa cenisia* All. and *Poa arctica* R. Br. in the characters of its leaves and sheaths, and in the larger and more densely pubescent lemmas. Apparently closely related to *Poa gelida* Roem. & Schult. from Greenland, so far as can be determined from the description of that species, but differs in certain sheath, panicle, and spikelet characters.

EXPLANATION OF PLATE 16. *a*, Plant; *b*, glumes; *c*, three florets of a spikelet. *a*, Natural size; *b*, scale about 5; *c*, scale about 4. Drawn from the type specimen.



POA LANATA SCRIBN. & MERR.

17. *Poa trinii* sp. nov.

Poa rigens Trin.; Griseb. in Ledeb. Fl. Ross. 4: 393. 1853, as synonym, not Hartm. 1820.

A robust, erect, glabrous perennial about 60 cm. high, with firm, rigid, mostly plane leaves and ovate, very densely flowered panicles 8 to 10 cm. long, 2 to 4 cm. in diameter; culms and sheaths glabrous, the latter shorter than the internodes, rather loose; ligule a cartilaginous ring 1 to 2 mm. long; leaf blades 10 to 15 cm. long, 5 to 8 mm. wide, erect or ascending, glabrous except on the scabrous margins; panicles very densely flowered, the axis and branches glabrous, the latter appressed or ascending, flower-bearing throughout, the lower ones 3 to 4 cm. long; spikelets 6 to 7 mm. long, 3 or 4-flowered; glumes broadly lanceolate, abruptly acute, the first 4.5 mm. long, the second 3-nerved, 5 to 5.5 mm. long; lemmas lanceolate, about 5.5 mm. long, 5-nerved, abruptly acute, very scabrous throughout, with numerous basal hairs about 1 mm. long, and also usually somewhat silky-hairy on the keel and marginal nerves below.

Poa rigens was a herbarium name and was never published by Trinius, although specimens were distributed under it. There is in the Gray Herbarium a specimen bearing the following printed label: "*Poa rigens* Trin. Kamtsch.," and in writing: "Comm. Acad. Petr. 1835," which is the type of our species, and which is doubtless of the same collection that Grisebach observed in the herbarium of Ledebour and which he reduced to *Glyceria glumaris* (*Poa emineus* Presl). *Poa trinii* is, however, very distinct from that species, being readily recognized by its smaller spikelets, and especially by its very densely flowered ovate panicles.

Norton Sound, islands of the Bering Sea, and Shumagin Islands.

SPECIMENS EXAMINED: St. Michael Island, *Turner* 6, common on dry hillside; Nagai Island, *Harrington* in 1871-72; without locality, *Dall* in 1873.

18. *Poa emineus* Presl, Rel. Haenk. 1: 273. 1830.

Poa glumaris Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 379. 1830.

Glyceria glumaris Griseb. in Ledeb. Fl. Ross. 4: 392. 1853.

A stout, erect, glabrous, glaucous perennial 30 to 90 cm. high, from strong creeping rootstocks, with thick, flat leaves 15 to 25 cm. long, 6 to 10 mm. wide and many-flowered panicles 10 to 20 cm. long, the branches spreading or ascending, fasciculate, glabrous, often 8 to 10 cm. long; spikelets 3 to 5-flowered, 8 to 12 mm. long, with nearly equal glabrous glumes, the second 7 to 8 mm. long, somewhat exceeding the first; lemmas strongly scabrous, 5 to 7 mm. long, pubescent on the keel and margins below, not webbed.

In damp soil and in sands along the coast from the Aleutian Islands to southeastern Alaska, and southward to California; also on the northern Atlantic coast.

SPECIMENS EXAMINED: *Turner* 1206 in part; St. Paul Island, *Macoun* 16631; Nushagak, *Winneman* in 1884, *McKay* in 1881; Popof Island, *Saunders* in 1899, *Trelease & Saunders* 2919; Seldovia, *Piper* 4767; Shumagin Islands, *Harrington* in 1871-72, *Trelease & Saunders* 2977; Cape Fox, *Trelease & Saunders* 2920; Homer, *Evans* 472, *Piper* 4765; Kasilof, *Evans* 692; Kodiak, *Piper* 4766, 4768; between Cook Inlet and Tanana River, *Glenn* in 1899; Virgin Bay, *Coville & Kearney* 1210; Yakutat Bay, *Trelease & Saunders* 2923, 2924; Unalaska, *Coville & Kearney* 1750, *Harrington* in 1871-72; Tatitlak, *Evans* 273; without locality, *Funston* 137.

Presl's name being the earliest available one for this species, it is here taken up, as there is no doubt as to the identity of his species. *Poa emineus* is a most distinct species, readily recognized by its coarse, rigid culms and leaves, and large panicles and spikelets.

SPECIES OF POA ERRONEOUSLY ASCRIBED TO ALASKA.

In addition to the Alaskan species of *Poa* enumerated above many other species have been reported from that region, chiefly, we believe, on misconception of species and erroneous determinations. Specimens reported as *Poa cenisia* All. are doubtless *Poa arctica* R. Br.; *Poa cenisia* is not found in North America. *Poa bulbosa vivipara* Bess., reported by Durand, is *Poa stenantha vivipara* Trin. *Poa caesia* J. E. Smith is reported from Alaska by Grisebach and Macoun, but evidently on a misconception of the species. *Poa pratensis alpigena* Fries, a variety unknown to us, is reported from Port Clarence by Kjellman.^a *Poa flexuosa* Wahl., formae *genuina* and *typica*, is reported from the same locality by Kjellman,^b as are also *Poa glauca* Vahl, and *Poa glauca elatior* Anderss., evidently, however, on erroneous determinations. *Poa flexuosa* of Trinius from Sitka is *Poa arctica* R. Br., at least, in part. *Poa abbreviata* R. Br.^c is also reported^d as being collected by Beechey at Kotzebue Sound, but we have seen no Alaskan specimens of this grass.

19. COLPODIUM Trin.

Colpodium Trin. Fund. Agrost. 119. 1820.

Arctophila Rupr. Fl. Samoj. Cisural. 62. 1845.

Spikelets 2 to 7-flowered; glumes thin-membranaceous, 1 to 3-nerved or nerveless, obtuse, usually shorter than the lemmas; lemmas thin-membranaceous with broad scarious margins, obtuse, very obscurely 5-nerved; rachilla and callus glabrous or (in Section *Arctophila*) the callus pilose with rather short, stiff hairs.

Leaf blades 3 to 6 mm. wide; lemmas glabrous 1. *C. fulvum*.

Leaf blades 2 mm. wide or less; lemmas silky-pubescent below.....!..... 2. *C. wrightii*.

1. *Colpodium fulvum* (Trin.) Griseb. in Ledeb. Fl. Ross. 4: 385. 1853.

Poa fulva Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 378. 1830.

Arctophila fulva Rupr. Fl. Samoj. Cisural. 64. 1845.

Graphephorum fulvum A. Gray, Proc. Amer. Acad. 5: 191. 1862.

A rather stout, erect, leafy, and glabrous plant, 20 to 60 cm. high, with flat leaves and open panicles 8 to 15 cm. long, the upper ones longest; spikelets 3 to 7-flowered, 5 to 7 mm. long; lemmas broadly obtuse, about 4 mm. long.

Arctic Alaska to the Pribilof and Shumagin islands, thence to southeastern Alaska and British Columbia. Type locality Eschscholtz Bay, Kotzebue Sound.

SPECIMENS EXAMINED: Shumagin Islands, *Harrington* in 1871-72; Port Clarence, *Walpole* 1634, 1659, 1670, 1715, 1919, 2004; St. George Island, *Merriam* in 1891; St. Paul Island, *Macoun* in 1892, *Palmer* 496; Nushagak, *Harvard* in 1881; Point Barrow, *Murdoch* in 1882 and 1883; near Nome City, *Flett* 1688; Point Gustavus, Glacier Bay, *Coville & Kearney* 712; Seward Peninsula, abundant at Mud Lake on Portage, *Collier* in 1900.

This species may prove to be identical with *Arctophila effusa* Lange. *Colpodium mucronatum* Beal,^e is based upon an immature and apparently somewhat abnormal plant in which the midnerve is more strongly developed than usual.

2. *Colpodium wrightii* sp. nov.

A densely caespitose, slender, glabrous perennial 30 to 50 cm. high, with numerous rather short, linear, involute basal leaves and exserted, open, purplish panicles 4 to 9 cm. long; sheaths crowded and marcescent below; ligule about 3 mm. long, acute; basal leaves about 5 cm. long, 1 mm. wide or less, those of the culm shorter; panicle

^a Nordenskiöld, Vega-Exp. 2: 54. 1883.

^b Loc. cit.

^c Suppl. App. Parry's Voy. 287. 1824.

^d Griseb. in Ledeb. Fl. Ross. 4: 377. 1853.

^e Grasses N. Amer. 2: 558. 1896.

branches glabrous, the lower ones usually in pairs, spreading or ascending, 3 to 4 cm. long, bearing a few flowers toward the apex; naked below; spikelets 3 or 4-flowered, 6 to 8 mm. long, purplish; glumes unequal, the first 1.5 to 2.5 mm. long, the second about 2.5 to 3.5 mm. long, obtuse, 3-nerved; lemmas lanceolate, somewhat obtuse, 4.5 to 5 mm. long, rather prominently 5-nerved, appressed silky-pubescent on the back toward the base, glabrous above; palea equaling the glume, the keels scabrous.

Type U. S. National Herbarium no. 592344, collected by C. Wright on Arakamtchetchene, or Kayne Island (Siberia), on the Pacific Exploring Expedition under Commanders Ringgold and Rodgers, 1853-56. Distributed as "*Glyceria arctica* Hook."

This was also secured at Port Clarence, by F. A. Walpole in low sandy tundra, 1891, 1893, and 1901, forms with less pubescent glumes than the type. A peculiar species approaching *Poa*, but apparently quite closely related to *Colpodium humile* Griseb. (*C. bulbosum* Trin.), differing in its greater size and the pubescence of the longer lemmas. The base of the culms in our species is somewhat thickened, as in *C. humile*.

2a. *Colpodium wrightii flavum* subsp. nov.

Panicles bright yellow, otherwise as in the species.

Type, U. S. National Herbarium no. 379007, collected August 21, 1901, low sandy tundra, Port Clarence, by F. A. Walpole (no. 1891a), the only specimen seen.

COLPODIUM PENDULINUM (Vahl) Griseb. is reported from Alaska, mouth of the Klondike, *R. S. Williams* ^a in 1899, but we have seen no specimens of this species from Alaska, and accordingly have not admitted it.

20. *DUPONTIA* R. Br.

Dupontia R. Br. Suppl. App. Parry's Voy. 290. 1824.

Spikelets 2 to 5-flowered, hermaphrodite; rachilla articulated above the glumes, the callus of the lemmas distinctly hairy; glumes 2, membranaceous, awnless, exceeding the lemma, this attenuate-pointed and entire, or finely and minutely toothed at the apex. Low arctic grasses with flat leaves and small narrow or spreading panicles.

Lemmas pilose below 1. *D. fischeri*.
Lemmas glabrous..... 2. *D. psilosantha*.

1. *Dupontia fischeri* R. Br. Suppl. App. Parry's Voy. 291. 1824.

Melica fischeri Spreng. Syst. Veg. 2: 32. 1827.

Dupontia fischeri flavescens Hook. & Arn. Bot. Beechey Voy. 132. 1841.

Graphephorum fischeri A. Gray, Proc. Amer. Acad. 5: 191. 1862.

A slender, erect perennial, 10 to 25 cm. high, with flat leaves and contracted simple panicles 4 to 7 cm. long; spikelets 2 or 3-flowered, 6 to 7.5 mm. long, with lanceolate acute glumes and obtuse or acute lemmas, the latter silky-pilose on the back toward the base.

In moist soils, arctic Alaska and Seward Peninsula; also Europe and Asia.

SPECIMENS EXAMINED: Point Barrow, *Murdoch* in 1891; Port Clarence, *Walpole* 1630, 2017.

2. *Dupontia psilosantha* Rupr. Fl. Samoï. Cisural. 65. pl. 6. 1845.

Poa psilosantha Rupr. loc. cit.

Graphephorum psilosanthum Fourn. Bull. Soc. Bot. France 24: 182. 1877.

Graphephorum fischeri psilosanthum A. Gray, Proc. Amer. Acad. 5: 191. 1862.

A slender, erect, glabrous perennial 15 to 40 cm. high, with flat leaves and panicles 7 to 12 cm. long, their branches spreading, at least in flower; spikelets 6 to 7 mm. long, with attenuate-pointed glabrous lemmas.

In moist soils, Seward Peninsula and Pribilof Islands; also in Europe and Asia.

SPECIMENS EXAMINED: St. Paul Island, *Macoun* 16225; Port Clarence, *Walpole* 1792, 1822, 1882, 1982.

^a Nash, Bull. N. Y. Bot. Gard. 2: 157. 1901.

21. PANICULARIA Fabr.

Panicularia Fabr. Enum. Pl. Hort. Helmst. ed. 2. 2: 373. 1763.

Glyceria R. Br. Prodr. Fl. Nov. Holl. 179. 1810.

Spikelets few to many-flowered, terete or slightly flattened, in narrow or spreading panicles; rachilla articulated above the glumes and between the florets, usually smooth; glumes unequal, shorter than the lemmas; lemmas smooth or scabrous, rounded on the back, 5 to 9-nerved, the nerves mostly prominent. Usually tall, aquatic, perennial grasses with flat leaves and terminal panicles.

Spikelets 10 to 18 mm. long; panicles narrow..... 1. *P. borealis*.

Spikelets 3 to 6 mm. long; panicles diffuse.

Leaves broad and comparatively short; ligule 10 to 12 mm.

long; spikelets crowded at the ends of the flexuous branches. 2. *P. pauciflora*.

Leaves elongated; ligule about 4 mm. long; spikelets not

crowded..... 3. *P. americana*.

1. ***Panicularia borealis*** Nash, Bull. Torrey Club 24: 348. 1897.

Glyceria fluitans angustata Vasey, Proc. Portland Soc. Nat. Hist. 2: 91. 1895, not *G. angustata* Fries, 1869.

Glyceria borealis Batch. Proc. Manchester Inst. Arts Sci. 1: 74. 1900.

A slender, glabrous perennial 40 to 150 cm. high, with flat leaves and narrow panicles 10 to 40 cm. long; spikelets 10 to 18 mm. long, 7 to 13-flowered, the lemmas hispidulous on the nerves only. Related to *Panicularia septentrionalis* Hitchc.

Margins of streams and ponds, southeastern Alaska, south and east to Washington, New England, and New York.

SPECIMEN EXAMINED: Yes Bay, Behm Canal, by small lakes, Howell 1717.

Panicularia borealis Nash is very near *Panicularia plicata* (Fr.) (*Glyceria plicata* Fries)^a being distinguished by its somewhat longer, more sharply nerved, and more acute lemmas.

2. ***Panicularia pauciflora*** (Presl) Kuntze, Rev. Gen. Pl. 2: 783. 1891.

Glyceria pauciflora Presl, Rel. Haenk. 1: 257. 1830.

Glyceria spectabilis flaccida Trin.; A. Gray, Proc. Acad. Phila. 1862: 336. 1862.

A rather stout, glabrous perennial 60 to 120 cm. high, with broad leaves, long ligules and diffuse panicles 10 to 20 cm. long; leaf blades 10 to 30 cm. long, 1 to 2 cm. wide; ligules 10 to 12 mm. long; spikelets 5 or 6-flowered, 3 to 5 mm. long, mostly crowded or subfasciculate at the ends of the branches; glumes broadly obtuse, the first about 1.5 mm. long, the second 2 mm. long; the lemmas 2.5 to 3 mm. long, prominently 5-nerved, scabrous on the back, with a broadly obtuse scarious and erose apex.

In damp soils and in bogs, Cook Inlet, Yakutat Bay, and southeastern Alaska, southward to Colorado and California.

SPECIMENS EXAMINED: Lawson Bay, Kellogg 183; Latouche, Piper 4660; Foggy Bay, near Cape Fox, Coville & Kearney 2570; Kasilof, Evans 788; Sitka, Evans 203, Wright 1581, 1591, Piper 4658; Yakutat, Coville & Kearney 2981, Piper 4657; Juneau, Cole in 1899, Trelease & Saunders 2944, Coville & Kearney 2530; Yes Bay, Behm Canal, Howell 1717a.

3. ***Panicularia americana*** (Torr.) MacM. Met. Minn. Val. 81. 1892.

Poa aquatica americana Torr. Fl. North. & Mid. U. S. 1: 108. 1824.

Glyceria grandis S. Wats. in A. Gray, Man. ed. 6. 667. 1890.

A stout, coarse grass 90 to 150 cm. high, with rather broad flat leaves and ample, spreading panicles 20 to 40 cm. long; sheaths loose; ligule 2 to 4 mm. long, truncate; leaf blades 18 to 30 cm. long or more, 6 to 16 mm. wide, scabrous above, glabrous be-

^a Mant. 3: 176. 1842.

neath; ligule about 4 mm. long; spikelets 4 to 7-flowered, 4 to 6 mm. long; pedicels glabrous; glumes 1-nerved, acute; lemmas about 2 to 2.5 mm. long, 7-nerved, very minutely and closely punctate, scabrous on the back, obtuse.

Cook Inlet and southeastern Alaska, eastward and southward to California, Pennsylvania, and Tennessee.

SPECIMENS EXAMINED: Homer, *Piper* 4659; Red Mountain, *Gorman* 1104.

PANICULARIA PULCHELLA Nash, Bull. N. Y. Bot. Gard. 2: 157. 1901, was based upon specimens collected by R. S. Williams, White River, Alaska, August 17, 1899, which we have not seen.

GLYCERIA NERVATA Willd. is reported from Lawson's Bay by Durand^a but the specimen is doubtless *Panicularia borealis* Nash.

GLYCERIA SPECTABILIS is also reported by various authors, and *Glyceria remota* Fries is reported from Sitka,^b but the specimens cited are *Panicularia pauciflora*.

22. PUCCINELLIA Parl.

Puccinellia Parl. Fl. Ital. 1: 366. 1848.

Atropis Rupr. Fl. Samoj. Cisural. 61. 1845.

Spikelets as in *Panicularia*, but with the lemmas usually smaller, nerves less distinct or obscure, and lodicules more hyaline and distinct. Grasses chiefly confined to the seacoast or to the alkaline regions of the interior.

Panicles contracted, the branches erect, mostly densely flowered.

Lemmas appressed-ciliate on the nerves below..... 3. *P. alaskana*.

Lemmas glabrous.

Culms 6 cm. high or less, stoloniferous..... 2. *P. phryganodes*.

Culms 10 cm. high or more, not stoloniferous..... 1. *P. angustata*.

Panicles open, the branches few-flowered, spreading or ascending.

Lemmas 2 mm. long..... 4. *P. tenuiflora*.

Lemmas 3 to 4 mm. long..... 5. *P. maritima*.

1. ***Puccinellia angustata*** (R. Br.) Nash, Bull. Torrey Club 22: 512. 1895.

Poa angustata R. Br. Suppl. App. Parry's Voy. 287. 1824.

Poa nutkaensis Presl, Rel. Haenk. 1: 272. 1830.^c

Atropis angustata Griseb. in Ledeb. Fl. Ross. 4: 390. 1853.

Puccinellia maritima minor S. Wats. in A. Gray, Man. ed. 6. 668. 1890.

Glyceria arctica Hook. Fl. Bor. Amer. 2: 248. 1840.

Glyceria maritima arctica F. Kurtz, Bot. Jahrb. Engler 19: 423. 1894.

A glabrous tufted perennial, 10 to 30 cm. high, with usually overlapping sheaths. linear, mostly involute leaves, and contracted panicles 2 to 5 cm. long; spikelets 4 to 8 mm. long, 2 to 7-flowered; lemmas 2.5 to 3 mm. long, obtuse.

Along the coast from Seward Peninsula and the Shumagin Islands to southeastern Alaska, and eastward and southward to Hudson Bay, Greenland, and Maine; also in Europe and Asia.

SPECIMENS EXAMINED: Port Clarence, *Walpole* 1889; Aleutian Islands, *Turner* 1208; Shumagin Islands, *Popof*, *Trelease & Saunders* 2946; Nagai Island, *Harrington*, in 1871-72; **Kukak Bay**, *Coville & Kearney* 1588; Kodiak Island, *Coville & Kearney* 2240, *Trelease & Saunders* 2945, 2973, *Kincaid* in 1899, *Cole* in 1899; Long Island, near Kodiak, *Trelease & Saunders* 2942; Yakutat Bay, *Funston* 31, *Trelease & Saunders* 2939; Glacier Bay, *Trelease & Saunders* 2937; Sitka, *Coville & Kearney* 843, *Evans* 257, *Wright* 1585, 1593; Howkan, *Evans* 144; Yes Bay, Behm Canal, *Howell* 1718.

^a Rep. Supt. U. S. Coast Surv. 1867: 324. 1869.

^b Griseb. in Ledeb. Fl. Ross. 4: 391. 1853.

^c See also Scribner, Rep. Mo. Bot. Gard. 10: 51. pl. 51. 1899.

2. **Puccinellia phryganodes** (Trin.)

Poa phryganodes Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 389. 1830.

Catabrosa vilfoidea Anderss. Öfv. Vet. Akad. Förh. 19: 254. 1862.

Glyceria vilfoidea Fries, Öfv. Vet. Akad. Förh. 26: 139. 1869.

A densely caespitose, glabrous, prostrate perennial with numerous, very short leaves 1 to 2 cm. long and creeping, geniculate culms 1.5 cm. long or less, the flowering culms about 5 cm. high, with a small, few-flowered contracted panicle 1 to 2 cm. in length; sheaths overlapping; spikelets 3 to 5 mm. long, few-flowered; lemmas 2.5 to 3 mm. long.

On saline sands and mud flats, Seward Peninsula and Pribilof; also in Spitzbergen.

SPECIMENS EXAMINED: Port Clarence, wet sand flats, *Walpole* 633, 1718; St. Paul Island, *Macoun* 16223 (sterile specimens).

A very distinct species, recognized at once by its prostrate habit. Specimens from Fries labeled *Glyceria vilfoidea*, collected in Spitzbergen in 1868, are apparently identical with our species, which is certainly *Poa phryganodes* Trin.

3. **Puccinellia alaskana** sp. nov.

A densely caespitose glabrous perennial 10 to 20 cm. high, with numerous rather soft, short, plane, glabrous leaves and small, contracted, densely flowered panicles 2 to 4 cm. long; sheaths overlapping, the upper one somewhat inflated; ligule about 2 mm. long; leaf blades linear, 1 to 2 mm. wide, 3 to 6 cm. long; panicles pale or purplish, the branches glabrous, appressed, rarely spreading, naked below, flower-bearing above; spikelets 4 to 6 mm. long, 3 to 5-flowered; glumes unequal, the first 1 mm. long, acute, the second 2 mm. long, 3-nerved, obtuse; lemmas about 2.5 mm. long, rather prominently 5-nerved and appressed-ciliate on the nerves below; palea equaling the lemma, the keels glabrous.

Type U. S. National Herbarium no. 592343, collected August 4, 1891, on St. Paul Island, Bering Sea, by C. Hart Merriam.

Seward Peninsula, islands of Bering Sea, and Pribilof Islands.

SPECIMENS EXAMINED: Port Clarence, tundra bank, *Walpole* 1015; St. Paul Island, *Merriam* in 1891, *Macoun* in 1892, *Trelease & Saunders* 2690; St. Matthew Island, *Cole* in 1899.

A species related to **Puccinellia vahliana** (Liebm.) (*Poa vahliana* Liebm. ^a); *Glyceria vahliana* Fries), but distinguished by its much smaller glumes, less pubescent and much smaller lemmas, larger size, and flat, more flaccid leaves. From *Puccinellia angustata* it is at once distinguished by the appressed-ciliate and rather prominent nerves of the lemmas.

4. **Puccinellia tenuiflora** (Griseb.)

Atropis tenuiflora Griseb. in Ledeb. Fl. Ross. 4: 369. 1853.

Glyceria distans tenuiflora Turcz. loc. cit. as synonym.

An erect glabrous perennial 40 to 60 cm. high with linear leaves, usually effuse panicles and small spikelets; ligule 2 to 3 mm. long; leaf blades 6 to 9 cm. long, 1 to 2 mm. wide, usually involute; panicles 10 to 15 cm. long, the branches scabrous, capillary, spreading or ascending, few-flowered, the lower ones somewhat fasciculate, often 10 cm. long; spikelets 3 to 4 mm. long, 3 or 4-flowered; lemmas glabrous, 2 mm. long, the nerves very faint or wanting.

Upper Yukon and Saskatchewan; also in northern Asia.

SPECIMEN EXAMINED: Fort Yukon, *Bates* in 1889.

A distinct species, at once recognized by its effuse, almost capillary panicles and small lemmas.

5. **Puccinellia maritima** (Huds.) Parl. Fl. Ital. 1: 370. 1848.

Poa maritima Huds. Fl. Angl. 35. 1762.

^a Fl. Dan. 14: pl. 2401. 1845.

Glyceria maritima Mert. & Koch in Röhl. Deutschl. Fl. ed. 3. 1: 588. 1823.

A glabrous, erect, or decumbent perennial 20 to 60 cm. high, with numerous linear, often involute leaves and open panicles 5 to 15 cm. long, the branches spreading or ascending, naked below, flower-bearing above; spikelets 3 to 8-flowered, 5 to 10 mm. long, the lemmas glabrous, about 3 mm. long.

In salt marshes and on sea beaches, Cook Inlet and Prince William Sound, southward to California, and on the eastern coast of North America from Nova Scotia to Rhode Island; also in Europe and Asia.

SPECIMENS EXAMINED: Cook Inlet, Halibut Cove, *Coville & Kearney* 2456; Kasilof, *Evans* 609, 684 (in no. 684 the lemmas are 3.5 mm. long; branches widely spreading); Tyonek, *Evans* 480; Prince William Sound, near Orea, *Coville & Kearney* 1336.

The Alaskan material here referred to *Puccinellia maritima* differs somewhat from our Atlantic coast plants and also from the European specimens so named, and may possibly be a distinct species, but for the present we deem it advisable to refer it all to *Puccinellia maritima*.

PUCCINELLIA DISTANS (L.) Parl. has been reported from Alaska by various authors, but it is very certain that this species does not extend to that region, the plants so named being referable to the form here considered as *P. maritima*. *Puccinellia festucaeformis* has also been reported, but the specimens so named are only a large form of *P. maritima*. This form is represented by the following specimens: Sitka, *Piper* 4697; Kodiak, *Piper* 4696, 4700, 4701; Aurora, *Piper* 4699; Skwashianski Bay (near Sitka), *Piper* 4698.

23. FESTUCA L.

Festuca L. Sp. Pl. 73. 1753.

Spikelets several-flowered, pedicellate in narrow and dense or loose and spreading panicles; rachilla articulated above the glumes and between the florets; glumes 2, unequal; lemmas rounded on the back, at least below, acute or tapering into a straight awn, faintly 3 to 5-nerved, not webbed at the base. Usually caespitose, perennial grasses of various habit.

- Leaf blades flat, 5 to 8 mm. wide..... 1. *F. subulata*.
- Leaf blades narrow, convolute, 2 mm. wide or less.
 - Plants with creeping rootstocks, innovations extravaginal.
 - Lemmas smooth or simply scabrous..... 3. *F. rubra*.
 - Lemmas pubescent..... 3a. *F. rubra kitai-beliana*.
 - Lemmas lanuginous..... 3b. *F. rubra lanuginosa*.
 - Plants densely tufted, roots fibrous, innovations extravaginal.
 - Leaves at length falling away from the persistent sheaths; palea bidentate..... 2. *F. altaica*.
 - Leaves short and involute, not falling away from the sheaths; palea not bidentate..... 4a. *F. ovina brachyphylla*.

1. **Festuca subulata** Trin. in Bong. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 173. 1832.

Festuca jonesii Vasey, Contr. Nat. Herb. 1: 278. 1893.

A glabrous, erect perennial 60 to 100 cm. high, with broad, plane leaves and ample, few-flowered, usually open panicles 15 to 30 cm. long, the lower branches often 15 cm. in length; leaf blades 10 to 20 cm. long, 6 to 10 mm. wide; spikelets 2 or 3-flowered; glumes unequal, subulate-pointed, lemmas 6 to 7 mm. long, glabrous or nearly so, bearing a slender awn about 1 cm. in length.

Southeastern Alaska, to the mountains of Washington. Type locality, Baranof Island.

SPECIMENS EXAMINED: Foggy Bay, *Coville & Kearney* 2572; Howkan, *Evans* 120; Yes Bay, Behm Canal, *Howell* 1721; Cape Fox, *Cole* in 1899.

2. *Festuca altaica* Trin. in Ledeb. Fl. Alt. 1: 109. 1829.

Festuca scabrella Torr.; Hook. Fl. Bor. Amer. 2: 252. 1840.

Festuca subulata Trin. err. det. Vasey, U. S. Dept. Agr. Div. Bot. Bull. 13: pl. 92. 1893.

A densely caespitose perennial 30 to 80 cm. high, with numerous elongated, involute basal leaves and open, lax panicles of few large purplish spikelets; panicles 10 to 15 cm. long, the branches spreading, flexuous, often recurved, flower-bearing above the middle; spikelets 8 to 12 mm. long, 3 to 5-flowered.

In dry rocky soils from Seward Peninsula to the upper Yukon, Aleutian Islands, and southeastern Alaska; also in northern Asia.

A very striking species, evidently common throughout its range. In some respects it approaches *Festuca hallii* (Vasey) Piper, but it is evidently distinct from that species. It is recognized by its numerous long, nearly glabrous leaves and lax open panicles of rather large, usually purplish spikelets.

3. *Festuca rubra* L. Sp. Pl. 74. 1753.

An erect, glabrous perennial 30 to 70 cm. high, with creeping rootstocks, exserted, contracted or open panicles, 3 to 10 cm. long; lemmas about 6 mm. long, scabrous, awned.

The Pribilof and Aleutian islands and the valley of the lower Yukon to southeastern Alaska thence eastward and southward to Labrador, Tennessee, and Colorado; also in Europe and Asia.

SPECIMENS EXAMINED: St. Paul Island, *Macoun* 16634; Yukon River, *Funston* 136; Atka, *Macoun* 42 in 1891; Unalaska, *Macoun* 41 in 1891, *Harrington* in 1871-72, *Piper* 4674; Long Island, near Kodiak, *Trelease & Saunders* 2998, *Coville & Kearney* 2403; Kenai, *Piper* 2675; Kodiak Island, *Georgeson* 9, *Piper* 4672; Homer, *Piper* 4677; Popof Island, *Trelease & Saunders* 2999, *Saunders* in 1899; Shumagin Islands, *Harrington* in 1871-72; Kasilof, *Evans* 616; Orca, *Piper* 4670; Sitka, *Wright* 1586; Foggy Bay, *Coville & Kearney* 2564, *Trelease & Saunders* 3002, 3003.

An exceedingly variable species having many synonyms. European botanists have recognized many varieties, differentiating them chiefly by leaf characters.

3a. *Festuca rubra kitaibeliana* (Schult.) Piper, Contr. Nat. Herb. 10: 23. 1906.

Festuca pubescens Willd.; Link, Enum. Pl. 1: 91. 1821, not *Zea*, 1817.

Festuca kitaibeliana Schult. Mant. 2: 398. 1824.

Bromus secundus Presl, Rel. Haenk. 1: 263. 1830.

Festuca rubra pubescens Vasey in Beal, Grasses N. Amer. 2: 607. 1896.

Festuca rubra secunda Scribn. Rep. Mo. Bot. Gard. 10: 39. pl. 52. 1899.

An erect, caespitose perennial 30 to 80 cm. high from a creeping rootstock, with narrow, involute leaves, exserted, mostly contracted panicles, and densely villous spikelets; innovation leaves 15 to 30 cm. long, glabrous, those of the culm much shorter; panicles 6 to 15 cm. long, the branches naked below, scabrous, mostly secund, the lower ones 4 to 5 cm. long; spikelets about 12 mm. long, 5 to 10-flowered; glumes glabrous, unequal, the second 5 to 6 mm. long, broadly lanceolate, the first shorter and narrowly lanceolate; lemmas 6 to 7 mm. long, lanceolate, acuminate into a straight awn 2 to 3 mm. long, very strongly villous throughout.

Dry soils and river banks from Seward Peninsula and the Pribilof Islands to the Aleutian Islands and Yakutat Bay, thence to Washington, Oregon, and Montana; also in Europe and northern Asia.

SPECIMENS EXAMINED: Port Clarence, *Walpole* 1636; St. Michael Island, *Turner* 9; Kasilof, *Evans* 603, 735; Homer, *Evans* 474; Cold Bay, *Piper* 4668; St. Paul Island,

Macoun in 1891 and 1897, 16634 in part; Kodiak Island, *Georgeson* 9 in part, *Trelease & Saunders* 3000, *Coville & Kearney* 2286; Kenai, *Piper* 4676; Shumagin Islands *Harrington* in 1871-72; Disenchantment Bay, *Trelease & Saunders* 2922; Unalaska, *Coville & Kearney* 2193, *Harrington* in 1871-72, *Piper* 4674.

This very distinct form is the European *Festuca rubra barbata* Hack. (*F. barbata* Schrank) and is readily distinguished by its very villous glumes and lemmas. The specimens collected by *Harrington*, Shumagin Islands, cited above, agree with Presl's type of *Bromus secundus* in the herbarium of the Missouri Botanical Garden.

A form with awnless lemmas comes from: Eagle, *Georgeson* 30.

3b. ***Festuca rubra lanuginosa*** Mert. & Koch in Röhl. Deutschl. Fl. ed. 3. 1: 654. 1823.

Festuca arenaria Osbeck in Retz. Suppl. Prodr. Fl. Scan. 1: 4. 1805, not Lam. 1791.

Festuca rubra arenaria Fries, Fl. Halland. 28. 1817.

Festuca richardsoni Hook. Fl. Bor. Amer. 2: 250. 1840.

Festuca lanuginosa Scheele, Flora 1: 63. 1844.

Lemmas densely villous; awns very short or wholly wanting.

Aleutian Islands, and in the arctic regions of both hemispheres.

SPECIMEN EXAMINED: Unimak Island, *Macoun* 22801.

The Richardson specimens from "the Arctic seacoast" are identical with arctic European specimens, agreeing with *F. rubra arenaria* forma *arctica* Hackel.^a

4. ***Festuca ovina*** L. Sp. Pl. 73. 1753.

A densely caespitose grass 10 to 30 cm. high, with slender rigid culms, no running rootstocks, numerous involute basal leaves and simple panicles 3 to 8 cm. long; lemmas 4 mm. long or less, usually short-awned.

An extremely variable and widely distributed species presenting many puzzling forms. The Alaska specimens apparently all belong to the variety named below.

4a. ***Festuca ovina brachyphylla*** (Schult.) Piper. Contr. Nat. Herb. 10: 27. 1906.

Festuca brevifolia R. Br. Suppl. App. Parry's Voy. 289. 1824, not Muhl. 1817.

Festuca brachyphylla Schult. Mant. 3: 646. 1827.

Festuca ovina brevifolia Hack. Monogr. Fest. Eur. 117. 1882.

Culms 5 to 15 cm. high; basal leaves numerous, subsetaceous, short, 2 to 6 cm. long; ligule shortly biauriculate; panicle contracted, 2 to 3.5 cm. long; spikelets about 6 mm. long, green or more or less tinged with violet; lemmas 3 to 4 mm. long, smooth or slightly scaberulous, short-awned.

Seward Peninsula and the islands of Bering Sea to the Aleutian Islands and southeastern Alaska, thence southward to the mountains of Utah and Colorado; also in arctic and alpine regions of the Old World.

SPECIMENS EXAMINED: Port Lawrence, *Trelease & Saunders* 2990; St. Matthew Island, *Trelease & Saunders* 2991; Unalaska, *Trelease & Saunders* 2989, *Piper* 4669; Popof Island, *Kincaid* in 1899; Kodiak, *Trelease & Saunders* 2988, *Piper* 4674, 4678, *Evans* 422; Muir Glacier, *Trelease & Saunders* in 1899; Cold Bay, *Piper* 4673; Juneau, *Trelease & Saunders* 2987; St. Paul Island, *Macoun* 16633; Unalaska, *Harrington* in 1871-72, *Coville & Kearney* 2204; Kukak Bay, *Coville & Kearney* 1501, 1503; Prince William Sound, *Trelease & Saunders* 2992; Hidden Glacier, Yakutat Bay, *Coville & Kearney* 986; Disenchantment Bay, *Coville & Kearney* 1098.

Several other species and varieties of *Festuca* have been reported from Alaska by various authors, but in most cases manifestly based on wrongly determined material. "*Festuca scabrella*" Torrey, reported from Nushagak by Knowlton^b is *F. altaica*, and *Festuca ovina duriuscula* (L.) A. Gray, and *F. ovina violacea* (Gaud.) Griseb., are reported by various authors, but the Alaskan material so named is here referred to

^a Monogr. Fest. Eur. 140. 1882.

^b Proc. U. S. Nat. Mus. 8: 220. 1885.

Festuca ovina brachyphylla. *Festuca rubra glabra* Trautv., reported from Port Clarence by Kjellman^a is probably only a glabrous form of *Festuca rubra*.

24. BROMUS L.

Bromus L. Sp. Pl. 76. 1753.

Spikelets few to many-flowered, more or less compressed, usually paniculate; rachilla articulated above the glumes and between the florets; lemmas keeled or rounded on the back, usually awned from the apex. Annual or perennial grasses with flat leaves and rather large, erect or nodding spikelets.

Panicles erect or nearly so.

Lemmas conspicuously pilose or pubescent.

Glumes glabrous or scabrous; lemmas pubescent only

along the margins and at the base. 5. *B. pumpellianus*.

Glumes pubescent and also the lemmas.

Lemmas 12 to 14 mm. long; plants perennial. 6. *B. arcticus*.

Lemmas 8 to 11 mm. long; plants annual. 2. *B. hordeaceus*.

Lemmas glabrous or merely scabrous.

Lemmas 6 to 8 mm. long, glabrous. 1. *B. racemosus*.

Lemmas about 15 mm. long, scabrous. 7. *B. aleutensis*.

Panicles nodding.

Lemmas glabrous or scabrous. 8. *B. sitchensis*.

Lemmas conspicuously pilose or pubescent.

Lemmas pubescent throughout; glumes pubescent. 4. *B. pacificus*.

Lemmas pubescent only along or near their margins, and

at the base; glumes not pubescent. 3. *B. richardsonii*.

1. *Bromus racemosus* L. Sp. Pl. ed. 2. 114. 1762.

An erect or ascending annual or biennial 30 to 70 cm. high with usually densely pilose-pubescent sheaths, simple panicles and acute 5 to 9-flowered spikelets 15 to 20 mm. long; lemmas elliptical, glabrous or scabrous, 6 to 8 mm. long, bearing a straight awn 5 to 8 mm. long; palea shorter than the lemma.

Sparingly introduced in various localities in North America, native in Europe and Asia.

SPECIMENS EXAMINED: We have seen no specimens of this grass from Alaska. It is, however, reported^b as introduced at Dawson and collected by R. S. Williams in 1899.

2. *Bromus hordeaceus* L. Sp. Pl. 77. 1753.

Bromus mollis L. Sp. Pl. ed. 2. 112. 1762.

An erect or ascending annual, 20 to 80 cm. high, with flat, pubescent leaves and short and rather dense, erect panicles; sheaths retrose-pubescent with soft hairs; leaf blades 5 to 15 cm. long, 3 to 5 mm. wide; panicle contracted, 5 to 10 cm. long; spikelets ovate-lanceolate, 5 to 15-flowered; glumes broadly ovate, obtuse, coarsely pilose-pubescent; lemmas 8 to 11 mm. long, pilose, bearing a rather stout awn 6 to 9 mm. long.

Introduced at Yakutat in Alaska and in fields and waste places throughout the United States; native of Europe.

SPECIMEN EXAMINED: Yakutat, introduced, *Piper* 4683.

3. *Bromus richardsonii* Link, Hort. Berol. 2: 281. 1833.

Bromus purgans longispicata Hook. Fl. Bor. Amer. 2: 252. 1840.

An erect, robust perennial 60 to 130 cm. high with smooth culms, smooth or pilose sheaths and diffuse nodding panicles, 15 to 25 cm. long; spikelets 2 to 3 cm. long;

^a In Nordenskiöld, *Vega-Exped.* 2: 54. 1883.

^b Nash, *Bull. N. Y. Bot. Gard.* 2: 158. 1901.

lemmas 12 to 15 mm. long, appressed-pubescent from the second nerve to the margin and also across the base.

In damp soil and on shaded slopes, arctic Alaska to the Shumagin Islands and Cook Inlet, thence to Wyoming and Arizona.

SPECIMENS EXAMINED: Shumagin Islands, Popof, *Kincaid* in 1899; Kenai, *Piper* 4685; Chandlar (Gens de Large) River, *Schrader* in 1899; opposite Port Axel (Kachemak Bay?), *Piper* 4682.

4. ***Bromus pacificus*** Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23**: 38. *f.* 21. 1900.

A stout, erect perennial 100 to 150 cm. high, with leafy culms, pubescent nodes, retrose pilose sheaths, and large, dense, nodding panicles; spikelets 2 to 2.5 cm. long, coarsely pubescent throughout; lemmas 11 to 12 mm. long, the pubescence more dense and somewhat villous towards the base.

Moist thickets along the coast from Seward Peninsula to southeastern Alaska and southward to Oregon.

SPECIMENS EXAMINED: Prince of Wales Island, *Wright* 1595; Cape Nome, *Blaisdell* in 1900 (small form); Sitka, *Piper* 4684.

5. ***Bromus pumpellianus*** Scribn. Bull. Torrey Club **15**: 9. 1888.

A stout, erect perennial 60 to 120 cm. high, with creeping rootstocks, smooth or pubescent nodes and sheaths, and narrow, erect, panicles 10 to 20 cm. long; spikelets 2 to 3 cm. long; lemmas densely and coarsely pubescent along the margins and across the back at the base.

In moist, usually shaded soils, upper Yukon to North Dakota and Colorado.

SPECIMENS EXAMINED: Fort Yukon, *Bates* in 1889, *Georgeson* 17; Yukon River, *Dawson* 92 in part; Steamboat Slough (upper Yukon Valley), *Gorman* 1090; Fort Selkirk, *Tarleton* 135; Circle City, *Osgood* in 1899; Dawson, *Williams* in 1899.

5a. ***Bromus pumpellianus tweedyi*** Scribn. in Beal, Grasses N. Amer. **2**: 622. 1896.

A form differing from the species in its usually pilose-pubescent sheaths and leaves and lemmas with coarser, denser, and more hirsute pubescence.

Occurs with the species.

SPECIMEN EXAMINED: Yukon River, *Dawson* 92 in part.

6. ***Bromus arcticus*** Shear, sp. nov.

A rather stout, erect perennial 50 to 80 cm. high, from creeping rootstocks, with smooth or sparsely pilose-pubescent sheaths, broadly linear-lanceolate leaves, and rather narrow, erect, purplish panicles 10 to 20 cm. long; culms slightly pubescent at the nodes; ligule membranous, lacinate-dentate, 1 to 2 mm. long; leaf blades scabrous, usually more or less pilose-pubescent on the nerves, 15 to 25 cm. long, 5 to 8 mm. wide; panicles purplish, the lower branches 1 to 3 at each node, 3 to 10 cm. long, spreading in flower, erect or ascending at maturity; spikelets 6 to 10-flowered, 2 to 4 cm. long, 5 to 7 mm. wide, laterally compressed in flower; glumes coarsely pubescent, the first 1-nerved or sometimes with two faint lateral nerves, sharply acuminate, 8 to 9 mm. long, the second broader, 3-nerved, 11 to 12 mm. long; lemmas ovate-lanceolate, subacute, 5-nerved, 12 to 14 mm. long, rather densely and coarsely pubescent over the whole exterior, awned from the emarginate apex; awns about 2 mm. long; palea shorter than the lemma, about 10 mm. long; rachilla slender, pilose-pubescent.

Type U. S. National Herbarium no. 379157, collected September 9, 1901, tundra bank, Teller Reindeer Station, Port Clarence, by F. A. Walpole (no. 2066).

SPECIMENS EXAMINED: Port Clarence, *Walpole* 2066; without locality, *Schrader* in 1901.

This species is evidently related to *Bromus pumpellianus*, from which it is distinguished by its less robust habit of growth, pubescent glumes, and longer and narrower lemmas pubescent throughout.

2036

7. *Bromus aleutensis* Trin.; Griseb. in Ledeb. Fl. Ross. 4: 361. 1853.

A rather tall, stout perennial with lax, suberect panicles 12 to 20 cm. long, the lower branches bearing 1 to 3 somewhat nodding spikelets 2.5 to 3.5 cm. long; lemmas about 15 mm. long, 7-nerved, smooth or scabrous-pubescent and with broad, membranous margins.

In damp soil, Aleutian Islands.

SPECIMENS EXAMINED: Atka Island, *Turner* 1194; Unalaska, *Evans* 550, *Kellogg* 142, *Harrington* in 1871-72, *Coville & Kearney* 1727, 2196, *Applegate, Piper* 4680, 4681.

8. *Bromus sitchensis* Trin. in Bong. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 173. 1832.

A tall, stout, leafy perennial 120 to 180 cm. high, with smooth sheaths and lax, drooping panicles 25 to 35 cm. long, the lower branches 2 to 4, weak, spreading, usually bearing 1 to 3 spikelets on long slender pedicles; spikelets 2.5 to 3 cm. long; lemmas 12 to 14 mm. long, smooth or scabrous.

In damp soils near the coast, Aleutian Islands and southeastern Alaska to Oregon.

SPECIMENS EXAMINED: Yes Bay, Behm Canal, *Howell* 1722a; Unalaska, *Kellogg* 142; Hope Island (southeast Alaska), *Kellogg* 143; Foggy Bay, near Cape Fox, *Coville & Kearney* 2577; Sitka, *Piper* 4679.

SPECIES OF BROMUS ERRONEOUSLY ASCRIBED TO ALASKA.

Bromus purgans L., *Bromus ciliatus* L., and *Bromus virens* Nutt., have been reported from Alaska in various published lists, but none of these species extend to Alaska. Alaskan specimens referred to the two former species are *Bromus pumpellianus*, *B. pacificus*, or *B. richardsonii*, while that reported as *Bromus virens* is doubtless *Bromus aleutensis*. *Bromus virens* Nutt. is a synonym of *Bromus carinatus hookerianus* (Thurb.) Shear, a form not found north of Washington.

25. AGROPYRON Gaertn.

Agropyron Gaertn. Nov. Comm. Petrop. 14¹: 539. pl. 19. f. 4, 5. 1770.

Spikelets 3 to many-flowered, closely sessile and solitary at each node of the axis; rachilla articulated above the glumes and between the florets; glumes 2, usually shorter than the lemmas, these rounded on the back or slightly keeled above, acute or awned from the apex. Perennial grasses with erect simple culms and terminal spikes.

Lemmas awnless, or if awned, the awn much shorter than the lemma.

Lemmas very densely villous.

Plants glaucous; leaves involute, rigid; glumes glabrous or nearly so 1. *A. dasystachyum*.

Plants green; leaves flat; glumes strongly pilose..... 2. *A. yukonense*.

Lemmas glabrous, scabrous, or short-pubescent, not densely villous.

Nodes appressed-pubescent; lemmas sparingly strigose-pubescent..... 3. *A. alaskanum*.

Nodes glabrous; lemmas glabrous or pubescent.

Lemmas densely short-pubescent..... 5a. *A. violaceum latiglume*.

Lemmas scabrous or glabrous.

Spike relatively thick; internodes of the rachilla densely pubescent..... 5. *A. violaceum*.

Spike slender; internodes of the rachilla glabrous 4. *A. tenerum*.

Lemmas terminating in a straight or divergent awn which equals or much exceeds the lemma in length.

- Awns divergent..... 8. *A. spicatum*.
- Awns straight.
 - A stout grass with lemmas 10 to 13 mm. long..... 7. *A. richardsonii*.
 - A slender grass with lemmas about 8 mm. long..... 6. *A. caninum*.

1. **Agropyron dasystachyum** (Hook.) Scribn. Bull. Torrey Club 10: 78. 1883.

Triticum repens dasystachyum Hook. Fl. Bor. Amer. 2: 254. 1840.

Triticum dasystachyum A. Gray, Man. 602. 1848.

A rigid, glabrous perennial 30 to 90 cm. high, with involute leaves and densely pubescent spikelets; spikes 3 to 10 cm. long; glumes lanceolate, acuminate or short-awned, 6 to 9 mm. long, glabrous or nearly so; lemmas acute or short-awned, densely pubescent; plants usually glaucous.

In the upper Yukon and reported from the Chilkat region of southeastern Alaska. It occurs in sandy soil from Saskatchewan to Wyoming and Michigan.

SPECIMEN EXAMINED: White River, Yukon Valley, *Gorman* 1151. Reported from Chilkat region by F. Kurtz.^a

2. **Agropyron yukonense** sp. nov.

An erect, glabrous, not glaucous perennial, about 70 cm. high, with flat leaves and crowded, densely pubescent spikelets with comparatively short glumes; sheaths about equaling the internodes; ligule a narrow ring; leaf blades 10 to 20 cm. long, rather thin in texture, 3 to 6 mm. wide, flat, prominently nerved, glabrous beneath, scabrous and thinly pilose above; spikes 8 to 10 cm. long; spikelets 10 to 15 mm. long, the lower ones about equaling the nodes of the glabrous rachis, the upper ones more crowded; glumes broadly lanceolate, acute or short-acuminate, subequal, 4 to 5 mm. long, 1 to 2 mm. wide, strongly 3-nerved and pilose throughout; lemmas lanceolate, acute, about 8 mm. long, 5-nerved, densely villous throughout; palea equaling the lemma, narrow, truncate, slightly pilose and ciliate on the keels.

Type U. S. National Herbarium no. 592342, collected July, 1900, Fort Yukon, Alaska, by C. C. Georgeson (no. 22).

Related to *Agropyron dasystachyum* (Hook.) Scribn., but distinguished by its green, not glaucous, appearance, flat and rather soft, not involute, rigid, leaves, and comparatively short glumes, which are about one-half as long as the lower lemmas.

3. **Agropyron alaskanum** sp. nov.

A glabrous, erect perennial 60 to 90 cm. high, with pubescent nodes, usually flat leaves and exserted narrow spikes; culms glabrous, nodes pubescent with short appressed hairs; sheaths mostly shorter than the internodes; ligule lacerate, about 1 mm. long; leaf blades 10 to 25 cm. long, 4 to 7 mm. wide, flat or sometimes involute, scabrous on both surfaces; spikes long-exserted, 6 to 14 cm. long, rather slender; spikelets sometimes 2 at each node, 1.5 to 2 cm. long, 4 to 6-flowered, exceeding the scabrous internodes of the rachis; joints of the rachilla rather densely hispid with short stiff hairs; glumes subequal, oblanceolate, 6 to 8 mm. long, 1.5 mm. wide, abruptly obtuse or truncate, often slightly emarginate, bearing a stout awn 0.5 to 1 mm. long; lemmas 8 to 10 mm. long excluding the awn, lanceolate, hispid with short stiff hairs along the sides, especially toward the base and on the callus, otherwise glabrous; awn straight, 2 to 3 mm. long; palea equaling the lemma, truncate, ciliate on the nerves above, glabrous toward the base.

Upper Yukon.

Type U. S. National Herbarium no. 592341, collected August 18, 1899, Circle City, by W. H. Osgood.

^a Bot. Jahrb. Engler 19: 424. 1894.

SPECIMENS EXAMINED: Circle City, *Osgood* in 1899; Fort Yukon, *Georgeson* 26; Lake Lindeman, *Dawson* in 1887.

In habit this species is related to *Agropyron tenerum* Vasey, but it is distinguished by its pubescent nodes, peculiarly truncate glumes, and hispid lemmas. *Agropyron parishii* Scribn. & Smith, from southern California, is the only other American species in this genus having pubescent nodes.

4. **Agropyron tenerum** Vasey, Bot. Gaz. 10: 258. 1885. SLENDER WHEAT-GRASS.

An erect, cespitose, glabrous perennial, 60 to 90 cm. high, with narrow, flat leaves and slender spikes, 5 to 15 cm. long; glumes lanceolate; lemmas 8 to 10 mm. long, tipped with a stout, straight awn 1 to 4 mm. in length.

In dry soil, Cook Inlet and the upper Yukon, thence to California, New Mexico, and Minnesota.

SPECIMENS EXAMINED: Kenai, *Piper* 4703, 4705; opposite Port Axel (Kachemak Bay?), *Piper* 4704; it is reported ^a as collected at Dawson by R. S. Williams in 1899.

5. **Agropyron violaceum** (Hornem.) Lange, Consp. Fl. Groenland. 154. 1880.

Triticum violaceum Hornem. Fl. Dan. 12: pl. 2044. 1832.

An erect, cespitose, glabrous perennial, with rather short, flat leaves and comparatively stout purplish spikes, 2 to 6 cm. long; glumes 8 to 12 mm. long; lemmas glabrous or nearly so, acuminate or short awn-pointed.

Usually in sandy soil, southeastern Alaska to Labrador, and southward to Colorado; also in northern Europe and Asia.

We have seen no specimens of this grass from Alaska; it is, however, reported from the Chilkat region by F. Kurtz.^b

5a. **Agropyron violaceum andinum** Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 4: 30. 1897.

A low form differing from the species by its somewhat decumbent habit, shorter spikes, and awned lemmas, the awn equaling or exceeding the lemma.

Southeastern Alaska, southward to the high mountains of Colorado.

SPECIMEN EXAMINED: Lake Lindeman, *Dawson* 88, in part.

5b. **Agropyron violaceum latiglume** Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 4: 30. 1897.

A low form, 10 to 15 cm. high, with thicker spikes and broader, pubescent lemmas and often pubescent leaves.

Yakutat Bay and southeastern Alaska, south to Montana and Labrador; also in Grinnell Land.

SPECIMENS EXAMINED: Lake Lindeman, *Dawson* 86; Hidden Glacier, Yakutat Bay, *Coville & Kearney* 971, 983a.

6. **Agropyron caninum** (L.) Beauv. Ess. Agrost. 102. 1812.

Triticum caninum L. Sp. Pl. 86. 1753.

Elymus caninus L. Fl. Suec. ed. 2. 112. 1755.

An erect, glabrous perennial, 30 to 90 cm. high, with flat leaves and awned spikelets; spikes 7 to 20 cm. long, glumes about 10 mm. long, tapering into an awn usually 2 to 6 mm. long; lemmas about 8 mm. long, acuminate into an awn 1 to 2 cm. in length.

In waste grounds in the upper Yukon valley, east to New Brunswick and south to Colorado and Tennessee; also in Europe and Asia.

SPECIMEN EXAMINED: Fort Yukon, *Bates* in 1889.

7. **Agropyron richardsonii** Schrad. in Trin. Linnaea 12: 467. 1838.

Triticum richardsonii Trin. loc. cit.

Agropyron unilaterale Cassidy, Bull. Colo. Exp. Sta. 12: 63. 1890, not Beauv. 1812.

^a Nash, Bull. N. Y. Bot. Gard. 2: 158. 1901.

^b Bot. Jahrb. Engler 19: 424. 1894.

Agropyron violacescens Beal, Grasses N. Amer. 2: 635. 1896.

A rather stout, smooth perennial, 60 to 80 cm. high, with rough, involute-pointed leaves and erect, usually one-sided, bearded spikes 7 to 10 cm. long; glumes exceeding the florets, 12 to 16 mm. long; lemmas 10 to 13 mm. long, with a scabrous awn about 2.5 cm. in length.

The Upper Yukon, and southward to Colorado, Nebraska, and Minnesota.

SPECIMEN EXAMINED: Dawson, *Williams* in 1899.

8. **Agropyron spicatum** (Pursh) Rydb. Mem. N. Y. Bot. Gard. 1: 61. 1900.

Festuca spicata Pursh, Fl. Amer. Sept. 1: 83. 1814.

Agropyron divergens Nees in Steud. Syn. Pl. Glum. 1: 347. 1854.

A rigid wiry, cespitose, glabrous perennial, 30 to 90 cm. high, with narrow, flat or involute leaves and erect spikes; glumes acute, about one-half as long as the spikelet; lemmas terminating in a stout, scabrous divergent awn 1 to 2.5 cm. long.

Dry rocky soils and bench lands, Washington and Montana to Colorado; reported from Alaska.

We have seen no specimens of this grass from Alaska. It is, however, reported from there by F. Kurtz ^a from dry hills, Kloquan (444a).

8a. **Agropyron spicatum tenuispicum** (Scribn. & Smith) Rydb. Mem. N. Y. Bot. Gard. 1: 61. 1900.

Agropyron divergens tenuispicum Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 4: 27. 1897.

A slender form with flexuous spikes 8 to 15 cm. long, smaller spikelets, and shorter awns than in the species.

Range of the species.

We have seen no specimens of this grass from Alaska. It is, however, reported ^b as collected at Dawson by R. S. Williams in 1899.

AGROPYRON REPENS (L.) Beauv. is reported from Kotzebue Sound (*Turner* 1886) and from Eschscholtz Bay, ^c but it is certain that this species does not extend to Alaska, the plants so referred being doubtless forms of *Agropyron violaceum* (Hornem) Lange.

26. HORDEUM L.

Hordeum L. Sp. Pl. 84. 1753.

Spikelets 1-flowered, 2 or 3 at each joint of the articulate rachis, sessile or on very short pedicels; rachilla articulated above the glumes and continued behind the palea of the central spikelet into a naked bristle; glumes 2, subulate, setaceous, rigid; lemmas lanceolate, rounded on the back, usually awned. Annual or perennial grasses with terminal cylindrical spikes and awned spikelets.

Glumes 4 to 7 cm. long..... 1. *H. jubatum*.

Glumes 2 cm. long or less.

Leaf blades 4 to 8 mm. wide; spike rather stout, lateral spikelets strongly developed..... 2. *H. boreale*.

Leaf blades 3 mm. wide or less; spike slender, lateral spikelets but slightly developed..... 3. *H. nodosum*.

1. **Hordeum jubatum** L. Sp. Pl. 85. 1753.

SQUIRREL-TAIL GRASS.

A smooth, slender, cespitose, erect perennial, 20 to 60 cm. high, with flat leaves and long-bearded, nodding spikes, 5 to 10 cm. long, the awns 4 to 7 cm. in length.

In moist, usually saline soil, in the upper Yukon, east to Newfoundland, south to Colorado and California.

^a Bot. Jahrb. Engler 19: 424. 1894.

^b Nash, Bull. N. Y. Bot. Gard. 2: 158. 1901.

^c Ledeb. Fl. Ross. 4: 340. 1854.

SPECIMENS EXAMINED: Ranch Valley (Upper Yukon Valley), *Gorman* 1079; Fort Yukon, *Bates* in 1889, *Georgeson* 23.

2. *Hordeum boreale* Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 4: 24. 1897. NORTHERN WILD BARLEY.

A slender, erect perennial with rather broad flat leaves, smooth culms, and erect, terminal spikes 5 to 10 cm. long; leaf blades 4 to 8 mm. wide; glumes setaceous and awn-like, 2 cm. long or less; lateral florets staminate or neuter. Closely related to *Hordeum nodosum* L.

Alutian Islands and Alaska Peninsula to the southeastern boundary, thence southward to California; also in the Commander Islands.

This species is the *Hordeum pratense* and *H. secalinum* of the various published lists of Alaskan grasses.

3. *Hordeum nodosum* L. Sp. Pl. ed. 2. 126. 1762. MEADOW BARLEY.

A species closely related to the last, differing in its more slender habit, narrower leaves (about 3 mm. wide) more slender spikes, and less developed lateral spikelets.

Kodiak Island to southeastern Alaska, California, Texas, and Mississippi; also in Europe and Asia.

SPECIMENS EXAMINED: Foggy Bay, near Cape Fox, *Coville & Kearney* 2565; Kodiak, *Piper* 4656.

27. ELYMUS L.

Elymus L. Sp. Pl. 83. 1753.

Spikelets 2 to 6-flowered, sessile in pairs at the nodes of the continuous or articulate rachis; rachilla articulated above the glumes and between the florets; glumes 2, subequal, rigid, narrow, 1 to 3-nerved; the lemmas shorter than the glumes, rounded on the back, obscurely 5-nerved, acute or awned from the apex. Erect grasses with flat leaves and densely flowered terminal spikes.

Mostly slender plants; lemmas glabrous or nearly so (ciliate on the margins in *E. borealis*).

Lemmas awnless or nearly so..... 1. *E. howellii*.

Lemmas long-awned.

Lemmas glabrous or scabrous..... 2. *E. glaucus maximus*.

Lemmas prominently ciliate on the margins..... 3. *E. borealis*.

Mostly stout plants; lemmas villous or pubescent throughout.

Glumes subulate..... 4. *E. innovatus*.

Glumes lanceolate.

Spike less than 8 cm. in length..... 5. *E. villosissimus*.

Spike exceeding 10 cm. in length..... 6. *E. mollis*.

1. *Elymus howellii* sp. nov.

A rather slender, glabrous perennial 90 to 120 cm. high, with flat, lanceolate leaves, exserted spikes, and awnless spikelets; culms geniculate below, the nodes, at least the upper ones, appressed-pubescent; sheaths shorter than the internodes; ligule hyaline, truncate, about 2 mm. long; leaf blades 15 to 25 cm. long, 8 to 12 mm. wide, acuminate, scabrous above, glabrous beneath; spike 8 to 10 cm. long, 1 cm. or less in diameter, densely flowered, the rachis prominently scabrous on the margins; spikelets in pairs, about 1.5 cm. long; glumes subequal, lanceolate, acuminate, equaling the spikelet, 1 to 2 mm. wide, strongly nerved, scabrous; first lemma 12 to 14 mm. long, lanceolate, acuminate, and sometimes bearing an awn 1 mm. long, glabrous or slightly scabrous above, ciliate-scabrous on the margins; palea somewhat shorter than the lemma, ciliate-scabrous on the nerves.

Type U. S. National Herbarium no. 592340, collected August 14, 1895, Revillagigedo Island by Thomas Howell (no. 1723) and distributed as "*Elymus dahuricus* Turcz. (?)"

SPECIMENS EXAMINED: Revillagigedo Island, *Howell* 1723; Juneau, *Coville & Kearney* 2491, *Cole* in 1899.

This species is related to *Elymus virescens* Piper, but is distinguished by its much larger size, larger spikelets, and usually pubescent nodes.

2. ***Elymus glaucus maximus*** Davy in Jepson, Fl. Mid. West. Calif. 79. 1901.

Elymus americanus Vasey & Scribn.; Macoun, Cat. Can. Pl. 4: 245. 1888, nom. nud.

A rather stout glabrous perennial, 90 to 150 cm. high, with broad, lanceolate leaves, densely flowered spikes about 15 cm. long, and long-awned spikelets; lemmas glabrous or scabrous, bearing a terminal awn, 1 to 2 cm. in length.

In dry or damp, usually shady soils, southeastern Alaska, southward to California.

SPECIMEN EXAMINED: Sitka, *Wright* 1587.

There is in the U. S. National Herbarium a fragmentary specimen from Fort Yukon, collected by O. S. Bates in 1889, that is apparently undescribed, differing from the above in its subulate glumes and strigose-pubescent lemmas, in this latter respect approaching *Elymus sibiricus* L. It is most closely related to *Elymus macounii* Vasey.

3. ***Elymus borealis*** Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 27: 9. 1900.

ALASKAN RYEGRASS.

Elymus ciliatus Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 11: 57. pl. 16. 1898, not Muhl. 1817.

A rather slender, erect perennial about 70 cm. high, with soft, flat leaves and slender, nodding spikes 7 to 12 cm. long; spikelets 1.5 cm. long; lemmas about 1 cm. long, ciliate-pubescent along the margins, especially near the apex, bearing a nearly straight awn 2 to 2.5 cm. long.

In damp soil, Yakutat Bay, southward to the Olympic Mountains, Washington.

SPECIMENS EXAMINED: Sitka, *Evans* 210 (type), 798; Juneau, *Cole* in 1899, *Coville & Kearney* 2475, *Piper* 4661; Yes Bay, Behm Canal, *Howell* 1724; Yakutat, *Piper* 4662.

A peculiar species, at once recognized by its ciliate lemmas. It is related to *Elymus sibiricus* L., to which Trinius^a referred it. Most if not all of the material in Alaskan collections named *Elymus sibiricus* should be referred to *E. borealis*.

4. ***Elymus innovatus*** Beal, Grasses N. Amer. 2: 650. 1896.

Elymus mollis R. Br. in Richards. Bot. App. Frankl. Journ. 732. 1823, not Trin. 1821.

Elymus brownei Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 8: 7. pl. 4. 1897.

A rigid, rather slender, erect perennial, 50 to 90 cm. high, with numerous basal leaves, short cauline leaves and densely flowered, pubescent spikes 4 to 10 cm. long; glumes short, subulate; lemmas densely pubescent, short awn-pointed.

Gravelly or sandy banks, arctic Alaska, southward in the interior to Wyoming and South Dakota.

SPECIMENS EXAMINED: Chandlar (Gens de Large) River, Camp 6, *Schrader* in 1899; Cape Smythe, *Schrader* in 1901.

5. ***Elymus villosissimus*** Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 11: 56. 1898.

A stout, erect perennial, 30 to 40 cm. high, from a strong creeping rootstock, with rather broad, flat leaves and short, densely flowered spikes, 5 to 8 cm. long; spikelets 3 to 5-flowered, with densely villous lemmas, the narrowly lanceolate and subulate-pointed glumes nearly equaling the spikelet.

Aleutian and Pribilof islands.

SPECIMENS EXAMINED: Wrangell Island, *Hooper* in 1881; St. Paul Island, *Macoun* 16226.

^a In Bong. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 2: 174. 1832.

6. *Elymus mollis* Trin. in Spreng. Neu. Entd. 2: 72. 1821.

Elymus dives Presl, Rel. Haenk. 1: 265. 1830.

Elymus capitatus Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 11: 55. pl. 14. 1898.

A stout, erect, glabrous perennial, 60 to 150 cm. high, with lanceolate, firm leaves, and dense spikes of strongly villous spikelets; leaf blades lanceolate, glabrous below, scabrous above; spike 10 to 18 cm. long, about 2 cm. in diameter; spikelets 1.5 to 2 cm. long; glumes lanceolate, villous; lemmas lanceolate, acute, densely villous.

The common grass in sands along the coast from Seward Peninsula southward to Oregon, also on the Aleutian and Pribilof islands, and in Siberia.

SPECIMENS EXAMINED: Atka Island, *Turner* 1191; Dyea, *Canby* 371; Muir Glacier, *Golder* 5; Glacier Bay, Point Gustavus, *Coville & Kearney* 762; Kodiak, *Brewer & Coe* 211, *Kellogg* 140; near Port Clarence, *Walpole* 1635, 1689, 1794; Kasilof, *Evans* 699; Cape Nome, *Flett* 1687, *Blaisdell* in 1900; Sitka, *Wright* 1594, *Piper* 4661; Nushagak, *McKay* in 1881; St. Paul Island, *Macoun* in 1896, 16627, *Merriam* in 1891, *Trelease & Saunders* 2917; Homer, *Evans* 471; Kruzgamepa River, *Collier* in 1900; Tatitlek, *Evans* 284; Tatoosh Islands, *Flett* 2011; Unalaska, *Harrington* in 1871-72, *Coville & Kearney* 1722, 2187, *Kellogg* in 1867; Prince William Sound, Virgin Bay, *Trelease & Saunders* 2619, *Coville & Kearney* 1215; Wrangell, *Evans* 42; Yakutat Bay, *Coville & Kearney* 1125, *Funston* 140; Yes Bay, Behm Canal, *Howell* 1725.

EXCLUDED SPECIES.

GRAPHEPHORUM MELICOIDEUM MAJOR A. Gray.

Reported from Portage Bay by Kurtz,^a but certainly on a misconception of the species and genus, as that species is not found west of the Great Lakes.

AVENA SATIVA L.

This cultivated species is reported ^b as collected at Dawson by R. S. Williams, but it is only an escape from cultivation and should not be considered as a part of the Alaskan flora.

^a Bot. Jahrb. Engler 19: 422. 1894.

^b Nash, Bull. N. Y. Bot. Gard. 2: 156. 1901.

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