

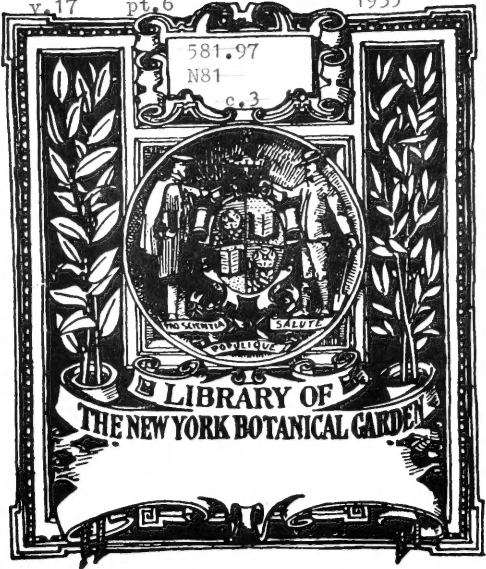
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VOLUME 17

PART 6

NORTH AMERICAN FLORA

(POALES)

POACEAE (pars)

ALBERT SPEAR HITCHCOCK



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late, almost smooth, scaberulous on the angles only, slightly twisted to the second bend, the first and second segments each 3-5 mm. long.

TYPE LOCALITY: Michoacán.

DISTRIBUTION: Dry open ground, northern Mexico.

28. *Stipa lepida* Hitchc. Am. Jour. Bot. 2: 302. 1915.

Culms cespitose, often in large bunches, erect or spreading at base, glabrous or scaberulous, or the lower internodes pubescent, the upper ones sometimes puberulent below the nodes; sheaths glabrous, sometimes a little roughened, slightly villous at the throat; ligule very short, less than 1 mm. long; blades flat or soon involute, rather lax, glabrous or scaberulous beneath, pubescent on upper surface, 10-30 cm. long, 1-2 or even as much as 4 mm. wide; panicle open, nodding, 10-20 cm. long, the branches single, in pairs, or in clusters, ascending or more or less spreading, slender, scabrous, naked below (or with some short branches in the cluster), 5-8 cm. long, or sometimes longer, branching about the middle, bearing several or many pale or sometimes purplish spikelets, the branchlets appressed; glumes 6-8 mm. long, equal or the first a little longer, narrow, acuminate, glabrous, 3-nerved; lemma 4.5-5.5 mm. long, the callus less than 1 mm. long, barbed with white hairs, the body tapering from below the middle to the summit, brown at maturity, sparsely villous all over with white hairs or glabrate toward summit, the neck short and obscure, the summit with several short stiff appressed hairs; awn obscurely twice geniculate, scaberulous, very slender, loosely twisted to the second bend, mostly 2.5-3.5 cm. long; anthers tipped with a minute tuft of hairs.

TYPE LOCALITY: Santa Barbara County, California (Chase 5611).

DISTRIBUTION: Dry hills, open woods, and rocky slopes, central California to Lower California.

ILLUSTRATION: Hitchc. Man. f. 904.

NOTE: This species has been referred in California floras to *S. eminens* Cav.

Stipa lepida var. *Andersonii* (Vasey) Hitchc. Am. Jour. Bot. 2: 303. 1915. *Stipa eminens* var. *Andersonii* Vasey, Contr. U. S. Nat. Herb. 3: 54. 1892. *Stipa Hasselii* Vasey, Contr. U. S. Nat. Herb. 1: 267. 1893. (Type from Santa Monica, California. The spikelets are distorted by a smut.) Differing only in the more slender culms, the slender involute blades, and the narrow or reduced panicle. Scarcely a distinct variety. TYPE LOCALITY: Santa Cruz, California. The locality, Lower California, given with the original description, is an error. DISTRIBUTION: Dry or rocky hills, central and southern California. ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. 13: pl. 9 (as *S. eminens*).

29. *Stipa lobata* Swallen, Jour. Wash. Acad. 23: 199. 1933.

Culms densely tufted, erect, scaberulous below the panicle, 35-85 cm. tall; blades flat or loosely folded toward the base, tapering into a fine point, as much as 50 cm. long, 1-4 mm. wide at the base, scabrous on the upper surface, glabrous beneath; ligule less than 0.5 mm. long; panicle narrow 10-18 cm. long, the branches appressed; glumes about equal, acuminate, 3-nerved, scabrous, 9-10 mm. long; lemma brownish, 6 mm. long, densely pubescent, with hairs 1-2 mm. long, the callus very short, blunt, the summit 2-lobed, the lobes 0.8-1.5 mm. long, awned from between the lobes; awn twice geniculate, 12-16 mm. long, the first and second segments appressed-hispid.

TYPE LOCALITY: Queen, Guadalupe Mountains, New Mexico (Amer. Gr. Nat. Herb. 819).

DISTRIBUTION: Rocky hills at medium altitudes, western Texas and New Mexico.

ILLUSTRATION: Jour. Wash. Acad. 23: 199. f. 2.

30. *Stipa Scribneri* Vasey, Bull. Torrey Club 11: 125. 1884.

Culms erect, glabrous, sometimes puberulent below the nodes, 30-70 cm. tall; sheaths glabrous, villous at the throat; ligule less than 1 mm. long; blades flat, involute toward the tip or sometimes involute to base, glabrous, scaberulous on the upper surface, 15-25 cm. long, 2-4 mm. wide; panicle narrow, rather compactly flowered, 10-25 cm. long, pubescent at the nodes, the branches fascicled, appressed, some short and some as much as 5 cm. long, the shorter ones bearing 1 or 2 spikelets, the longer ones naked at base and bearing several spikelets; glumes 10-15 mm. long, about equal or the first longer, pale, long-acuminate, scaberulous, 3-nerved; lemma about 8 mm. long, pale, the callus 1 mm. long, barbed with tawny hairs, the body nar-

row-fusiform, villous, the hairs white, on the lower part short and appressed, on the upper part ascending, as much as 2 mm. long, more dense at the summit; awn 14-20 cm. long, twice geniculate, scabrous, twisted to the second bend, the first and second segments 3-5 mm. each, the third straight.

TYPE LOCALITY: Santa Fé, New Mexico.

DISTRIBUTION: Mesas and rocky slopes, Colorado, Utah, New Mexico, and Arizona.

ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. 12: pl. 9.

31. *Stipa pinetorum* M. E. Jones, Proc. Calif. Acad. II. 5: 724. 1895.

Culms caespitose, often in large tufts, the inner partly dying out leaving a zone of living plants; culms erect, puberulent below the nodes, otherwise glabrous, slender, 30-50 cm. tall; sheaths glabrous; ligule a very short membrane; blades involute-capillary, more or less flexuous, slightly scabrous, mostly clustered near the base, two on the culm, the basal 5-12 cm. long, scarcely 0.5 mm. thick; panicle narrow, 8-10 cm. long, the branches short and appressed or ascending, few-flowered; glumes about 9 mm. long, equal, acuminate, obscurely nerved; lemma 5 mm. long, 0.5 mm. wide, narrowly fusiform, pale or finally brownish, clothed especially on the upper half with hairs 2 mm. long, forming a conspicuous tuft, exceeding the body of the lemma, the summit bearing two very thin slender teeth at base of awn; awn about 2 cm. long, twice geniculate, scaberulous or nearly glabrous, the first segment 6 mm., the second 4 mm. long; palea a little more than half as long as the lemma, villous at top with hairs 0.2 mm. long.

TYPE LOCALITY: Panguitch Lake, Utah (Jones 6023p).

DISTRIBUTION: Open pine woods, Colorado to California (Inyo County).

ILLUSTRATION: Hitchc. Man. f. 930.

32. *Stipa mexicana* Hitchc. Contr. U. S. Nat. Herb. 24: 247. 1925.

Culms caespitose, glabrous, erect, or usually geniculate or prostrate-spreading, mostly 20-30 cm. long, sometimes as much as 60 cm. long; sheaths glabrous, naked at the throat; ligule a very short firm membrane; blades firm, involute, sharp-pointed, glabrous beneath, scabrous on upper surface, mostly less than 10 cm. long and less than 0.3 mm. thick when rolled, sometimes as much as 20 cm. long; panicle narrow, usually purplish, 5-10 cm. long, the branches appressed or ascending, short and few-flowered; glumes equal, about 1 cm. long, broad, 3-nerved, rather firm, glabrous, abruptly narrowed to an acute point; lemma 4 mm. long, finally dull-brown, the callus rather short and comparatively blunt, densely barbed with white hairs, the body oblong, appressed-villous all over with short white hairs, somewhat narrowed at summit into a short firm whitish neck about 0.2 mm. long, ciliate with hairs about 0.5 mm. long; awn about 1 cm. long, weakly twice geniculate, scabrous-pubescent to the second bend.

TYPE LOCALITY: Sierra de las Cruces, State of Mexico (Pringle 4299).

DISTRIBUTION: Open woods and grassy slopes at high altitudes, southern Mexico to Peru.

33. *Stipa angustifolia* Hitchc. Contr. U. S. Nat. Herb. 24: 246. 1925.

Culms slender, glabrous, 10-30 cm. tall; sheaths glabrous, naked at the throat, the old basal ones flat; ligule of the culm-leaves 1-2 mm. long, of the innovations shorter; blades involute, slender, rather lax and flexuous, glabrous, 10-20 cm. long, scarcely 0.5 mm. thick; panicle narrow, pale, rather loose or lax, the branches ascending or appressed, the lowermost as much as 5 cm. long, usually with one or two shorter branches at the base, the lower node of the main axis sometimes a little villous or hispidulous; glumes about 6 mm. long, nearly equal, green in the center and hyaline on the edges, broad, abruptly acuminate, 5-nerved; lemma medium-brown, about 5 mm. long, the callus broad, a little less than 1 mm. long, densely barbed with brown hairs, the body oblong, 1 mm. wide, abruptly and asymmetrically contracted at summit, villous all over with ascending brown hairs about 1 mm. long, these sometimes less dense toward the summit, the summit densely ciliate with hairs nearly 1 mm. long; awn 10-15 mm. long, twice geniculate, very minutely scaberulous, twisted to the second bend; palea as long as the lemma; anthers without hairs at the tip.

TYPE LOCALITY: Saltillo, Mexico (Palmer 726 in 1905).

DISTRIBUTION: Rocks on summit of Sierra de la Puebla; known only from the type collection.

34. *Stipa virescens* H.B.K. Nov. Gen. & Sp. 1: 126'. 1815.

Stipa caerulea Presl, Rel. Haenk. 1: 227. 1830. (Type from Mexico.)

Stipa avenacea Willd.; Steud. Nom. Bot. ed. 2: 2: 643, as synonym of *S. virescens* H.B.K. 1841.

Oryzopsis Pringlei Scribn.; Beal, Grasses N. Am. 2: 226. 1896. (Type from Oaxaca.) Not *O.*

Pringlei Beal, 1890.

Stipa Arsenii Hack. Repert. Sp. Nov. 8: 515. 1910. (Type from Morelia, Michoacán.)

Culms erect, glabrous, mostly 75–120 cm. tall; sheaths glabrous; ligule firm, 1–2 mm. long; blades slender and involute, rather lax, those of the innovations numerous, glabrous or scabrous, 10–40 cm. long, about 1 mm. wide when flat; panicle narrow, 10–25 cm. long, the branches slender, appressed, 1 to several at a node, bearing 1 to few spikelets, the shorter pedicels shorter than the spikelets; glumes 7–8 mm. long, equal, rather broad, pale or purple, abruptly acuminate, obscurely 3-nerved; lemma dark-brown at maturity, 5–6 mm. long, the callus about 1 mm. long, densely barbed with brown hairs, the body more than 1 mm. broad, densely villous with brown hairs, contracted above to a very short undifferentiated neck, the summit bearing a close row of stiff erect brown hairs 0.5 mm. long; awn 1–2 cm. long, twice geniculate, twisted and scabrous-pubescent to the second bend, straight and scabrous beyond, the first segment 3–5 mm. long, the first bend often at right angles, the second segment about as long as the first.

TYPE LOCALITY: Central Mexico.

DISTRIBUTION: Open woods, central Mexico.

35. *Stipa Lemmonii* (Vasey) Scribn. Circ. U. S. Dep. Agr. Agrost. 30: 3. 1901.

Stipa Pringlei var. *Lemmonii* Vasey, Contr. U. S. Nat. Herb. 3: 55. 1892.

Stipa Lemmonii var. *Jonesii* Scribn. Circ. U. S. Dep. Agr. Agrost. 30: 4. 1901. (Type from Emigrant Gap, California.)

Culms erect, scaberulous, puberulent below the nodes, 30–80 cm. tall; sheaths glabrous; ligule membranaceous, decurrent, 1–3 mm. long; blades flat or involute, glabrous beneath, scabrous on the margins, scabrous-pubescent on the upper surface, 10–20 cm. long, 1–2 mm. wide, or those on the innovations very narrow; panicles narrow, rather compact, mostly pale, sometimes purplish, mostly 5–12 cm. long, the branches appressed, bearing 1 to few spikelets, usually more or less villous at the base; glumes 8–10 mm. long, about equal, rather broad and firm, somewhat abruptly acuminate, glabrous, the first 5-nerved, the second 3-nerved with an outer obscure pair; lemma mostly 6–7 mm. long, pale- or light-brown, the callus rather blunt, 0.5 mm. long, barbed with white hairs, the body fusiform, 1.2 mm. wide, villous with appressed hairs, those at the summit and around the crown rather stiff, about 0.5 mm. long; awn 20–35 mm. long, twice geniculate, twisted and appressed-pubescent to the second bend, the first segment 3–6 mm. long, the second 5–7 mm., the third 10–20 mm. long.

TYPE LOCALITY: Plumas County, California (*Lemmon 5456*).

DISTRIBUTION: Dry open ground and open woods, British Columbia to Idaho and central California.

ILLUSTRATION: Hitchc. Man. f. 918.

36. *Stipa Williamsii* Scribn. Bull. U. S. Dep. Agr. Agrost. 11: 45. 1898.

Culms erect, rather robust, velvety-puberulent, glabrate above, 60–100 cm. tall, the nodes glabrous or glabrate; sheaths velvety-pubescent, the upper often glabrate; ligule about 0.5 mm. long; blades flat, those of the innovations more or less involute, more or less pubescent on one or both surfaces, 10–30 cm. long, 1–4 mm. wide; panicles narrow, moderately compact, sometimes rather loose, 10–20 cm. long, the branches appressed, two or more at each node, some short and floriferous from base, one usually longer and naked at base, the nodes glabrous or sparsely pilose; glumes about 1 cm. long, equal, hyaline, narrow, acuminate and short-awned, scaberulous, 3-nerved; lemma about 7 mm. long, pale or brownish at maturity, the callus sharp and rather slender, about 1 mm. long, barbed above the point with white hairs, the body narrowly fusiform, villous all over with appressed whitish hairs, those of the crown scarcely

different, about 1 mm. long; awn 3-5 cm. long, twisted and scabrous-pubescent to the second bend; anthers glabrous at tip or with 1 or 2 hairs. This species is closely related to *S. columbiana*, especially to the variety *Nelsoni*. The type is distinctly pubescent on culm, sheaths, and blades; on other specimens the pubescence is more scant, and may be absent except on the lowermost sheaths. The ligule is usually shorter, and the awns are usually longer than in *S. columbiana*.

TYPE LOCALITY: Monument Spring, Wyoming (*Williams 3804*).

DISTRIBUTION: Dry hills and plains, Montana to Washington, and southward to Colorado and northern California.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 11: *pl. 4*.

37. *Stipa viridula* Trin. Mém. Acad. St.-Pétersb. VI. 4²: 39. 1836.

Stipa sparta Trin.; Hook. Fl. Bor. Am. 2: 237. 1839. (No description; *S. parviflora* Nutt., not Desf. cited as synonym.)

Stipa Nuttalliana Steud. Nom. Bot. ed. 2: 643. 1841. (Based on *Stipa parviflora* as described by Nuttall (Gen. Pl. 1: 59. 1818).)

Culms erect or sometimes geniculate at base, glabrous or scaberulous, mostly 60-100 cm. tall; sheaths glabrous, villous at the throat, often rather sparingly so, more or less hispidulous in a line across the collar, villous on the margin; ligule membranaceous, about 1 mm. long; blades flat or, especially on the innovations, involute, mostly scabrous, sometimes glabrous beneath, 10-30 cm. long, 1-3 or even 5 mm. wide; panicle narrow, greenish or tawny at maturity, 10-20 cm. long, the branches appressed or ascending, somewhat distant but usually overlapping, 2 or 3 at a node or branching near base and appearing fascicled, some short, one longer and naked below, 3-7 or even 10 cm. long, the lower nodes hispidulous; glumes 7-10 mm. long, about equal, narrowed above and extending into a slender tip as much as 3 mm. long, hyaline with green nerves, 3-nerved, scaberulous on the keel and sometimes on the lateral nerves; lemma 5-6 mm. long, fusiform, at maturity plump, more than 1 mm. wide, the callus rather blunt, about 0.5 mm. long, barbed with short whitish hairs, the body at maturity usually brown or brownish, rather sparingly villous all over with whitish appressed hairs, the surface roughened with minute papillae, the summit hispidulous with erect hairs 0.5-1 mm. long; awn 2-3 cm. long, twice geniculate, slender, scabrous, twisted to the second bend, the first segment 3-4 mm. long, the second usually a little longer, the third somewhat flexuous; anthers bearing at apex a few hairs.

TYPE LOCALITY: Saskatchewan.

DISTRIBUTION: Plains and dry slopes, Wisconsin to Alberta, and southward to Kansas and New Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: *f. 430*.

38. *Stipa robusta* (Vasey) Scribn. Bull. U. S. Dep. Agr. Agrost. 5: 23. 1897.

Stipa viridula var. *robusta* Vasey, Contr. U. S. Nat. Herb. 1: 56. 1890.

Stipa Vaseyi Scribn. Bull. U. S. Dep. Agr. Agrost. 11: 46. 1898. (Based on *S. viridula* var. *robusta* Vasey "not *S. robusta* Nutt.," However, *S. robusta* Nutt. was given only as a synonym of *S. sparta* by Trinius (Trin. & Rupr. Mém. Acad. St.-Pétersb. VI. 7²: 69. 1843) and was not effectively published.)

Culms erect, robust, glabrous, mostly 1-1.5 meters tall; sheaths glabrous, villous at the throat and on the margin, a strong hispidulous line across the collar; ligule membranaceous, sometimes ciliate, 2-4 mm. long, shorter on the innovations; blades flat or on the innovations slender and involute, mostly glabrous, scaberulous on the margins and toward the tip, as much as 60 cm. long and 8 mm. wide; panicles narrow, compact, pale or greenish, often more or less interrupted below, as much as 30 cm. long and 2 cm. wide, the branches appressed, several at each node, some short, some as much as 8 cm. long and naked at base, bearing several spikelets, strongly villous or hispid at the lower nodes; glumes about 1 cm. long, equal, acuminate to a fine soft point but scarcely awned, rather firm, 3-nerved or the first 5-nerved, the nerves inconspicuous; lemma 6-8 mm. long, at maturity medium-dark-brown, the callus rather blunt, about 0.5 mm. long, densely barbed with whitish hairs, the body narrow-fusiform, narrowed

above into an obscure neck, villous all over with appressed white hairs, those of the summit 1.5–2 mm. long; awn mostly 2–3 cm. long, scabrous, rather obscurely twice geniculate, twisted to the second bend; anthers tipped with a minute tuft of hairs.

TYPE LOCALITY: Chenate Mountains, Presidio County, Texas (*Nealley 714*).

DISTRIBUTION: Dry plains and hills, and dry open woods, western Texas to Colorado, Arizona, and northern Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: f. 437.

NOTE: This species differs from *S. viridula* in the more robust habit, larger and more compact panicles, firmer, less hyaline glumes (the nerves thus less conspicuous), the acuminate, less attenuate-tipped glumes, and the longer, less turgid fruit, with longer hairs on the crown. It is called sleepy grass and is reported on creditable authority to act as a narcotic on horses (see Contr. U. S. Nat. Herb. 24: 252. 1925).

39. *Stipa columbiana* Macoun, Cat. Can. Pl. 4: 191. 1888.

Stipa viridula var. *minor* Vasey, Contr. U. S. Nat. Herb. 3: 50. 1892. (Type from Kelso Mountain, near Torrey Peak, Colorado.)

Stipa minor Scribn. Bull. U. S. Dep. Agr. Agrost. 11: 46. 1898. (Based on *S. viridula* var. *minor* Vasey.)

Culms erect, glabrous, mostly 30–60 cm. tall, sometimes as much as 1 meter; sheaths glabrous, naked at the throat; ligule rather firm, 1–2 mm. long; blades mostly involute, especially on the innovations, those of the culm sometimes flat, glabrous or nearly so, 10–20 cm. long or sometimes longer, on the innovations mostly about 0.5 mm. thick, sometimes wider on the culms; panicles narrow, compact or rather loose, often purplish, 5–15 cm. long, the branches short and appressed; glumes about 1 cm. long, nearly equal, acuminate or awn-pointed, glabrous or slightly scaberulous, 3-nerved, the nerves rather obscure because of the firm texture; lemma 6–7 mm. long, the callus short, barbed, the body densely appressed-villous, scarcely narrowed at summit, the hairs at the summit about the same as the others; awn mostly 2–2.5 cm. long, more or less twice geniculate, scabrous or somewhat scabrous-pubescent to the second bend.

TYPE LOCALITY: Yale, British Columbia.

DISTRIBUTION: Dry plains, meadows, and open woods, South Dakota to Yukon, and southward to western Texas and California.

ILLUSTRATION: Hitchc. Man. f. 924.

Stipa columbiana var. *Nelsoni* (Scribn.) Hitchc. Contr. U. S. Nat. Herb. 24: 254. 1925. *Stipa Nelsoni* Scribn. Bull. U. S. Dep. Agr. Agrost. 11: 46. 1898. Differing in its usually large size, being as much as 1 meter tall, the broader culm-blades, and the larger and denser panicle. The lemma is 6–7 mm. long, the awn as much as 3.5 cm. long or even longer. In some specimens (for example, *Griffiths & Cotton 433*, from eastern Washington) the awns are as much as 5.5 cm. long. TYPE LOCALITY: Woods Landing, Wyoming. DISTRIBUTION: Dry plains and open woods, Alberta to Washington, and southward to Colorado, California, and Lower California.

40. *Stipa Lettermani* Vasey, Bull. Torrey Club 13: 53. 1886.

Stipa viridula var. *Lettermani* Vasey, Contr. U. S. Nat. Herb. 3: 50. 1892.

Culms caespitose, often in large tufts, glabrous or minutely scaberulous, erect, mostly 30–60 cm. tall; sheaths glabrous, not pilose at throat; ligule a rather firm membrane less than 0.5 mm. long; blades slender, involute, the innovations numerous, glabrous or minutely scaberulous, 10–20 cm. long, mostly less than 0.5 mm. thick; panicles slender, narrow, rather loosely flowered, pale or greenish, 10–15 cm. long, the branches short and appressed, few-flowered; glumes about 6 mm. long, equal, acuminate, or awn-pointed, pale, rather firm, rather obscurely 3-nerved, minutely scaberulous; lemma 4–5 mm. long, pale, the callus 0.5 mm. long, rather sparsely barbed, the body narrow, somewhat narrowed at the summit, appressed-villous, the hairs longer above, those of the summit 1–1.5 mm. long; awn slender, obscurely twice geniculate, scabrous, 1.5–2 cm. long.

TYPE LOCALITY: Snake River, Idaho (*Letterman 102*).

DISTRIBUTION: Open ground or open woods at upper altitudes, Montana to Oregon, and southward to New Mexico and California.

ILLUSTRATION: Hitchc. Man. f. 926.

41. *Stipa arida* M. E. Jones, Proc. Calif. Acad. II. 5: 725. 1895.

Stipa Mormonum Mez. Repert. Sp. Nov. 17: 209. 1921. (Type from Utah.)

Culms densely caespitose, erect, scaberulous below the nodes, 40–80 cm. tall; sheaths glabrous or somewhat scaberulous; ligule a ciliate membrane about 0.5 mm. long; blades flat or involute, scabrous, 10–20 cm. long, 1–2 mm. wide when flat; panicle narrow, compact, somewhat nodding, pale or silvery, 10–15 cm. long, the branches short, appressed; glumes 8–12 mm. long, equal or the first a little longer, hyaline, scaberulous, acuminate, the first 3-nerved, the second 5-nerved; lemma about 5 mm. long, pale- or light-brown, the callus very sharp, about 0.5 mm. long, barbed with whitish hairs, the body narrow, villous with appressed white hairs except the narrowed slightly roughened summit, more or less glabrate on the sides, the summit naked or sparsely ciliate; awn 4–6 cm. long, capillary, scaberulous, loosely twisted for 1–2 cm., not twisted but flexuous beyond, sometimes obscurely once or twice geniculate; palea half as long as lemma.

TYPE LOCALITY: Marysville, Utah (Jones 5377).

DISTRIBUTION: Rocky slopes, Colorado, Utah, and New Mexico.

ILLUSTRATION: Hitchc. Man. f. 932.

42. *Stipa editorum* Fourn. Mex. Pl. Gram. 75. 1886.

Culms erect, glabrous, closely caespitose, 80–100 cm. tall, the scales at the somewhat bulbous base felty-pubescent; sheaths glabrous, more or less pilose at the throat; ligule 3–6 mm. long, thin; blades flat or usually loosely involute, tapering to a fine involute point, glabrous beneath, more or less scabrous toward the point, 20–40 cm. long, 2–3 mm. wide on the culm, very slender on the innovations; panicle narrow, rather soft, 10–20 cm. long, or even longer, the branches appressed, several at each node, many-flowered, the shorter ones floriferous from base, the longer ones naked at base, as much as 10 cm. long, the pedicels slender; glumes about 9 mm. long, subequal, narrow, hyaline, acuminate to a fine point, 1-nerved, the second with a faint lateral pair of nerves, the first scaberulous on the keel; lemma narrowly fusiform, pale, 5–6 mm. long, the callus acute, rather slender, nearly 1 mm. long, densely barbed with white hairs, the body appressed-villous all over, the hairs at the summit few, about 1 mm. long; awn very slender, 3–4 cm. long, scaberulous, flexuous, usually rather obscurely twice geniculate; anthers with a minute tuft of hairs at summit.

TYPE LOCALITY: Southern Mexico (Karwinsky 1009c).

DISTRIBUTION: Dry open ground and rocky hills, central and southern Mexico.

43. *Stipa tenuissima* Trin. Mém. Acad. St.-Pétersb. VI. 4²: 36. 1836.

Stipa cirrosa Fourn. Mex. Pl. Gram. 75. 1886. (Type from Mexico.)

Stipa subulata Fourn. Mex. Pl. Gram. 75. 1886. (Type from Mexico.)

Culms densely caespitose in large tufts, slender, wiry, erect, glabrous, 30–70 cm. tall; sheaths glabrous or minutely scaberulous; ligule acute, 2 mm. long; blades slender and wiry, closely involute, tapering to a fine point, more or less scabrous, 15–30 cm. long or even longer, scarcely 0.5 mm. wide when rolled; panicle narrow, soft, nodding, 10–30 cm. long, the branches appressed, slender, rather loosely flowered; glumes about 1 cm. long, the first a little the longer, pale or purplish, soft and hyaline, glabrous, minutely scaberulous on the keel, faintly 3-nerved, tapering to a fine soft awn or awnlike point; lemma 2–3 mm. long, oblong-elliptic, plump, brown, glabrous, roughened with minute papillae, the callus 0.5 mm. long, densely barbed, the hairs extending a short distance up on the keel of the lemma, the neck abruptly narrowed, slightly hispidulous; awn capillary, flexuous, obscurely geniculate about the middle, scaberulous, about 5 cm. long.

TYPE LOCALITY: Mendoza, Argentina. (Fide type specimen, Gillies in Trinius Herbarium; type locality as published "V. spp. Chil.")

DISTRIBUTION: Dry open ground, rocky slopes, and open dry woods, western Texas and southern New Mexico to southern Mexico; also in Argentina.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Agrost. 17: f. 432; Bull. U. S. Dep. Agr. 772: f. 94.

44. *Stipa Ichu* (R. & P.) Kunth, Rév. Gram. 1: 60. 1829.

Jarava Ichu R. & P. Fl. Per. 1: 5. 1798.

Jarava usitata Pers. Syn. Pl. 1: 6. 1805. (Based on *Jarava Ichu* R. & P.)

Stipa Jarava Beauv. Agrost. 18, 179. 1812. (Based on *Jarava Ichu* R. & P.)

Stipa eriostachya H.B.K. Nov. Gen. & Sp. 1: 127. 1815. (Type from Ecuador.)

Jarapha Ichu R. & P.; Steud. Nom. Bot. ed. 2. 1: 643, as synonym of *Stipa Ichu*. 1840.

Jarapha arundinacea Willd.; Steud. Nom. Bot. ed. 2. 1: 643, as synonym of *Stipa eriostachya*. 1840.

Stipa pungens Nees & Meyen; Nees, Nova Acta Acad. Leop.-Carol. 19: Suppl. 151. 1841. (Type from Peru.)

Stipa gynerioides Philippi. Anal. Univ. Chile 36: 203. 1870. (Type from Mendoza, Argentina.)

Stipa Liebmannii Fourn. Mex. Pl. Gram. 76. 1886. (Type from Veracruz, Mexico.)

Stipa Ichu var. *gynerioides* Hack.; Stuck. Anal. Mus. Nac. Buenos Aires 11: 98. 1904. (Based on *Stipa gynerioides* Philippi.)

Stipa Ichu var. *gynerioides* f. *interrupta* Hack.; Stuck. Anal. Mus. Nac. Buenos Aires III. 14: 76. 1911. (Type from Argentina.)

Stipa Ichu var. *pungens* Pilger, Notizbl. Bot. Gart. Berlin 11: 778. 1933. (Based on *S. pungens* Nees & Mey.)

Culms closely caespitose, often in large bunches, erect, slender, wiry, glabrous, mostly 80–100 cm. tall, sometimes depauperate; sheaths glabrous or scaberulous, minutely hispidulous at the throat; ligule rather firm, about 2 mm. long, on the innovations much shorter; blades of the culm flat or involute, as much as 4 mm. wide, those of the numerous innovations slender, involute, wiry, mostly scabrous, 30–60 cm. long; panicle narrow, nodding, shining, pale or purplish, densely flowered, often inclosed at base in the uppermost more or less inflated sheath, 15–40 cm. long, the numerous branches appressed, many-flowered, the axis scaberulous, the pedicels very scabrous; glumes about 1 cm. long, less than 0.5 mm. wide, equal, hyaline, papery, gradually narrowed to a fine soft point, faintly 3-nerved, glabrous; lemma fusiform, about 2.5 mm. long, rather sparsely short-pubescent, narrowed into a short neck bearing a conspicuous tuft of ascending or spreading hairs 3–4 mm. long; awn slender, 1–2 cm. long, flexuous or obscurely twice geniculate, scaberulous, the lower part more or less twisted. This species is distinguished by the small fruits, with a crown of long hairs. In the Andes the grass is commonly known as "ichu."

TYPE LOCALITY: Peru.

DISTRIBUTION: Dry hills and plains, Mexico through the Andes to Argentina.

ILLUSTRATIONS: R. & P. Fl. Per. pl. 6, f. b.; Beauv. Agrost. pl. 6, f. 3.

BALLAST PLANTS

STIPA BRACHYCHAETA Godr. Mém. Acad. Montp. Méd. 1: 450. 1853.

Blades firm, flat or loosely involute; panicle narrow, open, the few spikelets on slender pedicels; glumes 8 mm. long; lemma 5 mm. long, brown, pubescent in lines; awn 12 mm. long. On ballast, near Portland, Oregon; native of South America.

STIPA NEESIANA Trin. & Rupr. Mém. Acad. St.-Pétersb. VI. 7²: 27. 1843.

Related to *S. leucotricha*, but with shorter lemma with thickened erose crown. On ballast, Mobile, Alabama; native of South America.

DOUBTFUL SPECIES

STIPA GRISEBACHII Fourn. Mex. Pl. Gram. 74. 1886. (Type from near Mexico City.)

STIPA KOLEOTRICHIA Steud. Syn. Gram. 125. 1854. (Type from Veracruz.)

STIPA SPICATA Walt. Fl. Car. 78. 1888. (Type from South Carolina. Probably a species of *Andropogon*.)

STIPA VIRLETII Fourn. Mex. Pl. Gram. 75. 1886. (Type from San Luis Potosí.)

97. *ORYZOPSIS* Michx. Fl. Bor. Am. 1: 51. 1803.

Dilepnyrum Raf. Med. Repos. II. 5: 353. 1808. (Type species, *Oryzopsis asperifolia* Michx.)

Piptatherum Beauv. Agrost. 17. pl. 5, f. 10. 1812. (Type species, *Milium coeruleascens* Desf.)

Eriocoma Nutt. Gen. 1: 40. 1818. (Type species, *E. cuspidata* Nutt.)

Urachne Trin. Fund. Agrost. 109. 1820. (Type species, *Milium coeruleascens* Desf.)

Fendleria Steud. Syn. Gram. 419. 1855. (Type species, *F. rhynchelytroides* Steud.)

Perennial, mostly low grasses, with flat or often involute blades and terminal narrow or open panicles. Spikelets 1-flowered, disarticulating above the glumes; glumes about equal, ob-

tuse or acuminate; lemma indurate, usually about as long as the glumes, broad, oval or oblong, nearly terete, usually pubescent, with a short, blunt, oblique callus, and a short, deciduous, sometimes bent and twisted awn; palea inclosed by the edges of the lemma.

Type species, *O. asperifolia* Michx.

Lemma glabrous (rarely pubescent in *O. micrantha*).

- | | |
|--|----------------------------|
| Leaf-blades flat, 5 mm. wide or more; spikelets numerous, about 3 mm. long. | 1. <i>O. miliacea</i> . |
| Leaf-blades more or less involute, less than 2 mm. wide. | |
| Panicle-branches spreading or reflexed; fruit about 2 mm. long, pale. | 2. <i>O. micrantha</i> . |
| Panicle-branches ascending or appressed; fruit about 4 mm. long, dark-brown. | 3. <i>O. Hendersoni</i> . |
| Lemma pubescent. | |
| Pubescence on lemma short, appressed. | |
| Spikelets, excluding awn, 5 mm. long or less; blades involute or sub-involute. | |
| Panicle-branches erect or appressed. | |
| Blades and panicles stiff, erect; awns about 5 mm. long. | 4. <i>O. exigua</i> . |
| Blades flexuous, the panicle somewhat so; awns at least 10 mm. long. | 7. <i>O. Kingii</i> . |
| Panicle-branches loosely ascending or spreading. | |
| Awn not more than 2 mm. long, straight or nearly so. | 5. <i>O. pungens</i> . |
| Awn 10-20 mm. long, weakly twice-geniculate. | 6. <i>O. canadensis</i> . |
| Spikelets, excluding awn, 6-9 mm. long; blades flat. | |
| Basal blades elongate, the uppermost not more than 1 cm. long. | 8. <i>O. asperifolia</i> . |
| Basal blades reduced, the upper elongate. | 9. <i>O. racemosa</i> . |
| Pubescence on lemma long and silky. | |
| Panicle-branches and pedicels erect or ascending. | |
| Awn 12 mm. long; culms 30-60 cm. tall. | 10. <i>O. Bloomeri</i> . |
| Awn 6 mm. long; culms usually not more than 30 cm. tall. | 11. <i>O. Webberi</i> . |
| Panicle-branches and the capillary pedicels divaricately spreading. | 12. <i>O. hymenoides</i> . |

1. *Oryzopsis miliacea* (L.) Benth. & Hook.; Aschers. & Schweinf. Mém. Inst. Egypt. 2: 169. 1887.

Agrostis miliacea L. Sp. Pl. 61. 1753.

Achnatherum miliaceum Beauv. Agrost. 20, 146, 148. 1812. (Based on *Agrostis miliacea* L.)

Piptatherum miliaceum Coss. Notes Crit. 129. 1851. (Based on *Agrostis miliacea* L.)

Culms erect from a decumbent base, relatively stout, sometimes branching, 60-150 cm. tall, glabrous or scaberulous, the nodes several; sheaths glabrous, mostly shorter than the internodes, somewhat keeled; ligule truncate, scaberulous, 1-2 mm. long; blades flat, glabrous or nearly so beneath, scaberulous on the upper surface, 20-30 cm. long, 4-8 mm. wide; panicle 15-30 cm. long, erect or somewhat nodding, loose, the branches ascending or spreading, 5-10 cm. long, verticillate, naked below, often with some short leaves intermixed, the axis glabrous, the branches scabrous; pedicels scabrous, the lateral about 1 mm. long; glumes 3 mm. long, glabrous, rather abruptly acuminate, faintly 3-nerved, minutely scaberulous; lemma glabrous, oblong-elliptic, 2 mm. long; awn straight or slightly flexuous, 4 mm. long.

TYPE LOCALITY: Europe.

DISTRIBUTION: Open ground and waste places, southern California; ballast, near Philadelphia; introduced from the Mediterranean.

2. *Oryzopsis micrantha* (Trin. & Rupr.) Thurber, Proc. Acad. Phila. 1863: 78. 1863.

Urachne micrantha Trin. & Rupr. Mém. Acad. St.-Petersb. VI. 7: 16. 1842.

Culms densely tufted, with numerous innovations, erect, slender, scaberulous, 3-5-noded, 30-70 cm. tall; sheaths glabrous, longer than the internodes; ligule scarcely 1 mm. long; blade, slender, flat or, especially on the innovations, involute, often nearly as long as the culms scabrous, 2 mm. wide or less; panicle open, 10-15 cm. long, the branches distant, single or in pairs, spreading or finally reflexed, 2-5 cm. long, with short-pedicled appressed spikelets toward the ends; glumes thin, acuminate, 3-4 mm. long; lemma elliptic, glabrous and shining, rarely appressed-pilose, 2-2.5 mm. long, yellow or brown; awn more or less flexuous, 5-10 mm. long.

TYPE LOCALITY: Saskatchewan.

DISTRIBUTION: Open dry woods and rocky slopes, medium altitudes, Saskatchewan to Montana, south to New Mexico and Arizona. The form with pilose lemmas is found from Colorado to Arizona.

ILLUSTRATION: Bull. U. S. Dep. Agr. 7: f. 96.

3. *Oryzopsis Hendersoni* Vasey, Contr. U. S. Nat. Herb. 1: 267. 1893.

Oryzopsis exigua var. *Hendersoni* Jones, Contr. West. Bot. 14: 11. 1912. (Based on *O. Hendersoni* Vasey.)

Culms densely caespitose, scabrous, 10–40 cm. tall; leaves mostly basal, much shorter than the culms, the sheaths (especially the lower ones) broad, papery, glabrescent; ligule very short; blades subfiliform, involute, scabrous, firm, mostly less than 10 cm. long, the one or two culm blades 4–5 cm. long; panicles narrow, few-flowered, 5–12 cm. long, the few scabrous branches appressed or ascending, spikelet-bearing toward the ends, the lower single or in pairs, as much as 8 cm. long; spikelets short-pedicelated; glumes abruptly acute, minutely scaberulous, rather distinctly 3-nerved, 5–6 mm. long; lemma glabrous, dark brown at maturity, about 4.5 mm. long; awn early deciduous, nearly straight, 6–10 mm. long.

TYPE LOCALITY: Clements Mountain, near North Yakima, Washington.

DISTRIBUTION: Dry or gravelly soil, known only from Clements Mountain, Washington, and the Ochoco National Forest, Oregon.

ILLUSTRATION: Hitchc. Man. f. 866.

4. *Oryzopsis exigua* Thurber, in Torr. U. S. Expl. Exp. 17: 481. 1874.

Culms densely caespitose, the innovations numerous, stiffly erect, scabrous, 15–30 cm. tall; leaves mostly basal, the sheaths smooth or somewhat scabrous; ligule scaberulous, acute, 2–3 mm. long; blades involute-filiform, stiffly erect, scabrous, 5–10 cm. long, the culm-blades usually 2, shorter; panicle narrow, 3–6 cm. long, the short branches appressed, the lower 1–2 cm. long; spikelets short-pedicelated, pale; glumes acute, about 4 mm. long, thin, faintly nerved; lemma elliptic-oblong, appressed-pilose, about as long as the glumes, the callus short and blunt; awn attached at one side between the 2 short lobes of the lemma, about 5 mm. long, obscurely scaberulous, a little bent about the middle, the lower part slightly twisted.

TYPE LOCALITY: Cascade Mountains, Oregon.

DISTRIBUTION: Dry open ground or open woods, Montana to eastern Washington, and southward to Colorado, Oregon, and Nevada.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 13: f. 17; Bull. U. S. Dep. Agr. Agrost. 7: f. 95.

5. *Oryzopsis pungens* (Torr.) Hitchc. Contr. U. S. Nat. Herb. 12: 151. 1908.

Milium pungens Torr.; Spreng. Neu. Entd. 2: 102. 1821.

Panicum firmum Kunth, Rév. Gram. 1: 37. 1829. (Based on *Milium pungens* Torr.) Not *P. pungens* Poir. 1816.

Urachne brevicaudata Trin. Mém. Acad. St.-Petersb. VI. 3: 127. 1834. (Type from Lake Winnipeg, Canada.)

Urachne canadensis Torr. & Gray; Trin. & Rupr. Mém. Acad. St.-Petersb. VI. 7: 17. 1843. (As synonym of *Urachne brevicaudata* Trin.)

Culms caespitose, erect, slender, glabrous or slightly scaberulous, 20–50 cm. tall; sheaths glabrous or slightly scaberulous; ligule 1–2 mm. long; blades slender, flat or usually involute, smooth or slightly scabrous, less than 2 mm. wide, 5–20 cm. long, the 2 or 3 culm blades shorter; panicle narrow, rather few-flowered, 3–6 cm. long, the branches erect or ascending (more or less spreading in anthesis), the lower usually 1–2 cm. long, solitary or in pairs; lateral pedicels 3–5 mm. long; glumes 3–4 mm. long, obscurely 3-nerved, obtuse; lemma about as long as the glumes, elliptic, acutish, rather densely appressed-pilose; awn straight, 1–2 mm. long, or wanting.

TYPE LOCALITY: Schenectady, New York.

DISTRIBUTION: Sandy or rocky soil, Labrador to British Columbia, and southward to Connecticut, Indiana, South Dakota, and Colorado.

ILLUSTRATION: Hitchc. Man. f. 869.

6. *Oryzopsis canadensis* (Poir.) Torr. Fl. N. Y. 2: 433. 1843.

Stipa juncea Michx. Fl. Bor. Am. 1: 54. 1803. (Type from Hudson Bay, Canada, *Michaux.*) Not *S. juncea* L. 1753.

Stipa canadensis Poir. in Lam. Encyc. 7: 452. 1806. (Based on *Stipa juncea* Michx. Basis of *Oryzopsis canadensis* Torr.)

Oryzopsis parviflora Nutt. Jour. Acad. Phila. 3: 125. 1823. (Type from Bellows Falls, Vermont.)

Utrachne canadensis Torr. & Gray, Gram. Cyper. Exsicc. No. 114. 1836. Based on *Stipa canadensis* Poir.
Oryzopsis juncea B.S.P. Prel. Cat. N. Y. 67. 1888. Based on *Stipa juncea* Michx.
Stipa Macounii Scribn.; Macoun, Cat. Can. Pl. 5: 390. 1890. (Type from New Brunswick.)
Oryzopsis Macounii Beal, Grasses N. Am. 2: 229. 1896. Based on *Stipa Macounii* Scribn.

Culms cespitose, slender, erect, somewhat scaberulous, 30-70 cm. tall; sheaths faintly scaberulous; ligule about 2 mm. long; blades flat or usually involute, scabrous, elongate, less than 2 mm. wide; panicles open, 5-10 cm. long, the slender flexuous branches ascending or spreading, naked below, few-flowered above, the lower 1-3 cm. long, solitary or in pairs; lateral pedicels 2-4 mm. long; glumes acute, pale or purplish, faintly nerved, glabrous, 4-6 mm. long; lemma elliptic, appressed-pubescent, about 3 mm. long; awn once or obscurely twice-geniculate, 1-2 cm. long, scaberulous, the lower part somewhat twisted.

TYPE LOCALITY: Hudson Bay, Canada.

DISTRIBUTION: Woods and thickets, Newfoundland to Alberta, and southward to New Hampshire, New York, northern Michigan, and northern Minnesota.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 442; Bull. U. S. Dep. Agr. Agrost. 17: f. 431.

NOTE: This is the species to which the name *Stipa Richardsonii* Link was applied by A. Gray in the earlier editions of the Manual.

7. *Oryzopsis Kingii* (Bolander.) Beal, Grasses N. Am. 2: 229. 1896.

Stipa Kingii Bolander. Proc. Calif. Acad. 4: 170. 1872.

Culms cespitose, with numerous innovations, slender, glabrous, 20-40 cm. tall; leaves mostly basal, the sheaths glabrous or scaberulous; ligule about 1 mm. long; blades involute, filiform, flexuous, scabrous, mostly 10-15 cm. long, the culm-blades about 2, somewhat shorter; panicles narrow, loose, mostly 5-7 cm. long, the slender branches appressed or ascending, few-flowered, 1-2 cm. long; lateral pedicels 2-3 mm. long, scabrous; glumes broad, papery, scarcely nerved, obtuse, purple at base, unequal, the first 3-4 mm. long, the second about 1 mm. longer; lemma elliptic, acutish, appressed-pubescent, 3-3.5 mm. long, the callus acutish, 0.5 mm. long; awn bent in a wide curve or indistinctly geniculate below the middle, not twisted, minutely pubescent, about 12 mm. long, not readily deciduous.

TYPE LOCALITY: Mount Dana, California (*Bolander 6076* [error for 6097]).

DISTRIBUTION: Meadows at upper altitudes, central Sierra Nevada, California.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 13: pl. 10; Bull. U. S. Dep. Agr. Agrost. 7: f. 90.

8. *Oryzopsis asperifolia* Michx. Fl. Bor. Am. 1: 51. 1803.

Oryzopsis mutica Link. Enum. 1: 41. 1821. (Type from North America.)

Utrachne asperifolia Trin. Gram. Unifil. 174. 1824. (Based on *Oryzopsis asperifolia* Michx.)

Utrachne leucosperma Link. Hort. Berol. 1: 94. 1827. (Type from Albany, New York.)

Utrachne mutica Steud. Nom. Bot. ed. 2. 2: 731. 1841. (Based on *Oryzopsis mutica* Link.)

Oryzopsis leucosperma Link; Walp. Ann. 3: 728. 1852. (As synonym of *Utrachne asperifolia* Trin.)

Culms cespitose, glabrous above, faintly scaberulous below, the innovations erect, the fertile culms widely spreading or prostrate, 20-70 cm. long, nearly naked, the two or three sheaths bearing reduced or obsolete blades; sheaths glabrous or faintly scaberulous, those of the culm elongate; ligule a narrow erose ciliolate rim less than 1 mm. long; blades erect, firm, scabrous, flat to somewhat rolled, elongate, 3-8 mm. wide, tapering toward apex, the lower end narrowed to a long involute or folded base, glaucous beneath; panicle narrow, nearly simple, rather few-flowered, 5-8 cm. long, the short branches or pedicels appressed; pedicels 3-6 mm. long; glumes 6-8 mm. long, somewhat obovate, about 7-nerved, abruptly pointed or apiculate, white-margined above; lemma about as long as the glumes, pale or yellowish at maturity, oblong below, tapering and acute, above sparsely pubescent on the body, densely pubescent at base; awn flexuous, angled, scabrous, 5-10 mm. long.

TYPE LOCALITY: Hudson Bay to Quebec.

DISTRIBUTION: Wooded slopes and dry banks, Newfoundland to British Columbia and Montana, and southward to Connecticut, Indiana, South Dakota (Black Hills), and (in the mountains) New Mexico.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Agrost. 7: f. 93; Bull. U. S. Dep. Agr. 772: f. 92; Michx. Fl. Bor. Am. 1: pl. 9.

9. *Oryzopsis racemosa* (J. E. Smith) Ricker; Hitchc. Rhodora 8:
210. 1906.

Milium racemosum J. E. Smith, in Rees's Cycl. 23: Milium 15. 1813.

Oryzopsis melanocarpa Muhl. Descr. Gram. 79. 1817. (Type from Pennsylvania, Muhlenberg.)

Piptatherum nigrum Torr. Fl. U. S. 1: 79. 1823. (Type from Williamstown and Deerfield, Massachusetts; Kingston and Fishkill Mountains, New York; Pennsylvania, Muhlenberg.)

Utrachne racemosa Trin. Gram. Unifl. 174. 1824. (Based on *Milium racemosum* J. E. Smith.)

Utrachne melanocarpa Link. Hort. Berol. 1: 94. 1827. (Based on *Oryzopsis melanocarpa* Muhl.)

Culms from a knotty rhizome, erect, glabrous or scabrous, 30–100 cm. tall, the nodes pubescent; sheaths mostly longer than the internodes, more or less scabrous, the collar puberulent; ligule a ciliolate membrane 0.5 mm. long; culm-leaves several, the lowermost blades reduced, the others elongate, flat, tapering at both ends, rather thin, scabrous on the upper surface, pubescent beneath, 5–15 mm. wide; panicles 10–20 cm. long, the branches distant, the lower spreading or reflexed at maturity, bearing a few spikelets toward the end, the axis and branches scabrous; lateral pedicels 3–5 mm. long, enlarged at summit; glumes 7–9 mm. long, about 7-nerved, with anastomosing cross veins, abruptly acuminate; lemma slightly shorter than the glumes, oblong-elliptic, acute, sparsely pubescent, nearly black at maturity; awn 1.5–2.5 cm. long, slightly flexuous, angular, scabrous.

TYPE LOCALITY: Lancaster, Pennsylvania (Muhlenberg).

DISTRIBUTION: Rocky woods, Quebec to Minnesota and South Dakota, and southward to Delaware, Kentucky, and Iowa.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 92.

10. *Oryzopsis Bloomeri* (Boland.) Ricker; Piper, Contr. U. S. Nat.
Herb. 11: 109. 1906.

Stipa Bloomeri Boland. Proc. Calif. Acad. 4: 168. 1872.

Oryzopsis caduca Beal, Bot. Gaz. 15: 111. 1890. (Type from Belt Mountains, Montana, Scribner.)

Stipa caduca Scribn. Contr. U. S. Nat. Herb. 3: 54. 1892. (Based on *Oryzopsis caduca* Beal.)

Eriocoma caduca Rydb. Mem. N. Y. Bot. Gard. 1: 25. 1900. (Based on *Stipa caduca* Scribn.)

Culms caespitose in dense hard tufts, glabrous, 30–60 cm. tall; leaves crowded at the base, the sheaths glabrous, sometimes sparsely pilose at the throat; ligule firm, about 1 mm. long, decurrent; blades slender, involute, firm, glabrous or somewhat scabrous on the outer surface, tapering to a fine point; panicles somewhat open, rather densely many-flowered, 7–15 cm. long or rarely longer, the branches slender, rather stiffly ascending, the longer 5–7 cm. long, spikelet-bearing from about the middle, the axis and branches slightly scabrous; lateral pedicels of spikelets 5 mm. or more long; glumes broad, indistinctly 3–5-nerved, rather abruptly acuminate, mostly pale but often purplish about the middle, usually minutely pubescent or scaberulous, especially near the base, 8–10 mm. long; lemma elliptic, acute, densely long-villous, 5 mm. long, the callus acute, villous, nearly 1 mm. long; awn about 12 mm. long, tardily deciduous, weakly geniculate or nearly straight, appressed-villous and slightly twisted below, faintly scabrous above.

TYPE LOCALITY: Bloody Canyon, near Mono Lake, California (Bolander 6116).

DISTRIBUTION: Dry ground, medium altitudes, Montana to eastern Washington, and southward to New Mexico and California; rather rare.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: f. 433.

NOTE: This is the species described by Beal (Grasses N. Amer. 2: 226. 1896) under the name *Oryzopsis sibirica* Beal, but the name is based on *Stipa sibirica* Lam., not known from America.

11. *Oryzopsis Webberi* (Thurb.) Benth.; Vasey, Grasses
U. S. 23. 1883.

Eriocoma Webberi Thurb. in S. Wats. Bot. Calif. 2: 283. 1880.

Culms densely caespitose in tussocks, erect, glabrous, 15–30 cm. tall; sheaths glabrous, the truncate summit broader than the base of the blade; ligule a very short membrane; blades involute, filiform, firm, scabrous, panicles narrow, rather few-flowered, 2.5–5 cm. long, the short branches appressed, the axis and branches scabrous; glumes obscurely 5-nerved, acuminate,

minutely scaberulous, about 8 mm. long; lemma narrowly lanceolate, acuminate, densely long-pilose, 6 mm. long; awn early deciduous, straight or bent, not twisted, minutely scabrous.

TYPE LOCALITY: Sierra Valley, California (*Bolander*).

DISTRIBUTION: Deserts and plains, western Colorado, Nevada, and northeastern California; rare.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 13: pl. 18; Bull. U. S. Dep. Agr. Agrost. 17: f. 441.

12. *Oryzopsis hymenoides* (R. & S.) Ricker; Piper, Contr. U. S. Nat. Herb. 11: 109. 1906.

Stipa membranacea Pursh, Fl. Am. Sept. 2: 728. 1814. (Type from banks of the Missouri River *Bradbury*.) Not *S. membranacea* L., 1753.

Stipa hymenoides R. & S. Syst. Veg. 2: 339. 1817. (Based on *Stipa membranacea* Pursh. Basis of *Oryzopsis hymenoides* Ricker.)

Eriocoma cuspidata Nutt. Gen. Pl. 1: 40. 1818. (Type from grassy plains of the Missouri River.)

Milium cuspidatum Spreng. Syst. Veg. 1: 251. 1825. (Based on *Eriocoma cuspidata* Nutt.)

Urachne lanata Trin. Mém. Acad. St.-Petersb. VI. 3: 126. 1834. (Type from North America.)

Eriocoma membranacea Steud. Nom. Bot. ed. 2. 1: 586. 1840. (As synonym of *Urachne lanata* Trin.)

Fendleria rhynchelytroides Steud. Syn. Gram. 420. 1854. (Type from New Mexico, *Fendler 979*.)

Oryzopsis cuspidata Benth.; Vasey, Grasses U. S. 23. 1883. (Based on *Eriocoma cuspidata* Nutt.)

Oryzopsis membranacea Vasey, Bull. U. S. Dep. Agr. Bot. 12: 10. 1891. (Based on *Stipa membranacea* Pursh.)

Eriocoma membranacea Beal, Grasses N. Am. 2: 232. 1896. (Based on *Stipa membranacea* Pursh.)

Eriocoma hymenoides Rydb. Bull. Torrey Club 39: 102. 1912. (Based on *Stipa hymenoides* R. & S.)

Culms densely cespitose, glabrous, 30-60 cm. tall; sheaths glabrous; ligule thin, pale, acute, about 6 mm. long; blades slender, involute, glabrous or nearly so, nearly as long as the culm; panicles diffuse, 7-15 cm. long, about as wide when mature, the slender branches in pairs, the branchlets dichotomous, all divaricately spreading, the ultimate pedicels capillary, flexuous; glumes puberulent, papery, ovate, abruptly pointed, 3-nerved, 6-7 mm. long; lemma fusiform, turgid, about 3 mm. long, nearly black at maturity, densely long-pilose with white hairs 3 mm. long; awn readily deciduous, straight, about 4 mm. long.

TYPE LOCALITY: Banks of the Missouri River, *Bradbury*.

DISTRIBUTION: Deserts and plains, at medium altitudes, Manitoba to British Columbia, and southward to Texas, California, and northern Mexico.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 12: pl. 10; Bull. U. S. Dep. Agr. Agrost. 7: f. 97.

98. *PIPTOCHAETIUM* Presl, Rel. Haenk. 1: 222. 1830.

Cespitose perennials with narrow usually involute blades and rather narrow, and few-flowered panicles. Spikelets 1-flowered, disarticulating above the glumes, the callus of the floret short, acutish, usually bearded; glumes about equal, broad, ovate, convex on the back, thin, abruptly acuminate; fruit brown or dark-gray, coriaceous, obovate, shorter than the glumes, glabrous or hispid above the callus, often minutely striate, sometimes tuberculate near the summit, the lemma turgid, usually somewhat compressed and keeled on the back, gibbous near the summit back of the awn, the edges not meeting but showing the sulcus of the palea, the summit sometimes expanded into a crown; awn deciduous or persistent, curved, flexuous or geniculate, often twisted below; palea narrow, indurate, except toward the margins, central keel consisting of two nerves and a narrow channel or sulcus between, the apex of the keel projecting above the summit of the lemma as a minute point.

Type species, *Piptochaetium setifolium* Presl, of Peru.

Lemma appressed-pubescent.

Lemma glabrous.

Lemma glabrous, striate, the callus strongly pilose.

1. *P. fimbriatum*.

2. *P. brevicalyx*.

3. *P. ovatum*.

1. *Piptochaetium fimbriatum* (H.B.K.) Hitchc. Jour. Wash. Acad. Sci. 23: 453. 1933.

Stipa fimbriata H.B.K. Nov. Gen. & Sp. 1: 126. 1815. (Type from Mexico.)

Milium mexicanum Spreng. Syst. Veg. 1: 251. 1825. (Type from Mexico.)

Piptatherum mexicanum Schultes, in R. & S. Syst. Veg. Mant. 3: Addit. 564. 1827. (Based on *Milium mexicanum* Spreng.)

Avena stipoides Steud. Nom. Bot. ed. 2. 2: 146. 1841. (As synonym of *Milium mexicanum* Spreng.)

Oryzopsis fimbriata Hemsl. Biol. Centr. Am. Bot. 3: 538. 1885. (Based on *Stipa fimbriata* H.B.K.)

Oryzopsis Seleri Pilger, Verh. Bot. Ver. Brand. 51: 192. 1909. (Type from high mountains, Dept. Huehuetenango, Guatemala, *Seler* 3238.)

Culms densely cespitose, erect, slender, glabrous, about 2-noded, 40–80 cm. tall; sheaths glabrous; ligule acute, firm, about 1 mm. long; blades involute-filiform (rarely flat and as much as 1 mm. wide), glabrous or scaberulous, sulcate, flexuous, sometimes nearly as long as the culm, sometimes in a short basal tuft, the culm-blades short, sometimes much reduced; panicles open, 5–15 cm. long, the slender branches spreading, few-flowered toward the ends, the lateral pedicels 2–5 mm. long; glumes about 3 to usually 5 mm. long, pale or greenish to brown or purple, glabrous, rather faintly nerved, sometimes rounded at tip, sometimes extending into a slender point; lemma oblong, about 3.5 mm. long, appressed-pubescent, especially on the short acute callus, dark-brown at maturity, the summit slightly asymmetric, with a short ciliate ridge around the base of the somewhat excentric awn; awn weakly twice-geniculate, green, faintly scaberulous, 1–2 cm. long, the lower part twisted.

TYPE LOCALITY: Guanajuato, Mexico (*Humboldt & Bonpland*).

DISTRIBUTION: Open rocky woods, Colorado to western Texas, Arizona, and Oaxaca, Mexico; Guatemala.

ILLUSTRATIONS: Kunth, Rév. Gram. 2: pl. 43; Bull. U. S. Dep. Agr. Bot. 12: pl. 11; Bull. U. S. Dep. Agr. Agrost. 7: f. 94.

2. *Piptochaetium brevicalyx* (Fourn.) Ricker; Hitchc. Contr.

U. S. Nat. Herb. 17: 286. 1913.

Oryzopsis Fournieriana Hemsl. Biol. Centr. Am. Bot. 3: 538. 1885. (Based on *Stipa brevicalyx* Fourn. [proof sheets], hence a nomen nudum.)
Stipa brevicalyx Fourn. Mex. Pl. Gram. 150. 1886.

Culms densely cespitose in tussocks, slender, glabrous, usually 2-noded, 10–30 cm. tall, the nodes black (when dry), the innovations numerous; sheaths glabrous; ligule 0.5–1 mm. long; blades involute-filiform, glabrous or nearly so, sulcate, 5–15 cm. long, the culm-blades short; panicles narrow, rather loose, few-flowered, 2–4 cm. long, the branches ascending, about 1 cm. long, bearing 1–3 spikelets, the lateral pedicels about 3 mm. long; glumes broad, oblong, rounded and apiculate at tip, usually dark-purple, glabrous, about 3 mm. long; lemma glabrous, somewhat compressed, dark-brown or purple, shining, oblong, asymmetric at the truncate summit; awn somewhat flexuous, glabrous or nearly so, 5–10 mm. long.

TYPE LOCALITY: San Luis de Potosí (*Parry & Palmer 959*).

DISTRIBUTION: Rocky hills, central and southern Mexico.

3. *Piptochaetium ovatum* (Trin.) Desv. in C. Gay, Hist. Fl. Chile

Bot. 6: 273. 1854.

Stipa ovata Trin. Mém. Acad. St.-Pétersb. VI. 1: 73. 1830.

Culms densely cespitose, slender, glabrous, sparingly branching, 2–3-noded, 15–60 cm. tall; sheaths glabrous; ligule 1 mm. long; blades involute-filiform, glabrous, elongate; panicles narrow, loose, 3–12 cm. long, the slender branches flexuous, ascending, 1–3 cm. long; glumes broad, abruptly narrowed to an awn-point 1–2 mm. long, purplish, about 5 mm. long; lemma dark-brown at maturity, nearly globose, slightly compressed, acutish below, glabrous, striate, somewhat asymmetric, 3 mm. long, the blunt callus strongly pilose with brown hairs 1 mm. long, the summit bearing a whitish puberulous ring or crown 1 mm. or more wide, the awn springing from the center; awn weakly twice-geniculate, 1.5–2 cm. long, scaberulous, the lower part twisted.

TYPE LOCALITY: Montevideo.

DISTRIBUTION: Meadows and sandy soil, San José, Tamaulipas, Mexico, *Bartlett 10225*; Uruguay, Argentina, and Chile.

99. MUHLENBERGIA Schreb. Gen. 1: 44. 1789.*

Dilepnyrum Michx. Fl. Bor. Am. 1: 40. 1803. (Standard species, *D. minutiflorum* Michx.)

Podosesum Desv. Nouv. Bull. Soc. Philom. 2: 188. 1810. (Type species, *Stipa capillaris* Lam.)

* Description of genus but no mention of species; Gmel. Syst. Nat. 2: 171. 1791, genus with one species mentioned, *M. Schreberi* Gmel.

- Clomena* Beauv. Agrost. 28. 1812. (Type species, *C. peruviana* Beauv.)
Trichochloa Beauv. Agrost. 29. 1812. (Type species, *T. purpurea* Beauv.)
Tosagris Beauv. Agrost. 29. 1812. (Type species, *T. agrostidea* Beauv. [*Muhlenbergia capillaris*].)
Acroxis Trin. Fund. Agrost. 117. 1820. Name used for a subdivision of *Trichochloa* to include *T. mexicana* (*Muhlenbergia mexicana*) and three other species of *Muhlenbergia*. Steudel gives *Acroxis* Trin. as a synonym of *Muhlenbergia* (Nom. Bot. ed. 2. 1: 22. 1840).
Sericostis Raf. Neog. 4. 1825. (Type species, *Stipa sericea* Michx. [*Muhlenbergia capillaris*].)
Epicampes Presl. Rel. Haenk. 1: 235. 1830. (Type species, *E. strictus*.)
Calycodon Nutt. Jour. Acad. Phila. II. 1: 186. 1848. (Type species, *C. montana* [*Muhlenbergia montana*].)
Vaseya Thurb. in Gray, Proc. Acad. Phila. 1863: 79. 1863. (Type species, *V. comata* [*Muhlenbergia andinalis*].)
Crypsinna Fourn. Mex. Pl. Gram. 90. 1886. (Standard species, *C. macroura* [*Muhlenbergia macroura*].)

Perennial or sometimes annual, low or moderately tall, rarely reed-like grasses, tufted or rhizomatous, the culms simple or much branched, the inflorescence a narrow or open panicle. Spikelets 1-flowered (rarely in part 2-flowered) the rachilla disarticulating above the glumes; glumes as long as the lemma or usually shorter, rarely longer, obtuse to acuminate or awned, the first sometimes small or rarely obsolete; lemma membranaceous, usually rather firm, 3-5-nerved, with a very short, usually minutely pilose callus, the apex acute, sometimes bidentate, rarely bilobed, mucronate or bearing a straight or flexuous awn at apex, or between minute teeth or rarely between lobes.

Type species, *M. Schreberi* Gmel.

Plants annual.

Lemma deeply 2-lobed.

Lemma not lobed, sometimes minutely bifid.

Spikelets in part 2-flowered.

Spikelets 1-flowered.

Awn shorter than the body of the lemma.

Glumes sparsely hirsute; panicle open, the capillary pedicels spreading.

Glumes glabrous or minutely scabrous; panicle with ascending or spreading branches but branchlets and short-pedicelled spikelets appressed.

Panicle oblong, usually more than 5 cm. long, the branches ascending or spreading, 2-4 cm. long, naked below.

Lemma mucronate; culm 30-75 cm. tall.

Lemma with an awn 1-2 mm. long; culm more delicate, 15-30 cm. tall.

Panicle narrow, interrupted, usually less than 5 cm. long, the branches few-flowered, appressed.

Awn more than twice as long as the body of the lemma.

Branches of panicle disarticulating at maturity just above the base; first glume of terminal spikelet on the branch bearing an awn 1-7 mm. long.

Branches of panicle not disarticulating at maturity; glumes of all the spikelets alike.

Second glume broad, 3-toothed (in only a part of the spikelets in *M. pulcherrima*).

Lemma 3.5-4 mm. long, scaberulous except the callus and lower part of margin.

Lemma densely pilose on the lower half.

Upper part of lemma scaberulous; awn flexuous, 5-10 mm. long.

Upper part of lemma glabrous; awn much crisped or curled above, 10-15 mm. long.

Second glume obtuse to acuminate, not toothed.

Pedicels capillary, flexuous or recurved, thickened below the spikelet.

Pedicels straight, usually short.

Glumes obtuse, 1 mm. long or less; lemma 4-5 mm. long.

Glumes acute or awn-pointed; less difference between length of glumes and lemma than in the preceding.

Lemma 1.5 mm. long, glabrous except the callus and margin below, the awn 3-5 mm. long.

Lemma more than 1.5 mm. long.

Lemma 3-4 mm. long, the straight awn 1 cm. long; panicle loosely spikelike, more than half the entire length of the culm, the branches appressed.

Lemma 2-2.5 mm. long; panicles narrow but not spikelike.

1. *M. biloba*.
2. *M. subbiflora*.
3. *M. texana*.
4. *M. Schmitzii*.
5. *M. flavida*.
6. *M. filiformis*.
7. *M. diversiglumis*.
8. *M. pulcherrima*.
9. *M. pusilla*.
10. *M. crispiseta*.
11. *M. implicata*.
12. *M. microsperma*.
13. *M. tenuissima*.
14. *M. depauperata*.

- Branches of panicle somewhat distant; spreading, closely flowered; lemmas usually ciliate on the upper half. 15. *M. ciliata*.
- Branches of panicle appressed; lemmas not ciliate on the upper half.
- Glumes broad at base (the body about 0.5 mm. long), abruptly narrowed into a scabrous awn 1-2 times as long as the body. 16. *M. tenella*.
- Glumes narrowed into an awn shorter than the body, the second 1.5-2 mm. long. 17. *M. tenuifolia*.
- Plants perennial.
- Creeping rhizomes present or the slender decumbent base rooting at the nodes (rhizomes short in *M. dumosa* and *M. californica*) (see also *M. breviseta*).
- Rhizomes wanting; base of the slender, branching culms decumbent and rooting at the nodes.
- Spikelets awnless. 18. *M. uniflora*.
- Spikelets awned.
- Glumes minute, the first often obsolete. 19. *M. Schreberi*.
- Glumes evident (see also *M. Schreberi* var. *palustris*).
- Blades stiffly spreading, 1-3 cm. long, 1-2 mm. wide. 20. *M. brevifolia*.
- Blades lax, longer and wider.
- Lateral nerves of lemma excurrent. 21. *M. laxa*.
- Lateral nerves of lemma not excurrent.
- Awn mostly less than 2 mm. long. 22. *M. curti-setosa*.
- Awn mostly 5-10 mm. long. 23. *M. setarioides*.
- Rhizomes present, creeping, scaly.
- Panicles open, the spikelets on slender pedicels.
- Spikelets awned, 4-5 mm. long.
- Ligule very short; glumes awned. 24. *M. pungens*.
- Ligule 2-3 mm. long; glumes obtuse. 25. *M. Seatonii*.
- Spikelets awnless, acute or mucronate, 1-2 mm. long; blades flat.
- Panicles oblong; eastern species. 26. *M. Torreyana*.
- Panicles as broad as long; western species.
- Ligule 1-2 mm. long, auricled. 27. *M. arenacea*.
- Ligule minute, not auricled. 28. *M. asperifolia*.
- Panicles narrow, more or less condensed (main branches open and spreading in *M. plumbea*), the spikelets on short pedicels.
- Hairs at base of floret copious, as long as the body of the lemma.
- Hairs at base of floret inconspicuous, not more than half as long as the body of the lemma. 29. *M. andina*.
- Blades 2 mm. wide or less, short.
- Main branches of panicle ascending or spreading, naked below, the spikelets clustered at the ends.
- Main branches of panicle short, appressed.
- Culms tall and stout somewhat woody at base, as much as 6 mm. thick, 1-3 meters tall. 30. *M. plumbea*.
- Culms lower, slender. 31. *M. dumosa*.
- Lemmas villous on the lower part.
- Blades 5-10 cm. long, 1-2 mm. wide. 32. *M. glauca*.
- Blades less than 5 cm. long and 1 mm. wide.
- Sheaths glabrous. 33. *M. Thurberi*.
- Sheaths puberulent. 34. *M. curtifolia*.
- Lemmas glabrous.
- Culms erect or decumbent at base, sometimes spreading but not widely creeping. Culms nodulose-roughened.
- Culms widely creeping, the blades conspicuously recurved-spreading.
- Spikelets 3 mm. long. 35. *M. Richardsonii*.
- Spikelets 2 mm. long. 36. *M. repens*.
37. *M. utilis*.
- Blades flat, at least some of them, more than 3 mm. wide.
- Panicles loosely flowered, slender, much exceeding the leaves (see also *M. sylvatica*); glumes broad below, abruptly pointed, shorter than the body of the lemma.
- Culms slender, rather weak, becoming much branched, glabrous or slightly scabrous below the nodes; lemma acuminate, 2.5-3.5 mm. long, awned. 38. *M. brachyphylla*.
- Culms erect, simple or sparingly branched.
- Spikelets 1.5-2.5 mm. long; lemma awnless or awn-tipped; blades commonly not more than 5-7 mm. wide. 39. *M. sobolifera*.
- Spikelets 3-4 mm. long; lemma with an awn 2-5 times as long as the body; blades commonly 8 mm. or more wide. 40. *M. tenuiflora*.

- Panicles usually densely flowered (sometimes loosely in *M. sylvatica*); culms commonly freely branching (sparingly so or even simple in *M. racemosa*); blades mostly not more than 5 mm. wide, usually ascending; glumes tapering from base to apex.
- Glumes with stiff awn-tips, much exceeding the awnless lemma; panicles terminal on the culm or leafy branches, compact, interrupted, bristly. 41. *M. racemosa*.
- Glumes acuminate, sometimes awn-tipped but not stiff and exceeding the lemma; panicles terminal and axillary, numerous, not bristly.
- Culms glabrous below the nodes; panicles not compact, the branches ascending; plants sprawling-topheavy, the branchlets geniculate-spreading. 42. *M. mexicana*.
- Culms strigose below the nodes; panicles compact or if not the branches erect or nearly so; plants often bushy-branching but not sprawling with geniculate branchlets.
- Callus hairs wanting; lemmas nearly smooth, awnless. 43. *M. glabriflora*.
- Callus hairs present; lemmas pubescent below.
- Panicles not compactly flowered; lemmas with awn as much as 10 mm. or more long (awnless in var. *attenuata*); some of the blades 10-15 cm. or more long. 44. *M. sylvatica*.
- Panicles compactly flowered or if not the lemma awnless; blades commonly less than 10 cm. long, but sometimes longer.
- Sheaths glabrous. 45. *M. foliosa*.
- Sheaths scabrous. 46. *M. californica*.
- Creeping rhizomes wanting, the culms cespitose, usually erect (see also *M. uniflora*).
- Second glume 3-toothed.
- Leaves flabellately clustered at the nodes. 47. *M. flabellata*.
- Leaves mostly basal, not flabellately clustered at the nodes.
- Culms filiform, 10-20 cm. tall; lemmas 2.5-3 mm. long. 48. *M. filiculmis*.
- Culms stouter, 30-70 cm. tall; lemmas 3-4 mm. long.
- Lemma strongly pilose; glumes nearly equal. 49. *M. montana*.
- Lemma sparsely pilose; glumes unequal, the second twice as long as the first. 50. *M. quadridentata*.
- Second glume usually acute, sometimes erose but not 3-toothed.
- Culms robust, mostly more than 1 m. tall, the basal tuft of overlapping sheaths strongly compressed-keeled; blades elongate, firm, flat or usually closely folded; ligule usually thin and elongate; panicles narrow (except in *M. magna* and its allies), sometimes condensed but not spikelike; glumes about as long as the lemma, often rather obtuse (many of the species have been referred to *Epicampes*).
- Glumes acute, extending into a short awn; panicle narrow, rather loose; lemma about 2 mm. long, densely short-pilose at base, the awn 1-2 cm. long. 51. *M. scoparia*.
- Glumes acutish or obtuse, not awned.
- Lemma bearing a delicate flexuous awn 1-2 cm. long.
- Glumes villous. 52. *M. speciosa*.
- Glumes not villous, more or less scabrous.
- Lemma 2.5-3 mm. long, rarely less.
- Lemma glabrous. 53. *M. angustifolia*.
- Lemma villous on the lower half.
- Ligule 1-2 cm. long. 54. *M. Emersleyi*.
- Ligule very short. 55. *M. breviligula*.
- Lemma 1.5-2 mm. long, slightly villous or glabrous.
- Lemma glabrous except for a few hairs on the callus; panicle rather loose. 56. *M. distichophylla*.
- Lemma pilose at base; panicle dense. 57. *M. grandis*.
- Lemma awnless or with an awn not more than about 3 mm. long.
- Glumes villous. 58. *M. lanata*.
- Glumes scaberulous or glabrous.
- Branches of the very large panicle long-naked below, finally widely spreading, the lower as much as 20-25 cm. long; plants robust; spikelets glabrous even at base, mostly not more than 2 mm. long (as much as 2.5 mm. in *M. gigantea*) (see also *M. alta*).
- Lemma distinctly shorter than the glumes. 59. *M. mutica*.
- Lemma about as long as the glumes.

- Panicle brownish. 60. *M. magna*.
 Panicle ashy-purple. 61. *M. gigantea*.
 Branches of the narrow panicle appressed or ascending.
 Lemma pubescent.
 Lemma pubescent on lower half (see also awnless forms of *M. Emersleyi*). 62. *M. pubescens*
 Lemma pubescent or villous all over. 63. *M. distans*.
 Lemma glabrous or minutely scabrous, sometimes with a few short hairs at base.
 Glumes 1.5 mm. long. 64. *M. alta*.
 Glumes 2 mm. long.
 Ligule with firm prominent auricles on each side. 65. *M. Meziana*.
 Ligule without auricles at the side. 66. *M. Presliana*.
 Glumes 2.5-3 mm. long.
 Panicle pale or whitish, rather slender, mostly 1-2 cm. wide.
 Panicle ashy-gray or plumbeous, rather robust, mostly more than 2 cm. wide.
 Lemma about as long as the glumes. 68. *M. robusta*.
 Lemma longer than the glumes. 69. *M. macrotis*.
 Culms usually not robust, the lower sheaths not crowded and compressed-keeled.
 Panicle open, the branches finally spreading, the pedicels spreading, usually longer than the spikelets (some of them shorter in *M. rigida*).
 Plants widely spreading, much branched, wiry, the base knotty. 70. *M. Porteri*.
 Plants erect, not widely spreading and much branched.
 Blades flat, short. 71. *M. arizonica*.
 Blades, at least in part, involute.
 Blades short.
 Culms with no visible nodes, the blades clustered at base; panicles mostly less than 15 cm. long; blades curled or falcate.
 Glumes awn-tipped, 2 mm. long. 72. *M. Torreyi*.
 Glumes obtuse, 1 mm. long. 73. *M. Purpusii*.
 Culms with 2 to several nodes.
 Panicles mostly more than 20 cm. long; blades commonly 5-8 cm. long. 74. *M. arenicola*.
 Panicles and blades mostly less than 5 cm. long. 75. *M. breviseta*.
 Blades elongate.
 Lemmas awnless or with an awn as much as 2 mm. long. 76. *M. expansa*.
 Lemmas with awns 5-15 mm. long (2-5 mm. in *M. reverchonii*).
 Culms puberulent.
 Lemmas bilobed. 77. *M. argentea*.
 Lemmas not lobed.
 Sheaths puberulent. 78. *M. stricta*.
 Sheaths glabrous.
 Panicle widely spreading. 79. *M. capillaris*.
 Panicle narrow. 80. *M. setifolia*.
 Culms glabrous.
 Awn of lemma 2-5 mm. long; glumes about 2 mm. long. 81. *M. Reverchonii*.
 Awn of lemma 5-15 mm. long; glumes about 1.5 (1-1.8) mm. long. 82. *M. rigida*.
 Panicle more or less condensed, sometimes spikelike, usually some of the branches floriferous from base, or the spikelets crowded and short pediceled on the branches, the panicle not open or diffuse as in the preceding division.
 Lemma awnless or with an awn as much as 3 mm. long.
 Glumes as long as or longer than the lemma (a little shorter in *M. leptoura*); panicle dense and spike-like (except *M. longiligula*).
 Panicle narrow but rather loose, not spikelike; lemma about as long as the glumes (2-3 mm.), awnless or rarely with a minute awn. 83. *M. longiligula*.
 Panicle dense and spikelike.
 Glumes 6-10 mm. long; panicle dark green or olive. 84. *M. nigra*.
 Glumes 2-4 mm. long.
 Glumes awn-pointed. 85. *M. leptoura*.
 Glumes acute or obtuse, not awn-pointed.

- Glumes 4 mm. long, a little longer than the lemma. 86. *M. macroura*.
 Glumes 2-3 mm. long, a little shorter than the lemma. 87. *M. rigens*.
 Glumes distinctly shorter than the lemma.
 Panicle rather loose.
 Lemma short-awned; panicle 25-40 cm. long. 88. *M. involuta*.
 Lemma acuminate or awn-tipped; panicle 5-8 cm. long. 89. *M. Jonesii*.
 Panicle rather dense to spikelike, often interrupted.
 Lemma short-awned, 4-5 mm. long.
 Panicle dense, spikelike. 90. *M. firma*.
 Panicle narrow but scarcely spikelike. 91. *M. dubia*.
 Lemma acute or mucronate, 2.5-3 mm. long.
 Lemma densely villous on the margins, about 1.5 mm. long. 92. *M. villiflora*.
 Lemma glabrous or minutely pubescent, 3-3.5 mm. long.
 Panicle slender, rather loosely flowered. 93. *M. cuspidata*.
 Panicle dense, interrupted, the branches closely flowered. 94. *M. Wrightii*.
 Lemma with an awn 5 mm. long or more.
 Awns yellow, strongly flexuous; plants 20-30 cm. tall.
 Glumes subequal. 95. *M. Watsoniana*.
 Glumes unequal, the first shorter. 96. *M. flaviseta*.
 Awns not yellow nor strongly flexuous. 97. *M. alamosae*.
 Panicle open, ovoid or pyramidal.
 Panicle narrow, elongate, spikelike or rather loose.
 Blades comparatively short, mostly less than 10 cm. long (sometimes longer in *M. Metcalfei*).
 Glumes minute, less than 1 mm. long. 98. *M. spiciformis*.
 Ligule about 0.5 mm. long. 99. *M. parviglumis*.
 Ligule 1-3 mm. long.
 Glumes more than 1 mm. long. 100. *M. polycaulis*.
 Lemma loosely villous on the lower half.
 Lemma somewhat pubescent or glabrous.
 Lemma glabrous or scaberulous.
 Panicle contracted, closely flowered on the branchlets. 101. *M. pauciflora*.
 Panicle rather loose, loosely flowered on the branchlets. 102. *M. Metcalfei*.
 Lemmas pubescent on the lower part.
 Culms waxy, loosely tufted at base. 103. *M. Arsenei*.
 Culms densely and closely tufted at base. 104. *M. monticola*.
 Blades elongate, mostly more than 10 cm. long.
 Old sheaths flat, spirally coiled or ribbon-like; lemma pubescent or villous on the lower half; glumes 4-5 mm. long. 105. *M. virescens*.
 Old sheaths not flat and coiled; lemma glabrous or scaberulous, sometimes pubescent on the callus.
 Glumes 5-6 mm. long. 106. *M. longiglumis*.
 Glumes, at least the first, less than 5 mm. long.
 Blades of culm flat with long involute points. 107. *M. Palmeri*.
 Blades, at least some of them, involute.
 Glumes 2-2.5 mm. long.
 Lemma about 3.5 mm. long; awn 15-30 mm. long; panicle pale. 108. *M. elongata*.
 Lemma about 5 mm. long; awn 5-10 mm. long; panicle purple. 109. *M. glabrata*.
 Glumes 3-4 mm. long. 110. *M. articulata*.

1. *Muhlenbergia biloba* Hitchc. Contr. U. S. Nat. Herb. 17: 294. 1913.

Bealia mexicana Scribn. in Hack. True Grasses 104. 1890; Beal, Grasses N. Am. 2: 267. 1896. (Basis of *Muhlenbergia biloba* Hitchc.) Not *Muhlenbergia mexicana* Trin. 1824.
Epicampes mexicana Jones, Contr. West. Bot. 14: 7. 1912. (Based on *Bealia mexicana* Scribn.)

Annual, much-branched at base; culms erect, slender, glabrous, 10-30 cm. tall; sheaths scaberulous, clustered near the base of the plant; ligule thin, 2-3 mm. long, decurrent on the

sheath as a thin white margin; blades flat, scaberulous beneath, puberulent on the upper surface, 1-3 cm. long, 1 mm. wide or less; panicles long-exserted, ovoid or pyramidal, open, pale or purplish, 3-7 cm. long, the branches slender, scaberulous, few-flowered, the pedicels slightly thickened below the spikelet and more distinctly scabrous; glumes equal, obtuse, pubescent or somewhat villous, 3 mm. long; lemma a little shorter than the glumes, densely villous on the lower two-thirds, 2-lobed at summit, the lobes about 1 mm. long, obtuse, the awn from between the lobes, scabrous, flexuous, curved about the middle, 5-10 mm. long; palea about as long and broad as the lemma, obtuse, villous on the lower part like the lemma.

TYPE LOCALITY: Chihuahua City (*Pringle 819*).

DISTRIBUTION: Gravelly hills, Baja California to Durango.

NOTE: The bilobed lemma is found in *M. argentea*, a species not closely allied to this one.

2. *Muhlenbergia subbiflora* Hitchcock, sp. nov.

Annual; culms slender, much-branched, spreading, glabrous, 30-50 cm. long; sheaths glabrous, somewhat keeled, mostly shorter than the internodes; ligule thin, acute, 3 mm. long; blades flat, glabrous beneath, puberulous on upper surface, scabrous on the margins, mostly 3-7 cm. long, about 1 mm. wide; panicles 7-10 cm. long, the branches solitary or in pairs, 1-1.5 cm. distant, finally spreading or sometimes a little reflexed, 1-2 cm. long; spikelets on short pedicels or on short branchlets, somewhat crowded along the main branches, 1-flowered or frequently 2-flowered, gray or plumbeous; glumes subequal, acute, glabrous, about 2 mm. long; first lemma narrowly lanceolate, terete or somewhat angled by the 3 rather prominent nerves, minutely pubescent along the lower part of the midnerve and margin, about 3 mm. long or a little less, awned; awn 1-5 mm. long, straight or a little flexuous; palea a little shorter than the lemma, the bifid tip with 2 short slender awns.

Annual; culmi graciles ramosi 30-50 cm. longi; ligula 3 mm. longa; laminae planae, subtus glabrae, supra puberulae, 3-7 cm. longae, 1 mm. latae; panicula 7-10 cm. longa, ramis patulis, 1-2 cm. longis; spiculae breviter pedicellatae 1-2-florae plumbeae; glumae subaequales acutae glabrae 2 mm. longae; lemma 3 mm. longum prominente 3-nerviis, carina margineque inferiore pubescente, aristatum; arista 1-5 mm. longa, recta.

Type collected on rich moist soil in garden, city of Durango, Mexico, November, 1896, *Palmer 948* (U. S. Nat. Herb. no. 995434). The only other collection seen is *Palmer 731*, also from the vicinity of Durango.

NOTE: This species was thought by Scribner and Merrill to be *Chaboissaea ligulata* Fourn., which they regarded as a species of *Muhlenbergia*. They transferred the name and distributed the two collections mentioned above as *Muhlenbergia ligulata* (Bull. U. S. Dep. Agr. Agrost. 24: 19. 1901). In spite of the fact that many spikelets are two-flowered, the structure is that of *Muhlenbergia*. Two-flowered spikelets occur in other species of this genus.

3. *Muhlenbergia texana* Buckl. Proc. Acad. Phila. 1862: 91.

1863.

Muhlenbergia Buckleyana Scribn. Contr. U. S. Nat. Herb. 1: 56. 1890. (Based on *M. texana* Buckl. Name changed because supposed to be antedated by *M. texana* Thurb. 1874.)
Podosaemum texanum Bush, Am. Midl. Nat. 7: 41. 1921. (Based on *Muhlenbergia texana* Buckl.)

Annual; culms delicate, usually branched at base and often at the lower nodes, erect or usually decumbent at base, puberulous, 10-20 cm. tall; sheaths puberulent, mostly longer than the internodes; ligule thin, scarcely 1 mm. long; blades mostly less than 5 cm. long, about 1 mm. wide, scabrous; panicle oblong, more than half the entire height of the plant, open, the delicate branches ascending or spreading, 2-3 cm. long, scabrous, the capillary pedicels longer than the spikelets; glumes acute, about 1.5 mm. long, sparsely hirsute; lemma minutely silky on midnerve and margins below, notched at apex, about 2 mm. long, the delicate awn 1-2 mm. long.

TYPE LOCALITY: Northern Texas.

DISTRIBUTION: Open gravelly places, western Texas and New Mexico to northern Mexico.

ILLUSTRATION: Hitchc. Man. f. 732.

4. *Muhlenbergia Schmitzii* Hack. Ann. Nat. Hofmus. Wien
17: 255. 1902.

Muhlenbergia Diehlii Jones, Contr. West. Bot. 14: 13. 1912. (Type from Chihuahua, Jones 7316.)

Annual (originally described as perennial); culms erect, unbranched at base, sparingly branched above (the branches long, erect), 5-6-noded, scaberulous especially below the nodes, 30-75 cm. tall; sheaths shorter than the internodes, scaberulous at least toward summit; ligule 2-3 mm. long; blades linear from base, flat, rather abruptly narrowed at apex, glabrous beneath, scabrous on the upper surface and on the margins, about 15 cm. long, the lower approximate and shorter, 3-5 mm. wide; panicle loose, oblong, 20-30 cm. long, the axis and branches very scabrous, the capillary branches ascending, naked below, mostly solitary, the upper approximate, the lower distant; spikelets brownish, short-pedicel, appressed and rather loosely arranged along the main branches; glumes about equal, acuminate or short-awned, scabrous on the keel and back, more or less toothed near summit, 1.5-2 mm. long; lemma lanceolate, acute, mucronate, rather prominently 3-nerved, appressed-pubescent below on the midnerve and margins, 3-4 mm. long; palea as long as the lemma, flat, sparsely scaberulous.

TYPE LOCALITY: Mexico (*Schmitz 380*).

DISTRIBUTION: Rocky canyons, Mexico (habitat and locality of the type unknown); Sierra Madre, Chihuahua, Jones 7316; Canales Station, Hidalgo, Pringle 8951.

ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. 12: pl. 12, as *M. Buckleyana*.

5. *Muhlenbergia flavida* Vasey, Contr. U. S. Nat. Herb. 1: 282.
1893.

Annual; culms slender, often delicate, more or less branching, scaberulous, 15-30 cm. tall; sheaths mostly shorter than the internodes, faintly scaberulous toward the summit; ligule thin, about 2 mm. long; blades mostly less than 5 cm. long and less than 1 mm. wide, glabrous beneath, pubescent on the upper surface; panicle open, narrow, 5-15 cm. long, the axis and branches scabrous, the capillary branches ascending, 2-4 cm. long, naked below, mostly solitary; spikelets pale or yellow, short-pedicel, appressed along the main branches; glumes about equal, glabrous, narrow, acuminate or short-awned, 1.5-2 mm. long; lemma lanceolate, about 3 mm. long, prominently 3-nerved, pubescent on the midnerve below and on the margins nearly to summit, awned from between 2 minute lobes, the awn straight, 1-2 mm. long. Allied to *M. Schmitzii* but much more delicate.

TYPE LOCALITY: Río Blanco, Jalisco (*Palmer 645*).

DISTRIBUTION: Wet places, Jalisco (near Guadalajara, Palmer 645 in 1886, Pringle 11749) and Chihuahua (Sierra Madre, Pringle 3034).

Muhlenbergia flavida var. *strictior* Scribn.: (Beal, Grasses N. Am. 2: 263, as synonym. 1896) Hitchc. Contr. U. S. Nat. Herb. 17: 290. 1913 (based on *M. strictior* Beal), *M. strictior* Beal, Grasses N. Am. 2: 263. 1896. *M. madrensis* Jones, Contr. West. Bot. 14: 12. 1912 (type from Garcia, Sierra Madre, Chihuahua, Jones 7315). Differing only in the contracted panicle. TYPE LOCALITY: Sierra Madre, Chihuahua (Pringle 1418). DISTRIBUTION: Chihuahua and Durango.

6. *Muhlenbergia filiformis* (Thurb.) Rydb. Bull. Torrey Club 32:
600. 1905.

Vilfa depauperata var. *filiformis* Thurb.: S. Wats. Bot. King's Expl. 376. 1871.

Vilfa gracillima Thurb. in S. Wats. Bot. Calif. 2: 268. 1880. (Type from California.) Not *Muhlenbergia gracillima* Torr. 1856.

Sporobolus gracillimus Vasey, Cat. Grasses U. S. 44. 1885. (Based on *Vilfa gracillima* Thurb.) *Sporobolus filiformis* Rydb. Contr. U. S. Nat. Herb. 3: 189. 1895. (Based on *Vilfa depauperata* var. *filiformis* Thurb.)

Sporobolus depauperatus var. *filiformis* Beal, Grasses N. Am. 2: 296. 1896. (Type from Montana.) *Sporobolus simplex* Scribn. Bull. U. S. Dep. Agr. Agrost. 11: 48. 1898. (Type from Georgetown, Colorado, Rydberg 2411.)

Sporobolus aristatus Rydb. Bull. Torrey Club 28: 266. 1901. (Type from Big Horn Mountains, Wyoming, Tweedy 2196.)

Sporobolus simplex var. *thermale* Merr. Rhodora 4: 48. 1902. (Type from Lolo Hot Springs, Montana, Griffiths 302a.)

Muhlenbergia simplex Rydb. Bull. Torrey Club 32: 600. 1905. (Based on *Sporobolus simplex* Scribn.) Not *M. simplex* Kunth, 1829.

Muhlenbergia aristulata Rydb. Bull. Torrey Club 32: 600. 1905. (Based on *Sporobolus aristatus* Rydb.)

Annual; culms cespitose, rather soft and lax, erect or somewhat spreading, glabrous, filiform, usually 5-15 cm. tall, sometimes as much as 30 cm.; ligule thin, 1-2 mm. long; blades flat, glabrous beneath, scabrous-pubescent on the upper surface, usually less than 3 cm. long and 1 mm. wide; panicles numerous, narrow, interrupted, few-flowered, usually less than 5 cm. long; glumes ovate, about equal, obtuse or acutish, awnless, 1 mm. long; lemma lanceolate, acute, mucronate, minutely pubescent, scaberulous at tip, 1 mm. long, the callus glabrous.

TYPE LOCALITY: Yosemite Valley, California (*Bolander 6091*).

DISTRIBUTION: Open woods and mountain meadows, South Dakota and Kansas to British Columbia, and southward to New Mexico and California. A somewhat stouter form with thicker panicles has been called *M. simplex* Rydb.

ILLUSTRATION: Hitchc. Man. f. 735.

7. *Muhlenbergia diversiglumis* Trin. Mém. Acad. St.-Pétersb. 6²: 298 (reprint 52). 1841.

Muhlenbergia Trinitii Fourn.; Hemsl. Biol. Centr. Am. Bot. 3: 543. 1885; Mex. Pl. Gram. 84. 1886. (Based on *M. diversiglumis* Trin.)

Annual; culms very slender, delicate, several-noded, branching at all the nodes, spreading, lax, 20-50 cm. long, the nodes pilose; sheaths sparsely to rather densely papillose-pilose, mostly shorter than the internodes; ligule less than 0.5 mm. long; blades flat, lax, pilose on both surfaces, usually 2-5 cm. long, 0.5-2 mm. wide; panicles numerous, terminal and axillary, narrow, loose, mostly 1-sided, the filiform axis flexuous, the capillary scabrous branches simple, spreading or reflexed, disarticulating just above the base with the appressed subsessile spikelets attached, the lower branches somewhat distant, bearing 2-5 spikelets, the upper approximate, with two spikelets; glumes 0.2-0.3 mm. long, broad, irregularly dentate, the first glume of the terminal spikelet usually bearing a scabrous awn, 1-7 mm. long; lemma at first subterete, expanding toward maturity, scabrous on the back, pilose at base, usually ciliate on the margin toward the summit, 3-5 mm. long, tapering into a slender scabrous awn 5-15 mm. long, the tip of the lemma sometimes with a pair of slender teeth at the base of the awn; palea narrow, scabrous, the nerves extending into slender awns.

TYPE LOCALITY: Porto Pedro, Mexico (*Karwinsky*).

DISTRIBUTION: Rocky or sterile soil, southern Mexico (Michoacán, Morelos, Jalisco).

8. *Muhlenbergia pulcherrima* Scribn.; Beal, Grasses N. Am. 2: 240. 1896.

Annual; culms erect, cespitose, 15-25 cm. tall, much branched near base, the branches erect; sheaths striate, minutely scabrous, longer than the internodes, much overlapping toward base; ligule thin, acute, 2-3 mm. long, blades flat or loosely involute, scaberulous beneath, minutely pubescent on the upper surface, mostly less than 5 cm. long, 1 mm. wide or less; panicle narrow, rather loose, 3-5 cm. long, the branches ascending; glumes unequal, the first acute or notched, 0.5-1 mm. long, the second scaberulous, acute or 2-3-toothed, about 2 mm. long; lemma terete, narrow, gradually acuminate, 3.5-4 mm. long, minutely bifid at apex, minutely pubescent on the callus and just above, pubescent on the lower half on the contiguous margins, otherwise scaberulous only, the awn slender, flexuous, 1-1.5 cm. long. Resembling *M. pusilla*, differing in the size, shape, and pubescence of the lemma.

TYPE LOCALITY: Chihuahua (*Pringle 1416*).

DISTRIBUTION: Dry rocks or open places in pine woods, Chihuahua, Mexico (*Pringle 1416, 1697, Hitchcock 7663, 7722*).

9. *Muhlenbergia pusilla* Steud. Syn. Gram. 177. 1854.

Muhlenbergia Bourgaei Fourn.; Hemsl. Biol. Centr. Am. Bot. 3: 539, name only. 1885; Mex. Pl. Gram. 86. 1886. (Type from Valley of Mexico, *Bourgeau 1155, 1309*.)

Annual; culms slender, erect, glabrous, cespitose, 3-30 cm. tall, much branched near the base, the branches erect, or the outer sometimes spreading because of the large size of the tuft; sheaths glabrous, longer than the internodes, rather prominently nerved, the lower much

overlapping, thin, loose and flattened out, the margin hyaline; ligule thin, acutish, about 3 mm. long; blades flat or usually loosely involute, erect, glabrous beneath, minutely pubescent on the upper surface, mostly less than 5 cm. long, 1 mm. wide or less; panicles numerous, terminating the culms and the short basal often included branches, oval or oblong, narrow or rather loose, 1-4 cm. long, the branches appressed or ascending, mostly floriferous from near base, few-flowered, one or two of the lowermost naked at base, the branchlets and short pedicels appressed; glumes thin, unequal, the first narrow, acute, 1-nerved, about 1.5 mm. long, the second broad, 3-nerved, 3-toothed, about 2 mm. long, minutely scabrous on the nerves; lemma terete, lanceolate-acuminate, densely appressed-pilose on the lower half, scaberulous above, minutely bifid at apex, about 2 mm. long above the densely short-pilose callus, the awn very slender, scabrous, flexuous, 5-10 mm. long.

TYPE LOCALITY: Toluca, Mexico (*Berlandier 1141*).

DISTRIBUTION: Dry open ground, prairies, and open pine woods, 2000-3000 meters, San Luis Potosi to Jalisco.

NOTE: This species has been referred to *M. peruviana* (Beauv.) Steud. of South America.

10. *Muhlenbergia crispiseta* Hitchcock, sp. nov.

Annual; culms erect, caespitose, glabrous, very slender, 10-20 cm. tall, much-branched near the base, the branches erect; sheaths glabrous, longer than the internodes, the lower much overlapping; ligule rounded, about 1.5 mm. long; blades flat or loosely involute, glabrous beneath, pubescent on the upper surface, less than 5 cm. long, 1 mm. wide or less; panicles numerous, terminating the culms and the short basal branches, ovoid, rather loose, 1-3 cm. long, the branches ascending, mostly floriferous from near base, the short pedicels often curved; glumes pale, unequal, glabrous, the first lanceolate, acute, 1-nerved, about 1 mm. long, the second broader, oblong, 3-nerved, 3-toothed, a little longer than the first; lemma terete, lanceolate, acuminate, densely pilose on the lower half or two-thirds, glabrous above, a little less than 2 mm. long, the minute callus short-pilose, the apex bifid, the awn slender, flexuous below, much-crisped or curled in the upper part, 1-1.5 cm. long.

Annua; culmi graciles erecti caespitosi 10-20 cm. alti, basi ramosi; laminae planae vel paullum involutae, subtus glabrae, supra pubescentes, 1-5 cm. longae 0.5-1 mm. latae; paniculae numerosae ovatae vel oblongae 1-3 cm. longae; gluma secunda 3-dentata; lemma lanceolatum acuminatum, in dimidio inferiore dense pilosum, supra glabrum, vix 2 mm. longum; arista gracillima crispa 1-1.5 cm. longa.

Type collected on thin soil of porphyry ledges, Sierra Madre, State of Chihuahua, Mexico, October 23, 1887, *Pringle 1411* (U. S. Nat. Herb. no. 995491). Other specimens are *Pringle 824* and *Hitchcock 7663* from Chihuahua; *Schaffner 181* and *Parry & Palmer 932* from San Luis Potosi.

11. *Muhlenbergia implicata* (H.B.K.) Kunth, Rév. Gram. 1: 63.

1829.

Podosaeum implicatum H.B.K. Nov. Gen. & Sp. 1: 127. 1815.

Trichochloa implicata R. & S. Syst. Veg. 2: 385. 1817. (Based on *Podosaeum implicatum* H.B.K.)

Agrostis implicata Spreng. Syst. 1: 262. 1825. (Based on *Podosaeum implicatum* H.B.K.)

Muhlenbergia erecta Presl, Rel. Haenk. 1: 231. 1830. (Type from Mexico, *Haenke*.) Not *M. erecta* Schreb. 1807.

Annual; culms slender, puberulent, branching near base, erect or spreading; sheaths glabrous, mostly shorter than the internodes; ligule about 3 mm. long; blades flat or loosely involute, glabrous beneath, pubescent on the upper surface, scabrous on the margins, less than 10 cm. long and 2 mm. wide; panicles terminating the culms and branches, rather narrow, loose and open, 5-15 cm. long, the axis puberulent, the branches capillary, spreading, somewhat distant, the scabrous branchlets and somewhat distant curved and implicate glabrous pedicels spreading, the pedicels enlarged for 1 mm. below the spikelets; glumes thin, broad, unequal, truncate and somewhat erose at apex, the second about 0.5 mm. long, the first about half as long as the second; lemma very narrow, scaberulous on the 5 prominent nerves, 3 mm. long, the callus pubescent, the apex 2-toothed, the teeth extending into minute awns; awn scabrous, nearly straight, 1.5-2 cm. long.

TYPE LOCALITY: Near Lake Cuiseo and Puerto de Andaracuas.

DISTRIBUTION: Open sterile or rocky soil, Mexico to Colombia and Venezuela.

12. *Muhlenbergia microsperma* (DC.) Kunth, Rév. Gram. 1: 64. 1829.

- Trichochloa microsperma* DC. Cat. Pl. Hort. Monsp. 151. 1813.
Podosaemum debile H.B.K. Nov. Gen. & Sp. 1: 128. 1815. (Type from Ecuador.)
Podosaemum setosum H.B.K. Nov. Gen. & Sp. 1: 129. 1815. (Type from Mexico.)
Agrostis microsperma Lag. Gen. & Sp. Nov. 2. 1816. (Type grown in Botanic Garden, Madrid, the seed from Mexico.)
Trichochloa debilis R. & S. Syst. Veg. 2: 385. 1817. (Based on *Podosaemum debile* H.B.K.)
Trichochloa setosa R. & S. Syst. Veg. 2: 386. 1817. (Based on *Podosaemum setosum* H.B.K.)
Muhlenbergia fasciculata Trin. Gram. Unifl. 192. 1824. (Type from North America.)
Agrostis setosa Spreng. Syst. 1: 262. 1825. (Based on *Podosaemum setosum* H.B.K.) Not *A. setosa* Muhl. 1817.
Agrostis debilis Spreng. Syst. 1: 262. 1825. (Based on *Podosaemum debile* H.B.K.) Not *A. debilis* Poir. 1810.
Muhlenbergia setosa Kunth, Rév. Gram. 1: 63. 1829. (Based on *Podosaemum setosum* H.B.K.)
Muhlenbergia debilis Kunth, Rév. Gram. 1: 63. 1829. (Based on *Podosaemum debile* H.B.K.)
Muhlenbergia purpurea Nutt. Jour. Acad. Phila. II. 1: 186. 1848. (Type from Santa Barbara and Santa Catalina Island, California, *Gambel*.)
Muhlenbergia ramosissima Vasey, Bull. Torrey Club 13: 231. 1886; S. Wats. Proc. Am. Acad. 21: 443. 1886. (Type from Southwest Chihuahua, *Palmer 158* in 1885.)

Annual; culms slender, scaberulous at least below the nodes, branching at base and more or less at all the nodes, spreading, 10–70 cm. tall; sheaths more or less scaberulous, mostly shorter than the internodes; ligule thin, 1.5–2 mm. long; blades flat or loosely involute, more or less scabrous on both surfaces, mostly less than 10 cm. long, rarely longer, usually less than 1 mm. wide, sometimes as much as 3 mm. wide; panicles numerous, usually purple, terminal and axillary, narrow, 5–20 cm. long, the scabrous branches and branchlets and scabrous-pubescent pedicels spreading and somewhat implicate in anthesis, the axis angled, scabrous, the lateral pedicels comparatively stiff and stout, 1 mm. long; glumes subequal, broad, awnless, usually obtuse at tip, the second about 1 mm. long; lemma narrow, attenuate above, scabrous, especially on the 3 rather strong nerves, 4–5 mm. long, the callus pubescent, the apex with 2 minute awned teeth; awn slender, nearly straight, 1–3 cm. long. Cleistogamous spikelets are developed at the base of the lower sheaths, solitary or few in a fascicle in each axil, each spikelet included in an indurate-thickened, tightly rolled, narrowly conical, reduced sheath, which readily disarticulates from the plant at maturity. The glumes are wanting and the awn of the lemma is reduced but the grain is larger than that of the spikelets in the terminal inflorescence, being about the same length (2 mm.) but much thicker.

TYPE LOCALITY: Mexico.

DISTRIBUTION: Rocky places and dry open ground, Arizona and southern California to Guatemala; also in Ecuador and Peru.

ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. 13¹: pl. 21.

13. *Muhlenbergia tenuissima* (Presl) Kunth, Rév. Gram. Suppl. xvi. 1830.

- Podosaemum tenuissimum* Presl, Rel. Haenk. 1: 230. 1830.
Muhlenbergia nebulosa Scribn.; Beal, Grasses N. Am. 2: 247. 1896. (Type from Guadalajara, Mexico, *Pringle 2366*.)

Annual; culms slender, branching at all the nodes, spreading, angled, glabrous or finely scaberulous especially below the nodes, 5–25 cm. tall; sheaths scaberulous, shorter than the internodes; ligule thin, 1–1.5 mm. long; blades flat or loosely involute, glabrous beneath, pubescent on the upper surface, mostly not more than 3 cm. long, 0.5 mm. wide; panicles numerous, terminal and axillary, rather narrow, open, 2–4 cm. long, the branches ascending or spreading, usually less than 1 cm. long, the pedicels slender, longer than the spikelets; glumes somewhat unequal, acute or mucronate, the second 0.5–1 mm. long; lemma lanceolate, 3-nerved, sparsely pilose along the contiguous margins about 1.5 mm. long; awn slender, scabrous, nearly straight, 3–5 mm. long.

TYPE LOCALITY: Panama and Mexico (*Haenke*).

DISTRIBUTION: Open wet soil, Jalisco, Colima, and Nayarit (*Pringle 2366, 11753, Orcutt 4629, Palmer 1933* in 1892); also Panama (*Presl*).

14. *Muhlenbergia depauperata* Scribn. Bot. Gaz. 9: 187. 1884.

Muhlenbergia Schaffneri Fourn. Mex. Pl. Gram. 85. 1886. (Type from Tacubaya, Mexico.)
Muhlenbergia Schaffneri var. *longisetata* Scribn. Proc. Acad. Phila. 1891: 297. 1891. (Type from near City of Mexico, Pringle in 1890.)
Lycurus Schaffneri Mez, Repert. Sp. Nov. 17: 212. 1921. (Based on *Muhlenbergia Schaffneri* Fourn.)

Annual; culms densely caespitose, scaberulous, branching at all the nodes, erect or in large tufts, the outer culms spreading, the branches mostly appressed, the whole plant usually pale or tawny; sheaths glabrous, striate, mostly longer than the internodes; ligule thin, 1-2 mm. long; blades flat or folded, scabrous beneath, puberulent on the upper surface, mostly less than 3 cm. long, about 1 mm. wide; panicle narrow, loosely spikelike, usually more than half the entire length of the culm, the branches appressed; glumes narrow, scabrous, the first irregularly bidentate or entire, mostly 1-3 mm. long, occasionally reduced, the second a little longer; lemma narrow, terete, prominently 3-nerved, slightly pubescent along the internerves, 3-4 mm. long, the delicate awn straight, about 1 cm. long.

TYPE LOCALITY: Arizona (Pringle).

DISTRIBUTION: Open gravelly places, Colorado and Arizona to southern Mexico.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 12: pl. 14, f. 1, 2; Bull. U. S. Dep. Agr. Agrost. 7: f. 109.

15. *Muhlenbergia ciliata* (H.B.K.) Kunth, Rév. Gram. 1: 63. 1829.

Podosaemum ciliatum H.B.K. Nov. Gen. & Sp. 1: 128. 1815.
Trichochloa ciliata R. & S. Syst. Veg. 2: 386. 1817. (Based on *Podosaemum ciliatum* H.B.K.)
Polyopogon ciliatus Spreng. Syst. 1: 243. 1825. (Based on *Podosaemum ciliatum* H.B.K.)
Muhlenbergia adpersa Trin. Mém. Acad. St.-Pétersb. VI. 6: 291 (reprint 45). 1841. ("Cynosurus tenellus" ht. Madrid. (in hb. Mertensii!). Lima?" The specimen in Trinius' herbarium is *M. ciliata*.)
Podosaemum brachyphyllum Nees; Nees & Schauer, Linnaea 19: 690. 1847. (Type from Mexico.)
Polyopogon brachyphyllus Fourn.; Hemsl. Biol. Centr. Am. Bot. 3: 552. 1885. (Based on *Podosaemum brachyphyllum* Nees.)
Muhlenbergia brachyphylla Nees,* B. D. Jackson, Ind. Kew. 2: 269. 1894.

Annual; culms branching freely at the lower nodes, erect or usually lax and spreading, slender, glabrous, 10-30 cm. long; sheaths glabrous or sparsely pilose; ligule 0.5 mm. long; blades flat, glabrous beneath, pilose on the upper surface, spreading, lax, mostly 1-3 cm. long, sometimes longer, mostly less than 1 mm. wide, sometimes as much as 2 mm.; panicles numerous, terminating the culms and branches, mostly 4-10 cm. long, the axis glabrous, the branches rather distant, 7-20 mm. long, spreading, closely flowered to base, the spikelets appressed on short appressed branchlets, the main branches tending finally to disarticulate from the axis just above the base; glumes narrow, glabrous, acuminate, somewhat unequal, extending into a short awn sometimes as long as the body, the second about 1 mm. long, sometimes as much as 2 mm.; lemma very narrow, subterete, rather strongly 5-nerved, 2 mm. long or a little longer, loosely ciliate on the lateral nerves along the upper half, the short callus minutely pubescent; the awn very slender, straight or subflexuous, 5-20 mm. long; palea as long as the lemma, narrow, acuminate.

TYPE LOCALITY: Jorullo, Mexico.

DISTRIBUTION: Moist rocks, walls, sides of ditches, and moist open ground, Mexico to Panama; also in Ecuador and Peru.

NOTE: The ciliation may be dense or sparse, extending nearly to base or confined to the upper part of the lemma; sometimes it appears to be altogether wanting, but usually at least a part of the spikelets on a plant will show the cilia. When the cilia are wanting, the species can still be distinguished from *M. tenella* by the strong nerves of the lemma and the spreading branches of the inflorescence.

*This must be considered a nomen nudum. The authority "Nees" would imply that *Podosaemum brachyphyllum* was meant, but (Ind. Kew. 3: 580) *Podosaemum brachyphyllum* Nees is referred to *Polyopogon brachyphyllus* and *Polyopogon brachyphyllus* (Ind. Kew. 3: 601) is regarded as a valid species. There is nothing to connect *Muhlenbergia brachyphylla* directly with the other names. Hence *M. brachyphylla* Bush (1919) is not invalidated.

16. *Muhlenbergia tenella* (H.B.K.) Trin. Gram. Unifl. 192. 1824.

- Podosaeum tenellum* H.B.K. Nov. Gen. & Sp. 1: 128. 1815.
Arundo tenella Spreng. Pug. 2: 6. 1815. (Type from Mexico.)
Trichochloa tenella R. & S. Syst. Veg. 2: 385. 1817. (Based on *Podosaeum tenellum* H.B.K.)
Muhlenbergia Sprengelii Trin. Gram. Unifl. 189. 1824. (Based on *Arundo tenella* Spreng.)
Polypogon tenellus Spreng. Syst. 1: 243. 1825. (Based on *Podosaeum tenellum* H.B.K.) Not
Polypogon tenellus R. Br.
Polypogon gracilis Spreng. Syst. 5: 558 (Index). 1828. (Based on *Polypogon tenellus* Spreng.)
Muhlenbergia exilis Fourn. Mex. Pl. Gram. 84. 1886. (Type from Veracruz.)

Annual; culms very slender, glabrous, branching from the base and lower nodes, spreading, 10–30 cm. tall; sheaths glabrous, or the lower pilose, mostly shorter than the internodes; ligule less than 0.5 mm. long, ciliate; blades flat becoming involute, glabrous beneath, pilose on the upper surface, sometimes pubescent on both surfaces, mostly less than 3 cm. long, sometimes longer, usually less than 1 mm. wide; panicles terminating the numerous culms, narrow, 5–12 cm. long, the short appressed branches floriferous to base, the spikelets appressed; glumes broad at base, the body about 0.5 mm. long, abruptly narrowed into a scabrous awn once or twice as long as the body, rarely ciliate about the base of the awn; lemma very narrow, subterete, glabrous, usually obscurely nerved, about 2 mm. long, the callus minutely pubescent, the slender awn 1–2 cm. long; palea as long as the lemma.

TYPE LOCALITY: Jalapa, Mexico.

DISTRIBUTION: Moist banks, wet rocks and ledges, and stone walls, Mexico to Panama.

17. *Muhlenbergia tenuifolia* (H.B.K.) Kunth, Rév. Gram. 1: 63. 1829.*

- Calamagrostis tenuifolia* H.B.K. Nov. Gen. & Sp. 1: 134. 1815.
Calamagrostis quitensis H.B.K. Nov. Gen. & Sp. 1: 133. 1815. (Type from southern Mexico. The specific name seems to have been given inadvertently.)
Arundo tenuifolia Poir. in Lam. Encyc. Suppl. 4: 704. 1816. (Based on *Calamagrostis tenuifolia* H.B.K.)
Arundo quitensis Poir. in Lam. Encyc. Suppl. 4: 704. 1816. (Based on *Calamagrostis quitensis* H.B.K.) Not *A. quitensis* Spreng.
Calamagrostis mexicana H.B.K. Nov. Gen. & Sp. 7: Corrigenda. 1825; Kunth. Syn. Pl. 4: 473. 1825. (Name substituted for *C. quitensis*.)
Muhlenbergia calamagrostidea Kunth, Rév. Gram. 1: 63. 1829. (Based on *Calamagrostis quitensis* H.B.K., the name presumably changed because not appropriate, the type being from Mexico, not Quito.)
Muhlenbergia longiseta Benth. Pl. Hartw. 28. 1840. (Type from Aguas Calientes, Mexico, Hartweg 248.)
Podosaeum tenuifolium Nees; Nees & Schauer, Linnaea 19: 690. 1847. (Based on *Calamagrostis tenuifolia* H.B.K.)
Muhlenbergia quitensis Hitchc. Contr. U. S. Nat. Herb. 17: 292. 1913. (Based on *Calamagrostis quitensis* H.B.K.)

Annual; culms slender, glabrous, loosely caespitose, branched from lower and sometimes from the middle nodes, widely spreading, geniculate at lower nodes, 20–70 cm. tall; sheaths mostly shorter than the internodes, glabrous or scaberulous; ligule thin, about 2 mm. long; blades flat or loosely involute, scaberulous beneath, scabrous-pubescent on the upper surface, mostly less than 10 cm. long and 1 mm. wide; panicles numerous, usually purple, terminating the culms and branches, narrow but rather loose, nodding, mostly 8–15 cm. long, sometimes longer, the axis glabrous below, scaberulous above, the lower branches distant, ascending or finally spreading, as much as 4 cm. long, usually floriferous from near base, the branchlets and very short pedicels appressed, or in anthesis spreading, scabrous-pubescent, the upper branches shorter, contiguous, all rather densely flowered; glumes narrow, unequal, acute, more or less awn-pointed, the awns shorter than the body, the first (excluding awn) 1–1.5 mm. long, the second 1.5–2 mm. long; lemma terete, lanceolate, 2–2.5 mm. long, about 0.3 mm. wide, pubescent at base and on the minute callus, the pubescence extending up the contiguous margins more than half way to summit, the surface otherwise minutely scaberulous; awn very slender, scabrous, flexuous, more or less crisped toward the end, mostly 1.5–2 cm. long.

TYPE LOCALITY: Mexico City.

DISTRIBUTION: Fields, open ground, walls, gulches, and sterile soil, Mexican Plateau; South America (without locality, Bolivia, Bang 487).

ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. 13: pl. 19.

* *Calamagrostis quitensis* and *C. tenuifolia* have the same date, 1815, but the latter was transferred first to *Muhlenbergia*, hence *M. tenuifolia* is the valid name.

18. *Muhlenbergia uniflora* (Muhl.) Fernald, *Rhodora* 29: 10. 1927.*Poa? uniflora* Muhl. Descr. Gram. 151. 1817.*Agrostis serotina* Torr. Fl. U. S. 1: 88. 1823. (Type from New Jersey.) Not *A. serotina* L. 1767.*Vilfa serotina* Trin. Ic. pl. 251. 1830. (Type from North America.)*Vilfa tenera* Trin. Mém. Acad. St.-Petersb. VI. 6: 87. 1840. (Type from Boston.)*Poa modesta* Tuckerm. Am. Jour. Sci. 45: 45. 1843. (Type from Cambridge, Massachusetts.)*Sporobolus serotinus* A. Gray, Man. 577. 1848. (Based on *Agrostis serotina* Torr.)*Sporobolus difflorus* Scribn. & Merr. Circ. U. S. Dep. Agr. Agrost. 27: 5. 1900. (Based on *Poa uniflora* Muhl.)*Muhlenbergia uniflora* var. *terrae-notae* Fernald, *Rhodora* 29: 11. 1927. (Type from Newfoundland, Fernald et al., 26244.)

Perennial, but often appearing like an annual, tufted, often with decumbent bases or slender rhizomes; culms compressed, slender, erect, scaberulous, 20–40 cm. tall; sheaths overlapping, compressed-keeled, glabrous or slightly pubescent; ligule thin, truncate, about 1 mm. long, the margin erose; blades flat, crowded along the lower part of the culm, erect, lax, mostly less than 10 cm. long, sometimes longer, 1 mm. wide or less; panicles loose, open, oblong, 7–20 cm. long, 2–4 cm. wide, the slender branches ascending, rather stiff, the axis and branches scabrous, the capillary pedicels (branches of the third or fourth order) much longer than the spikelets; spikelets glabrous, dark-purplish, about 1.5 mm. long, rarely 2-flowered; glumes scarcely half as long as the spikelet, subacute; lemma faintly 3-nerved, acutish; palea as long as the lemma.

TYPE LOCALITY: New England.

DISTRIBUTION: Bogs and wet meadows, Newfoundland to Michigan and New Jersey.

NOTE: The lower branches come from buds originating 1–3 mm. below the nodes on the same side of the culm as the sheath below, there being no bud in the axil of that sheath.

19. *Muhlenbergia Schreberi* Gmel. Syst. Veg. 2: 171. 1791.*Muhlenbergia diffusa* Willd. Sp. Pl. 1: 320. 1797. (Type from North America.)*Dilepysum minutiflorum* Michx. Fl. Bor. Am. 1: 40. 1803. (Type from Kentucky and Illinois.)Listed as *Dilepysum multiflorum* by Beauv. Agrost. 160. 1812.*Cynodon diffusus* Raspail, Ann. Sci. Nat. 5: 303. 1825. (Based on "*Muhlenbergia* Schr." [error for Willd.])*Muhlenbergia Bolteri* Fourn. Mex. Pl. Gram. 85. 1886. (Type from Orizaba, Mexico.)*Muhlenbergia minutiflorum* Hitchc. Trans. Kansas Acad. 14: 140. 1896. (Based on *Dilepysum minutiflorum* Michx.)

Perennial; culms slender, glabrous, branching, spreading and decumbent at base, usually rooting at the lower nodes, but not forming definite creeping rhizomes, the flowering branches ascending, rather lax, 10–30 cm. long; sheaths somewhat keeled, glabrous or slightly scabrous, more or less pilose at the throat, shorter or sometimes a little longer than the internodes; ligule a ciliate membrane about 1 mm. long; blades flat, scabrous on the margins and more or less so on both surfaces, pilose in the vicinity of the ligule, linear, rounded at the base, usually less than 5 cm. long, 2–4 mm. wide; panicles terminal and axillary, slender, loosely flowered, lax, nodding, 5–15 cm. long, sometimes as much as 30 cm., the scabrous branches appressed or ascending, the lower often distant, the lateral pedicels scabrous, 0.5 mm. long; glumes minute, the first often obsolete, the second rounded, 0.1–0.2 mm. long; lemma narrow, acuminate, somewhat pubescent around the base, the body about 2 mm. long, the slender awn 2–3 cm. long.

TYPE LOCALITY: Pennsylvania.

DISTRIBUTION: Damp shady places, New Hampshire to Wisconsin and eastern Nebraska, and southward to Florida, Texas, and Veracruz.

NOTE 1: In spring and early summer the culms are short and erect with spreading blades, the plants being very different in appearance from the flowering phase of autumn.

NOTE 2: *Muhlenbergia* was based on the species described by Schreber (Gen. 1: 44. 1789) under *Muhlenbergia* with no specific name.

Muhlenbergia Schreberi var. *palustris* (Scribn.) Scribn. *Rhodora* 9: 17. 1907. *Muhlenbergia palustris* Scribn. Bull. U. S. Dep. Agr. Agrost. 11: 47. 1898. Glumes developed, as much as 1 mm. long. TYPE LOCALITY: District of Columbia. DISTRIBUTION: Known only from Washington, D. C. ILLUSTRATIONS: Bull. U. S. Dep. Agr. 772: f. 82; Bull. U. S. Dep. Agr. Agrost. 7: f. 99 (as *M. diffusa*).

20. *Muhlenbergia brevifolia* Scribn.; Beal, Grasses N. Am. 2:
254. 1896.

Perennial; culms slender, glabrous, many-noded, branching at the lower and middle nodes, decumbent and more or less rooting at the lower nodes, 20–30 cm. long; sheaths glabrous, ligule thin, lacerate, decurrent, about 1 mm. long, the lateral parts appearing like auricles; blades flat or usually becoming involute, spreading, glabrous beneath, sparsely villous on the upper surface, scabrous on the margin, narrowed to a blunt point, 1–3 (sometimes 4–5) cm. long, 1–1.5 (rarely 2) mm. wide, the uppermost reduced; panicles terminating the culms and branches long-exserted, ovoid, loose, 2–4 cm. long, the axis glabrous or slightly puberulent, the branches few, closely few-flowered, some of them naked below, ascending or more or less spreading, the very short pedicels puberulent; glumes about equal, narrow, acuminate or short-awned, scabrous on the keel, 3–4 mm. long; lemma short-pilose around the callus, otherwise glabrous, about 3.5 mm. long, minutely bifid at the narrow summit, the awn slender, more or less flexuous, 3–15 mm. long.

TYPE LOCALITY: Guadalajara, Mexico (*Pringle 5367*).
DISTRIBUTION: Wet ledges, Durango to Jalisco.

21. *Muhlenbergia laxa* Hitchcock, sp. nov.

Perennial; culms slender, branching, long-decumbent, spreading, lax, glabrous, many-noded, 40–70 cm. long; sheaths shorter than the internodes, glabrous; ligule thin, about 1 mm. long; blades flat, scaberulous, 2–5 cm. long, 1–2 mm. wide; panicles terminating the branches, green, narrow, compact, almost spikelike, interrupted, 4–6 cm. long, the spikelets clustered on short appressed branches, the axis flat, scaberulous, the branches and short pedicels pubescent; glumes about equal, pale with a green midnerve, oblong or somewhat spatulate, scabrous, more or less 2-lobed, awned from between the lobes, the body about 1.5 mm. long, the awn rather stout, scabrous, tapering from a flattish base to a fine point, about as long as the body; lemma glabrous below, scaberulous above, 3-nerved, about 2.5–3 mm. long, the lateral nerves excurrent as short awns, the mid-nerve extending into a slender scabrous awn 4–8 mm. long; palea a little shorter than the lemma, the keels short-awned.

Perennis; culmi laxi graciles longe decumbentes ramosi 40–70 cm. longi; laminae planae scaberulae 2–5 cm. longae 1–2 mm. latae; paniculae virides compactae interruptae 4–6 cm. longae, spiculis in ramulis brevibus acervatis; glumae aequales plus minusve bilobatae 1.5 mm. longae aristatae, arista circa 1.5 mm. longa; lemma infra glabrum, supra scaberulum, 3-nerviium, 2.5–3 mm. longum, nervis lateralibus excurrentibus, arista media 4–8 mm. longa.

Type collected in moist places, at Orizaba, Mexico, October, *Botteri 1259* (U. S. Nat. Herb. no. 822840). The only other specimen seen is *Botteri 1257* from the same locality.

22. *Muhlenbergia curtisetosa* (Scribn.) Bush, Am. Midl. Nat.
6: 35. 1919.

Muhlenbergia Schreberi curtisetosa Scribn. *Rhodora* 9: 17. 1907.

A little-known form, differing from *M. Schreberi* in having stouter culms and coarser panicles, the glumes evident, rarely as much as 2 mm. long, the lemma 2.5–3 mm. long, the awn 1–2 mm. long.

TYPE LOCALITY: Illinois (*Wolf* in 1881).
DISTRIBUTION: Illinois (*Wolf*); Champaign, Illinois (*Clinton*); Eagle Rock, Missouri (*Bush 377*).

23. *Muhlenbergia setarioides* Fourn. Mex. Pl. Gram. 84. 1886.

Muhlenbergia sylvatica var. *setarioides* Beal, Grasses N. Am. 2: 249. 1896. (Based on *M. setarioides* Fourn.)
Muhlenbergia polypogonoides Hack. Ann. Nat. Hofmus. Wien 17: 255. 1902. (Type from Mexico, *Schmitz 862*.)

Perennial; culms slender, glabrous, branching, straggling, usually with long decumbent or creeping rooting base, many-noded, often a meter or more long; sheaths glabrous or minutely

roughened, mostly shorter than the internodes; ligule rather prominent, thin, lacerate or dentate, 1-2 mm. long; blades thin, flat, rather lax, scabrous on both surfaces, somewhat narrowed toward base, 2-12 cm. long, 3-8 mm. wide; panicles numerous, terminating the culms and branches, rather lax or nodding, narrow, interrupted or almost spike-like, 5-15 cm. long, the axis nearly glabrous, the branches and short pedicels scabrous, the former ascending or appressed, as much as 2 cm. long, or rarely as much as 4 cm., the spikelets crowded, the lateral ones almost sessile; glumes nearly equal or the second longer, thin, pale with a green midnerve, scabrous on the keel, mostly 1.5-2 mm. long; lemma lanceolate-terete, short-pilose on the lower part, scabrous above, pale, rather prominently 5-nerved, acute, about 2 mm. long, awned, the awn flexuous, usually purplish, 2-10 mm. long, variable in the same panicle.

TYPE LOCALITY: Orizaba, Mexico.

DISTRIBUTION: Shady banks and moist thickets, often persisting in pastures, mostly 1000-2000 meters, Veracruz to Panama.

24. *Muhlenbergia pungens* Thurb. Proc. Acad. Phila. 1863: 78.
1863.

Podosaemum pungens Bush, Am. Midl. Nat. 7: 32. 1921. (Based on *Muhlenbergia pungens* Thurb.)
Not *Podosaemum pungens* Link, 1827.

Perennial, with strong creeping rhizomes; culms erect from a decumbent leafy base, 20-40 cm. tall, sometimes taller, glabrous except the lower internodes, thin, the prophylla and the covered parts of the sheaths softly and densely lanate-pubescent; sheaths glabrous, except as noted above, crowded toward the base, much overlapping; ligule a ciliate membrane 1 mm. long; blades short, flat at base but closely involute above, firm, sharp-pointed, spreading, often curved, minutely pubescent on both surfaces, mostly 3-5 cm. long, sometimes as much as 10 cm., rarely longer; panicles long-exserted, open, oblong, 5-15 cm. long, the main branches 3-5, these divided into fascicles of capillary, finally spreading or divaricate, very scabrous branchlets, the whole cluster ascending, 5-6 cm. long, the capillary pedicels 2-3 cm. long; spikelets purple to brownish, 4-5 mm. long; glumes about one third as long as the spikelet, scabrous, often erose or toothed, the midnerve extending into a short awn; lemma terete, tapering into an awn about 1 mm. long; palea about as long as the lemma, the keels awn-tipped.

TYPE LOCALITY: Rocky Mountains, Colorado (*Hall & Harbour 632*).

DISTRIBUTION: Dry hills and sandy plains, South Dakota, Colorado, and Utah to New Mexico and Arizona.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 107.

25. *Muhlenbergia Seatonii* Scribn; Seaton, Proc. Am. Acad. 28:
122. 1893.

Perennial, apparently from creeping rhizomes; culms slender, erect or somewhat decumbent at base, several from a branching base, about 20 cm. tall; sheaths glabrous, longer than the internodes; ligule membranaceous, prominent, 2-3 mm. long; blades flat or more or less involute, glabrous beneath, puberulent on the upper surface, 3-8 cm. long, about 1 mm. wide; panicle open, 10-15 cm. long, the axis nearly glabrous, the branches stiffly ascending or spreading, scaberulous, 4-7 cm. long, with capillary basal branches, the branchlets bearing 1-3 spikelets, all on pedicels longer than the spikelets; glumes unequal, glabrous, broad, obtuse, the first a little less than 1 mm. long, the second a little longer; lemma narrow, glabrous, 3-nerved, about 4 mm. long, minutely pilose on the callus, the summit 2-toothed, the teeth extending into bristles 1-2 mm. long, the awn from between the teeth, scabrous, somewhat flexuous, 10-15 mm. long; palea broad, about as long as the lemma, obtuse.

TYPE LOCALITY: Esperanza, Mexico (*Seaton 320*).

DISTRIBUTION: Known only from the type collection.

NOTE: The underground part of the type specimen is not present but the base appears to be rhizomatous.

26. *Muhlenbergia Torreyana* (Schult.) Hitchc. Am. Jour. Bot. 21:
136. 1934.

Agrostis compressa Torr. Cat. Pl. N. Y. 91. 1819. (Type from New Jersey.) Not *A. compressa* Willd. 1790.

Vilfa compressa Trin.; Spreng. Neue Entdeck. 2: 58. 1821. (Type from North America.) Not *V. compressa* Beauv. 1812.

Agrostis Torreyana Schultes, in R. & S. Syst. Veg. Mant. 2: 203. 1824. (Based on *Agrostis compressa* Torr. Basis of *Muhlenbergia Torreyana* Hitchc.)

Sporobolus compressus Kunth, Enum. Pl. 1: 217. 1833. (Based on *Agrostis compressa* Torr.)

Sporobolus Torreyanus Nash in Britton, Man. 107. 1901. (Based on *Agrostis Torreyana* Schult.)

Perennial, strongly compressed at base, with short stout very scaly rhizomes; culms simple or sparingly branched at base, erect, glabrous, 30-60 cm. tall, the nodes appressed-pilose, the branches erect; sheaths compressed-keeled, numerous and strongly overlapping on the lower part of the culm, glabrous or minutely roughened, pubescent near the base; ligule a rather firm ciliate membrane about 1 mm. long; blades elongate, rather firm, flat or folded, minutely scabrous on both surfaces, as wide as sheaths at base, tapering into a fine sharp apex, 1-3 mm. wide; panicles oblong, erect, narrow but open, 10-20 cm. long, the capillary branches ascending, the lower as much as 10 cm. long, the axis and mostly solitary branches scaberulous, rather few-flowered, the capillary pedicels being branches of the third or fourth order, the pedicels enlarged just below the spikelet, the lateral ones 1.5 to 2 mm. long; spikelets about 2 mm. long; glumes subequal, acute, slightly shorter than the lemma; lemma 3-nerved, the palea about as long, both minutely scaberulous-puberulent.

TYPE LOCALITY: New Jersey (*Goldy*).

DISTRIBUTION: Moist pine barrens and meadows, New Jersey and Delaware; Georgia (Sumter County, *Harper 549*).

ILLUSTRATION: Hitchc. Man. f. 751.

27. *Muhlenbergia arenacea* (Buckl.) Hitchc. Proc. Biol. Soc.
Wash. 41: 161. 1928.

Sporobolus arenaceus Buckl. Proc. Acad. Phila. 1862: 89. 1863.

Sporobolus auriculatus Vasey, Contr. U. S. Nat. Herb. 3: 64. 1892. (Type from Pena, Texas, *Nealley*.)

Perennial with extensively creeping rhizomes; culms cespitose from a cluster of vertical rhizomes, glabrous, erect or decumbent at base, 10-20 cm. tall; sheaths crowded and overlapping at base, glabrous; ligule prominent, decurrent, 1-2 mm. long, the margins usually split away, forming an erect auricle at each side; blades flat, wavy, mostly 1-3 cm. long, about 1 mm. wide, involutely sharp-pointed, the scabrous margins and midnerve white and cartilaginous, scaberulous on the upper surface, glabrous beneath, strongly nerved on both surfaces; panicles diffuse, 7-12 cm. long, about as broad, the branches and pedicels capillary, spreading; spikelets about 2 mm. long, rarely 2-flowered; glumes about half as long as the spikelet, abruptly apiculate or subacute, glabrous; lemma glabrous, abruptly mucronate; palea about as large and as long as the lemma.

TYPE LOCALITY: Western Texas (*Wright 737*).

DISTRIBUTION: Low places in mesas, Texas to Arizona and Sonora.

ILLUSTRATION: Hitchc. Man. f. 748.

28. *Muhlenbergia asperifolia* (Nees & Mey.) Parodi, Revista Fac.
Agron. Buenos Aires 6: 117. 1928.

Vilfa asperifolia (Meyen. Reise 1: 408, name only. 1834) Nees & Mey.; Trin. Mém. Acad. St.-Petersb. VI. 6: 95. 1840.

Sporobolus asperifolius Nees, Nova Acta Acad. Leop.-Carol. 19: Suppl. 141. 1843. (Based on *Vilfa asperifolia* Nees & Mey.)

Agrostis distichophylla R. A. Phil. Fl. Atac. 54. 1860. (Type from Chile, *Parodi*.) Not *A. distichophylla* R. & S. 1817.

Sporobolus sarmentosa Griseb. Abh. Ges. Wiss. Gött. 24: 295. 1879. (Type from Argentina.)

Sporobolus deserticolus Phil. Anal. Mus. Nac. Chile Bot. 8: 82. 1891. (Type from Chile, *fide* *Parodi*.)

Sporobolus asperifolius var. *major* Vasey, Contr. U. S. Nat. Herb. 3: 64. 1892. (Type from Marfa, Texas.)

Sporobolus distichophyllus Phil. Anal. Univ. Chile 94: 7. 1896. (Based on *Agrostis distichophyllus* Phil.)

Agrostis eremophila Speng. Anal. Mus. Nac. Buenos Aires 7: 190. 1902. (Based on *A. distichophylla* Phil.)

Perennial, pale or glaucous, with slender scaly rhizomes; culms branching at base, spreading, slender, compressed, glabrous, 10–40 cm. tall, the branches ascending or erect; sheaths compressed-keeled, usually overlapping, glabrous; ligule truncate, erose-toothed, about 0.5 mm. long; blades flat, crowded, scabrous, mostly 2–5 cm. long, 1–2 mm. wide; panicles slender, diffuse, 5–15 cm. long, about as wide, the capillary scabrous branches finally widely spreading, the panicle at maturity breaking away, the axis glabrous or nearly so, the main branches scaberulous, the branches of the second and third order (pedicels) scabrous, rather stiff, the pedicels slightly enlarged below the spikelets, much longer than the spikelets; spikelets 1.5–2 mm. long, occasionally 2-flowered; glumes acute, glabrous, scabrous on the keel, sometimes minutely and sparsely pilose on the back, from half to nearly as long as the spikelet; lemma thin, broad, minutely mucronate from an obtuse apex; palea about as long and as broad as the lemma.

TYPE LOCALITY: Chili (*Meyen*).

DISTRIBUTION: Damp or marshy, often alkaline soil, along irrigation ditches and banks of streams, Illinois and Alberta to British Columbia, and southward to Texas, California, and Mexico; southern South America.

ILLUSTRATION: Hitchc. Man. f. 749.

NOTE: *Muhlenbergia asperifolia*, *M. arenacea*, *M. Torreyana*, and *M. uniflora* are placed in *Muhlenbergia* instead of *Sporobolus* because of the 3-nerved mucronate lemma. The caryopsis does not fall from the lemma and palea as in most species of *Sporobolus*, nor can the pericarp be separated from the grain by moistening it.

29. *Muhlenbergia andina* (Nutt.) Hitchc. Bull. U. S. Dep. Agr.

772: 145. 1920.

Calamagrostis andina Nutt. Jour. Acad. Phila. II. 1: 187. 1848.

Vaseya comata Thurb. Proc. Acad. Phila. 1863: 79. 1863. (Type from "Nebraska" [probably Wyoming], Hall & Harbour 685.)

Muhlenbergia comata Thurb.; Benth. Jour. Linn. Soc. Bot. 19: 83. 1881. (Based on *Vaseya comata* Thurb.)

Perennial, with numerous scaly rhizomes; culms erect or sometimes spreading, scabrous-puberulent below the nodes and panicles, 50–100 cm. tall; sheaths smooth or slightly scabrous, keeled; ligule 1 mm. long, membranaceous, short-ciliate; blades flat or loosely involute, scabrous, 5–15 cm. long, mostly less than 10 cm., 2–6 mm. wide; panicles narrow, spikelike, usually more or less lobed or interrupted, grayish, silky, often purple-tinged, 7–15 cm. long; glumes thin, narrow, acuminate, ciliate-scabrous on the keels, 3–4 mm. long; lemma 3 mm. long, tapering into a capillary awn 4–8 mm. long, the hairs at base of floret copious, nearly as long as the body of the lemma.

TYPE LOCALITY: California, on the Colorado of the West (*Gambel*).

DISTRIBUTION: Meadows, moist thickets, gravelly river beds, and open ground, at medium altitudes, Montana to eastern Washington, and southward to New Mexico and central California.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: f. 444.

30. *Muhlenbergia plumbea* (Trin.) Hitchc. Contr. U. S. Nat.

Herb. 17: 296. 1913.

Vilfa plumbea Trin. Mém. Acad. St.-Pétersb. VI. 6: 98. 1840.

Sporobolus plumbeus Hemsl. Biol. Centr. Am. Bot. 3: 546. 1885. (Based on *Vilfa plumbea* Trin.)
Sporobolus poaeoides Hack. Repert. Sp. Nov. 10: 167. 1911. (Type from Puebla, Mexico, *Nicolás* 5423.)

Perennial, with creeping rhizomes; culms loosely much branched at base, erect or spreading, usually from a decumbent base, glabrous, 10–40 cm. tall; sheaths glabrous, more or less compressed-keeled; ligule a ciliate membrane less than 1 mm. long; blades flat or folded, scabrous on the margins, and on the upper surface toward the tip, mostly 5–10 cm. long, sometimes longer, 1–2 mm. wide; panicles terminal, erect, open, 3–15 cm. long, the few main branches solitary, rather distant, ascending or spreading, naked below, as much as 8 cm. long, the axis

and branches scaberulous; spikelets plumbeous, about 3 mm. long, clustered at the ends of the branches on short appressed branchlets; glumes about half as long as the spikelet, equal, acutish, acute, or apiculate, glabrous; palea nearly as long as the lemma, obtuse.

TYPE LOCALITY: "Min. del Monte," Mexico.

DISTRIBUTION: Open ground, pastures, alkaline meadows and along ditches, states of Mexico and Puebla.

31. *Muhlenbergia dumosa* Scribn.; Vasey, Contr. U. S. Nat. Herb.

3: 71. 1892.

Muhlenbergia dumosa var. *minor* Scribn.; Beal, Grasses N. Am. 2: 261. 1896. (Type from Mexico, Pringle 2355.)

Perennial, with short stout creeping scaly rhizomes; culms robust, solid, thick and scaly at base (here as much as 6 mm. thick), the main culm erect or leaning, 1-3 meters tall, the lower part clothed with bladeless sheaths, freely branching at the middle and upper nodes, the branches numerous, fascicled, spreading, decompound, the ultimate branchlets filiform; sheaths glabrous, firm, very smooth, finally flattening out and separating from the culm below; ligule truncate, about 0.5 mm. long; prophyllum often prominent, protruding from the sheath as a slender ciliate appendage; blades flat or soon involute, glabrous, those of the branches very numerous, mostly less than 5 cm. long and 1 mm. wide; panicles numerous on the branches, commonly exceeded by the leaves, 1-3 cm. long, narrow, somewhat flexuous, the axis scabrous, the very short pedicels pubescent; spikelets, excluding the awn, about 3 mm. long, the glumes scarcely half as long, thin, pale with a green midnerve, usually minutely awn-tipped; lemma narrow, pubescent about the base and margins, pale with green nerves, the awn from the slightly tufted apex, flexuous, 3-5 mm. long; palea narrower than the lemma, acuminate, pilose below, the keels green. The plant has the aspect of a small bamboo.

TYPE LOCALITY: Santa Catalina Mountains, Arizona (Pringle in 1884).

DISTRIBUTION: Canyons and valley flats, southern Arizona to Jalisco.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 13: pl. 22; Bull. U. S. Dep. Agr. Agrost. 17: f. 445.

32. *Muhlenbergia glauca* (Nees) Mez, Repert. Sp. Nov. 17: 214.

1921.

Podosaemum glaucum Nees, Linnaea 19: 689. 1847.

Agrostis glauca Steud. Syn. Gram. 175. 1854. (Based on *Podosaemum glaucum* Nees.) Not

Agrostis glauca Muhl. 1817.

Muhlenbergia Lemmoni Scribn. Contr. U. S. Nat. Herb. 1: 56. 1890. (Type from Arizona, Lemmon 2918.)

Perennial, from a slender, creeping, branching, woody rhizome; culms wiry, slender, erect or ascending, scabrous-pubescent, 30-60 cm. tall, branching from the lower nodes, the branches erect; sheaths minutely pubescent, overlapping; ligule a lacerate, truncate membrane about 1 mm. long; blades flat to subinvolute, scabrous, mostly 5-10 cm. long, 1-2 mm. wide; panicles narrow, contracted, interrupted, 5-12 cm. long, the branches short, appressed, the axis scabrous, the branchlets and pedicels pubescent; spikelets 3-4 mm. long, the glumes nearly as long, acuminate or awn-pointed, softly scabrous on the keel; lemma pilose on the lower part, scaberulous above, obtusish, minutely bifid at apex, the midnerve extending into an awn 1-3 mm. long (rarely as much as 6 mm.); palea about as long and as broad as the lemma.

TYPE LOCALITY: Mexico (Aschenborn 335).

DISTRIBUTION: Deserts, western Texas to southern California (Jamacha, Canby 58) and northern Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: f. 447.

33. *Muhlenbergia Thurberi* Rydb. Bull. Torrey Club 32: 601.

1905.

Sporobolus filiculmis Vasey, Descr. Cat. Grasses U. S. 44, name only. 1885; Beal, Grasses N. Am. 2: 288. 1896. (The basis of *Muhlenbergia Thurberi* Rydb.) Not *Sporobolus filiculmis* L. H.

Dewey. 1894.

Sporobolus Thurberi Scribn. Bull. U. S. Dep. Agr. Agrost. 11: 48. 1898. (Type from Plaza Larga, New Mexico.)

Muhlenbergia filiculmis Jones. Contr. West. Bot. 14: 12. 1912. (Based on *Muhlenbergia Thurberi* Rydb.) Not *M. filiculmis* Vasey, 1893.

Perennial, with creeping rhizomes; culms loosely cespitose, branched at base, from upright branches of the rhizome, erect, very slender, glabrous, 10–20 cm. tall; sheaths numerous, glabrous, overlapping, the upper node exposed; ligule about 1 mm. long; blades involute, crowded, very slender, 1–3 cm. long; panicles pale, narrow, slender, 3–7 cm. long, the branches short, appressed, few-flowered, the axis nearly glabrous, the pedicels (1–2 mm. long) scabrous; spikelets terete, lanceolate, acuminate, 3.5–4 mm. long; glumes acute, glabrous, pale, a little shorter than the lemma; lemma and palea villous on the lower half, the lemma mucronate or short-awned.

TYPE LOCALITY: Plaza Larga, New Mexico (*Bigelow 778*).

DISTRIBUTION: Dry hills, Texas, New Mexico, Nevada, Arizona; rare.

ILLUSTRATION: Hitchc. Man. f. 741.

34. *Muhlenbergia curtifolia* Scribn. Bull. Torrey Club 38: 328. 1911.

Perennial, with long creeping rhizomes; culms loosely branched at base, pubescent below the lower nodes, erect or decumbent at base, 15–35 cm. tall; sheaths puberulent; ligule less than 0.5 mm. long; blades firm, mostly flat at base, involute toward tip, puberulent on both surfaces, spreading or ascending, sharp-pointed, mostly 1–2 cm. long, 1 mm. wide or less; panicles long-exserted, narrow, interrupted, 5–8 cm. long, the axis and short appressed branches scabrous-puberulent; glumes subequal, acute, 2–3 mm. long; lemma a little longer than the glumes, acuminate, villous on the lower half, awned, the awn 1–3 mm. long.

TYPE LOCALITY: Southwestern Utah (*Jones 6047*).

DISTRIBUTION: Canyons, southern Utah: between Kanab and Carmel, *Jones 6047*; near the Natural Bridge, *Rydb. & Garrett 9505*.

ILLUSTRATION: Hitchc. Man. f. 743.

NOTE: This rare and little known species may not be distinct from *M. Thurberi*.

35. *Muhlenbergia Richardsonis* (Trin.) Rydb. Bull. Torrey Club 32: 600. 1905.

Vilfa Richardsonis Trin. Mém. Acad. St.-Pétersb. VI. 6: 103. 1840.

Vilfa squarrosa Trin. Mém. Acad. St.-Pétersb. VI. 6: 100. 1840. (Type from Menzies Island, Columbia River, Washington.)

Vilfa depauperata Torr.; Hook. Fl. Bor. Am. 2: 257. 1840. (Type from Menzies Island, Columbia River, Washington.) Not *Muhlenbergia depauperata* Scribn. 1884.

Sporobolus depauperatus Scribn. Bull. Torrey Club 9: 103. 1882. (Based on *Vilfa depauperata* Torr.)

Sporobolus aspericaulis Scribn. Bot. Gaz. 21: 15. 1896. (Based on *Muhlenbergia aspericaulis* Nees, which was published as a synonym of *Vilfa Richardsonis* Trin.)

Sporobolus Richardsonis Merr. Rhodora 4: 46. 1902. (Based on *Vilfa Richardsonis* Trin.)

Muhlenbergia squarrosa Rydb. Bull. Torrey Club 36: 531. 1909. (Based on *Vilfa squarrosa* Trin.)

Muhlenbergia brevifolia var. *Richardsonis* Jones, Contr. West. Bot. 14: 12. 1912. (Based on *Vilfa Richardsonis* Trin.)

Perennial, with numerous hard creeping rhizomes; culms slender, wiry, nodulose-roughened, erect or decumbent at base, 5–60 cm. long; sheaths glabrous, mostly shorter than the internodes; ligule 1–3 mm. long; blades flat or involute, glabrous beneath, scabrous on the upper surface and margins, 1–5 cm. long, rarely longer, 0.5–1 mm. long; panicles narrow, interrupted or sometimes rather close and spikelike, 2–10 cm. long, the axis scaberulous, the branches short and appressed, the very short pedicels glabrous; spikelets 2–3 mm. long; glumes subequal, broad, acutish, glabrous, a little more than 1 mm. long; lemma nearly terete, acute, mucronate, faintly scaberulous toward tip; palea nearly as broad as the lemma, a little shorter, scaberulous on the keels toward apex.

TYPE LOCALITY: North America.

DISTRIBUTION: Dry or moist, often alkaline soil, New Brunswick and Maine to Alberta, southward to South Dakota, and in the mountains to New Mexico, through eastern Washington to California, Arizona, and southern Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. 772: f. 81.

NOTE: This is the species which Nash (in Britton, Man. 105. 1901) called *Sporobolus brevifolius*, but that name is based on *Agrostis brevifolius* Nutt., which is *Muhlenbergia cuspidata*, which see.

36. *Muhlenbergia repens* (Presl) Hitchc. in Jepson, Fl. Calif. 1: 111. 1912.

Sporobolus repens Presl, Rel. Haenk. 1: 241. 1830.

Vilfa repens Trin. Mém. Acad. St.-Pétersb. VI. 6: 102. 1840. (Based on *Sporobolus repens* Presl.)

Muhlenbergia subtilis Nees, Linnaea 19: 689. 1847. (Type from Mexico, Aschenborn 206.)

Perennial, with widely creeping scaly rhizomes; culms decumbent, branching, spreading, the flowering branches 5–20 cm. long; sheaths glabrous; ligule rounded, 0.5–1 mm. long, broadly decurrent; blades mostly 1–2 cm. long, flat or soon involute, glabrous or nearly so beneath, scabrous-pubescent on the upper surface; panicles narrow, interrupted, 1–4 cm. long, the branches short, appressed, bearing 1–few spikelets; spikelets about 3 mm. long, the pedicels short, angled, scabrous; glumes half as long as the lemma or a little more, acutish, glabrous; lemma narrowed to a more or less apiculate summit, minutely roughened, usually darker than the glumes, the lateral nerves obscure; palea nearly as large as the lemma.

TYPE LOCALITY: Mexico (*Haenke*).

DISTRIBUTION: Dry rocky or sandy open ground, Texas to Arizona; known in Mexico only from the type collection.

ILLUSTRATION: Hitchc. Man. f. 737.

37. *Muhlenbergia utilis* (Torr.) Hitchc. Jour. Wash. Acad. Sci. 23: 453. 1933.

Vilfa utilis Torr. Pacif. R. R. Rep. 5: 365. 1858.

Vilfa sacatilla Fourn. Mex. Pl. Gram. 101. 1886. (Type from Mexico.)

Sporobolus utilis Scribn. Bull. U. S. Dep. Agr. Agrost. 17: 171. 1899. (Based on *Vilfa utilis* Torr.)

Perennial, with slender creeping rhizomes; culms glabrous, slender, branching, lax, widely spreading or prostrate, 20–40 cm. long; sheaths mostly shorter than the internodes, glabrous, the acuminate prophyllum often protruding from the throat; ligule 0.5 mm. long or less; blades numerous, mostly involute, glabrous beneath, scabrous-puberulent on the upper surface, scabrous on the margins, spreading and usually somewhat recurved, usually 1–2 cm. long, sometimes 3–4 mm. long, 1 mm. wide when flat; panicles narrow, interrupted, 1–4 cm. long, the branches short, appressed, the axis and very short pedicels nearly glabrous; glumes subequal, broad, obtuse or acutish, a little less than half as long as the spikelet; lemma terete, lanceolate, acute or acuminate, slightly apiculate, about 2 mm. long; palea about as broad and as long as the lemma. Similar to *M. repens* but usually more delicate with finer leaves and with smaller spikelets.

TYPE LOCALITY: Between Tejon Pass and Lost Hills, California (*Blake*).

DISTRIBUTION: Wet places, marshy soil, and along ditches and streams, Texas, Arizona, southern California, Nevada, and Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: f. 467.

38. *Muhlenbergia brachyphylla* Bush, Am. Midl. Nat. 6: 41. 1919.

Perennial, with numerous slender scaly rhizomes; culms slender, suberect, freely branching at the middle nodes, the branches lax, glabrous or obscurely scabrous below the nodes; sheaths glabrous; ligule 0.5 mm. long or less; blades flat, spreading, scaberulous, narrowed at base, mostly 7–15 cm. long and 3–5 cm. wide; panicles on filiform peduncles, very slender, lax, relatively few-flowered, mostly 8–15 cm. long, the slender axis, branches, and pedicels more or less scabrous; spikelets, excluding awns, about 3 mm. long, the glumes about two thirds as long, awn-tipped; lemma minutely pubescent toward the base, tapering into a slender awn 3–6 mm. long, rarely shorter.

TYPE LOCALITY: Webb City, Missouri (*Palmer 2734*).

DISTRIBUTION: Low woods, Indiana to Nebraska, and southward to Texas.

ILLUSTRATION: Hitchc. Man. f. 760.

NOTE 1: Resembling *M. tenuiflora*, but with more numerous filiform branches and more slender panicles.

NOTE 2: *Muhlenbergia brachyphylla* Nees; B. D. Jackson, Ind. Kew. 2: 269. 1894, is a clerical error for *Podosaeum brachyphyllum* Nees.

39. *Muhlenbergia sobolifera* (Muhl.) Trin. Gram. Unifl. 189.
1824.

Agrostis sobolifera Muhl.; Willd. Enum. 95. 1809.
Achnatherum soboliferum Beauv. Agrost. 20, 146. 1812. (Based on *Agrostis sobolifera* Muhl.)
Trichochloa sobolifera Trin. Fund. Agrost. 117. 1820. (Based on *Agrostis sobolifera* Muhl.)
Cinna sobolifera Link. Enum. 1: 71. 1821. (Based on *Agrostis sobolifera* Muhl.)
Podosaemum soboliferum Link. Hort. Berol. 1: 83. 1827. (Based on *Agrostis sobolifera* Muhl.)

Perennial, with numerous creeping scaly rhizomes 2-3 mm. thick; culms erect, slender, solitary or few in a tuft, glabrous or scaberulous below the nodes, 60-100 cm. tall, sparingly branching, the branches erect; sheaths glabrous; ligule truncate, ciliolate, scarcely 0.5 mm. long; blades flat, rather stiffly spreading, scabrous, somewhat narrowed at base, those of the main culm 5-15 cm. long, 3-8 mm. wide, occasionally larger at time of flowering, aggregate above the middle of the culm; panicles slender, somewhat nodding, mostly 5-15 cm. long, the distant branches appressed, floriferous from base, overlapping or the lower more distant, the axis glabrous or nearly so, the branches and short pedicels scaberulous; spikelets mostly 2-2.5 mm. long, the glumes about two thirds as long, abruptly acuminate or awn-tipped; lemma elliptic, bluntish, pubescent on the lower part, usually apiculate; palea as long as the lemma.

TYPE LOCALITY: Pennsylvania.

DISTRIBUTION: Dry rocky woods and cliffs, New Hampshire to Iowa, and southward to Virginia, Tennessee, and Texas.

ILLUSTRATION: Hitchc. Man. f. 762A.

Muhlenbergia sobolifera var. *setigera* Scribn. Rhodora 9: 18. 1907. *Muhlenbergia sobolifera* f. *setigera* Deam, Grasses Ind. 163. 1929. (Based on *M. sobolifera setigera* Scribn.) Branching more freely in the later stages; lemma with an awn 1-3 mm. long. TYPE LOCALITY: Texas, *Reverchon 70*. DISTRIBUTION: Dry woods, Arkansas and Texas.

40. *Muhlenbergia tenuiflora* (Willd.) B. S. P. Prel. Cat. N. Y.
67. 1888.

Agrostis tenuiflora Willd. Sp. Pl. 1: 364. 1797.
Apera tenuiflora Beauv. Agrost. 151. 1812. (Based on *Agrostis tenuiflora* Willd.)
Trichochloa longiseta Trin. Fund. Agrost. 117. 1820. (Based on *Agrostis tenuiflora* Willd. Erroneously given as *T. longiflora* Trin. by Kunth, Enum. Pl. 1: 601. 1833.)
Cinna tenuiflora Link. Enum. 1: 71. 1821. (Based on *Agrostis tenuiflora* Willd.)
Muhlenbergia Willdenowii Trin. Gram. Unifl. 188. 1824. (Based on *Agrostis tenuiflora* Willd.)
Trichochloa tenuiflora Sweet, Hort. Brit. 443. 1826. (Based on *Agrostis tenuiflora* Willd.)
Podosaemum tenuiflorum Link. Hort. Berol. 1: 82. 1827. (Based on *Agrostis tenuiflora* Willd.)
Muhlenbergia tenuiflora variabilis Scribn. Rhodora 9: 18. 1907. (Type from Chimney Mountain, North Carolina, *Biltmore Herbarium 654a*.)

Similar to *M. sobolifera* in habit; culms often more robust, more or less retrorsely scabrous-pubescent at and below the nodes; sheaths more or less scabrous or short-pilose; blades mostly 10-18 cm. long and 6-10 mm. wide, scabrous; panicles averaging longer than in *M. sobolifera*; spikelets (excluding awns) 3-4 mm. long, the glumes about half as long, broad at base, abruptly acuminate, scaberulous; lemma narrow, pubescent toward the base, tapering into a slender straight awn 3-10 mm. long.

TYPE LOCALITY: North America.

DISTRIBUTION: Rocky woods, Ontario and Vermont to Iowa, and southward to Virginia, Tennessee, and Oklahoma.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 101.

41. *Muhlenbergia racemosa* (Michx.) B. S. P. Prel. Cat. N. Y.
67. 1888.

Agrostis racemosa Michx. Fl. Bor. Am. 1: 53. 1803.
Polygomon setosus Spreng. Mant. Fl. Hal. 31. 1807. (Type from Pennsylvania.)
Polygomon glomeratus Willd. Enum. 87. 1809. (Type from North America.)
Vilfa racemosa Beauv. Agrost. 16, 148, 182. 1812. (Based on *Agrostis racemosa* Michx.)
Alopecurus glomeratus Poir. in Lam. Encyc. Suppl. 5: 495. 1817. (Based on *Polygomon glomeratus* Willd.)
Agrostis setosa Muhl. Descr. Gram. 68. 1817. (Type from Pennsylvania.)
Polygomon racemosus Nutt. Gen. 1: 51. 1818. (Based on *Agrostis racemosa* Michx.)
Trichochloa glomerata Trin. Fund. Agrost. 117. 1820. (Based on *Polygomon glomeratus* Willd.)
Muhlenbergia glomerata Trin. Gram. Unifl. 191. 1824. (Based on *Polygomon glomeratus* Willd.)
Podosaemum glomeratum Link. Hort. Berol. 1: 84. 1827. (Based on *Polygomon glomeratus* Willd.)

- Cinna racemosa* Kunth, Rév. Gram. 1: 67. 1829. (Based on *Agrostis racemosa* Michx.)
Dactylogramma cinnoides Link, Hort. Berol. 2: 248. 1833. (Type grown in Berlin, seed sent by Richardson from western North America.)
Cinna glomerata Link, Hort. Berol. 2: 237. 1833. (Based on *Podosaemum glomeratum* Link.) Not *C. glomerata* Walt. 1788.
Muhlenbergia glomerata var. *ramosa* Vasey, Cat. Grasses U. S. 40. 1885. (Type from Dakota and Wisconsin.)
Muhlenbergia racemosa var. *ramosa* Vasey, Beal, Grasses N. Am. 2: 253. 1896. (Presumably based on *M. glomerata* var. *ramosa* Vasey.)
Muhlenbergia racemosa violacea Scribn. Rhodora 9: 22. 1907. (Type from North Hannibal, New York.)

Perennial, with stout creeping scaly rhizomes; culms erect or reclining, slightly roughened below the nodes, 50–100 cm. tall or even more, simple or sparingly branching, the branches erect; sheaths smooth, keeled; ligule a ciliate membrane scarcely 0.5 mm. long; blades flat, mostly appressed, scabrous, scarcely narrowed at base, 5–10 cm. long, 2–5 mm. wide; panicles narrow, compact or lobed, erect or slightly nodding, bristly, 3–10 cm. long, the axis, short branches, and very short pedicels scabrous; spikelets 4–6 mm. long, the narrow subequal glumes stiffly awn-tipped, the awns 1–3 mm. long, exceeding the lemma; lemma acuminate, about 3 mm. long, pilose on the lower part; palea acuminate, nearly as long as the lemma.

TYPE LOCALITY: Mississippi River, Illinois.

DISTRIBUTION: Moist meadows and low ground, Newfoundland to British Columbia, and southward to Maryland, Kentucky, Oklahoma, and Arizona.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 103.

42. *Muhlenbergia mexicana* (L.) Trin. Gram. Unifl. 189. 1824.

- Agrostis mexicana* L. Mant. 1: 31. 1767.
Agrostis lateriflora Michx. Fl. Bor. Am. 1: 53. 1803. (Type from Mississippi River, Illinois, Michaux.)
Vilfa mexicana Beauv. Agrost. 16, 148, 181. 1812. (Based on *Agrostis mexicana* L.)
Vilfa lateriflora Beauv. Agrost. 16, 147, 181. 1812. (Based on *Agrostis lateriflora* Michx.)
Cinna ? mexicana Beauv. Agrost. 32, 148, 158. 1812. (Based on *Agrostis mexicana* L.)
Trichochloa mexicana Trin. Fund. Agrost. 117. 1820. (Based on *Agrostis mexicana* L.)
Podosaemum mexicanum Link, Hort. Berol. 1: 84. 1827. (Based on *Muhlenbergia mexicana* "Linn.")
Cinna lateriflora Kunth, Rév. Gram. 1: 67. 1829. (Based on *Agrostis lateriflora* Michx.)
Muhlenbergia lateriflora Trin.; Kunth, Enum. Pl. 1: 207. 1833. (Based on *Agrostis lateriflora* Michx.)
Polypogon canadensis Fourn. Mex. Pl. Gram. 92. 1886. (Based on *Agrostis mexicana* L.)

Perennial, with creeping scaly rhizomes; culms decumbent and rooting at base, freely branching from all the nodes, 50–100 cm. tall, the branches ascending, the plants becoming topheavy and bushy, the culms glabrous below the nodes; sheaths glabrous, somewhat keeled; ligule irregularly dentate, about 1 mm. long; blades flat, scabrous, usually less than 10 cm. long, but sometimes as much as 15 cm., 3–7 mm. wide; panicles numerous, short-exserted or partly included, terminal and axillary, the larger as much as 10 cm. long, the axillary shorter, narrow, the branches ascending, mostly densely flowered from the base, the axis and branches scabrous, the very short pedicels scabrous-pubescent; glumes narrow, 2–3 mm. long or slightly longer, tapering into an awn-tip; lemma about equaling the glumes, acuminate, short-pilose at base.

TYPE LOCALITY: Grown at Upsala, erroneously credited to tropical America.

DISTRIBUTION: Thickets, low ground and waste places, New Brunswick to North Dakota, and southward to the mountains of Georgia and Texas.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 100.

Muhlenbergia mexicana var. *commutata* Scribn. Rhodora 9: 18. 1907. (Described as *M. mexicana commutata*.) *M. mexicana* var. *commutata* Farwell, Rep. Mich. Acad. 17: 181. 1916. (Based on *M. mexicana commutata* Scribn.) *M. commutata* Bush, Am. Midl. Nat. 6: 61. 1919. (Based on *M. mexicana commutata* Scribn.) *M. mexicana* f. *commutata* Farwell, Rhodora 26: 1. 1924. (Based on *M. mexicana commutata* Scribn.) Lemmas awned, the awns 4–10 mm. long. TYPE LOCALITY: Maine. DISTRIBUTION: Quebec and Maine to South Dakota, and southward to Virginia and Missouri. Less common than the species. May be distinguished from *M. foliosa* var. *ambigua*, which it sometimes resembles, by the culms smooth below the nodes and the included or scarcely exserted panicles.

43. *Muhlenbergia glabriflora* Scribn. Rhodora 9: 22. 1907.

Perennial, with creeping scaly rhizomes, in habit resembling *M. mexicana*; culms freely branching, scaberulous below the nodes, 50–100 cm. tall; sheaths glabrous; ligule about 0.5 mm.

long; blades numerous, short, narrow and appressed; panicles on the average shorter and narrower than in *M. mexicana*; spikelets about as in *M. mexicana* but the lemma glabrous.

TYPE LOCALITY: Texas (Reverchon 5).

DISTRIBUTION: Low woods, Maryland, Indiana, Illinois, Missouri, and Texas.

ILLUSTRATION: Hitchc. Man. f. 772.

44. *Muhlenbergia sylvatica* Torr.; Trin. Mém. Acad. St.-Pétersb.

VI. 6²: 292 (reprint 46). 1841.

Agrostis diffusa Muhl. Descr. Gram. 64. 1817. (Type from Pennsylvania.) Not *A. diffusa* Host. 1809.

Agrostis sylvatica Torr. Fl. U. S. 1: 87. 1823. (Basis of *Muhlenbergia sylvatica* Torr.) Not *A. sylvatica* L. 1762.

Muhlenbergia sylvatica var. *gracilis* Scribn. Trans. Kansas Acad. 9: 116. 1885. (Type from Topeka, Kansas.)

Muhlenbergia umbrosa Scribn. Rhodora 9: 20. 1907. (Based on *Agrostis sylvatica* Torr.)

Muhlenbergia umbrosa var. *attenuata* Scribn. Rhodora 9: 21. 1907. (Type from Aurora County, South Dakota, Wilcox 25; awn reduced or wanting.)

Muhlenbergia diffusa Farwell, Rep. Mich. Acad. 20: 168. 1918. (Based on *Agrostis diffusa* Muhl.) Not *M. diffusa* Willd. 1797.

Muhlenbergia umbrosa f. *attenuata* Deam, Grasses Ind. 171. 1929. (Based on *M. umbrosa* var. *attenuata* Scribn.)

Perennial, with creeping scaly rhizomes, resembling *M. mexicana* in habit, freely branching, the branches more slender and lax; culms retrorsely scabrous below the nodes; sheaths glabrous; ligule about 0.5 mm. long; panicles slender, nodding, 5–15 cm. long, the branches distant, appressed, overlapping or the lower scarcely so; glumes lanceolate, rather abruptly acuminate or awn-pointed, about 2 mm. long; lemma a little longer than the glumes, somewhat pilose below, tapering into an awn 5–10 mm. long. Awn sometimes reduced or wanting.

TYPE LOCALITY: Mountains of New Jersey.

DISTRIBUTION: Moist woods and thickets, Maine to South Dakota, and southward to Alabama and Texas; Arizona.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 102.

45. *Muhlenbergia foliosa* (R. & S.) Trin. Gram. Unifl. 190. 1824.

Agrostis filiformis Willd. Enum. 95. 1809. (Type from Pennsylvania.) Not *A. filiformis* Vill. 1787.

Agrostis foliosa "Hortul."; R. & S. Syst. Veg. 2: 373. 1817. (Basis of *Muhlenbergia foliosa* Trin.)

Trichochloa foliosa Trin. Fund. Agrost. 117. 1820. (Based on *Agrostis filiformis* Willd.)

Cinna filiformis Link, Enum. 1: 70. 1821. (Based on *Agrostis filiformis* Willd.)

Agrostis lateriflora var. *filiformis* Torr. Fl. U. S. 1: 86. 1823. (Based on *A. filiformis* Muhl. [error for Willd.])

Podosium foliosum Link, Hort. Berol. 1: 83. 1827. (Based on *Agrostis foliosa* R. & S.)

Muhlenbergia mexicana var. *purpurea* Wood, Bot. & Flor. ed. 1873. 386. 1873. (Type from Illinois.)

Muhlenbergia mexicana filiformis Scribn. Mem. Torrey Club 5: 36. 1894. (Based on *A. filiformis* Muhl. [error for Willd.])

Muhlenbergia polystachya Mackenzie & Bush, Man. Fl. Jackson Co. 23. 1902. (Type from Sibley, Missouri, Mackenzie 637.)

Muhlenbergia ambigua var. *filiformis* Farwell, Rep. Mich. Acad. 20: 168. 1918. (Based on *Agrostis filiformis* Muhl. [error for Willd.])

Perennial, with creeping scaly rhizomes, resembling *M. mexicana* and *M. umbrosa* in habit; culms scabrous below the nodes; sheaths glabrous, keeled; ligule about 0.5 mm. long; panicles mostly exserted, often rather long-exserted, narrow, of numerous short, appressed, densely flowered, somewhat aggregate branches; spikelets 2–3 mm. long; glumes narrow, attenuate into a short awn, about as long as the acuminate to awn-tipped lemma, the lemma long-pilose below.

TYPE LOCALITY: Garden specimen; seed from North America.

DISTRIBUTION: Moist thickets, low woods, and low open ground, Quebec and Maine to Montana, and southward to North Carolina, Indiana, Kansas, New Mexico, and Arizona.

ILLUSTRATION: Hitchc. Man. f. 776.

Muhlenbergia foliosa var. *setiglumis* (S. Wats.) Scribn. Rhodora 9: 20. 1907. (Based on *M. sylvatica* var. *setiglumis* S. Wats. Published as *M. foliosa setiglumis*.) *Muhlenbergia ambigua* Torr. in Nicolle, Rep. 164. 1843. (Type from "Okaman Lake, Sioux Country.") *Muhlenbergia sylvatica* var. *setiglumis* S. Wats. in Bot. King's Expl. 5: 378. 1871. (Basis of *M. foliosa* var. *setiglumis* Scribn.) *Muhlenbergia foliosa ambigua* Scribn. Rhodora 9: 20. 1907. (Based on *M. ambigua* Torr.) *Muhlenbergia setiglumis* Nels. & Macbr. Bot. Gaz. 61: 30. 1916. (Based on *M.*

sylvatica var. *setigulumis* S. Wats.) *Muhlenbergia foliosa* f. *ambigua* Wiegand, *Rhodora* 26: 1. 1924. (Based on *M. ambigua* Torr.) Lemmas awned, the awn 4-10 mm. long. TYPE LOCALITY: Humboldt Pass, Nevada, Watson 1288. DISTRIBUTION: About the same range as the species; also Washington to northern California and Nevada.

46. *Muhlenbergia californica* Vasey, Bull. Torrey Club 13: 53.
1886.

Muhlenbergia glomerata var. *brevifolia* Vasey, Bot. Gaz. 7: 92. 1882. (Basis of *Muhlenbergia californica* Vasey.)

Muhlenbergia sylvatica var. *californica* Vasey, Bot. Gaz. 7: 93. 1882. (Type from San Bernardino Mountains, California, Parish 1076.)

Muhlenbergia Parishii Vasey, Bull. Torrey Club 13: 53. 1886. (Based on *M. sylvatica* var. *californica* Vasey.)

Muhlenbergia racemosa var. *brevifolia* Beal, Grasses N. Am. 2: 253. 1896. (Based on *M. glomerata* var. *brevifolia* Vasey.)

Perennial, pale, leafy, the base more or less creeping and rhizomatous; culms usually several, ascending from the branching end of the rhizome, somewhat woody below, puberulent below the nodes, 30-60 cm. tall; sheaths scaberulous; ligule obtuse or truncate, ciliate, somewhat pilose, about 1 mm. long; blades flat, scabrous, 5-15 cm., usually less than 10 cm. long, 4-6 mm. wide; panicles narrow, dense but more or less interrupted, 7-15 cm. long, the axis scabrous, the short branches appressed, the very short pedicels pubescent; spikelets 3-4 mm. long, the glumes slightly shorter, scabrous, acuminate, awn-tipped; lemma scabrous, acuminate, awn-tipped, with sparse callus hairs about half as long as the lemma; palea acuminate, as long as the body of the lemma.

TYPE LOCALITY: San Bernardino Mountains, California (Parish 1028).

DISTRIBUTION: Stream borders and gullies, foothills and mountain slopes up to 2000 meters; confined to southern California.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 13: pl. 20, 23.

47. *Muhlenbergia flabellata* Mez, Repert. Sp. Nov. 17: 213. 1921.

Perennial; culms slender, erect or ascending, glabrous, about 35 cm. tall; sheaths flabellately clustered at 2 or 3 of the nodes, strongly compressed but not keeled, closely overlapping, glabrous or the upper minutely puberulent, the culms more or less branching at these clusters; ligule thin, acute, about 5 mm. long; blades erect, continuous with the sheath, linear, flat, acute, flocculent-pubescent on the upper surface, faintly puberulent beneath, 2-5 cm. long, 1-2 mm. wide; panicles erect, narrow, 4-6 cm. long, the axis glabrous or nearly so, the branches scaberulous, appressed, floriferous from base, 1-2 cm. long, the pedicels puberulent; glumes unequal, glabrous, the first obtusish, 1 mm. long, the second broad, strongly 3-nerved, tridentate, about 2 mm. long; lemma lanceolate, brown, minutely and sparsely pilose at base, scaberulous on the upper half, awned from between 2 minute teeth, about 3.5 mm. long, the awn scaberulous, somewhat flexuous, about 5 mm. long.

TYPE LOCALITY: Near the summit of Cerro de Buena Vista, Costa Rica, 3100 meters altitude (Pittier, *Insl. Fis.-Geogr.* 3372).

DISTRIBUTION: Known only from the type collection.

48. *Muhlenbergia filiculmis* Vasey, Contr. U. S. Nat. Herb. 1:
267. 1893.

Perennial; culms densely tufted, erect, filiform, glabrous, 10-20 cm. tall, the leaves in a short basal cluster; sheaths glabrous, the lower pale, becoming loose and more or less flattened, strongly and closely nerved; ligule prominent, pale, acute, 3-4 mm. long; blades involute, slender, often curved, firm, scabrous, sharp-pointed, 2-5 cm. long, rarely as much as 10 cm.; panicles narrow, erect, pale, terminating the culms, 1-5 cm. long, rarely longer, the somewhat distant branches appressed, the axis glabrous or nearly so, the branches and short pedicels (the lateral 0.5 mm. long or less) minutely scaberulous; glumes broad, the first abruptly awn-tipped, the body about 1 mm. long, the second 3-nerved, a little longer than the first, sharply 3-toothed,

rarely entire or erose only; lemma lanceolate-terete, pubescent on the lower half, tapering to an awned tip, the body 2.5-3 mm. long.

TYPE LOCALITY: Green Mountain Falls, Colorado (*Sheldon 321*).

DISTRIBUTION: Open sandy or rocky soil, 2000-3000 meters altitude, Wyoming, Colorado, and New Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 108.

49. *Muhlenbergia montana* (Nutt.) Hitchc. Bull. U. S. Dep. Agr.

772: 145, 147. 1920.

Calycodon montanum Nutt. Jour. Acad. Phila. II. 1: 186. 1848.

Muhlenbergia gracilis var. *breviaristata* Vasey, in Wats. & Rothr. Cat. Pl. Wheeler's Surv. 54. 1874. (Type from Twin Lakes, Colorado, *Wolf 1090*.)

Muhlenbergia gracilis var. *major* Vasey, in Rothr. Bot. Wheeler's Surv. 284. 1878. (Type from Mount Graham, Arizona, Wheeler Exped. [*Rothrock 744*].)

Muhlenbergia subalpina Vasey, Cat. Grasses U. S. 40. 1885. (Based on *M. gracilis* var. *breviaristata* Vasey.)

Muhlenbergia gracilis var. *enervis* Scribn.; Beal, Grasses N. Am. 2: 242. 1896. (Type from Sierra Madre, Chihuahua, *Pringle 1413*.)

Muhlenbergia trifida Hack. Repert. Sp. Nov. 8: 518. 1910. (Type from Michoacán, *Arsène 3217*.)

Muhlenbergia enervis Hitchc. Contr. U. S. Nat. Herb. 17: 302. 1913. (Based on *M. gracilis* var. *enervis* Scribn.)

Perennial; culms densely tufted, erect, glabrous or slightly roughened below the panicle, 30-60 cm. tall, the leaves mostly in a basal cluster, the innovations numerous; sheaths glabrous or minutely roughened, longer than the internodes, the lower finally pale, flat, and loose; ligule prominent, thin, pale, acute, as much as 1 cm. long; blades flat to involute, scabrous, firm, mostly less than 10 cm. long, sometimes 15-20 cm., 1-2 mm. wide, those of the culm usually 2; panicle long-exserted, narrow, usually rather loose, sometimes dense, erect or somewhat nodding, 5-15 cm. long, the axis glabrous or nearly so, the branches ascending or appressed, scabrous, floriferous from base, the pedicels scabrous-pubescent (the lateral less than 1 mm. long); glumes about equal or the second a little longer, the first acute or somewhat toothed, the body about 1.5 mm. long, more or less awn-tipped, the second broader, 3-nerved, 3-toothed, the teeth long or short; lemma about 4 mm. long, pilose below, scaberulous above, the awn slender, flexuous, scabrous, 1-1.5 cm. long, sometimes shorter.

TYPE LOCALITY: Santa Fe, New Mexico (*Gambel*).

DISTRIBUTION: Canyons, mesas, and rocky hills, 2000-3000 meters, Montana to Utah and central California, and southward to western Texas and southern Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. 12: pl. 26.

NOTE: This is the species referred to *Muhlenbergia gracilis* by American authors, not *M. gracilis* (H.B.K.) Kunth. The glumes vary in total length and in the relative length of the teeth and body. In most of the Mexican specimens the lemma is more villous (*M. trifida*). In *M. gracilis* var. *enervis* the glumes are only about 1 mm. long with short teeth (Chihuahua and Arizona, *Knowlton 26*).

50. *Muhlenbergia quadridentata* (H.B.K.) Kunth, Rév. Gram. 1:

64. 1829.

Podosaemum quadridentatum H.B.K. Nov. Gen. & Sp. 1: 130. 1815.

Podosaemum gracile H.B.K. Nov. Gen. & Sp. 1: 131. 1815. (Type from Jorullo Volcano, Michoacán.)

Trichochloa gracilis R. & S. Syst. Veg. 2: 389. 1817. (Based on *Podosaemum gracile* H.B.K.)

Trichochloa quadridentata R. & S. Syst. Veg. 2: 388. 1817. (Based on *Podosaemum quadridentatum* H.B.K.)

Agrostis quadridentata Spreng. Syst. 1: 263. 1825. (Based on *Podosaemum quadridentatum* H.B.K.)

Muhlenbergia gracilis Kunth, Rév. Gram. 1: 64. 1829. (Based on *Podosaemum gracile* H.B.K.)

Muhlenbergia anomalis Fourn. Mex. Pl. Gram. 82. 1886. (Type from Mexico.) An awnless form.

Perennial; culms densely tufted, usually erect, scaberulous, slender, 50-70 cm. tall; sheaths much overlapping and somewhat compressed on the lower part of the culm, glabrous, finally somewhat loose and flattened; ligule about 2 mm. long; blades slender, involute, scaberulous, erect, 5-15 cm. long, sometimes flexuous; panicle narrow, loose or interrupted, somewhat nodding, 5-20 cm. long, the axis scabrous, the scabrous branches somewhat distant, appressed or ascending, floriferous from base, the lower as much as 5 cm. long, the spikelets on very short pedicels, rather loosely arranged; glumes unequal, the first acute, 1-3 mm. long, the second

obscurely or distinctly 3-4-toothed, 2-4 mm. long, the teeth short, sometimes irregular; lemma more or less pilose, 3-4 mm. long, awned, the awn flexuous, 5-10 mm. long.

TYPE LOCALITY: Toluca, Mexico.

DISTRIBUTION: Wooded hillsides, 2000-3000 meters altitude, mountains of southern Mexico.

51. *Muhlenbergia scoparia* Vasey, Contr. U. S. Nat. Herb. 1: 283.
1893.

Muhlenbergia carinata Mez, Repert. Sp. Nov. 17: 213. 1921. (Type from Guadalajara, Mexico, Pringle 2350.)

Perennial; culms rather slender, erect, glabrous, about one m. tall, the basal overlapping sheaths compressed-keeled; sheaths glabrous, keeled; ligule thin, elongate, hidden in the folded base of the blade, 1-2 cm. long; blades elongate, slender, more or less flexuous, folded at base, flat or folded above, long-attenuate at tip, scabrous on the margins and more or less on the surfaces, 1-2 mm. wide; panicle narrow, rather soft, somewhat loose, erect or somewhat nodding, purplish, 20-40 cm. long, the axis somewhat angled, nearly glabrous, the branches slender, loosely flowered, ascending or somewhat spreading, 3-10 cm. long, the puberulent pedicels about 1 mm. long; glumes subequal, thin, broad, ciliate near summit, otherwise glabrous, about 1.5 mm. long, acute or extending into a ciliate awn as much as 1 mm. long; lemma oblong, narrowed above, glabrous on body, densely short-pilose at base, about 2 mm. long, awned, the awn slender, flexuous, scaberulous, 1-2 cm. long.

TYPE LOCALITY: Guadalajara, Jalisco (Pringle 2350).

DISTRIBUTION: Rocky hills and canyons, Chihuahua to Jalisco.

52. *Muhlenbergia speciosa* Vasey, Bull. Torrey Club 13: 231.
1886.

Bealia speciosa Beal, Grasses N. Am. 2: 268. 1896. (Based on *Muhlenbergia speciosa* Vasey.)

Epicampes speciosa Jones, Contr. West. Bot. 14: 7. 1912. (Based on *Muhlenbergia speciosa* Vasey.)

Perennial; culms comparatively slender, erect, villous, especially below the nodes, mostly 1-1.5 meters tall, the basal overlapping sheaths compressed-keeled, the old sheaths becoming fibrous at base; sheaths villous, the hairs appressed or spreading; ligule very short, ciliate, about 1 mm. long; blades elongate, flat or usually folded, involute at the long slender point, villous; panicle soft and feathery, narrow, nodding at the summit, pale or brownish or purplish, rather densely flowered, 20-60 cm. long, the axis villous or nearly glabrous, the branches numerous, slender, appressed at the naked base, ascending or somewhat spreading above, many-flowered, 5-10 cm. long; glumes thin, about equal, obtuse, villous, 1.5-2 mm. long; lemma obtuse, villous, a little shorter than the glumes, awned, the awn delicate, flexuous, purplish, nearly smooth below, minutely scabrous above, 8-15 mm. long; palea broad, obtuse, villous, about as long as the lemma.

TYPE LOCALITY: Southwestern Chihuahua (Palmer 30 in 1885).

DISTRIBUTION: Dry hills and canyons, Nayarit to Chihuahua.

53. *Muhlenbergia angustifolia* Swallen, sp. nov.

Perennial, rather slender; culms erect, glabrous or slightly scabrous, about one m. tall; sheaths compressed-keeled, scaberulous; ligule delicate, elongate; blades elongate, conduplicate below, about 1 mm. wide as folded (2 mm. when flattened), very scabrous on the margins, becoming revolute above, tapering into a long fine flexuous scabrous point; panicle erect, narrow, pale, 20-30 cm. long, the axis scabrous, the branches appressed or somewhat ascending, rather loosely imbricate, 1-3 cm. long, the lower sometimes longer; spikelets about 2.5 mm. long; glumes equal, faintly scaberulous, rather obtuse; lemma about as long as or slightly longer than the glumes, acute, slightly scaberulous but not pubescent except slightly on the inner side at base; awn from just below the bifid apex, slender, flexuous, mostly 5-15 mm. long, sometimes shorter; palea nearly as long as the lemma.

Perennis; culmi erecti glabri vel scaberuli 1 m. alti; vaginae compressae carinatae scaberulae; ligula hyalina elongata; laminae angustae elongatae, in parte inferiore conduplicatae, 1 mm. latae, marginibus scaberrimis, in parte superiore revolutae, apice sensim angustatae flexuosae scaberrimae; panicula angusta erecta pallida 20–30 cm. longa, ramis appressis 1–3 cm. longis; spiculae circa 2.5 mm. longae; glumae obtusiusculae; lemma glumas aequans acutum glabrum aristatum, arista flexuosa 5–15 mm. longa.

Type collected on rocky hills near Guadalajara, Mexico, November 11, 1889, *Pringle 2346* (U. S. Nat. Herb. no. 822882).

54. *Muhlenbergia Emersleyi* Vasey, Contr. U. S. Nat. Herb. 3:

66. 1892.

Muhlenbergia Vaseyana Scribn. Rep. Mo. Bot. Gard. 10: 52. 1899. (Based on *M. distichophylla* as described by Vasey, in Rothr. Bot. Wheeler's Surv. 283. 1878. Type from Arizona, *Rothrock 282*).

Epicampes Emersleyi Hitchc. Bull. U. S. Dep. Agr. 772: 144. 1920. (Based on *Muhlenbergia Emersleyi* Vasey.)

Epicampes subpatens Hitchc. Bull. U. S. Dep. Agr. 772: 144. 1920. (Type from Guadalupe Mountains, New Mexico, *Hitchcock 13541*. Spikelets awnless.)

Perennial; culms stiffly erect in small bunches, glabrous, 50–150 cm. tall, with 1 or 2 nodes below the middle; sheaths scaberulous, the lower, especially of the innovations, compressed-keeled; ligule softly membranaceous, 1–2 cm. long; blades flat or folded, scabrous, elongate, 1–4 mm. wide; panicle narrow but rather loose, erect or nodding, mostly 20–40 cm. long, the branches ascending, more or less fascicled or whorled, naked below, 5–10 cm. long; spikelets 2.5–3 mm. (rarely less) long, often purplish; glumes thin, equal, acutish, scabrous; lemma mostly a little shorter than the glumes, narrowed and scabrous above, villous below, with a delicate flexuous awn 1–2 cm. long or sometimes awnless.

TYPE LOCALITY: Southern Arizona (*Emersley*).

DISTRIBUTION: Rocky woods and ravines, Texas to Arizona, and southward to Panama.

ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. 12: pl. 25 (as *M. distichophylla*).

55. *Muhlenbergia breviligula* Hitchcock, sp. nov.

Perennial, rather robust, culms erect, scaberulous, 1–1.5 meters tall, the crowded lower sheaths compressed-keeled; sheaths keeled, scaberulous, broader than the base of the blade; ligule a very short membranaceous rim, the base of the blade just above densely short-pubescent; blades elongate, flat or folded, very scabrous, 1–3 mm. wide, the numerous old lower blades persistent as a flexuous bushy tuft; panicle narrow, rather loose, somewhat nodding, purplish, 25–35 cm. long, the axis scabrous, the branches slender, ascending, very scabrous, 10–15 cm. long, the capillary branchlets appressed, loosely flowered, the pedicels pubescent below the spikelets; glumes about equal, narrow, acute or acuminate, scabrous, especially on the keel, 2.5–3 mm. long; lemma acute, strongly 3-nerved, sparsely appressed-pilose below, densely so toward the margin and on the lower part of the palea, a little more than 2 mm. long, awned, the awn flexuous, 1–1.5 cm. long.

Perennis; culmi erecti scaberuli 1–1.5 m. alti; vaginae carinatae scaberulae, inferioribus imbricatis compressis carinatis; ligula brevissima; laminae elongatae planae vel plicatae scaberrimae 1–3 mm. latae; panicula angusta 25–35 cm. longa, ramis ascendentibus 10–15 cm. longis; glumae aequales acuminatae scabrae 2.5–3 mm. longae; lemma infra appresso-pilosum 2.2 mm. longum, arista 1–1.5 cm. longa flexuosa.

Type collected on clay hill, alt. 1500 meters, Guatemala City, December 2, 1911, *A. S. Hitchcock 9063* (U. S. Nat. Herb. no. 995888). Other specimens, all from Guatemala, are *Hitchcock 9064, 9109*, from Guatemala City; *Cook & Doyle 60*, from Secanquim.

NOTE: Differs from *M. Emersleyi* in the crowded old leaves at base of plant and in the very short ligule.

56. *Muhlenbergia distichophylla* (Presl) Kunth, Rév. Gram. Suppl.

xvi. 1830.

Podosaemum distichophyllum Presl, Rel. Haenk. 1: 231. 1830.

Epicampes distichophylla Vasey, Cat. Grasses U. S. 45. 1885. (Based on "*Muhlenbergia Munro*"; also Ind. Kew. 3: 269. 1894, as synonym of *Epicampes distichophylla* Vasey. Name not effectively published. The species referred to is *Muhlenbergia Emersleyi* Vasey.)

Epicampes stricta var. *distichophylla* Jones, Contr. West. Bot. 14: 6. 1912. (Based on *Podosaeum distichophyllum* Presl.)

Perennial; culms rather slender, glabrous, about 1 m. tall, the basal tuft of sheaths compressed-keeled; sheaths keeled, slightly scaberulous; ligule delicate, between firm slender auricles on either side, 1.5–2 cm. long; blades elongate, flat or folded, very scabrous, especially on the margins, 2–5 mm. wide, the apex long-attenuate; panicle narrow, soft and feathery, 30–40 cm. long, the axis angled, scabrous, the branches slender, ascending, approximate, naked below, many-flowered, 3–5 cm. long, or the lower as much as 10 cm. long; glumes scabrous, about 1 mm. long; lemma sparsely pilose and scaberulous, about 1.5 mm. long, the awn delicate, flexuous, scabrous, 1–1.5 cm. long.

TYPE LOCALITY: Mexico.

DISTRIBUTION: Rocky soil, Guerrero, Mexico (*Langlissé 607, 674*).

57. *Muhlenbergia grandis* Vasey, Contr. U. S. Nat. Herb. 1: 283. 1893.

Epicampes grandis Beal, Grasses N. Am. 2: 309. 1896. (Based on *Muhlenbergia grandis* Vasey.)
Epicampes Bourgaei var. *grandis* Jones, Contr. West. Bot. 14: 7. 1912. (Based on *Muhlenbergia grandis* Vasey.)

Perennial; culms erect, robust, glabrous or slightly puberulent below, 1–2 meters tall, the lower tuft of overlapping sheaths compressed-keeled; sheaths keeled, glabrous or the lower puberulent; ligule very short, 1–2 mm. long; blades elongate, scabrous, the lower mostly flat, 3–10 mm. wide, the upper narrower, folded, or involute-attenuate toward the end; panicle erect, narrow, 30–60 cm. long, about 5 cm. wide, the axis angled, scabrous, the branches ascending or appressed, crowded, naked below, many-flowered, scabrous-pubescent, 5–8 cm. long, the pedicels shorter than the spikelets; glumes thin, nearly equal, rather broad, acute or subacute, scaberulous, about 1.5 mm. long; lemma narrowed above, scaberulous, short-pilose at base, about 2 mm. long, the awn flexuous, delicate, scabrous, 1–2 cm. long.

TYPE LOCALITY: Guadalajara, Jalisco (*Palmer 515* in 1896).

DISTRIBUTION: Canyons, Jalisco.

58. *Muhlenbergia lanata* (H.B.K.) Hitchcock.

Agrostis lanata H.B.K. Nov. Gen. & Sp. 1: 136. 1815.

Cinna ? lanata Kunth, Rév. Gram. 1: 67. 1829. (Based on *Agrostis lanata* H.B.K.)

Epicampes lanata Presl, Rel. Haenk. 1: 235. 1830. (Combination not made; see Kunth, Enum. Pl. 1: 209. 1833. Based on *Agrostis lanata* H.B.K.)

In habitat and vegetative characters similar to *M. pubescens*; sheaths and blades, especially of the innovations, villous; glumes equal, thin, rather broad, acutish, villous, about 2.3 mm. long; lemma about as long as the glumes, oblong, scarcely narrowed toward summit, villous, awnless or with an awn as much as 3 mm. long.

TYPE LOCALITY: Near Villalpando, Santa Rosa, and Cubileta, Mexico.

DISTRIBUTION: Canyons and rocky hills, Chihuahua and San Luis Potosí to Puebla, Mexico.

NOTE: This species is closely allied to *M. pubescens* of which it may be a villous variety.

59. *Muhlenbergia mutica* (Fourn.) Hitchcock.

Epicampes mutica Fourn. Mex. Pl. Gram. 87. 1886.

Resembling *M. gigantea* and *M. alta*; culms tall (base not present in specimen described); sheaths glabrous; ligule thin, 5 mm. long; blades flat, scabrous, 5 mm. wide; panicle erect, loose and open, purplish, about 1 meter long, the axis angled, roughish, the branches slender, naked below, scaberulous, finally spreading, rather distant on the axis, the lower as much as 25 cm. long; glumes equal, acute, ashy-scaberulous, about 2.5 mm. long; lemma glabrous even at the base, scarcely 2 mm. long.

TYPE LOCALITY: State of Veracruz (Orizaba, *Botteri 104*, in part, and others).

DISTRIBUTION: Rocky hills, State of Veracruz (Orizaba, *Hitchcock 6348*).

60. *Muhlenbergia magna* Hitchcock, sp. nov.

? *Epicampes Bourgaei* Fourn. Mex. Pl. Gram. 88. 1886. (I have not seen the type of *Epicampes Bourgaei* Fourn. [*Bourgeau* 2973]. The specific name cannot be used because of *Muhlenbergia Bourgaei* Fourn.)

Epicampes Bourgaei var. *mutica* Fourn. Mex. Pl. Gram. 88. 1886. (Type from Mirador, Veracruz.) Not *E. mutica* Fourn.

Perennial; culms robust, erect, glabrous, 1-2 meters tall, the basal tuft of sheaths compressed-keeled; sheaths keeled, glabrous; ligule thin, lacerate, 1-1.5 cm. long; blades elongate, flat, 3-8 mm. wide, sometimes folded, usually involute at the long-attenuate tip, somewhat scabrous, especially on the margin; panicle brownish, large and finally open, 0.3-1 m. long, the axis angled, nearly smooth, the branches nearly smooth, naked at base, 10-20 cm. long, rather distant on the axis, as much as 3 cm. apart, finally widely spreading, the branches of the second order also naked at the base, finally spreading, as much as 8 cm. long, the branches of the third order bearing the aggregate spikelets on short scabrous pedicels; glumes about equal, obtuse, or acutish, scaberulous, about 2 mm. long; lemma about as long as the glumes, oblong-linear, acutish, 3-nerved, glabrous even at the base, awnless.

Perennis; culmi robusti erecti 1-2 m. alti, vaginis inferioribus imbricatis compressis; vaginae glabrae carinatae; ligula tenuis 1-1.5 cm. longa; laminae elongatae planae interdum plicatae 3-8 mm. latae, summo involutae, scabrae praesertim margine; panicula magna denique patula 0.3-1 m. longa, ramis 10-20 cm. longis, basi nudis; glumae aequales obtusae vel acutiusculae scabriusculae 2 mm. longae; lemma glabrum acutiusculum muticum 2 mm. longum.

Type collected under cool cliffs of barranca near Guadalajara, Mexico, November 3, 1890, Pringle 3335 (U. S. Nat. Herb. no. 825277).

DISTRIBUTION: Rocky canyons, southern Mexico.

61. *Muhlenbergia gigantea* (Fourn.) Hitchcock.

Epicampes gigantea Fourn. Mex. Pl. Gram. 88. 1886.

Perennial; culms robust, glabrous, erect, 1-1.5 meters tall, the basal overlapping sheaths compressed-keeled; sheaths keeled, glabrous; ligule rather firm below, thin and delicate above and usually crumpled, 5-10 mm. long; blades elongate, mostly flat, sometimes folded, long-attenuate above, scabrous, 3-8 mm. wide; panicle somewhat open, erect, mostly ashy-purple, 30-50 cm. long, the axis angled, slightly scabrous, the branches appressed and naked below, somewhat spreading above, the lower 10-15 cm. long, puberulent around the somewhat enlarged base, the branches of the second order ascending, the short-pedicel spikelets crowded on the branches of the third or fourth order; glumes rather narrow, about equal, acute, scaberulous, 2-2.5 mm. long; lemma about as long as the glumes, acute, glabrous even at the base or very minutely roughened near summit, 3-nerved.

TYPE LOCALITY: Orizaba, Mexico (*Bourgeau* 3137).

DISTRIBUTION: Rocky hills, southern Mexico (Zapotlán, Hitchcock 7247; Bolaños, Rose 3002; Reyes, Oaxaca, Nelson 1779).

62. *Muhlenbergia pubescens* (H.B.K.) Hitchcock.

Agrostis pubescens H.B.K. Nov. Gen. & Sp. 1: 136. 1815.

Cinna ? *pubescens* Kunth, Rév. Gram. 1: 67. 1829. (Based on *Agrostis pubescens* H.B.K.)

Epicampes pubescens Presl, Rel. Haenk. 1: 235. 1830. (No actual transfer made; see Kunth, Enum. Pl. 1: 209. 1833. Based on *Agrostis pubescens* H.B.K.)

Perennial, culms comparatively slender, erect, glabrous, 0.5-1.5 m. tall, the basal overlapping sheaths compressed-keeled; sheaths keeled, scaberulous; ligule very thin, lacerate, 5-10 mm. long; blades elongate, flat or usually folded, scabrous, 2-5 mm. wide; panicle narrow, rather dense, more or less interrupted below, pale or ashen, 20-40 cm. long, the axis scabrous, the branches appressed or ascending, naked below but the naked portion hidden by the imbricate closely flowered upper portion, 4-8 cm. long; glumes about equal, acute, scabrous or scabrous-pubescent, 2.5-3 mm. long; lemma a little shorter than the glumes, acutish, more or less pubescent over the lower half, scaberulous above, awnless or with an awn as much as 3 mm. long or rarely longer; palea as long as the lemma, pubescent on the lower part.

TYPE LOCALITY: Near Villalpando, Santa Rosa, and Cubilete, Mexico.

DISTRIBUTION: Canyons and rocky hills, southern Mexico.

63. *Muhlenbergia distans* Swallen, sp. nov.

Perennial, rather slender; culms erect, glabrous, puberulent below the nodes, scabrous below the panicle, 1-2-noded near the base, 50-100 cm. tall; sheaths compressed-keeled, scaberulous; ligule delicate, enclosed in the folded base of blade, 4-8 mm. long or longer; blades mostly basal, elongate, folded at base, flat above, or those of the innovations folded throughout, rather lax, rather finely scabrous on the margins, 1-4 mm. wide, the apex slender and acuminate but not narrowed to a long fine point; panicle narrow, plumbeous, slightly nodding, rather lax, mostly 20-30 cm. long, the axis scabrous, the branches appressed or ascending, slender, distant below, scabrous, naked on the lower half, rather loosely flowered above, some of the lower as much as 6-8 cm. long; glumes equal, narrowed to a rather obtuse point, scaberulous, 3-3.5 mm. long; lemma about as long as the glumes or slightly longer, acute, scarcely bifid, moderately villous all over, the awn somewhat curved or flexuous, mostly 2-4 mm. long, sometimes longer.

Perennis; culmi erecti, infra nodos puberuli, infra paniculam scabri, 50-100 cm. alti; vaginae compresso-carinatae scaberulae; laminae elongatae, in parte inferiore conduplicatae, in parte superiore planae, 1-4 mm. latae; panicula angusta plumbea 20-30 cm. longa, ramis appressis vel ascendentibus, inferioribus distantibus, infra nudis usque ad 6-8 cm. longis; glumae scaberulae 3-3.5 mm. longae; lemma glumas aequans villosum, arista 2-4 mm. longa.

Type collected on dry hills, alt. 1800 m., Las Sedas, Oaxaca, September 15, 1894, Pringle 5575 (U. S. Nat. Herb. no. 746297).

64. *Muhlenbergia alta* Hitchcock, sp. nov.

? *Epicampes expansa* Fourn. Mex. Pl. Gram. 88. 1886. (Type from Orizaba, Mexico.) Not *Muhlenbergia expansa* (DC.) Trin.

Perennial; culms robust, erect, glabrous, about 180 cm. tall, the basal tuft of sheaths imbricate, compressed-keeled; sheaths glabrous, keeled; ligule thin, 6 mm. long; blades elongate, mostly flat, 5-8 mm. wide, scabrous, attenuate-pointed; panicle loose, ashy-purple, erect, about 60 cm. long, the axis angled, slightly scabrous, the branches finally spreading, naked at base, minutely roughened, rather distant on the axis, the lower as much as 15 cm. long; glumes equal, acute, scaberulous, about 1.5 mm. long; lemma slightly shorter than the glumes, acute, glabrous even at base.

A *Muhlenbergia gigantea* differt spiculis minoribus, 1.5 mm. longis. Culmi robusti erecti glabri circa 180 cm. alti; vaginae inferiores compresso-carinatae glabrae; laminae elongatae plerumque planae scabrae; panicula patula erecta pallido-purpurea 60 cm. longa, ramis patulis basi nudis; glumae acutae glaberulae; lemma quam glumae paullo brevius glabrum.

Type collected on hills east of Zapotlán, Jalisco, Mexico, alt. 1500 m., September 25, 1910, Hitchcock 7180 (U. S. Nat. Herb. no. 998980).

NOTE: Known only from the type collection. The type specimen answers to the meager description of *Epicampes expansa*, except that the spikelets are described as "glomerate." The type of the latter species has not been examined. The new species differs from *M. mutica* in the smaller spikelets, denser panicle, and the lemma being about as long as the glumes; from *M. gigantea* in the smaller spikelets.

65. *Muhlenbergia Meziana* Hitchcock.

Epicampes minutiflora Mez. Repert. Sp. Nov. 17: 212. 1921. (Basis of *Muhlenbergia Meziana* Hitchc.) Not *Muhlenbergia minutiflora* Hitchc.

Perennial; culms rather robust, erect, glabrous, 1-2 m. high, the basal overlapping sheaths compressed-keeled; sheaths keeled, the lower glabrous, the upper scaberulous; ligule thin, lacerate, 1-2 cm. long, hidden in the folded base of the blade, the firm margins of the sheath extended upward into prominent auricles; blades elongate, folded at base, mostly flat above, involute-pointed, very scabrous on the margins, 1-5 mm. wide; panicle narrow, somewhat loose or condensed, pale or purplish, 30-60 cm. long, the axis angled, scaberulous, the branches slender, many-flowered, usually appressed, sometimes ascending, scaberulous, 5-10 cm. long, the lateral pedicels shorter than the spikelets; glumes nearly equal, acutish or obtuse, scaberulous, about 2 mm. long; lemma acute, usually slightly shorter than the glumes, faintly scabrous, 3-nerved, no hairs at base; palea as long as the lemma.

TYPE LOCALITY: El Canizal, Michoacán (Langlassé).

DISTRIBUTION: Canyons and rocky slopes, Sinaloa to Michoacán, Mexico (Pringle 2321, 2356, 2860, 11746; Mexia 1713; Arsène 8581, 9937; Hitchcock 7172).

66. *Muhlenbergia Presliana* Hitchcock.

Epicampes stricta Presl. Rel. Haenk. 1: 235. 1830. (Basis of *Muhlenbergia Presliana* Hitchc.)
Not *Muhlenbergia stricta* Kunth.

Perennial; culms moderately robust, glabrous, erect, 1-1.5 meters tall, the basal overlapping sheaths compressed-keeled; sheaths glabrous, keeled; ligule short, lacerate, mostly not more than 5 mm. long; blades elongate, folded at base, flat or folded above, involute toward the attenuate tip, scabrous, 1-4 mm. wide; panicle narrow, erect, rather dense, pale or plumbeous, 25-50 cm. long, the axis angled, scabrous, the branches appressed at the naked base, less appressed above, rather densely flowered, 5-10 cm. long; glumes equal, rather broad, obtusish, scabrous, 2 mm. long; lemma oblong, acutish, about as long as the glumes, faintly scaberulous, not pilose at base, awnless, mucronate or with an awn as much as 2 mm. long. Most of our specimens are awnless or mucronate only.

TYPE LOCALITY: Mexico (*Haenke*).

DISTRIBUTION: Sandy or rocky slopes, southern Mexico to Guatemala.

67. *Muhlenbergia Lindheimeri* Hitchc. Jour. Wash. Acad. Sci.

24: 291. 1934.

Epicampes gracilis Trin. Mém. Acad. St.-Pétersb. VI. 6: 271. 1841. (The published locality is Mexico, but the type specimen is from eastern Texas, probably collected by Berlandier.) Not *Muhlenbergia gracilis* (H.B.K.) Kunth.

Perennial; culms erect, slightly scaberulous or glabrous, 1-1.5 m. tall, the basal tuft of sheaths compressed-keeled; sheaths glabrous or nearly so; ligule rather thin, elongate, mostly hidden in the folded base of the blade; blades elongate, firm, flat or usually folded, about 3 mm. wide, scaberulous or glabrous; panicle narrow, pale, rather dense, erect, 20-40 cm. long, the axis scabrous, the branches ascending or appressed, 2-5 cm. long; spikelets 2.5-3 mm. long; glumes acute to rather obtuse, scabrous-puberulent to nearly smooth; lemma about as long as the glumes, 3-nerved, glabrous to obscurely pubescent, awnless or rarely with an awn as much as 3 mm. long.

TYPE LOCALITY: Eastern Texas (*Lindheimer 725*).

DISTRIBUTION: Rocky slopes, Texas.

ILLUSTRATION: Hitchc. Man. f. 808.

NOTE: This has been referred to *Epicampes Berlandieri* Fourn., a distinct species from Mexico. (See under *M. robusta*.)

68. *Muhlenbergia robusta* (Fourn.) Hitchcock.

Epicampes Berlandieri Fourn. Mex. Pl. Gram. 89. 1886. (Type from State of Mexico, *Berlandier 670*.) Not *Muhlenbergia Berlandieri* Trin. 1841.

Epicampes robusta Fourn. Mex. Pl. Gram. 89. 1886. (Basis of *Muhlenbergia robusta* Hitchc.)

?*Epicampes Ehrenbergii* Mez, Repert. Sp. Nov. 17: 212. 1921. (Type from Cuesta de Pinolco, Mexico.)

Muhlenbergia Fournieriana Hitchc. Jour. Wash. Acad. 23: 453. 1933. (Based on *Epicampes Berlandieri* Fourn.)

Perennial; culms robust, erect, glabrous or nearly so, 1-2 m. tall, with 1 or 2 nodes below the middle, the basal overlapping sheaths compressed-keeled; sheaths keeled, glabrous or the upper slightly scaberulous; ligule thin, 2-4 mm. long, sometimes longer on the innovations; blades elongate, firm, flat or usually folded, more or less involute, especially toward the long-attenuate point, scabrous, especially on the margins, 2-5 mm. wide; panicle erect, ashy-gray or plumbeous, narrow, 30-60 cm. long, mostly 4-6 cm. wide, the axis angled, scabrous, the branches appressed or ascending, numerous, approximate, naked below, mostly 5-15 cm. long, the lateral pedicels very short; glumes about equal, thin, scaberulous or nearly smooth, acute or rather obtuse, 2.5-3 mm. long; lemma about as long as the glumes, glabrous except a few short hairs at base, acute, more or less mucronate, sometimes short-awned.

TYPE LOCALITY: Federal District, Mexico (*Bourgeau 1153*).

DISTRIBUTION: Rocks and canyons, Puebla to Michoacán; Guatemala.

69. *Muhlenbergia macrotis* (Piper) Hitchcock.

Epicampes macrotis Piper, Proc. Biol. Soc. Wash. 18: 144. 1905.

Perennial; culms stout, glabrous, about 1 m. tall, the lower sheaths crowded, compressed-keeled; sheaths keeled, glabrous; ligule short, with a firm prominent auricle 2-4 cm. long on each side from the summit of the sheath; blades elongate, flat, firm, scabrous on the upper surface, margins, and prominent keel, 4-6 mm. wide; panicle erect, pale, narrow, about 30 cm. long, the axis scaberulous, the branches ascending or appressed, 3-6 cm. long, the spikelets rather crowded on short appressed branchlets; glumes equal, broad, obtusish, glabrous, about 2.5 mm. long; lemma glabrous below, scaberulous above, acute, about 3 mm. long. Resembling *M. robusta*, differing in the narrower looser panicle, the lemmas longer than the glumes, glabrous below, and scaberulous above.

TYPE LOCALITY: Sierra Madre, Zacatecas (*Rose 3528*).

DISTRIBUTION: Known only from the type collection.

70. *Muhlenbergia Porteri* Scribn.; Beal, Grasses N. Am. 2: 259.

1896.

Muhlenbergia texana Thurb.; Porter & Coult. Syn. Fl. Colo. 144. 1874. (Basis of *M. Porteri* Scribn.) Not *M. texana* Buckl. 1863.

Podosaemum Porteri Bush, Am. Midl. Nat. 7: 36. 1921. (Based on *Muhlenbergia Porteri* Scribn.)

Perennial; culms loosely cespitose from a knotty woody or persistent base, numerous, wiry, fragile, widely spreading or ascending through bushes, scaberulous, mostly branching from all the numerous nodes, 30-100 cm. tall or more; sheaths smooth, spreading away from the branches, the prophyllum conspicuous; ligule 1-2 mm. long; blades flat, early deciduous from the sheath, 2-5 cm. long, about 1 mm. wide; panicles open, 5-10 cm. long, about as wide, the slender branches and branchlets brittle, widely spreading, bearing rather few long-pediceled spikelets; glumes narrow, acuminate, slightly unequal, glabrous except the slightly scabrous keel, the second longer, about 3 mm. long; lemma purple, acuminate, sparsely pubescent, 3-4 mm. long, with a delicate awn 5-8 mm. long.

TYPE LOCALITY: Texas.

DISTRIBUTION: Dry mesas and hills, canyons, and rocky deserts, western Texas to Colorado, Nevada, and southern California, and southward to Durango, Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 105.

71. *Muhlenbergia arizonica* Scribn. Bull. Torrey Club 15: 8. 1888.

Perennial, in close tufts; culms slender, erect or decumbent at base, scaberulous, several-noded, 15-40 cm. tall; sheaths keeled, glabrous, or puberulent near the base; ligule thin, 1-2 mm. long, decurrent; blades flat or folded, scaberulous or scabrous-pubescent, scabrous near the tip, mostly less than 5 cm. long, 1-2 mm. wide, the margins and midnerve white-cartilaginous; panicles open, finally long-exserted, 5-12 cm. long, 4-8 cm. wide, the branches capillary, the slender pedicels being branches of the second or third order; glumes equal, ovate, subacute, glabrous, about 1 mm. long; lemma narrowly lanceolate, minutely pubescent along the midnerve and margins below, about 3 mm. long, the awn about 1 mm. long from a minutely notched apex.

TYPE LOCALITY: Near Mexican Boundary, Arizona (*Pringle* in 1884).

DISTRIBUTION: Stony hills, southern Arizona, and southward to Durango.

ILLUSTRATION: Hitchc. Man. f. 757.

72. *Muhlenbergia Torreyi* (Kunth) Hitchc.; Bush, Am. Midl.

Nat. 6: 84. 1919.

Agrostis caespitosa Torr. Ann. Lye. N. Y. 1: 152. 1824. (Basis of *Muhlenbergia Torreyi* Hitchc.) Not *A. caespitosa* Salisb. 1796; nor *Muhlenbergia caespitosa* Chapm. 1878.

Agrostis Torreyi Kunth, Rév. Gram. Suppl. vii. 1830. (Based on *A. caespitosa* Torr.)

Muhlenbergia gracillima Torr. Pacif. R. R. Rep. 4: 155. 1857. (Type from Llano Estacado and near Antelope Hills, Canadian River, Texas.)

Agrostis nardifolia Griseb. Abh. Ges. Wiss. Gött. 19: 252. 1874. (Type from Argentina.)

Agrostis Peckii House, Am. Midl. Nat. 7: 126. 1921. (Based on *A. caespitosa* Torr., but the name misapplied to the awned form of *Agrostis hiemalis* B.S.P.)

Podosaemum gracillimum Bush, Am. Midl. Nat. 7: 33. 1921. (Based on *Muhlenbergia gracillima* Torr.)

Perennial, in loose tufts, with numerous innovations, the base decumbent or forming short rhizomes, the plants usually gregarious, sometimes forming large patches or "fairy-rings"; culms slender, glabrous, 10-30 cm. tall; leaves in a short basal cluster, the sheaths glabrous; ligule thin, decurrent, 2-3 mm. long; blades closely involute, falcate or flexuous, scabrous, usually 2-3 cm. long, forming a crisp curly cushion; panicles open, usually about half the entire length of the culm, commonly purple, the capillary branches finally spreading, the pedicels (branches of the second or third order) mostly as long as the spikelets or longer; glumes lanceolate, glabrous, 1.5-2 mm. long (including the awn-tip); lemma nearly glabrous, the body about 3 mm. long, tapering into a delicate awn about 3 mm. long.

TYPE LOCALITY: Prairies of Missouri and Platte Rivers.

DISTRIBUTION: Plains, mesas, and dry hills, western Kansas and Colorado to Texas and Arizona.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 106.

73. *Muhlenbergia Purpusii* Mez, Repert. Sp. Nov. 17: 214. 1921.

Perennial; culms cespitose, slender, the lower internode (hidden in the sheath) puberulent; sheaths scaberulous, keeled, crowded at base of plant; ligule 3-5 mm. long; blades flat or mostly involute, scaberulous, 1 mm. wide or less, about 10 cm. long, curled or flexuous; panicle fusiform or subpyramidal, as much as 7 cm. long, the branches filiform, ascending, the pedicels (branches of the fourth order) longer than the spikelets; glumes subequal, obtuse, about 1 mm. long; lemma 2.3 mm. long, pilose, the awn as much as 15 mm. long.

TYPE LOCALITY: Minas San Rafael, San Luis Potosí (*Purpus 5011*).

DISTRIBUTION: Known only from the type collection.

74. *Muhlenbergia arenicola* Buckl. Proc. Acad. Phila. 1862: 91.

1863.

Podosaemum arenicola Bush, Am. Midl. Nat. 7: 40. 1921. (Based on *Muhlenbergia arenicola* Buckl.)

Resembling *M. Torreyi*; culms taller, mostly 30-50 cm. tall; ligule firmer, scaberulous; blades usually straight and on the average longer; panicles larger, mostly pale, the branches and pedicels appressed; spikelets slightly longer, the lemma scabrous.

TYPE LOCALITY: Western Texas (*Wright 735*).

DISTRIBUTION: Sandy plains and mesas, western Kansas to Arizona, and southward to Chihuahua (*Pringle 479*).

ILLUSTRATION: Hitchc. Man. f. 796.

75. *Muhlenbergia breviseta* Griseb.; Fourn. Mex. Pl. Gram. 83.

1886.

Perennial; culms cespitose, slender, wiry, erect or somewhat decumbent at base, puberulent, several-noded, 10-20 cm. long; ligule 1-2 mm. long; blades scattered along the culm, flat or folded, glabrous, scabrous on the margins, mostly 1-2 cm. long, sometimes as much as 5 cm., less than 1 mm. wide; panicles rather delicate, narrow but somewhat open, mostly less than 5 cm. long, usually purple, the axis slender, angled, scaberulous, the branches rather distant, ascending, scaberulous, few-flowered, naked below, about 1 cm. long or the lowermost sometimes as much as 2 cm.; glumes somewhat unequal, acuminate or awn-pointed, glabrous, about 1 mm. long; lemma oblong, 3-nerved, minutely apiculate, pubescent near the margins, 1.5 mm. long; palea about as long and as wide as the lemma, with a few hairs along the back.

TYPE LOCALITY: Orizaba, Mexico (*Müller 1453*).

DISTRIBUTION: Dry or sandy fields and pine woods, Orizaba to Michoacán.

76. *Muhlenbergia expansa* (Poir.) Trin. Gram. Pan. 26. 1826.

Stipa expansa Poir. in Lam. Encyc. 7: 453. 1806.

Agrostis arachnoidea Poir. in Lam. Encyc. Suppl. 1: 249. 1810. (Type from Carolina, *Bosc.*)

Trichochloa purpurea Beauv. Agrost. 29. 1812. (Type from United States.)

Vilfa arachnoidea Beauv. Agrost. 147, 181. 1812. (Presumably based on *Agrostis arachnoidea* Poir.)

- Podosaemum purpureum* Beauv. *Agrost.* 176, 179. 1812. (Based on *Trichochloa purpurea* Beauv.)
Trichochloa expansa DC. *Cat. Hort. Monsp.* 151. 1813. (Based on *Stipa expansa* Poir.)
Agrostis trichopodes Ell. *Bot. S. C. & Ga.* 1: 135. 1816. (Type from Chatham County, Georgia.)
Cinna arachnoidea Kunth, *Rev. Gram.* 1: 67. 1829. (Based on *Agrostis arachnoidea* Poir.)
Muhlenbergia arachnoidea Trin.; Kunth, *Enum. Pl.* 1: 207. 1833. (Based on *Agrostis arachnoidea* Poir.)
Muhlenbergia trichopodes Chapm. *Fl. S. U. S.* 553. 1860. (Based on *Agrostis trichopodes* Ell.)
Muhlenbergia caespitosa Chapm. *Bot. Gaz.* 3: 18. 1878. (Type from Apalachicola, Florida.)
Muhlenbergia capillaris var. *trichopodes* Vasey, *Contr. U. S. Nat. Herb.* 3: 66. 1892. (Based on *Agrostis trichopodes* Ell.)
Podosaemum trichopodes Bush, *Am. Midl. Nat.* 7: 30. 1921. (Based on *Agrostis trichopodes* Ell.)

Perennial, the old basal sheaths forming a fibrous mass; culms erect, slender, glabrous, scaberulous below the panicle, 60-90 cm. tall, 2- or 3-noded, the nodes in the lower one third; sheaths glabrous; ligule rather firm, 2-3 mm. long, decurrent; blades flat, soon folded or involute, scabrous on the upper surface and margins, glabrous beneath, mostly less than half the height of the culm, 1-2 mm. wide; panicle open, oblong, 10-20 cm. long, 2-3 times as long as wide, the axis scaberulous, the branches ascending or spreading, slightly flexuous or straight, the slender pedicels (branches of usually the third order) mostly longer than the spikelets; glumes nearly equal, acute or acuminate, glabrous, one third to two thirds as long as the lemma; lemma brownish, acuminate, scaberulous, shortly and sparsely pilose at base, 3.5-5 mm. long, awnless or with an awn as much as 2 mm. long, rarely longer.

TYPE LOCALITY: Carolina (*Bosc.*)

DISTRIBUTION: Moist pine barrens of the Coastal Plain, North Carolina to Florida and eastern Texas.

ILLUSTRATION: *Bull. U. S. Dep. Agr. Agrost.* 17: f. 443.

77. *Muhlenbergia argentea* Vasey, *Bull. Torrey Club* 13: 232.
1886.

Epicampes argentea Jones, *Contr. West. Bot.* 14: 7. 1912. (Based on *Muhlenbergia argentea* Vasey.)

Perennial; culms caespitose, slender, puberulent, several-noded, about 40 cm. tall; sheaths glabrous, longer than the internodes; ligule thin, acute, 5-8 mm. long; blades flat or loosely involute, glabrous beneath, puberulent on the upper surface, scabrous on the cartilaginous margins, 5-15 cm. long, about 1 mm. wide; panicle narrow, loose, 10-15 cm. long, the axis scabrous, the slender scabrous branches ascending, naked below, the pedicels mostly longer than the spikelets; glumes about equal, thin, oblong, obtuse or somewhat notched, the midnerve extending into a mucro or short awn, the summit minutely pubescent or ciliate, about 2 mm. long excluding the awn; lemma broad, thin, 3-nerved, minutely pubescent on the lower part of the nerves, 3-4 mm. long, the apex bilobed, the lobes obtuse, about 1 mm. long, the awn from between the lobes, scabrous, slightly flexuous, 5-10 mm. long.

TYPE LOCALITY: Southwestern Chihuahua (*Palmer 160* in 1885).

DISTRIBUTION: Known only from the type collection.

NOTE: This species agrees with *M. biloba* in the lobed lemma but does not seem to be closely allied with that species.

78. *Muhlenbergia stricta* (Presl) Kunth, *Rév. Gram. Suppl.* xvi. 1830.

Podosaemum strictum Presl, *Rel. Haenk.* 1: 230. 1830.

Muhlenbergia longifolia Vasey, *Contr. U. S. Nat. Herb.* 1: 283. 1893. (Type from Río Blanco, near Guadalajara, Mexico, *Palmer 523* in 1886.)

Muhlenbergia elata Vasey, *Contr. U. S. Nat. Herb.* 1: 282. 1893. (Type from Guadalajara, Mexico, *Palmer 770* in 1886.)

Perennial; culms robust, erect, puberulent, 1-1.5 meters tall, the nodes near the base; sheaths puberulent, elongate, closely overlapping at the base of the plant; ligule firm, 3-5 mm. long, the sheath broader than the base of the blade, extending up on each side as distinct auricles, the ligule connecting them; blades involute, elongate, puberulent or scaberulous; panicle oblong, finally open, about one third the entire height of the culm, the axis angled, scabrous, the capillary scabrous branches numerous in subverticels, rather closely set, as much as 15 cm. long, the pedicels (branches of the fourth order) much longer than the spikelets;

glumes acute, the second sometimes mucronate, half as long as the lemma; lemma acuminate, glabrous, about 3 mm. long, the delicate awn 5-10 mm. long.

TYPE LOCALITY: Mexico.

DISTRIBUTION: Rocky hills and canyons, Morelos to Michoacán and Nayarit.

79. *Muhlenbergia capillaris* (Lam.) Trin. Gram. Unifl. 191. 1824.

Stipa diffusa Walt. Fl. Car. 78. 1788. (Type from South Carolina.) Not *Muhlenbergia diffusa* Willd. 1798.

Stipa capillaris Lam. Tab. Encyc. 1: 158. 1791. (Basis of *Muhlenbergia capillaris* Trin.)

Podosaemum capillare Desv. Nouv. Bull. Soc. Philom. 2: 188. 1810. (Based on *Stipa capillaris* Lam.)

Tosagris agrostidea Beauv. Agrost. 29. 1812. (Type from United States.)

Podosaemum agrostideum Beauv. Agrost. 176, 179. 1812. (Based on *Tosagris agrostidea* Beauv.)

Trichochloa capillaris DC. Cat. Hort. Monsp. 152. 1813. (Based on *Stipa capillaris* Lam.)

Trichochloa polypogon DC. Cat. Hort. Monsp. 152. 1813. (Type from Carolina.)

Muhlenbergia polypogon Kunth, Rév. Gram. 1: 64. 1829. (Based on *Trichochloa polypogon* DC.)

Muhlenbergia trichodes Steud. Syn. Gram. 177. 1854. (Said to be from South America, but Steudel's type is from Guadeloupe, West Indies.)

Perennial; culms cespitose, rather slender, erect, puberulent, 60-100 cm. tall, the nodes 1 or 2; sheaths glabrous or somewhat scaberulous, longer than the internodes; ligule firm, 2-5 mm. long, strongly decurrent; blades elongate, flat or involute, 1-2 mm. wide, rarely more, those of the innovations narrower, involute, scaberulous on the upper surface, glabrous beneath; panicle purple, oblong, diffuse, one third to half the entire height of the culm, the axis puberulent, the branches capillary, flexuous, scaberulous, the branchlets and long capillary pedicels (branches of the third order) finally widely spreading; glumes acute or acuminate, or the second often short-awned, one fourth to one third as long as the lemma; lemma scaberulous, acuminate, very sparsely short-pilose at base, 4-5 mm. long, the delicate awn 5-15 mm. long.

TYPE LOCALITY: Carolina.

DISTRIBUTION: Rocky or sandy woods, Massachusetts to Indiana and eastern Kansas, and southward to Florida and eastern Texas; West Indies; eastern Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: f. 448.

Muhlenbergia capillaris var. *filipes* (M. A. Curtis) Chapm.; Beal, Grasses N. Am. 2: 256. 1896.

(Based on *M. filipes* M. A. Curtis.) *Stipa sericea* Michx. Fl. Bor. Am. 1: 54. 1803. (Type from South Carolina.)

Agrostis sericea Ell. Bot. S. C. & Ga. 1: 135. 1816. (Based on *Stipa sericea* Michx.)

Polygogon sericea Spreng. Syst. Veg. 1: 243. 1825. (Based on *Stipa sericea* Michx.)

Muhlenbergia filipes M. A. Curtis, Am. Jour. Sci. 44: 83. 1843. *Podosaemum filipes* Bush, Am. Midl. Nat. 7: 29. 1921. (Based on *Muhlenbergia filipes* M. A. Curtis.)

Culms stouter; blades mostly involute; glumes with delicate awns, mostly longer than the lemma; lemma with a setaceous tooth each side the awn. TYPE LOCALITY: Sea Islands of North Carolina. DISTRIBUTION: Moist pine barrens near the coast, North Carolina to Florida and Texas.

80. *Muhlenbergia setifolia* Vasey, Bot. Gaz. 7: 92. 1882.

Perennial; culms densely cespitose, erect, slender, wiry, puberulent, 50-80 cm. tall; sheaths glabrous, overlapping at base of plant; ligule thin, 8-10 mm. long, widely decurrent on the sheath; blades involute, fine, scarcely 0.5 mm. thick, scabrous, flexuous or curly, as much as 20 cm. long; panicle narrow, open, erect, 10 to 15 cm. long, the axis puberulent, the branches capillary, ascending, flexuous; naked below, rather few-flowered, the pedicels longer than the spikelets; glumes one third to one half as long as the lemma, obtuse to subacute, often with a short delicate awn; lemma acuminate, glabrous, minutely pubescent on the callus, the awn slender, scabrous, flexuous, 1.5-2 cm. long.

TYPE LOCALITY: Guadalupe Mountains, Texas (*Havard*).

DISTRIBUTION: Rocky hills, western Texas to Arizona and northern Mexico.

ILLUSTRATION: Hitchc. Man. f. 798.

81. *Muhlenbergia Reverchoni* Vasey & Scribn., Contr. U. S. Nat.

Herb. 3: 66. 1892.

Podosaemum Reverchoni Bush, Am. Midl. Nat. 7: 38. 1921. (Based on *Muhlenbergia Reverchoni* Vasey & Scribn.)

Perennial; culms slender, glabrous, puberulent below the panicle, 40-60 cm. tall; sheaths glabrous or nearly so, the basal ones not becoming fibrous; ligule rather firm, 3-4 mm. long,

decurent; blades flat or usually involute, often curled or flexuous, more or less scabrous, usually less than 2 mm. wide, those of the innovations often filiform; panicle open, oblong-pyramidal, 15-30 cm. long, 10-15 cm. wide, the axis and branches slender, scaberulous or puberulent, straight or slightly flexuous, finally widely spreading, the pedicels (mostly branches of the third order) mostly longer than the spikelets; glumes ovate-lanceolate, acute or erose, glabrous, about 2 mm. long; lemma acuminate, glabrous, shortly and sparsely pilose at base, about 5 mm. long, the awn nearly straight, 2-5 mm. long.

TYPE LOCALITY: Texas (*Reverchon 73*).
 DISTRIBUTION: Rocky prairies, Texas.
 ILLUSTRATION: Hitchc. Man. f. 806.

82. *Muhlenbergia rigida* (H.B.K.) Kunth, Rév. Gram. 1: 63.
 1829.

- Podosaemum rigidum* H.B.K. Nov. Gen. & Sp. 1: 129. 1815.
Podosaemum mucronatum H.B.K. Nov. Gen. & Sp. 1: 129. 1815. (Type from Guanajuato, Mexico. A short-awned form.)
Podosaemum elegans H.B.K. Nov. Gen. & Sp. 1: 130. 1815. (Type from Ecuador.)
Trichochloa mucronata R. & S. Syst. Veg. 2: 387. 1817. (Based on *Podosaemum mucronatum* H.B.K.)
Trichochloa rigida R. & S. Syst. Veg. 2: 386. 1817. (Based on *Podosaemum rigidum* H.B.K.)
Agrostis mucronata Spreng. Syst. 1: 262. 1825. (Based on *Podosaemum mucronatum* H.B.K.)
Muhlenbergia mucronata Kunth, Rév. Gram. 1: 63. 1829. (Based on *Podosaemum mucronatum* H.B.K.)
Muhlenbergia elegans Kunth, Rév. Gram. 1: 64. 1829. (Based on *Podosaemum elegans* H.B.K.)
Muhlenbergia Berlandieri Trin. Mém. Acad. St.-Petersb. VI. 6: 299 (reprint 53). 1841. (Type from Mexico City.)
Muhlenbergia affinis Trin. Mém. Acad. St.-Petersb. VI. 6: 301 (reprint 55). 1841. (Type from Toluca, Mexico, *Berlandier 1083*.)
Muhlenbergia laxiflora Scribn. Zoe 4: 389. 1894. (Type from La Chuparosa, Baja California, *Brandegee 74*.)
Muhlenbergia elegans var. *atroviolacea* Kuntze, Rev. Gen. Pl. 3: 357. 1898. (Type from Bolivia.)
Muhlenbergia elegans var. *subviridis* Kuntze, Rev. Gen. Pl. 3: 357. 1898. (Type from Bolivia.)
Podosaemum affine Bush, Am. Midl. Nat. 7: 40. 1921. (Based on *Muhlenbergia affinis* Trin.)

Perennial; culms cespitose, erect, rather slender, glabrous, scabrous just below the panicle, mostly 50-100 cm. tall, the nodes all at the base; sheaths glabrous; ligule 3-7 mm. long or the lower shorter, firm, truncate, the margins of the sheath extending up each side; blades mostly elongate, flat (2 mm. wide) or usually involute, scabrous on the margins and upper surface, usually glabrous beneath; panicle purple, narrow but finally open, nodding, 10-30 (usually 15-20) cm. long, the axis scabrous, the capillary branches finally ascending or spreading, scabrous, flexuous, 3-8 cm. long, the pedicels enlarged and scabrous-pubescent at the ends, mostly longer than the spikelets but some of them (finally spreading) only a little more than 1 mm. long, none crowded; glumes ovate to lanceolate, rounded or usually acute at apex, sometimes mucronate, 1-1.8 mm. long; lemma narrow, acuminate, slightly scaberulous, shortly and minutely pilose at base, minutely bifid at apex, 4-5 mm. long, the awn usually slender, scabrous, flexuous, 5-15 mm. long, sometimes shorter; palea as long as the lemma.

TYPE LOCALITY: Guanajuato, Mexico.
 DISTRIBUTION: Sterile soil, rocky hills, and canyons, Sonora and San Luis Potosí to Oaxaca.

83. *Muhlenbergia longiligula* Hitchc. Am. Jour. Bot. 21: 136.
 1934.

- Epicampes ligulata* Scribn.; Vasey, Contr. U. S. Nat. Herb. 3: 58. 1892. (Basis of *Muhlenbergia longiligula* Hitchc.) Not *Muhlenbergia ligulata* Scribn. & Merr.
Epicampes anomala Scribn.; Beal, Grasses N. Am. 2: 311. 1896. (Type from Chihuahua, *Pringle 1423*. An abnormal form.) Not *Muhlenbergia anomalis* Fourn. 1886.
Epicampes distichophylla var. *mutica* Scribn.; Beal, Grasses N. Am. 2: 308. 1896. (Type from Arizona, *Toumey 740*.)
Epicampes stricta var. *mutica* Jones, Contr. West. Bot. 14: 6. 1912. (Based on *E. distichophylla* var. *mutica* Scribn.)

Perennial; culms erect, densely cespitose, glabrous, about 1 m. tall, the base hard, pale, cylindrical, the lower sheaths expanded, overlapping but not strongly compressed-keeled; sheaths glabrous; ligule firm, about 1 cm. long, broadly decurrent along the summit of the sheath;

blades elongate, flat to subinvolute, very scabrous, 2-5 mm. wide; panicle narrow, somewhat loose, erect, pale or dark, 20-40 cm. long, the axis scaberulous, the branches ascending or appressed, the lower as much as 10 cm. long; glumes subequal, acutish, usually glabrous, 2-3 mm. long; lemma about as long as the glumes or a little longer, glabrous, awnless, or rarely with a minute awn.

TYPE LOCALITY: Santa Rita Mountains, Arizona (Pringle in 1884).

DISTRIBUTION: Mountain slopes and rocky pine woods, western New Mexico, Arizona, southern Nevada, Sonora, and Chihuahua.

ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. 12¹: pl. 27, by error labeled *E. macroura*.

84. *Muhlenbergia nigra* Hitchcock, sp. nov.

Perennial; culms densely caespitose in large clumps, puberulent below, scabrous below the panicle, 2- or 3-noded, 0.5-1.5 meters tall; sheaths scaberulous or the lower glabrous; ligule truncate, mostly 1-2 cm. long, much broader than the base of the blade, decurrent on the margins of the sheath; blades mostly slender, closely involute, the wider ones sometimes flat, about 2 mm. wide, deeply sulcate and scabrous on the upper surface, scaberulous beneath especially toward the involute attenuate point, the base of the closely involute blades usually with a curve, becoming in the old leaves a strong semicircular bend; panicle dense, spikelike, erect, tapering a little at each end, dark green or olive, 5-15 cm. long, 8-10 mm. wide, the axis scabrous, strongly sulcate, the short branches scabrous, closely set on the axis, bearing 1-3 spikelets, the pedicels scabrous-pubescent; glumes 6-10 mm. long, narrow, very scabrous, acuminate, more or less awn-pointed; lemma resembling the glumes but somewhat shorter, 3-nerved.

Perennis; culmi dense caespitosi erecti 0.5-1.5 m. alti; ligula 1-2 cm. longa; laminae involutae; panicula densa nigricans 5-15 cm. longa 8-10 mm. lata; glumae angustae dense scabrae acuminatae 6-10 mm. longae; lemma glumis simile sed paullo brevius.

Type collected on cool slopes under pines, alt. about 3300 m., Nevada de Toluca, Mexico, September 2, 1892, Pringle 4211 (U. S. Nat. Herb. no. 746689).

DISTRIBUTION: Southern Mexico, from Veracruz to Toluca; Guatemala (Volcano Agua).

85. *Muhlenbergia leptoura* (Piper) Hitchcock.

Epicampes leptoura Piper, Proc. Biol. Soc. Wash. 18: 143. 1905.

Crypsinna setigumis Jones, Contr. West. Bot. 14: 8. 1912. (Type from García, Chihuahua, Jones in 1903.)

Perennial; culms comparatively slender, glabrous, scabrous below the panicle, 60-120 cm. tall, with 2-4 nodes; sheaths glabrous, longer than the internodes; ligule truncate, 2-3 mm. long; blades flat or usually involute, scabrous, elongate, attenuate to a long fine point, sometimes as much as 3 mm. wide near base; panicle dense, spikelike, erect, pale, sometimes interrupted below, 10-25 cm. long, 5-6 mm. thick, the lower branches sometimes as much as 1 cm. long, the axis angled, scabrous; glumes lanceolate, rather thin, scabrous on the keel and slightly soon the back, 3-4 mm. long, extending into a short awn as much as 2 mm. long; lemma scabrous, rather broad, 3-nerved, awnless, 2-3 mm. long; palea broad, as long as or a little longer than the lemma.

TYPE LOCALITY: Colonia García, Chihuahua (Townsend & Barber 341).

DISTRIBUTION: Canyons and rocky beds of ravines, Chihuahua.

86. *Muhlenbergia macroura* (H.B.K.) Hitchcock.

Crypsis macroura H.B.K. Nov. Gen. & Sp. 1: 140. 1815.

Cinna macroura [macroura] Kunth, Rév. Gram. 1: 67. 1829. (Based on *Crypsis macroura* H.B.K.)

Crypsis setifolia Presl, Rel. Haenk. 1: 245. 1830. (Type from Mexico, Haenke.)

Cinna setifolia Kunth, Rév. Gram. Suppl. xvi. 1830. (Based on *Crypsis setifolia* Presl.)

Epicampes macroura Benth. Jour. Linn. Soc. 19: 87. 1881. (Based on *Cinna macroura* Kunth.)

Crypsinna setifolia Fourn. Mex. Pl. Gram. 90. 1886. (Based on *Crypsis setifolia* Presl.)

Perennial; culms densely caespitose in large bunches as much as 1 m. in diameter, erect, glabrous, scaberulous just below the panicle, several-noded, the uppermost node 30-50 cm. below the panicle, 1-1.5 meters tall; sheaths glabrous or slightly rough to the touch, all except

the lower elongate; ligule truncate, much broader than the base of the blade, decurrent as a broad wing on each side of the sheath, 1–2.5 cm. long or even longer, the lower ones shorter; blades elongate, flat or more or less involute, scabrous, 1–5 mm. wide, tapering into a fine point, panicle dense, spikelike, erect, plumbeous or olive, 15–30 cm. long, about 5 mm. thick, the axis sulcate, scabrous, the branchlets short, slender, appressed and closely set on the axis; the pedicels scabrous-pubescent; spikelets compressed; glumes about equal, narrow, acute, scaberulous on keel and back, about 4 mm. long; lemma a little shorter than the glumes, narrow, 3-nerved, acute, scabrous, the palea about as long as the lemma.

TYPE LOCALITY: Toluca, Mexico.

DISTRIBUTION: Open slopes and open woods, on the higher mountains, alt. about 3000 m., southern Mexico.

NOTE: The roots are used for brushes.

87. *Muhlenbergia rigens* (Benth.) Hitchc. Jour. Wash.

Acad. Sci. **23**: 453. 1933.

Epicampes rigens Benth. Jour. Linn. Soc. **19**: 88. 1881. (Based on *Cinna macroura* as described by Thurber; S. Wats. Bot. Calif. **2**: 276. 1880.)

Crypsinna rigens Jones, Contr. West. Bot. **14**: 8. 1912. (Based on *Epicampes rigens* Benth.)

Perennial; culms cespitose in small bunches, puberulent, scaberulous below the panicle, 1–1.5 meters tall, with 1 or 2 nodes near the base; sheaths glabrous or slightly rough, overlapping; ligule truncate, about 1–2 mm. long, somewhat auricled at the sides; blades scabrous, elongate, involute, tapering into a long slender point; panicle grayish or pale, slender, spikelike, 15–30 cm. long or more; glumes 2–3 mm. long, from acute to obtuse or somewhat erose, scabrous-puberulent, rarely faintly 3-nerved; lemma slightly exceeding the glumes, scaberulous, sparsely pilose at base, 3-nerved toward the narrowed summit, awnless.

TYPE LOCALITY: California.

DISTRIBUTION: Dry or open ground, hillsides, gullies, and open forest, Texas to southern California and northern Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Bot. **12**: pl. 28.

88. *Muhlenbergia involuta* Swallen, Am. Jour. Bot. **19**: 436. 1932.

Perennial; culms densely cespitose, erect, glabrous, or minutely puberulent, scaberulous below the panicle, 65–135 cm. tall; sheaths glabrous to scaberulous, longer than the internodes, the lower not strongly overlapping and compressed-keeled (as in *M. Emersleyi* and its allies); ligule hyaline, 1 cm. long; panicles narrow, erect or somewhat nodding, rather loose, 25–40 cm. long, the axis scaberulous, the slender branches ascending or appressed but not closely overlapping, scabrous, naked toward the base, the lower as much as 20 cm. long; glumes somewhat unequal, subacute or somewhat erose, scabrous, 2–2.5 mm. long; lemma narrowed above, minutely scaberulous, minutely pilose at base, 3–3.5 mm. long, minutely toothed at apex, the awn slender, 1.5–2 mm. long.

TYPE LOCALITY: San Antonio, Texas (*Silveus* 358).

DISTRIBUTION: Draws in hills, southern Texas.

ILLUSTRATION: Hitchc. Man. f. 809.

89. *Muhlenbergia Jonesii* (Vasey) Hitchc. in Jepson, Fl. Calif. **1**:

111. 1912.

Sporobolus Jonesii Vasey, Bot. Gaz. **6**: 297. 1881.

Perennial, closely tufted; culms erect, slender, glabrous, scabrous below the panicle, 20–40 cm. tall, the nodes at the base; sheaths glabrous; ligule 2–4 mm. long; blades subuliform, involute, scabrous, in a basal cluster 5–15 cm. long, the single culm blade 3–5 cm. long; panicles narrow, 5–8 cm. long, the axis scabrous, the branches appressed or ascending, rather loosely flowered, 1–2 cm. long; glumes broad, scabrous-puberulent, obtuse, often erose, about one third as long as the lemma; lemma obscurely pubescent below, tapering to an acuminate or awntipped point, 2.5–3 mm. long.

TYPE LOCALITY: Soda Springs, California (*Jones* 303 in 1881).

DISTRIBUTION: Open ground, northeastern California.

ILLUSTRATION: Hitchc. Man. f. 782.

90. *Muhlenbergia firma* Beal, Grasses N. Am. 2: 243. 1896.

Muhlenbergia densiflora Scribn. & Merr. Bull. U. S. Dep. Agr. Agrost. 24: 18. 1901. (Type from Federal District, Mexico, Pringle 6675.)

Perennial; culms densely caespitose, erect, scabrous below the panicle, puberulent below the nodes, 60–120 cm. tall; sheaths glabrous, the upper scabrous; ligule 5–10 mm. long, sometimes longer; blades involute, wiry, scabrous or nearly glabrous, erect, elongate; panicle strict, spikelike, usually purplish, often interrupted below, 10–20 cm. long, the branches appressed, 1–2 cm. long, floriferous from base, the axis scabrous, the pedicels scabrous-pubescent; glumes about equal, acute or acuminate, scabrous, 3–3.5 mm. long; lemma prominently 3-nerved, lanceolate, scabrous, minutely and sparsely pilose at base, 5 mm. long, the straight scabrous awn 1–3 mm. long.

TYPE LOCALITY: Sierra de San Filipe, Oaxaca (Pringle 4914).

DISTRIBUTION: Rocky hills and ledges, southern Mexico.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 24: f. 4.

91. *Muhlenbergia dubia* Fourn. in Hemsl. Biol. Centr. Am. Bot.

3: 540. 1885.

Muhlenbergia acuminata Vasey, Bot. Gaz. 11: 337. 1886. (Type from New Mexico, Wright 1993.)
Sporobolus ligulatus Vasey & Dewey; Vasey, Contr. U. S. Nat. Herb. 1: 268. 1893. (Type from Presidio County, Texas, Nealley 127.)

Sporobolus inflatus Vasey & Dewey; Beal, Grasses N. Am. 2: 289. 1896. (Error for *S. ligulatus* Vasey & Dewey.)

Crypsina breviglumis Jones, Contr. West. Bot. 14: 8. 1912. (Type from Chihuahua, Jones in 1903.)

Perennial, densely caespitose; culms erect, hard and wiry at base, faintly puberulent or scaberulous, 1 or 2-noded, 30–100 cm. tall; sheaths glabrous; ligule firm, 2–3 mm. long; blades involute, scabrous, mostly elongate; panicle narrow, sometimes almost spikelike, grayish, 10–30 cm. long, rarely longer, the axis and branches very scabrous, the slender branches appressed or ascending, mostly overlapping, floriferous from near the base, 1–5 cm. long; spikelets 4–5 mm. long; glumes about half as long as the spikelet, minutely scaberulous, obtuse; lemma minutely scaberulous, with an awn as much as 4 mm. long (rarely as much as 10 mm.), rarely acuminate only.

TYPE LOCALITY: Chinantla, Mexico (Liebmann 688).

DISTRIBUTION: Canyons and rocky hills, western Texas to Arizona and northern Mexico (Coahuila and Chihuahua); Puebla (Chinantla).

ILLUSTRATION: Hitchc. Man. f. 799.

92. *Muhlenbergia villiflora* Hitchcock.

Vilfa pubescens Fourn. Mex. Pl. Gram. 102. 1886. (Basis of *Muhlenbergia villiflora* Hitchc.) Not *Muhlenbergia pubescens* (H.B.K.) Hitchc.

Perennial; culms slender, glabrous, roughened with minute pustules, about 10 cm. tall; sheaths glabrous, shorter than the internodes; ligule less than 1 mm. long; blades involute, glabrous, falcate, spreading, 1–2 cm. long, 0.5 mm. thick when rolled; panicle narrow, pale, about 1.5 cm. long, the few short somewhat distant branches bearing 1–3 spikelets; glumes nearly equal, acute or apiculate, 1 mm. long or less, glabrous; lemma 3-nerved, densely villous on the lower half of the space between the lateral nerves and the margin, apiculate, about 1.5 mm. long; palea about as long as the glumes, villous between the keels on the lower part.

TYPE LOCALITY: "Cañon de las Minas et Victoria, inter Michiguana et Tonqueillos" (Karwinsky 1012).

DISTRIBUTION: Known only from the type collection. Specimen examined in the herbarium of the Botanic Garden, Leningrad.

93. *Muhlenbergia cuspidata* (Torr.) Rydb. Bull. Torrey Club 32:

599. 1905.

Agrostis brevifolia Nutt. Gen. 1: 44. 1818. (Type from Fort Mandan, North Dakota.) Not *Muhlenbergia brevifolia* Scribn. 1896.

Vilfa cuspidata Torr.; Hook. Fl. Bor. Am. 2: 238. 1839. (Basis of *Muhlenbergia cuspidata* Rydb.)

Vilfa gracilis Trin. Mém. Acad. St.-Petersb. VI. 6: 104. 1840. (Type from North America.) Not *V. gracilis* Trin. op. cit. 74.
Sporobolus cuspidatus Wood, Bot. & Flor. ed. 1873, 385. 1873. (Based on *Vilfa cuspidata* Torr.)
Sporobolus brevifolius Scribn. Mem. Torrey Club 5: 39. 1894. (Based on *Agrostis brevifolia* Nutt.)
Sporobolus brevifolius Nash, in Britton, Man. 105. 1901. Not *Sporobolus brevifolius* Nees. 1841.
Muhlenbergia brevifolia Jones, Contr. West. Bot. 14: 12. 1912. (Based on *Agrostis brevifolia* Nutt.)
 Not *M. brevifolia* Scribn. 1896.

Perennial in dense tufts with hard bulblike scaly bases; culms slender, wiry, erect, scabrous, several-noded, 20–40 cm. tall; sheaths glabrous except the puberulent base; ligule minute; blades flat or loosely involute, erect or ascending, more or less scabrous, mostly 5–15 cm. long, 1–2 mm. wide; panicles narrow, somewhat spikelike, interrupted, the axis and branches glabrous or slightly scabrous, the branches appressed, somewhat distant, mostly overlapping, mostly 1–2 cm. long, floriferous from near the base, bearing few to several spikelets on short pedicels; glumes subequal, acuminate-cuspidate, about two-thirds as long as the spikelet; lemma acuminate-cuspidate, minutely pubescent, 2.5–3 mm. long.

TYPE LOCALITY: Saskatchewan River, Rocky Mountains (*Drummond*).

DISTRIBUTION: Prairies and gravelly or stony slopes, Michigan to Alberta, and southward to Ohio and New Mexico.

ILLUSTRATION: Hitchc. Man. f. 744.

94. *Muhlenbergia Wrightii* Vasey, in Coult. Man. 409. 1885.

Muhlenbergia coloradensis Mez, Repert. Sp. Nov. 17: 213. 1921. (Type from "Chiann [Cheyenne] Canyon," Colorado, Jones 806.)

Perennial; culms densely caespitose, erect, slender, puberulent, scabrous below the panicle, about 3-noded, 30–60 cm. tall; sheaths glabrous; ligule truncate, about 1 mm. long; blades flat or usually folded or involute, erect, mostly 5–10 cm. long, scabrous, long-attenuate; panicle spikelike, erect, more or less interrupted below, 5–15 cm. long, the branches densely flowered, appressed, the lower 5–20 mm. long; glumes lanceolate, acuminate or awn-tipped, about 2 mm. long; lemma acuminate or mucronate, minutely pubescent on the lower half, about 3 mm. long.

TYPE LOCALITY: El Paso, Texas (*Wright 1986*).

DISTRIBUTION: Plains, rocks, and canyons, Colorado, Utah, New Mexico, Arizona, and northern Mexico.

ILLUSTRATION: Hitchc. Man. f. 746.

95. *Muhlenbergia Watsoniana* Hitchcock.

Muhlenbergia scabra S. Wats. Proc. Am. Acad. 18: 174. 1883. (Basis of *Muhlenbergia Watsoniana* Hitchc.) Not *M. scabra* Trin. & Rupr., which is *Aristida scabra* (H.B.K.) Kunth.

Perennial; culms erect, scabrous, 20–30 cm. tall, the nodes all near the base; sheaths scaberulous, somewhat compressed, much longer than the internodes, strongly overlapping; ligule truncate, about 1 mm. long; blades flat or folded, scabrous on both surfaces, 5–15 cm. long, 1–2 mm. wide, continuous with the sheath, abruptly acute; panicle narrow, congested or spikelike, lobed or interrupted, 5–10 cm. long, 5–8 mm. wide, the axis, branches, and pedicels scabrous-pubescent, the branches appressed, floriferous from base, densely flowered, the lower as much as 3 cm. long; glumes subequal, narrow, scaberulous, somewhat villous at base, 3–4 mm. long, the first acute, the second truncate or bifid, mucronate; lemma fusiform, villous on the lower half or two thirds, 3 mm. long, the scaberulous acuminate upper part bearing a slender, flexuous, scabrous yellow awn 1–2 cm. long.

TYPE LOCALITY: San Luis Potosí, Mexico (*Schaffner 1067*).

DISTRIBUTION: San Luis Potosí, Mexico.

96. *Muhlenbergia flaviseta* Scribn. Bull. U. S. Dep. Agr. Agrost.

8: 11. 1897.

Perennial, rather loosely tufted, the base scaly or rhizomatous; culms slender, erect or ascending, glabrous, naked above, 15–30 cm. tall, the nodes near the base; sheaths glabrous, the lower short and overlapping; ligule a short ciliate border, the uppermost about 0.5 mm. long with longer appendages at the sides, the lower ones shorter; blades flat, sometimes folded,

especially toward the tip, scabrous on the upper surface and the white margins, mostly basal, the uppermost about one-fourth the distance from the base, attenuate at tip, 2-10 cm. long, 1-3 mm. wide; panicle condensed, ovoid or elliptic, yellowish brown or bronze, 2-5 cm. long, the axis angled, scaberulous, the branches scabrous-puberulent, appressed or ascending (more spreading in anthesis), the lower as much as 2 cm. long, floriferous from near the base, the pedicels pubescent; glumes unequal, rather broad, glabrous or nearly so, 1-nerved, the first 1.5-2 mm. long, the second 3.5-4 mm. long; lemma narrow, scaberulous, about 4 mm. long, the awn slender, scaberulous, slightly flexuous, yellow, 1-1.5 cm. long.

TYPE LOCALITY: Durango, Mexico (*Palmer 834* in 1896).

DISTRIBUTION: Known only from the type locality.

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 8: *pl.* 7.

97. *Muhlenbergia alamosae* Vasey, Bot. Gaz. 16: 146. 1891.

Perennial; culms cespitose, erect, rather wiry, glabrous, several-noded, 30-60 cm. tall; sheaths glabrous, often flattening and diverging from the culm; ligule 1-2 mm. long; blades flat, minutely scaberulous on both surfaces, becoming lax and flexuous, 5-15 cm. long, 1-3 mm. wide; panicles ovoid or pyramidal, rather lax and open, 6-12 cm. long, one half to three fourths as wide, the axis slightly scaberulous, the scabrous branches and branchlets tending to be divaricately spreading, the lateral pedicels shorter than the usually purple spikelets; glumes a little unequal, broad, narrowed into a short awn, glabrous, the first, including awn, about 1.5 mm. long; lemma acuminate, densely short-pilose on the callus, scaberulous toward tip, 2.5-3 mm. long, narrowed into a slender flexuous awn about 5-10 mm. long; palea narrow, about as long as the lemma pilose on the lower part of the back.

TYPE LOCALITY: Alamosa, Sonora (*Palmer 407* in 1890).

DISTRIBUTION: Mossy cliffs and wet ravines, Sonora to Morelos.

98. *Muhlenbergia spiciformis* Trin. Mém. Acad. St.-Pétersb. VI.

6²: 288 (reprint 42). 1841.

Muhlenbergia acutifolia Fourn. Mex. Pl. Gram. 86. 1886. (Type from Orizaba, Mexico, *Bourgeau 3327*.)

Perennial; culms cespitose, erect, glabrous or scaberulous, 30-60 cm. tall; sheaths glabrous; ligule ciliolate, 0.5 mm. long; blades flat or usually more or less involute, puberulent or scaberulous, erect, mostly 5-10 cm. long, 1-2 mm. wide; panicle soft, pale or stramineous, dense or spikelike, mostly inclosed at base in the uppermost sheath, 10-15 cm. long, the branches appressed, angled, scaberulous, floriferous from base; glumes about equal, truncate, erose, mostly less than 1 mm. long; lemma narrow, acuminate, scaberulous, minutely and sparsely pilose at base, about 3 mm. long, the awn very slender, slightly flexuous, 1-4 cm. long.

TYPE LOCALITY: Mexico (*Karwinsky*).

DISTRIBUTION: Cliffs and canyons, southern Mexico.

99. *Muhlenbergia parviglumis* Vasey, Contr. U. S. Nat. Herb. 3:

71. 1892.

Perennial, with the habit of *M. monticola*; culms scaberulous below the nodes, 30-80 cm. tall; sheaths glabrous, shorter than the internodes; ligule 1-3 mm. long; blades on the average somewhat longer than in *M. monticola*, 1-3 mm. wide; glumes minute, subacute to truncate, erose, about 0.5 mm. long; lemma scaberulous only, minutely and sparsely pilose at base, about 3 mm. long, tapering into a delicate nearly straight awn 2-4 cm. long.

TYPE LOCALITY: Texas (*Nealley*).

DISTRIBUTION: Canyons, Texas and northern Mexico; Cuba (Pinar del Río, *Ekman 16547*).

ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: *f.* 449.

100. *Muhlenbergia polycaulis* Scribn. Bull. Torrey Club 38: 327.

1911.

Perennial, from a firm knotty crown; culms numerous, wiry, in a loose tuft, decumbent and scaly at base, puberulent, several-noded, 30-50 cm. tall; sheaths longer than the internodes,

glabrous or puberulent, sometimes somewhat pustulose-roughened; ligule thin, 1–2 mm. long; blades flat or more or less involute, glabrous or pustulose-roughened, mostly less than 5 cm. long, about 1 mm. wide; panicles narrow, contracted, interrupted, 3–8 cm. long, the axis scaberulous or puberulent, the branches appressed, floriferous from base; glumes about equal, narrow, acuminate or awn-tipped, about 3 mm. long; lemma narrow, acuminate, loosely villous on the lower half, the awn delicate, faintly scabrous, somewhat flexuous, 1–2 cm. long. Sometimes the decumbent base is long enough to appear like a rhizome.

TYPE LOCALITY: Chihuahua, Mexico (*Pringle 1414*).

DISTRIBUTION: Shaded ledges, canyons, and grassy slopes, western Texas and southern Arizona to central Mexico.

ILLUSTRATION: Hitchc. Man. f. 786.

101. *Muhlenbergia pauciflora* Buckl. Proc. Acad. Phila. 1862: 91.
1863.

Muhlenbergia sylvatica var. *Pringlei* Scribn. Bull. Torrey Club 9: 89. 1882. (Type from Santa Rita Mountains, New Mexico, *Pringle 480*.)

Muhlenbergia neo-mexicana Vasey, Bot. Gaz. 11: 337. 1886. (Type from New Mexico.)

Muhlenbergia Pringlei Scribn. in Vasey, Contr. U. S. Nat. Herb. 3: 71. 1892. (Type from Santa Rita Mountains, Arizona, *Pringle 480*.)

Perennial; culms loosely tufted, wiry, glabrous, erect, branching at the lower nodes, 30–50 cm. tall; sheaths glabrous or scaberulous, mostly shorter than the internodes; ligule 2–3 mm. long; blades flat or involute, scaberulous, mostly less than 5 cm. long, 1 mm. wide or less; panicles narrow, contracted, interrupted, 5–10 cm. long, the axis glabrous or nearly so, the branches scaberulous, erect or ascending, floriferous from base; glumes a little unequal, acuminate to awn-tipped, the first about 1.5 mm. long, the second about 2 mm. long; lemma scaberulous only or nearly glabrous, minutely and sparsely pilose at base, about 4 mm. long, tapering into a slender flexuous awn 5–12 mm. long.

TYPE LOCALITY: El Paso, Texas (*Wright 732*).

DISTRIBUTION: Rocky hills and canyons, western Texas to Colorado and Arizona, and southward to northern Mexico.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 12: pl. 13; Bull. U. S. Dep. Agr. Agrost. 7: f. 104.

102. *Muhlenbergia Metcalfei* Jones, Contr. West. Bot. 14: 12.
1912.

Perennial; culms densely caespitose, erect, faintly puberulous below, scaberulous below the panicle, 50–80 cm. tall, 1- or 2-noded near the base; sheaths scaberulous; ligule thin, 3–10 mm. long, sometimes longer; blades involute, slender, flexuous, scabrous, sometimes only slightly so, not crowded at base, 5–15 cm. long; panicle narrow but somewhat loose, pale or slightly purplish, 15–25 cm. long, the axis, branches, and pedicels scabrous, the slender branches usually naked at base, more or less appressed, 1–4 cm. long; spikelets tapering at summit, about 4 mm. long; glumes nearly equal, obtuse, a little less than half as long as spikelet; lemma scaberulous toward the summit; awn slender, scabrous, nearly straight, 5–10 mm. long.

TYPE LOCALITY: Santa Rita Mountains (*Metcalfe 1485*).

DISTRIBUTION: Rocky hills, Texas, New Mexico, and Arizona.

ILLUSTRATION: Hitchc. Man. f. 801.

103. *Muhlenbergia Arsenei* Hitchc. Proc. Biol. Soc. Wash.
41: 161. 1928.

Perennial; culms wiry, loosely tufted, branching at base and lower nodes, often decumbent and rhizomatous at base, glabrous, 10–30 cm. tall; leaves crowded on the lower part of the culm, the sheaths glabrous; ligule about 1 mm. long; blades slender, involute, sharp-pointed, 1–3 cm. long, sometimes longer on vigorous shoots; panicles long-exserted, narrow, somewhat loose or interrupted, 2–10 cm. long, the branches ascending, floriferous from base, 1–3 cm. long, the pedicels scabrous-pubescent; glumes 2–2.5 mm. long, somewhat hispidulous toward the awnless

acutish tip; lemma narrow, somewhat pubescent on the lower part, about 4 mm. long, the awn somewhat flexuous, 5-10 mm. long.

TYPE LOCALITY: Sulphur Springs, New Mexico (*Arsène & Benedict 16405*).
 DISTRIBUTION: Arid slopes, northern New Mexico and southeastern Utah.
 ILLUSTRATION: Hitchc. Man. f. 787.

104. *Muhlenbergia monticola* Buckl. Proc. Acad. Phila. 1862:
 91. 1863.

Muhlenbergia sylvatica var. *flexuosa* Vasey, in Rothr. Bot. Wheeler's Surv. 284. 1878. (Type from Camp Crittenden, Arizona, *Rothrock 681*.)

Perennial; culms densely tufted, slender, erect or decumbent at base, glabrous, 30-50 cm. tall, branching at the lower and middle nodes, leafy throughout; sheaths glabrous or scaberulous; ligule acute, 2-5 mm. long; blades 3-7 cm. long, narrow, flat or soon involute, 1-2 mm. wide, slightly scaberulous; panicles soft, narrow, contracted, 5-10, sometimes 15 cm. long, the branches appressed or slightly spreading, scabrous, floriferous from base, the axis glabrous or nearly so; glumes unequal, scabrous on the keel, acute, mucronate, or erose at tip, the first about 1.5 mm. long, the second about 2 mm. long; lemma pubescent at base and on lower half of margin, tapering into a delicate flexuous awn 1-2 cm. long.

TYPE LOCALITY: Western Texas (*Wright 731*).
 DISTRIBUTION: Rocky hills and canyons, western Texas to Arizona and central Mexico.
 ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 17: f. 446.

105. *Muhlenbergia virescens* (H.B.K.) Kunth, Rév. Gram. 1:
 64. 1829.

Podosaemum virescens H.B.K. Nov. Gen. & Sp. 1: 132. 1815.
Trichochloa virescens R. & S. Syst. Veg. 2: 389. 1817. (Based on *Podosaemum virescens* H.B.K.)
Muhlenbergia straminea Hitchc. Contr. U. S. Nat. Herb. 17: 302. 1913. (Type from Tecorichu, Chihuahua, *Endlich 1210*.)

Perennial; culms densely tufted, erect, glabrous, 40-60 cm. tall; sheaths scabrous, the old basal ones glabrous, flat, stramineous, more or less flexuous or spirally coiled; ligule, except the margin, delicate, acute, 3-10 mm. long; blades flat or, especially of the innovations, involute, mostly elongate and flexuous, scabrous, long-attenuate at tip; panicle whitish or stramineous, narrow but rather loose, 5-10 cm. long, the axis angled, scabrous, the branches erect, as much as 5 cm. long; glumes somewhat unequal, acute or acuminate, the first about 4 mm. long, the second 3-nerved, about 5 mm. long; lemma acute, about as long as the second glume, pubescent on the lower half, the awn slender, flexuous, 1-1.5 cm. long.

TYPE LOCALITY: Mexico.
 DISTRIBUTION: Canyons, rocky hills, and mesas, New Mexico and Arizona to central Mexico.
 ILLUSTRATION: Bull. U. S. Dep. Agr. Agrost. 7: f. 110.

106. *Muhlenbergia longiglumis* Vasey, Contr. U. S. Nat. Herb. 1:
 283. 1893.

Perennial; culms densely cespitose, puberulent, firm, slender, 50-90 cm. tall; sheaths scaberulous, overlapping, somewhat keeled, the old bases becoming fibrous; ligule thin, scarious, 4-8 mm. long; blades elongate, folded at base, usually flat above, very scabrous, flexuous, tapering to a fine point, 1-2 mm. wide; panicle narrow, rather loosely contracted, greenish or purplish, slightly nodding, about 35 cm. long, the axis scaberulous, the branches scabrous, appressed or ascending, not strongly overlapping, the lateral pedicels much shorter than the spikelets; glumes about equal, narrow, acuminate, faintly puberulent, 5-6 mm. long; lemma acuminate, faintly scaberulous, rather densely short-pilose on the callus, minutely bifid at apex, the awn slender, scaberulous, flexuous, mostly 4-5 cm. long; palea a little shorter than the lemma.

TYPE LOCALITY: Guadalajara, Mexico (*Palmer 766* in 1886).
 DISTRIBUTION: Rocky hills, Guadalajara, Mexico (*Palmer 766*, *Pringle 2365*, *11752*).

107. *Muhlenbergia Palmeri* Vasey, Bull. Torrey Club 13: 231.
1886.

Perennial; culms rather stout, erect, glabrous, 60–100 cm. tall, the nodes all near the base; sheaths glabrous or slightly roughened, long-overlapping; ligule 1–3 mm. long; blades flat with long-attenuate involute points, strongly sulcate-nerved and scabrous on the upper surface, puberulent beneath, elongate, those of the culm as much as 4 mm. wide, those of the innovations mostly slender and strongly involute; panicle narrow, erect, congested, sometimes somewhat loose, sometimes rather dense and spikelike, 15–30 cm. long, the axis angled, scabrous, the branches numerous, slender, flexuous, scabrous, ascending or appressed, branched 2 or 3 times, naked at base, but the naked portion below the first branch less than 5 mm., or sometimes branching near the base, the lateral pedicels about 1 mm. long; glumes about equal, narrow, scabrous, the body about 3 mm. long, extending into a very scabrous awn 1–2 mm. long; lemma narrow, scabrous, about 4 mm. long, minutely and sparsely pilose at base, minutely bifid at apex, the awn slender, scabrous, somewhat flexuous, about 0.5 cm. long.

TYPE LOCALITY: Southwestern Chihuahua (*Palmer 16* in 1885).

DISTRIBUTION: Wet places, pine plains, or rocky hills, Chihuahua, Mexico.

108. *Muhlenbergia elongata* Scribn.; Beal, Grasses N. Am. 2: 251.
1896.

Perennial; culms cespitose, erect, glabrous, 40–70 cm. tall; sheaths slightly roughened, longer than the internodes; ligule thin, acute, 5 mm. long; blades elongate, involute, slender or filiform, scaberulous; panicles elongate, narrow, somewhat flexuous or nodding, rather compact, pale, 20–35 cm. long; glumes nearly equal, acuminate or awn-pointed, glabrous or minutely scaberulous near summit, 2–2.5 mm. long; lemma narrow, acuminate, glabrous, short-pilose on the callus, about 3.5 mm. long, the awn slender, flexuous, scaberulous, 1.5–3 cm. long.

TYPE LOCALITY: Chihuahua City, Mexico (*Pringle 398*).

DISTRIBUTION: Ledges and rocky hills; known only from the type and from *Palmer 159* (southwestern Chihuahua).

109. *Muhlenbergia glabrata* (H.B.K.) Kunth, Rév. Gram. 1: 64.
1829.

Podosaeum glabratum H.B.K. Nov. Gen. & Sp. 1: 130. 1815.

Trichochloa glabrata R. & S. Syst. Veg. 2: 387. 1817. (Based on *Podosaeum glabratum* H.B.K.)

Perennial; culms erect, densely cespitose, glabrous, 50–100 cm. tall; sheaths glabrous; ligule short, firm, truncate, 1–4 mm. long, the upper often longer; blades flat or usually involute, glabrous or more or less scabrous on the lower or outer surface, scabrous-pubescent on the upper surface, elongate, 1–3 mm. wide when flat; panicle narrow, rather loose, usually purple, erect, mostly 10–20 cm. long, the axis scabrous, the branches ascending or appressed, 2–5 cm. long, some of them floriferous from near the base, the pedicels pubescent below the spikelet; glumes about equal, acute or obtusish, glabrous or minutely scaberulous near the tip, 2–2.5 mm. long; lemma acuminate, glabrous, short-pilose at base, minutely bifid at apex, about 5 mm. long, the awn slender, scabrous, somewhat flexuous, 5–10 mm. long; palea about as long as the lemma.

TYPE LOCALITY: Santa Rosa, Guanajuato.

DISTRIBUTION: Rocky hills, southern Mexico (*Pringle 6531, 7376, 9590; Hitchcock 6300, 6301, 6473, 6708, 6886*).

110. *Muhlenbergia articulata* Scribn. Proc. Acad. Phila. 1891: 298.
1892.

Perennial; culms closely cespitose, erect, glabrous, about 60 cm. tall; sheaths puberulent, slightly roughened, overlapping, the old blades disarticulating at the collar; ligule firm or indurate, obtuse, 3–7 mm. long; blades involute, elongate, slender, glabrous on the outer surface, puberulent on the inner surface, ending in a fine stiff point; panicles narrow, contracted, pale, inclosed at base in the uppermost sheath, 30–40 cm. long, glabrous below, scabrous-puberulent

above, the branches slender, appressed, closely overlapping, the lateral pedicels shorter than the spikelets; glumes unequal, acuminate or awn-pointed, more or less scaberulous, the first 3-4 mm. long, the second a little longer; lemma acuminate, faintly scaberulous, short-pilose on the callus, 4-5 mm. long, the awn slender, scabrous, flexuous, 2-4 cm. long; palea acuminate, as long as the lemma.

TYPE LOCALITY: Cárdenas, Mexico (*Pringle 3477*).

DISTRIBUTION: Dry calcareous hills, Cárdenas, Mexico.

DOUBTFUL SPECIES

The following species of *Epicampes* have not been identified:

- E. Buchingeri* Fourn. Mex. Pl. Gram. 88. 1886. Orizaba, *Thomas* (Herb. Buchinger).
E. laxiuscula Fourn. Mex. Pl. Gram. 88. 1886. Orizaba, *Botteri 155* (Herb. Paris), *Weber* (Herb. Buchinger).
E. Virletii Fourn. Mex. Pl. Gram. 88. 1886. San Luis Potosí, *Virlet 1415*.

100. BRACHYELYTRUM Beauv. Agrost. 39. 1812.

Perennial erect slender grasses, with short knotty rhizomes, flat blades, and narrow, rather few-flowered panicles. Spikelets 1-flowered, the rachilla disarticulating above the glumes, prolonged behind the palea as a slender naked bristle; glumes very short, unequal, the first sometimes obsolete, the second sometimes awned; lemma firm, narrow, 5-nerved, the base extending into a pronounced oblique callus, the apex terminating in a long straight scabrous awn.

Type species, *Muhlenbergia erecta* Schreb.

1. *Brachyelytrum erectum* (Schreb.) Beauv. Agrost. 39, 155. 1812.

- ? *Dilepyrum aristosum* Michx. Fl. Bor. Am. 1: 40. 1803. (Type from Georgia and Carolina.)
 ? *Muhlenbergia aristata* Pers. Syn. Pl. 1: 73. 1805. (Based on *Dilepyrum aristosum* Michx.)
Muhlenbergia erecta Schreb. in Spreng. Mém. Acad. St.-Pétersb. 2: 287. 1807-8. (Type from Georgia and Carolina.)
 ? *Brachyelytrum aristatum* R. & S. Syst. Veg. 2: 413. 1817. (Based on *Dilepyrum aristosum* Michx.)
Muhlenbergia Brachyelytrum Trin. Gram. Unil. 188. 1824. (Based on *Brachyelytrum erectum* Beauv.)
Agrostis erecta Spreng. Syst. 1: 264. 1825. (Based on *Muhlenbergia erecta* Schreb.)
Brachyelytrum aristatum var. *Engelmanni* A. Gray, Man. ed. 5. 614. 1867. ("A western form.")
 ? *Brachyelytrum aristosum* Trel. Brann. & Coville, in Brann. & Cov. Rep. Geol. Surv. Ark. 1888: 235. 1891. (Based on *Dilepyrum aristosum* Michx.)
Brachyelytrum aristosum var. *glabratum* Vasey, in Millsp. Bull. W. Va. Exp. Sta. 24: 469. 1892.
Dilepyrum erectum Farwell, Am. Midl. Nat. 8: 33. 1922. (Based on *Muhlenbergia erecta* Schreb.)

Culms usually few in a tuft, erect, glabrous to rather densely retrorse-pilose, 50-100 cm. tall; sheaths more or less retrorsely pilose; ligule truncate, 1-2 mm. long; blades flat, thin, scabrous and sometimes sparsely pilose on the upper surface, usually more or less pilose beneath especially on the veins, acuminate, narrowed at the base, 7-15 cm. long, 1-1.5 cm. wide; panicle narrow, 5-15 cm. long, the short branches appressed, few-flowered; first glume small or obsolete; second glume 0.5-2 mm. long; lemma readily deciduous, subterete, about 1 cm. long, scabrous, the nerves sometimes hispid, the awn 1-3 cm. long.

TYPE LOCALITY: Georgia and Carolina.

DISTRIBUTION: Moist or rocky woods, Newfoundland to Minnesota, and southward to Georgia and Oklahoma.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Agrost. 7: f. 112; Bull. U. S. Dep. Agr. 772: f. 90; Hitchc. Man. f. 859.

101. TRINIOCHLOA Hitchc. Contr. U. S. Nat. Herb. 17: 303.

1913.

Cespitose perennials with narrow, rather few-flowered panicles and spikelets as much as 1 cm. long excluding the awns. Spikelets 1-flowered, the rachilla not produced beyond the floret; glumes membranaceous, thin, papery; lemma narrow, rounded on the back, firmer than the glumes, bearing a stout, geniculate, dorsal awn attached above the middle, 2-toothed at the apex, the teeth slender, the callus densely bearded.

Type species, *Podosaemum stipoides* H.B.K.

Glumes much shorter than the lemma.

Glumes about as long as the lemma.

Blades very narrow, less than 1 mm. wide; glumes unequal, the second about 1 cm. long; ligule as much as 1 cm. long.

Blades 3 to 4 mm. wide; glumes nearly equal, the second 1.5 cm. long; ligule short.

1. *T. stipoides*.

2. *T. micrantha*.

3. *T. laxa*.

1. *Triniochloa stipoides* (H.B.K.) Hitchc. Contr. U. S. Nat.

Herb. 17: 303. 1913.

Podosaemum stipoides H.B.K. Nov. Gen. & Sp. 1: 131. 1815. (Type from Ecuador.)

Agrostis stipoides Spreng. Syst. 1: 263. 1825. (Based on *Podosaemum stipoides* H.B.K.)

Muhlenbergia stipoides Kunth, Rév. Gram. 1: 64. 1829. (Based on *Podosaemum stipoides* H.B.K.)

Avena stipoides Scribn. Circ. U. S. Dep. Agr. Agrost. 19: 4. 1900. (Type from Oaxaca, Pringle 4905.)

Culms loosely caespitose, erect, slender, glabrous, several-noded, 60–120 cm. tall; sheaths striate-sulcate, glabrous or sparsely pilose especially toward the summit; ligule thin, delicate, evanescent, 3–10 mm. long; blades flat or more or less involute, scabrous beneath, scabrous-pubescent or pilose on the upper surface, 5–20 cm. long, about 1 mm. wide or sometimes as much as 3 mm.; panicles terminal, exserted, open, mostly 10–20 cm. long, the axis slender, scaberulous, the branches slender, somewhat flexuous, scabrous, solitary or in pairs (rarely in threes), distant, bearing 1–several spikelets, the lateral pedicels shorter than the spikelets; glumes thin, glabrous, slightly scabrous on the keel, usually brown or purple with hyaline margins, acuminate, the first 4–5 mm. long, the second about 1 mm. longer; lemma narrow, nearly terete, scaberulous on the upper half, about 1 cm. long, the short callus densely short-pilose, this extending into 2 slender teeth; awn attached 3–4 mm. below the summit of the lemma, geniculate, the lower part mostly 3–4 mm. long, slightly or distinctly twisted, the upper part straight, 1–1.5 cm. long; palea as long as the lemma, the keels ending in slender teeth like those of the lemma.

TYPE LOCALITY: Ecuador.

DISTRIBUTION: Grassy hillsides and open woods, Mexico to northern Bolivia.

2. *Triniochloa micrantha* (Scribn.) Hitchc. Contr. U. S. Nat.

Herb. 17: 304. 1913.

Avena micrantha Scribn. Circ. U. S. Dep. Agr. Agrost. 19: 3. 1900.

Culms caespitose, slender, erect or somewhat decumbent, glabrous, 20–40 cm. tall; sheaths glabrous, striate-sulcate; ligule thin, hyaline, evanescent, 5–8 mm. long; blades slender, involute, slightly scaberulous beneath, pilose on the upper surface, 5–15 cm. long, scarcely 1 mm. wide; panicles pale, narrow, 8–12 cm. long, the axis glabrous or nearly so; branches slender, mostly solitary, finally spreading, 1–3 cm. long, bearing one to few spikelets; glumes thin, acuminate, glabrous, pale or the center purplish, the first 7–8 mm. long, the second 3–4 mm. longer; lemma about 1 cm. long, glabrous, the callus densely pilose with hairs 3–4 mm. long, the summit with 2 soft slender teeth; awn 2–3 mm. below summit of lemma, geniculate, the lower slightly twisted part about 5 mm. long, the upper nearly straight part 1–1.5 cm. long; palea about as long as the lemma.

TYPE LOCALITY: Sierra de Tepoxtlán, Morelos, Mexico (Pringle 8018).

DISTRIBUTION: Mossy cliffs; known only from the type locality.

3. *Triniochloa laxa* Hitchc. Contr. U. S. Nat. Herb. 17: 304. 1913.

Culms densely caespitose, lax, decumbent and rhizomatous at base, the old culms and leaves persistent; sheaths glabrous; ligule 1–3 mm. long; blades flat, scabrous, 15–30 cm. long, 3–4 mm. wide, long-acuminate, smooth and green beneath, scabrous and glaucous above; panicles narrow, few-flowered, scarcely exceeding the upper leaves, the branches few, short and appressed, bearing 1–3 spikelets; spikelets excluding the awn about 15 mm. long; glumes narrow, gradually narrowed to the acute apex, purple at base along the midrib, scarious, glabrous, the first 1-nerved, 12 mm. long, the second 3-nerved, 15 mm. long; lemma mottled with purple,

rounded on the back, about 14 mm. long, 5-nerved, the three central nerves passing into the dorsal awn, the other two extending into the 2 short teeth of the apex; callus densely bearded with white hairs 3-5 mm. long; awn attached about the middle of the lemma and below the short teeth, about 15 mm. long, stout, bent about the middle, loosely twisted below; palea similar to the lemma, nearly as long.

TYPE LOCALITY: Sánchez, Chihuahua (*Hitchcock 7687*).
DISTRIBUTION: Known only from the type locality.

102. AMMOPHILA Host, Gram. Austr. 4: 24. 1809.

Psamma Beauv. Agrost. 143. 1812. (Type species, *P. littoralis* Beauv.)

Tough, rather coarse, erect perennials, with hard, scaly, creeping rhizomes, long, tough, involute blades, and pale, dense, spike-like panicles. Spikelets 1-flowered, compressed, the rachilla disarticulating above the glumes, produced beyond the palea as a short bristle, hairy above; glumes about equal, chartaceous; lemma similar to and a little shorter than the glumes, the callus bearing a tuft of short hairs; palea nearly as long as the lemma.

Type species, *Arundo arenaria* L.

Ligule thin, 10-30 mm. long.
Ligule firm, 1-3 mm. long.

1. *A. arenaria*.
2. *A. breviligulata*.

1. *Ammophila arenaria* (L.) Link, Hort. Berol. 1: 105. 1827.

Arundo arenaria L. Sp. Pl. 82. 1753.

Calamagrostis arenaria Roth, Fl. Germ. 1: 34. 1788. (Based on *Arundo arenaria* L.)

Ammophila arundinacea Host, Gram. Austr. 4: 24. 1809. (Based on *Arundo arenaria* L.)

Psamma littoralis Beauv. Agrost. 144, 176. 1812.

Psamma arenaria R. & S. Syst. Veg. 2: 845. 1817. (Based on *Calamagrostis arenaria* Roth.)

Phalaris maritima Nutt. Gen. 1: 48. 1818. (Based on *Arundo arenaria* L., but misapplied to *A. breviligulata*.)

Phalaris ammophila Link, Enum. 1: 66. 1821. (Based on *Ammophila arundinacea* Host.)

Pale or greenish; culms glabrous, usually scarcely longer than the leaves, 50-150 cm. tall, with deep extensively creeping rhizomes; sheaths glabrous or slightly roughened; ligule thin, 1-3 cm. long; blades elongate, firm, soon involute, as much as 5 mm. broad at base when flat, tapering to a long fine point, the upper surface puberulent; panicle almost cylindrical, 10-20 cm. long, 1-2 cm. thick; the axis glabrous below, scabrous above, the branches appressed, scabrous, floriferous from base; spikelets short-pedicel, 1.2-1.5 cm. long; glumes glabrous, scabrous on the keels, lanceolate, pointed, the first 1-nerved, the second 3-nerved; lemma scabrous, the keel usually minutely excurrent below the tip, the callus hairs about 3 mm. long, the prolongation of the rachilla about 2 mm. long.

TYPE LOCALITY: Europe.

DISTRIBUTION: Sand dunes along the coast from central California to Oregon; introduced as a sand binder in the vicinity of San Francisco and now established at several places to the north; also coast of Europe and North Africa.

ILLUSTRATIONS: Host, Gram. Austr. pl. 41; Reichenb. Ic. Fl. Germ. f. 157; Hitchc. Man. f. 644B.

2. *Ammophila breviligulata* Fernald, Rhodora 22: 71. 1920.

Similar to *A. arenaria*; culm scabrous below panicle; sheaths glabrous; ligule firm, 1-3 mm. long; blades scaberulous on the upper surface; panicle often longer, the axis scabrous; lemma obtuse, the keel not excurrent.

TYPE LOCALITY: Milford, Connecticut.

DISTRIBUTION: Sand dunes along the coast, Newfoundland to North Carolina; shores of the Great Lakes.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. 772: f. 65; Hitchc. Man. f. 644.

103. CALAMOVILFA Hack. True Grasses 113. 1890.

Perennial, rigid, usually tall grasses, with narrow or open panicles, some species with creeping rhizomes. Spikelets 1-flowered, the rachilla disarticulating above the glumes, not prolonged behind the palea; glumes unequal, acute, chartaceous; lemma a little longer than the

second glume, chartaceous, awnless, glabrous or pubescent, the callus bearded; palea about as long as the lemma.

Type species, *Arundo brevipilis* Torr.

Rhizomes short and thick.

Panicle narrow, contracted.

Panicle subpyramidal, rather open.

Rhizomes extensively creeping.

Lemma glabrous (except for the callus hairs).

Lemma villous on the back above the callus hairs.

1. *C. Curtissii*.

2. *C. brevipilis*.

3. *C. longifolia*.

4. *C. gigantea*.

1. *Calamovilfa Curtissii* (Vasey) Scribn. Bull. U. S. Dep. Agr.

Agrost. 17: 199. 1899.

Ammophila Curtissii Vasey, Bull. Torrey Club 11: 7. 1884.

Calamagrostis Curtissii Vasey, Bot. Gaz. 15: 269. 1890. (Based on *Ammophila Curtissii* Vasey.)

Culms glabrous, about 3-noded, tufted from a short thick horizontal rhizome, about 1 m. tall; sheaths glabrous, the lower firm, overlapping, persistent; ligule a ciliate membrane less than 0.5 mm. long; blades elongate, flat to involute, 2-3 mm. wide, those of the innovations subfiliform, glabrous, except the scabrous margins and involute tip; panicle contracted but not dense, pale or purplish, 15-20 cm. long, the axis scabrous, the branches loosely appressed, overlapping but somewhat distant, as much as 8 cm. long, some of them naked at base; spikelets about 5 mm. long, the lateral pedicels 1 mm. long; glumes acute, glabrous or nearly so except the keels, the first about 4 mm. long, the second as long as the lemma and palea; lemma acute, villous on the back below, the callus hairs 1-1.5 mm. long.

TYPE LOCALITY: Indian River, Florida (*Curtiss*).

DISTRIBUTION: Low pine barrens, East Florida; Santa Rosa County, Florida.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Agrost. 17: f. 495; Hitchc. Man. f. 646.

2. *Calamovilfa brevipilis* (Torr.) Scribn. in Hack. True Grasses

113. 1890.

Arundo brevipilis Torr. Fl. U. S. 1: 95. 1823.

Calamagrostis brevipilis L. C. Beck, Bot. U. S. 401. 1833. (Based on *Arundo brevipilis* Torr.)

Ammophila brevipilis Benth.; Vasey, Grasses U. S. 29. 1883. (Based on *Calamagrostis brevipilis* Beck.)

Culms solitary or few, compressed, glabrous, about 3-noded, 60-120 cm. tall, the base as in *C. Curtissii*; sheaths glabrous; ligule as in *C. Curtissii*; blades elongate, 2-3 mm. wide, flat to subinvolute, slightly scabrous on the margins and the filiform tip; panicle brown or purple, subpyramidal, rather open, 10-25 cm. long, the axis glabrous or nearly so, the branches ascending, flexuous, glabrous, naked below, as much as 10 cm. long; spikelets 4.5-6 mm. long, the pedicel scabrous, sparsely villous at summit; glumes acuminate, scaberulous toward the summit, the first 2-2.5 mm., the second about 4 mm. long; lemma and palea about equal, or the latter longer, villous below, scaberulous above.

TYPE LOCALITY: Quaker Bridge, New Jersey.

DISTRIBUTION: Marshes and river banks, New Jersey and North Carolina, rare.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Agrost. 7: f. 150; Hitchc. Man. f. 647.

3. *Calamovilfa longifolia* (Hook.) Scribn. in Hack. True Grasses

113. 1890.

Calamagrostis longifolia Hook. Fl. Bor. Am. 2: 241. 1840.

Vilfa rigida Buckl. Proc. Acad. Phila. 1862: 89. 1863. (Type said to be from "Oregon?," the locality probably erroneous.)

Ammophila longifolia Benth.; Vasey, Grasses U. S. 29. 1883. (Based on *Calamagrostis longifolia* "Gray.")

Athernolus longifolius Lunell, Am. Midl. Nat. 4: 218. 1915. (Based on *Calamagrostis longifolia* Hook.)

Culms mostly solitary, glabrous, 50-180 cm. tall, with strong, scaly, creeping rhizomes; sheaths glabrous or appressed-villous, much overlapping on the lower part of the culm, villous at the throat; ligule a dense line of hairs 1 mm. long; blades firm, elongate, flat or soon involute,

glabrous except the margins and filiform tip, 4–8 mm. wide at base; panicle whitish or yellowish, sometimes purplish, 15–35 cm. long, rather narrow or contracted, sometimes more open, the axis glabrous, the branches ascending or appressed, sometimes somewhat spreading; spikelets 6–7 mm. long; glumes acuminate, glabrous, the first about 2 mm. shorter than the second; lemma somewhat shorter than the second glume, glabrous, the callus hairs copious, more than half as long as the lemma; palea about as long as the lemma.

TYPE LOCALITY: Saskatchewan (*Drummond*).

DISTRIBUTION: Sand hills and sandy prairies or open woods, Michigan to Alberta, and southward to Indiana, Colorado, and Idaho.

ILLUSTRATIONS: Britt. & Brown, Ill. Fl. f. 513; Bull. U. S. Dep. Agr. 772: f. 66; Hitchc. Man. f. 648.

Calamovilfa longifolia var. *magna* Scribn. & Merr. Circ. U. S. Dep. Agr. Agrost. 35: 3. 1901.

Panicle more open and spreading. TYPE LOCALITY: Mouth of Kalamazoo River, Michigan (*Taylor*). DISTRIBUTION: Sandy ridges and dunes along Lake Huron and Lake Michigan.

4. *Calamovilfa gigantea* (Nutt.) Scribn. & Merr. Circ. U. S. Dep. Agr. Agrost. 35: 2. 1901.

Calamagrostis gigantea Nutt. Trans. Am. Phil. Soc. II: 5: 143. 1837.

Culms robust, glabrous, leafy, mostly solitary, usually 1.5–2 m. tall, as much as 6 mm. thick at base, with strong creeping rhizomes; sheaths glabrous, much overlapping, more or less villous at the throat, especially on the innovations; ligule a ciliate membrane as much as 1 mm. long; blades elongate, glabrous throughout, 5–10 mm. wide at base, tapering to a long fine involute tip; panicle open, whitish or purplish, glabrous throughout, as much as 60 cm. long, the branches rather stiffly spreading, naked below, as much as 25 cm. long; spikelets appressed along the upper part of the branchlets, similar to those of *C. longifolia* but averaging larger; lemma and palea villous along the back; callus hairs copious, half as long as the lemma.

TYPE LOCALITY: Great Salt River of the Arkansas.

DISTRIBUTION: Sand dunes, North Dakota to Texas, and westward to Arizona.

ILLUSTRATION: Hitchc. Man. f. 650.

104. *Blepharoneuron* Nash, Bull. Torrey Club 25: 88. 1898.

A perennial grass with an open, narrow panicle. Spikelets 1-flowered, the rachilla disarticulating above the glumes; glumes subequal, rather broad; lemma 3-nerved, the nerves densely pilose; palea densely pilose between the two nerves.

Type species, *Vilfa tricholepis* Torr.

1. *Blepharoneuron tricholepis* (Torr.) Nash, Bull. Torrey Club 25: 88. 1898.

Vilfa tricholepis Torr. Pacif. R. R. Rep. 4: 155. 1857.

Sporobolus tricholepis Coulter, Man. 411. 1885. (Based on *Vilfa tricholepis* Torr.)

Culms erect, densely tufted, slender, glabrous, 20–40 cm. tall, the 2 or 3 nodes below the middle; sheaths crowded near the base, glabrous; ligule an erose-dentate membrane about 0.5 mm. long; blades mostly less than half as long as the culm, soon involute, often flexuous, scabrous, mostly less than 0.5 mm. thick; panicle grayish or plumbeous, elliptic, 5–15 cm. long, 2–5 cm. wide, many-flowered, the axis and axils glabrous, the branches slender, mostly 3–6 cm. long, scabrous, naked toward base, the pedicels capillary, flexuous, longer than the spikelets; spikelets 2.5–3 mm. long; glumes obtuse or subacute, a little shorter than the abruptly pointed lemma; palea slightly exceeding the lemma.

TYPE LOCALITY: Sandia Mountains, New Mexico (*Bigelow*).

DISTRIBUTION: Rocky slopes and dry open woods, 2000–3500 meters, Colorado to Utah, and southward to Texas, Arizona, and Mexico.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. Bot. 12: pl. 19; Bull. U. S. Dep. Agr. Agrost. 17: f. 52; Bull. U. S. Dep. Agr. 772: f. 87; Hitchc. Man. f. 854.

105. **CRYPISIS** Ait. Hort. Kew. 1: 48. 1789.

A spreading annual, with capitate inflorescences in the axils of broad bracts, these being enlarged sheaths with short rigid blades. Spikelets 1-flowered, the rachilla disarticulating below the glumes; glumes about equal, narrow, acute; lemma broad, thin, awnless; palea similar to the lemma, about as long, 2-nerved, readily splitting between the nerves; fruit a utricle, the seed free from the pericarp.

Type species, *Schoenus aculeatus* L.

1. **Crypsis aculeata** (L.) Ait. Hort. Kew. 1: 48. 1789.

Schoenus aculeatus L. Sp. Pl. 42. 1753.

Agrostis aculeata Scop. Fl. Carn. ed. 2. 1: 62. 1772. (Based on *Schoenus aculeatus* L.)

Phleum aculeatum Lam. Fl. Fr. 3: 563. 1778. (Based on *Schoenus aculeatus* L.)

Anthoxanthum aculeatum L. f. Suppl. 89. 1781. (Based on *Schoenus aculeatus* L.)

Antitragus aculeatus Gaertn. Fruct. 2: 7. 1791. (Based on *Schoenus aculeatus* L.)

Pallasia aculeata Kuntze, Rev. Gen. 2: 781. 1891. (Based on *Crypsis aculeata* Ait.)

Culms freely branching, prostrate, glabrous, the mats 30 cm. in diameter, or often depauperate, 1-2 cm. wide; sheaths inflated, striate, glabrous or more or less pilose, broad at the summit, pilose on the collar; ligule a line of stiff hairs about 1 mm. long; blades flat, more or less pilose on both surfaces, mostly less than 5 cm. long, often much shorter, 1-3 mm. wide; panicles globose, spikeletlike, mostly 3-5 mm. long, pale, the spikelets nearly sessile, crowded on a short axis, supported by 2 bracts, numerous on the short branches from all the nodes; glumes about 2.5 mm. long, compressed, more or less pubescent, scabrous on the keels; lemma about as long as the glumes.

TYPE LOCALITY: Southern Europe.

DISTRIBUTION: Open ground, dry beds of streams and pools, especially on land that has been overflowed, central California; introduced from the Mediterranean region.

ILLUSTRATIONS: Bull. U. S. Dep. Agr. 772: f. 88; Hitchc. Man. f. 856.

106. **SPOROBOLUS** R. Br. Prodr. 169. 1810.

Agrosticula Raddi, Agrost. Bras. 33. 1823. (Type species, *A. muralis* Raddi.)

Bennetia Raf. Bull. Bot. Seringe 1: 220. 1830. (Type species, *Agrostis juncea* Michx.)

Cryptostachys Steud. Syn. Gram. 181. 1854. (Type species, *C. vaginata* Steud.)

Bauchea Fourn. Mex. Pl. Gram. 87. 1886. (Type species, *B. Karwinskyi* Fourn.)

Annual or perennial grasses, with small spikelets in open or contracted panicles. Spikelets 1-flowered, the rachilla disarticulating above the glumes; glumes awnless, usually unequal, the second often as long as the spikelet; lemma membranaceous, 1-nerved, awnless; palea usually prominent and as long as the lemma or longer.

Type species, *Agrostis indica* L.

Plants annual.

Panicles narrow, more or less spikeletlike.

Glumes very unequal; panicle bronze-brown, many-flowered, exserted. 1. *S. ciliatus*.

Glumes equal; panicles pale or purplish, few-flowered, more or less included in the sheaths.

Lemma pubescent.

Lemma glabrous.

2. *S. vaginiflorus*.

3. *S. neglectus*.

Panicles open.

Glumes unequal.

Spikelets 1 mm. long.

Spikelets 2 mm. long.

4. *S. tenuissimus*.

5. *S. macropermus*.

Glumes equal.

Glumes abruptly acuminate.

Glumes acutish to obtuse.

6. *S. annuus*.

Glumes more or less pilose; lemma pubescent.

7. *S. micropermus*.

Glumes glabrous.

Spikelets about 1 mm. long; pedicels shorter than the spikelets.

Branches and pedicels scabrous; glumes nearly equal.

8. *S. ramulosus*.

Branches and pedicels glabrous; first glume a little shorter and narrower than the second.

9. *S. bahamensis*.

Spikelets 1.5-2 mm. long; pedicels longer than the spikelets.

Spikelets about 2 mm. long; lemma appressed-pubescent.

10. *S. Shepherdii*.

Spikelets about 1.5 mm. long; lemma glabrous.

11. *S. capillipes*.

- Plants perennial.
- Creeping rhizomes present
 Creeping rhizomes wanting (short rhizomes present in *S. macrus*).
 Glumes nearly equal, much shorter than the lemma; panicle narrow or spike-like.
- Panicle-branches short and appressed, the panicle spike-like.
 Panicle-branches slender, ascending, the panicle scarcely spike-like.
 Glumes unequal or, if equal, as long as the spikelet.
 Spikelets mostly 3-7 mm. long; plants usually less than 1 meter tall.
 Second glume shorter than the lemma.
- Panicle open, the branches spreading.
 Panicle contracted, more or less included in the sheaths.
- Plants with short rhizomes.
 Plants without rhizomes.
- Lemma glabrous, the palea not exceeding it.
 Lemma pubescent, the palea acuminate, exceeding it.
 Second glume about as long as the lemma; panicles open, usually narrow (contracted in *S. purpurascens*), not included.
- Branches of the narrow panicle in distinct verticils, usually less than 4 cm. long.
 Panicle contracted, the branches 1-2 cm. long, ascending or appressed, overlapping.
 Panicle open, the short branches ascending or spreading.
 Basal sheaths copiously felty-ciliate.
 Basal blades not felty-ciliate.
 Spikelets 3 mm. long.
 Spikelets 4 mm. long.
- Branches of the narrow panicle not in distinct verticils, usually more than 4 cm. long.
 Spikelets short-pedicel and appressed along the main panicle branches.
 Spikelets about 4 mm. long, purplish.
 Spikelets about 3 mm. long, pale.
 Spikelets not appressed, branchlets and pedicels somewhat spreading.
 Blades terete.
 Blades flat or folded.
 Glumes about equal, as long as the lemma.
 Glumes unequal.
 Blades elongate.
 Blades mostly less than half as long as the culm.
- Spikelets 1-2.5 mm. long (sometimes 3 mm. in *S. giganteus*).
 Lower panicle-branches in distinct verticils, the mature panicles pyramidal; spikelets about 1 mm. long.
- Lower panicle-branches not in distinct verticils (occasionally so in *S. domingensis*).
 Basal sheaths compressed-keeled; panicle-branches few; widely spreading, naked for about one third their length; spikelets 1.5 mm. long.
 Basal sheaths not compressed-keeled.
 Pedicels elongate, spreading, capillary, much longer than the spikelets; spikelets 2 mm. long.
 Pedicels short, sometimes longer than the spikelets, if spreading, the spikelets less than 2 mm. long.
 Panicles open, the branches, branchlets, and pedicels spreading, the spikelets not aggregated on the branchlets.
 Spikelets often 2-flowered, about 1.3 mm. long.
 Spikelets 1-flowered, about 1.5 mm. long.
- Panicles open or condensed, the pedicels short, appressed, usually more or less aggregate along the branches or branchlets, or the panicle condensed.
 Spikelets about 1 mm. long; plants rather delicate, 10-30 cm. tall.
 Spikelets 2-2.5, rarely 3 mm. long.
 Culms stout, densely cespitose in large clumps; panicle-branches spreading or stiffly ascending, the panicle not condensed in the upper part.
 Panicle 2-3 times as long as wide.
 Panicle usually more than 3 times as long as wide.
- Culms usually less robust (except *S. giganteus*), few to several in a tuft, not in large clumps; panicle condensed throughout or in the upper part (rather loose and spreading in *S. Nealleyi* and *S. flexuosus*).
12. *S. virginicus*.
 13. *S. Poiratii*.
 14. *S. indicus*.
 15. *S. Palmeri*.
 16. *S. macrus*.
 17. *S. asper*.
 18. *S. clandestinus*.
 19. *S. purpurascens*.
 20. *S. cubensis*.
 21. *S. junceus*.
 22. *S. Mülleri*.
 23. *S. Curtissii*.
 24. *S. Tharpaii*.
 25. *S. teretifolius*.
 26. *S. floridanus*.
 27. *S. heterolepis*.
 28. *S. interruptus*.
 29. *S. argutus*.
 30. *S. Buckleyi*.
 31. *S. texanus*.
 32. *S. brasiliensis*.
 33. *S. trichodes*.
 34. *S. atrovirens*.
 35. *S. airoides*.
 36. *S. Wrightii*.



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