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[GRASS AND FORAGE PLANT INVESTIGATIONS.]

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## ARISTIDA PURPUREA NUTT., AND ITS ALLIES.

The species of *Aristida* belonging to the section with very unequal empty glumes, occurring in the United States, never have been clearly understood, and an attempt is here made to show the relationships of the many species, or supposed species, which have been described by various authors. While in some instances the conclusions are not wholly satisfactory, and some species are interpreted to include many different forms, it has been thought that the only proper way to treat this group is on broad lines. Under the present tendency to multiply species, some authors would doubtless add many new species in this group; but we are of the opinion that such a multiplication of species would add to rather than lessen the difficulty in determining the limits of the several species. There appears to have been a tendency to overlook old published species which, by reason of their very short or imperfect descriptions, are doubtfully known, and in the present paper an attempt is made to correlate the old species and varieties, with the belief that, even if these are wrongly interpreted, such work is often of more value than promiscuous publications of many new species with no attempt to determine the limitations of those already published. Among the old species and varieties in this group are *Aristida americana* L., *A. fasciculata* Torr., *A. purpurea* Nutt., *A. dispersa* T. & R., *A. purpurea berlandieri* T. & R., *A. purpurea hookeri* T. & R., *A. fendleriana* Steud., *A. longiseta* Steud., *A. romeriana* Scheele, *A. æquiramea* Scheele, *A. filipendula* Buckley, and *A. curtiseta* Buckley.

—F. LAMSON-SCRIBNER.

There are in the U. S. National Herbarium the types of the several species and varieties described by Dr. Vasey, and also cotypes of the following species: *Aristida longiseta* Steud. (978 Fendler), *A. fendleriana* Steud. (973 Fendler), *A. purpurea berlandieri* T. & R. (1777 Berlandier), *A. purpurea hookeri* T. & R. (293 Drummond), and, apparently, *A. æquiramea* Scheele (562 Lindheimer). Through the courtesy of Mr. Stewardson Brown, curator of the botanical section of the Philadelphia Academy of Natural Sciences, we were able to examine the types of *A. purpurea* Nutt., *A. filipendula* Buckley, and *A. curtiseta* Buckley. Mr. George V. Nash kindly matched specimens with the type of *Aristida fasciculata* Torr., in the herbarium of Columbia University.

Of the above-mentioned species, *Aristida americana* L., was first

taken up for the plant which long passed under the name of *Aristida dispersa* T. & R., by Scribner.<sup>1</sup> *A. fasciculata* Torr., is a synonym of this species. *A. fasciculata* and *A. purpurea* have previously been confused, although they are not even closely related. The confusion of these two species doubtless occurred from the fact that *fasciculata* was interpreted to apply to habit of growth rather than to the inflorescence. Nearly all of the other species here considered have at one time or another been referred to *A. purpurea* or *A. fasciculata*, either as synonyms or as varieties. *A. æquimea* Scheele, treated here as a variety of *Aristida purpurea*, is perhaps worthy of specific rank.

In studying this group, one of the chief difficulties has been the large amount of young or imperfectly developed material in the herbarium, which, in many cases, we found impossible to determine satisfactorily; and, in addition to this, the great variability in habit, doubtless due to environment, added to the difficulty in determining the limits of the several species. It is hoped that the present paper will at least lead to some uniformity in determining the species here considered, as heretofore the names *Aristida purpurea*, *A. fasciculata*, *A. fendleriana*, and *A. longisetæ*, etc., have been variously applied, first to one form, then to another.

A. Culms branched, awns not exceeding 2 cm. in length.

*Aristida americana* Linn. Amoen. Acad. 5:393. 1759. (Pugill. Jam. Pl.) (*Aristida fasciculata* Torr. Ann. Lyc. N. Y. 1:154. 1824; *Chaetaria fasciculata* Schult. Mant. 3:578. 1826; *Aristida dispersa* Trin. & Rupr. Agrost. 3:129. 1842.)

The original description of this species in *Amoenitates Academicæ* is as follows: "*Aristida americana*. Gramen Festucam referens. Culmus ramosus. Differt ab *Aristida ascensionis* quod radii paniculæ sint indivisi. Spiculis alternis e flosculis sessilibus, quorum valvula calycina purpurascens est."

Munro<sup>2</sup> says regarding the specimen in the Linnean Herbarium: "*Aristida americana* L. Am. Acad. 5:393. From Jamaica, Browne. This is called *A. dispersa* Trin.; but Linnæus's name ought to take precedence. Kunth has misplaced the Linnean synonym in *Eutriana juncifolia*." Linnæus compares *Aristida americana* with his *A. adscensionis*, to which the form here considered, is closely related, not only in habit but also in spikelet characters. The description of *Aristida americana* in later editions of Linnæus's works is very different from the original one given above, and this may explain why Kunth referred this species to *Eutriana* (*Bouteloua*).

The type of *Aristida fasciculata* Torr., in the Herbarium of Columbia University, bears the label, "*Aristida fasciculata* Torr., Forests of the Canadian, Long's Expedition, Dr. James," and has been variously interpreted by different authorities. This specimen is well matched by No. 66 E. Palmer, Guaymas, Mexico, 1887, distributed as *Aristida dispersa* Trin. & Rupr.

<sup>1</sup> Bul. Torr. Bot. Club 9:87. 1888.

<sup>2</sup> On the identification of the Grasses of Linnæus's Herbarium, Journ. Linn. Soc. Bot. 6:149. 1862.

*Aristida americana* Linn., is an extremely variable species and extends from Kansas to Arizona, Lower California, Mexico, and the West Indies. It is a caespitose, much branched perennial 3 to 6 dm. high, with rather short involute leaves and many-flowered panicles 5 to 15 cm. long. Spikelets 8 to 10 mm. long, fasciculate; empty glumes usually purplish, unequal, the first one-half to two-thirds as long as the second, which about equals the flowering glume. Awns subequal, 1 to 1.5 cm. long.

SPECIMENS EXAMINED.—*Kansas*: sandy soil, Comanche County, 888 A. S. Hitchcock, 1896. *Texas*: "Western Texas," 741 C. Wright, October, 1849, also 30 V. Havard, September, 1883, Limpia Canyon, 163 G. C. Nealley, September, 1892; Abilene, H. L. Bentley, 1899. *New Mexico*: Mangos Valley, J. G. Smith, September 22, 1896; Organ Mountains, G. R. Vasey, 1881. *Arizona*: Fort Huachuca, Dr. T. E. Wilcox, 1894; Santa Catalina Mountains, 13 J. W. Toumey, April 3, 1894. *Mexico*: Guaymas, 66 E. Palmer, 1887; Mexican Boundary, near White Water, 2264 E. A. Mearns, September 11, 1893; Saltillo, State of Coahuila, 388 E. Palmer, September, 1898; also 1352, E. Palmer, 1880; Durango, State of Durango, 535 E. Palmer, August, 1896; Chihuahua, 390 C. G. Pringle, August, 1885. *Lower California*: 504 E. Palmer, 1887. *Dutch West Indies*: St. Croix, 64 A. E. Ricksecker, November 11, 1895. *Porto Rico*: Guanica, 3438, 3766 P. Sintenis, 1886.

*Aristida americana bromoides* (H. B. K.) Scribn & Merrill, U. S. Dept. Agr., Div. Agros., Cir. 32:5. 1901. (*Aristida bromoides* H. B. K. Nov. Gen. et Sp. Pl. 1:122. 1815; *Aristida dispersa bromoides* Trin. & Rupr. Agrost. 3:130. 1842; *Chaetaria bromoides* R. & S. Syst. 2:396. 1817).

A low tufted form 1 to 3 dm. high, with slender, simple or branched culms, short involute leaves and densely-flowered purplish or pale panicles 2 to 5 cm. long. Spikelets as in *Aristida americana*.

In dry soil, Texas to California. (Mexico).

SPECIMENS EXAMINED: *Texas*: Guadalupe Mountains, 67 V. Havard, 1881. *New Mexico*: between Santa Fe and Canoncito, 3754 A. A. & E. G. Heller, June 23, 1897; Santa Fe, 1325 A. L. Mulford, September 16, 1895, Socorro, G. R. Vasey, 1881. *Arizona*: Santa Catalina Mountains, 14 J. W. Toumey, April 20, 1894; near Bisbee, 1027 E. A. Mearns, October 5, 1892, also 861 Mearns, September 14, 1892; Quitovaquito, 2759 E. A. Mearns, January 30, 1894; Congress, C. R. Orcutt, April, 1896; Ehrenberg, W. M. Canby, September, 1874; Valley of the Colorado, 542 E. Palmer, 1876. *Nevada*: Rioville, 5034 M. E. Jones, April 12, 1894. *California*: near Saratoga Springs, 259 Coville & Funston, February 2, 1891, The Needles, 3788 M. E. Jones, May 3, 1884; Santa Catalina Islands, T. S. Brandegee, May 16, 1890. *Lower California*: near Indian Wells, 2033 C. R. Orcutt, February 5, 1890; San Julio, 12 T. S. Brandegee, 1889; Guadalupe Island, 669, 675 E. Palmer, 1889; Cedros Island, 665 Palmer, 1889; Santa Rosalia, 270 E. Palmer, 1890; no locality, 503 E. Palmer, 1887. *Mexico*: Sonora, Guadalupe Canyon, 2033 E. C. Merton, August 27, 1893; Guaymas, 270 E. Palmer, 1890; Valley of Mexico, Federal District, 6227 C. G. Pringle, November 4, 1895.

This variety is distinguished from *Aristida americana* by its smaller size, smaller panicles, usually less branched culms and more caespitose habit of growth. We have assumed this form to be *Aristida bromoides* H. B. K., but may be wrong in so interpreting it. The form here considered is doubtless *Aristida nana* Steud. Nom. ed. 2. 1:131. 1840.

B. *Culms simple, awns 2 to 3 cm. in length.*

*Aristida longiseta* Steud. Syn. Pl. Gram. 420. 1855. (*Aristida fasciculata nuttallii* Thurb. in Beal, Grasses N. A. 2:208. 1896.)

A densely tufted glaucous, glabrous perennial 1 to 4 dm. high, with numerous involute, basal leaves, erect simple culms and long, usually purplish setæ. Sheaths shorter than the internodes, striate; ligule a ciliate fringe; leaf-blades strongly involute, wiry, 2 to 11 cm. long, the basal ones numerous, often recurved, culm leaves one or two, similar to the basal ones. Panicles few-flowered, exserted, the branches solitary or 2 or 3 at the lower nodes, ascending, at least in herbarium specimens, each bearing 1 to 3 or 4 flowers. Spikelets rather large, purplish; empty glumes unequal, the first shorter than the flowering glume, slightly scabrous on the keel, acute or with a very short mucronate tip; 11 mm. long; second glume much exceeding the flowering glume, about 20 mm. long, otherwise like the first; flowering glume about 14 mm. long, including the densely pubescent callus, which is about 1 mm. long, smooth below, scabrous above. Setæ nearly equal, scabrous, about 7 cm. long.

Type locality, New Mexico, No. 978 A. Fendler, 1847.

GENERAL DISTRIBUTION.—In dry soil, South Dakota to Montana, south to Texas, New Mexico, and Arizona (Mexico). May to September.

SPECIMENS EXAMINED.—*South Dakota*: Stearns, 33 E. J. Wallace, August 2, 1896. *Montana*: Upper Big Horn River, 184 J. W. Blankinship, July, 1890. *Wyoming*: Devil's Tower, 544 David Griffiths, August 13, 1897. *Colorado*: Grand Junction, 5476 M. E. Jones, June 21, 1894; Denver, 11 J. M. Holzinger, 1896, also 31 Alice Eastwood, July, 1891; Walsenburg 790 C. L. Shear, July 10, 1896; Fort Collins, E. D. Ball, June 26, 1898, also 518 C. S. Crandall, July 1, 1892; Arboles, 14 C. F. Baker, June 29, 1899; Julesburg, 24 E. N. Plank, June, 1896; McElmo Canyon, 17b Alice Eastwood, June, 1892. *Utah*: Springdale, 5249 M. E. Jones, May 16, 1894; Silver Reef, 5163 M. E. Jones, May 4, 1894; Antelope Island, 1297 S. Watson, June, 1869. *Nebraska*: North Platte, 2025 P. A. Rydberg, June 22, 1895, also 279 C. L. Shear, same date; near Thedford, 1300 P. A. Rydberg, September 8, 1893; Lavaca, 817 J. M. Bates, July 14, 1898; Longpine, 1121 J. M. Bates, July 23, 1898. *Kansas*: Rockport, E. Bartholomew, June 12, 1889; Osborne City, 158 C. L. Shear, July 9, 1894; Ellsworth County, 589a A. S. Hitchcock, July 12, 1895; Riley County, 263 Hitchcock, July 15, 1895; Ulysses, 63 C. H. Thompson, June 27, 1893. *Texas*: San Diego, J. G. Smith, June 11, 1897; Kerrville, J. G. Smith, June 22, 1897; Palestine, 49 E. N. Plank, April, 1895. *Arizona*: Tucson, J. W. Toumey, 1892; "North Arizona," J. G. Lemmon, 1884; Port Apache, 575 E. Palmer, June, 1890; Ash Fork, 16, 17 J. W. Toumey, June, 1892. *New Mexico*: No locality, 978 A. Fendler, 1847 (cotype); Rosa, 152 C. F. Baker, June, 1899; Mangos, J. K. Metcalfe, May, 1897; White Sands, 404 E. O. Wooton, August 28, 1897; Santa Fe, 3535 A. A. & E. G. Heller, May 15, 1897; Socorro, 74 E. N. Plank, August, 1895. *Mexico*: Chihuahua, 473 C. G. Pringle, October 8, 1885.

This widely distributed species has been variously referred to *Aristida purpurea*, *A. fendleriana*, *A. fasciculata*, etc., but is readily distinguished by its simple, erect, slender culms, few, large spikelets, acute or but slightly mucronate empty glumes and long, purplish setæ.

Steudel describes *Aristida longiseta* as being but 3 or 4 inches high, but in all other particulars his rather full description applies to the form here considered. It is evident that Steudel based his description on a very small form. Fendler's No. 978 in the U. S. National Herbarium is 3 dm. high, while the same number in the herbarium of the Philadelphia Academy of Natural Sciences is but 1.5 dm. high.

**ARISTIDA LONGISETA ROBUSTA** var. nov.

A stout, densely tufted form, 3 to 4 dm. high, with robust culms, more rigid inflorescence and usually longer leaves than in the species. Empty glumes as in the species except that both are prominently cleft at the apex, bearing in the cleft a scabrous awn about 2 mm. long; flowering glume nearly smooth or only slightly scabrous.

GENERAL DISTRIBUTION.—In dry soil, South Dakota to Kansas, west to Washington and British Columbia. June to August.

SPECIMENS EXAMINED.—*South Dakota*: Aurora County, 35 E. N. Wilcox, August 18, 1896; Redfield, 68 David Griffiths, August 29, 1896; Belle Fourche, 404 Griffiths, August 4, 1897; Canning, 43 Griffiths, August 27, 1896; Lebanon, 252 Griffiths, July 23, 1896; Custer, 1118 P. A. Rydberg, August 16, 1892; Rosebud, 34 E. J. Wallace, July 26, 1896. *Iowa*: Rock Rapids, 410 C. R. Ball, July 6, 1897. *Nebraska*: St. Helena, 2629, F. Clements, June 27, 1893; Longpine, 1123 J. M. Bates, August 18, 1898; Osborne City, 156 C. L. Shear, July 9, 1894. *Wyoming*: Clear Creek, 116 Williams & Griffiths, August 5, 1898; Devil's Tower, 517 Griffiths, August 12, 1897; Whalen Canyon, 540 A. Nelson, July 19, 1894. *Montana*: Billings, 222 Williams & Griffiths, August 30, 1898; Glendive, L. F. Ward, July 21, 1883; Missoula, 250 Williams & Griffiths, September, 1898; Indian Creek, 336 F. L. Scribner, July 5, 1883 (type); Prickly Pear Canyon, 559 R. S. Williams, July 23, 1897. *Idaho*: T. E. Wilcox, 1881. *Colorado*: Colorado Springs, 496 S. M. Tracy, 1887. *Washington*: Alma, 536 A. D. E. Elmer, July, 1897; Rock Island, 439 Sandberg & Leiberg, July, 1893; Spokane, 906 Sandberg, Heller & McDougal, August 16, 1892, also 2597 C. V. Piper, June 25, 1897. *British Columbia*: Spencer's Bridge, J. Macoun, May 28, 1889.

This variety can be readily distinguished from the species by its more robust culms, and especially by its rather prominently awned empty glumes.

**ARISTIDA LONGISETA HOOKERI** (Trin. & Rupr.). (*Aristida purpurea hookeri* Trin & Rupr. *Agrost.* 3: 107. 1842).

A robust form 4.5 to 7 dm. high, with longer leaves and stouter culms than in the species. Leaf-blades rigid, involute, 10 to 20 cm. long. Spikelets somewhat larger than in the species, the empty glumes entire or only slightly toothed at the apex; flowering glume glabrous, or nearly so.

GENERAL DISTRIBUTION.—In dry soil, Texas, New Mexico, and Arizona. May to August.

SPECIMENS EXAMINED.—*Texas*: No locality, 293 Drummond (cotype); Llano, J. G. Smith, June, 1897, also 6 E. N. Plank, August, 1892; San Antonio, 45 Plank, May, 1893, also V. Havard, 1882; no locality, 11 J. Reverchon, 1881. *New Mexico*: Mesilla Park, 42 E. O. Wooton, June 19, 1897. *Arizona*: no locality, J. G. Lemmon, 1884.

This variety is evidently related to *Aristida longiseta* rather than to *A. purpurea*, and is distinguished by its larger size, longer leaves, and glabrous flowering glumes.

**ARISTIDA LONGISETA FENDLERIANA** (Steud.). (*Aristida fendleriana* Steud. *Syn. Pl. Gram.* 420. 1855; *A. purpurea fendleriana* Vasey *Contr. U. S. Nat. Herb.* 3: 46. 1892; *A. fasciculata fendleriana* Vasey in Beal, *Grasses N. A.* 2: 207. 1896.)

A densely tufted form 2 to 4 dm. high, with simple, erect culms, numerous involute basal leaves and much shorter setæ than in the species. Panicles strict, few-flowered. Empty glumes unequal, acute, generally cleft at the apex and bearing a short awn; second glume equaling or slightly exceeding the somewhat scabrous flowering glume. Setæ subequal, 2 to 3 cm. long.

GENERAL DISTRIBUTION.—In dry soil, Montana and Wyoming, south to Texas, Arizona, and California.

SPECIMENS EXAMINED.—*Montana*: Billings, 223 Williams & Griffiths, August 30, 1898. *Wyoming*: Pine Bluff, 3617 A. Nelson, July 6, 1897. *Colorado*: Grand Junction, 5469 M. E. Jones, June 21, 1894; Buena Vista, 605 C. L. Sheldon, July 6, 1892; Durango, 12 Alice Eastwood July, 1891; La Porte, L. H. Pammel, June 25, 1896; Salida, 953 C. L. Shear, August 2, 1896; Colorado Springs, 2113 T. A. Williams, July 20, 1896; Trinidad, 15 S. M. Tracy, 1887. *Utah*: Glenwood, 70 L. F. Ward, May 22, 1875; "South Utah," M. E. Jones, 1880. *Texas*: Dallas, 769 E. Hall, 1872; El Paso, M. E. Jones, April 21, 1884; no locality, G. C. Nealley, 1887; J. Reverchon, 1880. *New Mexico*: 2015 C. Wright, 1851-52; 973 A. Fendler, 1847 (cotype). *Arizona*: Cosnino, 4046 M. E. Jones, August 9, 1884; Tucson, J. W. Toumey, 1892; Mormon Lake, 91 D. T. MacDougal, June 11, 1898; Mt. Elden, 355 MacDougal, July 11, 1891; Moki Reservation, 9 W. Hough, 1896; no locality, E. Palmer, 1869. *California*: The Needles, 133 M. E. Jones, May 6, 1884.

This variety is fairly constant in its characters and is distinguished by its short setæ and short second glume, which about equals the flowering glume in length. In *Aristida longiseta* the second glume much exceeds the flowering glume.

*Aristida purpurea* Nutt. Trans. Am. Phil. Soc. 5: 145. 1837. (*A. purpurea berlandieri* Trin. & Rupr. Agrost. 3: 107. 1842; *A. romeriana* Scheele, Linnæa 22: 344. 1849.)

A tufted, glabrous perennial 3 to 6 dm. high, with slender culms, involute leaves and lax pale or purplish panicles. Culms simple, leafy, glabrous, sheaths shorter than the internodes; ligule a short ciliate fringe; leaf-blades 5 to 10 cm. long, involute, rigid, slightly scabrous. Panicles 5 to 15 cm. long, the branches at first erect or ascending, often becoming somewhat spreading and flexuous, short, solitary or two or three at each node, few-flowered. Spikelets pale or purplish; empty glumes unequal, the first lanceolate, 6 mm. long, cleft at the apex; the teeth acute, about 1 mm. long, bearing between them a scabrous awn about 1.5 mm. long. Second glume 12 mm. long, exceeding the flowering glume, cleft at the apex; the teeth 1.5 mm. long, the awn 2 mm. long. Flowering glume 10 mm. long, smooth below, tuberculate roughened above; callus bearded, about 0.5 mm. long. Awns equal, purplish, 2 to 4 cm. long (description of spikelet characters drawn entirely from the type specimen).

Through the courtesy of Mr. Stewardson Brown, curator of the botanical section of the Philadelphia Academy of Natural Sciences, we have been able to examine the specimen on which Nuttall based his *Aristida purpurea*.

SPECIMENS EXAMINED.—*Indian Territory*: 387 E. Palmer, 1868. *Texas*: Presidio, 66 V. Havard, 1881; San Angelo, J. G. Smith, July 12, 1897; San Angelo to Stirling City, 382½ W. L. Bray, May 20, 1899; Austin, 767, 768 E. Hall, May 12, 1872; Bracket, 267 W. M. Canby, March 21, 1900; Turtle Creek, Kerr County, 166 W. L. Bray, May 1, 1899; El Paso, 17a M. E. Jones, April 18, 1884; Llano, J. G. Smith, June 29, 1897; Laredo, 104 G. C. Nealley, August, 1892; Bastrop, 43 E. N. Plank, July, 1892; Gregory, 1579 A. A. Heller, April 14, 1894; Beeville, J. G. Smith, May 22, 1897; no locality, 3 S. B. Buckley, 1883; 949 Berlandier; 1777 Berlandier (cotype of *Aristida purpurea berlandieri* Trin. & Rupr.). *New Mexico*: Eddy, J. G. Smith, August 4, 1897. *Arizona*: Ash Fork, 47 H. H. Rusby, May 20, 1883 (exactly matches the type); no locality, Wheeler's expedition, 1872.

*Aristida purpurea* Nutt., has been variously interpreted by different authorities

and many very different forms have been referred to it. It apparently presents constant characters and, so far as our herbarium material shows, is confined to Indian Territory, Texas, New Mexico, and Arizona. It is readily distinguished from *Aristida longiseta* Steud., by its lax habit of growth, slender culms, smaller spikelets, shorter awns, tuberculate-roughened flowering glume and awned empty glumes.

*Aristida purpurea micrantha* Vasey, Contr. U. S. Nat. Herb. 3: 47. 1892. (*Aristida fasciculata micrantha* Beal, Grasses N. A. 2: 207. 1896).

A very slender form with pale, lax panicles, the flexuous branches capillary, spreading or reflexed; spikelets smaller than in the species, the flowering glume, 6 to 8 mm. long, very slightly scabrous or nearly smooth.

GENERAL DISTRIBUTION.—Texas to New Mexico (Mexico).

SPECIMENS EXAMINED.—*Texas*: Corpus Christi, 85 W. H. Ravenel, April 30, 1869; Western Texas, 743 C. Wright, October, 1849; San Diego, J. G. Smith, June 12, 1897; Del Rio, 82 E. N. Plank, December, 1891; no locality, S. B. Buckley, 1883; G. C. Nealley, 1888, 1889 (type); 563 F. Lindheimer, 1846; 2004 C. Wright, 1851-52.

This variety is distinguished from the species by its smaller spikelets, more lax panicles, the branches often somewhat spreading and flexuous, and usually nearly glabrous flowering glumes.

**ARISTIDA PURPUREA ÆQUIRAMEA** (Scheele). (*Aristida æquiramea* Scheele, Linnæa 22: 343. 1849. (*Aristida filipendula* Buckley, Proc. Acad. Nat. Sci. Phila. 1862: 93. 1862; *Aristida purpurea californica* Vasey, Contr. U. S. Nat. Herb. 3: 47. 1892; *Aristida fasciculata californica* Vasey in Beal, Grasses N. A. 2: 207. 1896.)

A rather stout, tufted, glabrous form 4 to 8 dm, high with simple culms, involute rigid leaves, erect or ascending panicle branches and very tuberculate-scabrous flowering glumes. Ligule a short ciliate ring; leaf-blades 8 to 15 cm. long, 1 to 2 mm. wide, involute. Panicles purplish, the branches capillary, generally erect or ascending, sometimes somewhat flexuose, usually many-flowered, 3-5 at each node. Spikelets pale or purplish; second empty glume twice as long as the first, equaling the flowering glume, both cleft at the apex, the midnerve excurrent as a scabrous awn 1 to 2 mm. long; flowering glume about 10 mm. long, strongly tuberculate-scabrous. Awns subequal, 5 to 7 cm. long.

GENERAL DISTRIBUTION.—In dry soil, Texas to California.

SPECIMENS EXAMINED.—*Texas*: no locality, 1409 bis, J. Reverchon; 562 F. Lindheimer, 1846; G. C. Nealley, 1887; Abilene, H. L. Bentley, 1899. *Arizona*: J. G. Lemmon, 1882. *California*: San Jacinto, 1549 S. B. & W. F. Parish, June, 1882; near San Bernardino, 2123 S. B. Parish, May 15, 1891, also 3668 S. B. Parish, May 20, 1895; Capon Valley, 5474 J. G. Lemmon, May, 1891.

This variety was based on a specimen collected in Texas by Lindheimer, no number cited, but doubtless the form distributed under 562 as *Aristida æquiramea* Scheele, as this specimen agrees perfectly with Scheele's description. The plant in the Herbarium of the Philadelphia Academy of Natural Sciences under this number is identical with the same number in the U. S. National Herbarium and is labeled by Buckley "*Aristida filipendula*," and is the form to which Buckley's description applies. Another specimen in the herbarium so labeled by Buckley is a form of *Aristida americana* Linn. *Aristida purpurea californica* Vasey, was based on number 1549 S. B. and W. F. Parish, cited above.

This variety is distinguished from the species by its larger size, usually more densely flowered panicles, longer awns, more prominently awned empty glumes and more strongly tuberculate-scabrous flowering glume.

**ARISTIDA PURPUREA LAXIFLORA** var. nov.

A lax, tufted form 3 to 6 dm. high, with open, few-flowered panicles. Panicle branches mostly solitary, flexuous, capillary, 1 to 3 flowered. Spikelets as in the species.

Type specimen collected in Texas, no locality, No. 12 J. Reverchon, May, 1881; No. 13 Reverchon, same date, is identical with No. 12. A specimen from Texas, no locality, collected by G. C. Nealley, in 1887, is referred here and also a specimen collected at Tucson, Arizona, by J. W. Toumey, in 1893.

This variety is very closely related to var. *œquiramea*, and is only distinguished by its very lax, open, few-flowered panicles.

**ARISTIDA PURPUREA CAPILLARIFOLIA** var. nov.

A pale glaucous form about 4 dm. high, with lax, few-flowered panicles and numerous involute basal and culm leaves 2 to 3 dm. long. First glume 6 mm. long, the second about 14 mm. long, mucronate and slightly exceeding the scabrous flowering glume. Awns 3 to 4 cm. long.

Type specimen collected in Texas by G. C. Nealley. No locality given.

*Aristida reverchoni* Vasey, Bul. Torr. Bot. Club, 13:52. 1886.

A densely tufted glabrous perennial, 3 to 5 dm. high, with numerous wiry, radical leaves 7 to 15 cm. long, and narrow spike-like panicles 10 to 15 cm. long. Sheaths short; ligule a short ciliate ring; leaf-blades involute, curved. Panicles purplish, the branches in pairs, unequal, the lower ones 2 cm. long, all appressed. First glume about 8 mm. long, the second 12 mm. long, about equaling the glabrous flowering glume. Awns about 2 cm. long, nearly equal.

GENERAL DISTRIBUTION.—Texas to Arizona.

SPECIMENS EXAMINED.—*Texas*: Rocky hills, Crockett County, 1237 J. Reverchon, May; Comanche Peak, 154 Reverchon, 1882; no locality, G. C. Nealley, 1887, 18 Reverchon, 1885; Limpia Canyon, 146 G. C. Nealley, September, 1892; El Paso, G. R. Vasey, 1881; Kerrville, J. G. Smith, June 21, 1897. *New Mexico*: Mangos, O. Metcalfe, September 2, 1897. *Arizona*: Fort Huachuca, T. E. Wilcox, September, 1894.

This species, although closely related to other species in this group, and especially to *Aristida longiseta fendleriana*, is readily distinguished by its narrow spike-like panicle and relatively longer first glume.

*Aristida reverchoni angusta* Vasey, Contr. U. S. Nat. Herb. 3:46. 1892.

A form distinguished from the species by its much narrower panicles, a character doubtless due entirely to habitat.

SPECIMENS EXAMINED.—*Texas*: Comanche Peak, 10 J. Reverchon, September, 1881 (type); San Angelo, J. G. Smith, July 12, 1897; no locality, G. C. Nealley, 1889.

*Aristida curtiseta* Buckl. Proc. Acad. Nat. Sci. Phila. 1862:92. 1862.

It is impossible to identify this species, as the specimen on which Buckley based his description is a form in which the spikelets are aborted by a species of *Ustilago*. It is probably *Aristida purpurea* Nutt., or some closely related form. Buckley's type is in the herbarium of the Philadelphia Academy of Natural Sciences.

ELMER D. MERRILL,

*Assistant in Charge of Collections.*

Approved:

JAMES WILSON,

*Secretary of Agriculture.*

WASHINGTON, D. C., May 3, 1901.