

A Technical Study of the Genera *Stipa* and *Aristida*
of the Family Gramineae
in Arizona

by
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INTRODUCTION

The Gramineae, or grass family, is one of the largest of plant families. In the temperate regions of the world, this family consists mostly of perennial herbs with a few annuals. In the sub-tropics and tropics there are shrubs and arborescent forms such as the giant-reeds and bamboos.

Of the natural families of plants that contribute their quota to supply the wants of man, the grass family exceeds all others in the amount and value of its products.

Many of our daily staple foods, in all parts of the world, are derived from products supplied by members of the grass family. It is the dry hard seeds or grains which are made into cereals and flour from such members as rice, wheat, sorgums, corn, oats, barley, and rye. Another universal food is sugar, obtained mostly from sugarcane. The domestic animals are supplied with forage from grama, timothy, blue stem, millet, brome, and hiliaria grasses. In addition domestic animals consume great quantities of those grasses mentioned above as furnishing human foods. Clumps of giant-reeds with their silvery plumes are good ornamentals; while the best lawns are derived from blue-grass, bermuda-grass, rye-grass, and within their region, St. Augustine-grass, creeping-bent and buffalo-grass.

The members of the grass family have fibrous roots; these are often very long, slender and thread-like.

Due to the large number of roots from a single crown and intricate branching and root hair formations a tremendous absorption area is obtained. These, the only real turf forming plants, to increase their vegetative growth, send out root-offshoots, rhizomes, and often runners, an effective means of propagation practiced little by other families. Their roots bind the soil in such a way that erosion is prevented wherever they are numerous. The stems of grasses are terete or somewhat compressed, mostly hollow, sometimes solid, with the vascular bundles scattered irregularly through the pithy tissue. Sheaths mostly split open opposite the blade with a distinct ligule connecting the two. The leaves are parallel-veined and two-ranked. The inflorescence of most grasses is a panicle often appearing spike-like. The flowers which are born in the axils of dry chaffy bracts are minute, usually perfect, without a distinct perianth, arranged in spikelets consisting of a rachilla and two to many two-ranked bracts, the two lower glumes empty, each succeeding bract (lemma) including a single flower and palea, the lemma and palea together termed the floret. Stamens are usually three, with delicate filaments and two-celled anthers. Pistil one, with a one-celled one-ovuled ovary, usually two styles and plumose stigmas, Fruit a grain with starchy endosperm and a small embryo at base, on the side opposite the hilum.

The grass family is divided into 13 tribes. The Agrostideae or Timothy tribe to which the gen-

era Oryzopsis, Stipa, and Aristida belong, is distinguished from the other tribes by the following characters; spikelets one-flowered, usually perfect, laterally compressed at least at maturity, glumes usually persistent on the pedicel or rachis after the fall of the florets, spikelets in an open or spike-like panicle or raceme, usually upon distinct pedicels. Within the tribe the genera Oryzopsis, Stipa, and Aristida are placed next to each other on the following characters; indurate fruits, which are terete, awned, with the nerves obscure; callus well developed, bearded.

The author has not made a study of the genus Oryzopsis except as a step in the phylogenetic development of the genera Stipa and Aristida. The awn is articulate and early deciduous in the genus Oryzopsis, Mountain Rice, which is taken up in more recent works just before Stipa. In the genus Stipa the fruit is jointed to the awn but the awn is not deciduous. A few members of the genus Aristida have an articulation between the lemma and awns, but most of them do not have a joint. The three inconspicuous nerves of the lemma in this genus have become more or less evident and tend to separate at angles to each other.

The tendency for the awns, of these two genera of grasses, to be plumose or scabrous is a direct advantage in dissipation by wind or animals. The neck or base of the awns, if dry and mature is usually tightly twisted. This fact along with the callus at the base of the lemma being sharp-pointed, with the bristle-like hairs erect, aids

materially in planting the seeds in dry rocky soil. The twisted neck is hygroscopic and when moist, unwinds, upon drying recoils, thus driving the sharp-pointed callus of the fertile lemma into the soil.

In this taxonomic study of the two closely related genera Stipa and Aristida detailed descriptions have been made for each species collected or sent in from other parts of the state. A study of the literature revealed the fact that many of the reported species were only synonyms of valid species. The valid names were determined mostly from the revisions by A. S. Hitchcock. (*) The most common synonyms have been included under each valid species name in the descriptions; all the names and synonyms of North American Species were included in the alphabetical lists at the close of each paper.

The genus Stipa was established by Linnaeus in 1754 (**), based upon three species, two from Europe, S. pennata and S. juncea, and one from Virginia, S. avenacea. The original generic concept has not been changed materially. The species of this genus are often valuable as forage when young, as fodder grasses at maturity. They are dominant over great stretches of the Steppe regions of Russia and Siberia, with thirty species common on the plains and grasslands of the western United States. In

(*) Cont. U. S. Nat. Herb. Vol. 24, Part 7.
The North American Species of Stipa. A. S. Hitchcock.
Cont. U. S. Nat. Herb. Vol. 22, Part 7.
The North American Species of Aristida. A. S. Hitchcock
(**) Gen. Pl. ed. 5 . 34. 1754.

the temperate regions of the world there are about 250 species represented. The common names applied to this genera are spear grass and porcupine grass. And one species, S. vaseyi, called sleepy grass, has the reputation of being toxic and is said to produce narcotic effects upon grazing animals especially horses.

The genus Aristida was established by Linnaeus in 1753 (#), based upon A. adscensionis, which is the type. This is the most important pioneer genus in the establishment of grasslands in sub-tropical and tropical grassland areas. It is a large genus consisting over 150 species, which are usually xerophytic, deep-rooted, pioneer grasses. The common name which distinguishes this genus is Triple-awned-needlegrass, for most of them have three distinct awns. Certain species of the Purpureae group are called dog-town grass because of the tendency to establish themselves in any new soil or prairie dog mound.

In most cases it has been possible to form the description from a group of specimens collected at different places in Arizona growing under various conditions of soil and climate. When the identity was uncertain, duplicate specimens were referred to A. S. Hitchcock. It is true here as with other closely related groups that individuals tend to be distinct while in groups over considerable area they tend to overlap.

(#) Sp. Pl. 82. 1753.

The keys to the species of each genus were made near the close of the study. It was not possible to arrange the six species of Stipa studied in a known phylogenetic order, so the arrangement followed by Hitchcock was used. In the *Aristida* key those two species with the jointed awns were placed first, for they are closer to the genus Stipa, the obsolete lateral awn group second, the divaricate group third, and the narrow paniculate group last, ending with the annual species which is considered to be of more recent origin.

In the separation of two groups of the *Aristidas*, the writer has used a character that has not been referred to in the literature studied. The character is a pulvinus or a cushion-like enlargement found at the base of each pair of branches on the panicle in the divaricate branched group, and is not present in the narrow panicled group.

A systematic study of these two closely related genera as found in Arizona constitutes the body of this paper.

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KEY TO GENERA

A. Awn simple articulated with the lemma.

- - - - - 1. Stipa L.

AA. Awn trifid, usually not articulated with the lemma.

(If lateral awns obsolete no articulation present at

apex of lemma.) - - - - - 2. Aristida L.

1. Stipa L.

Porcupine Grass. Spear Grass

Perennials, with usually involute blades and narrow panicles. Spikelets 1-flowered, disarticulating above the glumes, the articulation oblique, leaving a bearded sharp-pointed callus attached to the base of the floret. Glumes membranaceous, often papery, acute or acuminate, usually long and narrow. Lemma narrow, terete, firm or indurate, strongly convolute, terminating in a bent and twisted prominent persistent awn, with a distinct articulation between awn and body of lemma; palea inclosed in body of lemma.

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KEY TO ARIZONA SPECIES OF STIPA

- A. Awn conspicuously plumose throughout or just the first segment.
- B. Terminal segment of awn plumose, flexuous, $2\frac{1}{2}$ to 5" long.
1. S. neomexicana (Thurb.) Scribn.
- BB. Terminal segment of awn not plumose, first segment of the once-geniculate awn strongly plumose.
2. S. speciosa Trin. & Rupr.
- AA. Awn scabrous or nearly glabrous, rarely appressed-hispid, never plumose.
- C. Lemma mostly more than $\frac{5}{16}$ " (often $\frac{1}{2}$ ") long, glabrous or sparsely pubescent above the callus.
- D. Mature lemma pale, sparsely pubescent to summit, mostly over $\frac{3}{8}$ " long, callus tapering to a sharp point.
- E. Lemma mostly $\frac{7}{16}$ " long, third segment of awn sinuous mostly more than 4" long.
3. S. comata Trin. & Rupr.
- EE. Lemma mostly more than $\frac{7}{16}$ " long, third segment of awn straight, less than $3\frac{1}{2}$ " long.
3a. S. comata intermedia Scribn.
- DD. Mature lemma dark mostly less than $\frac{3}{8}$ " long, callus blunt.
4. S. pringlei (Beal) Scribn.
- CC. Lemma less than $\frac{5}{16}$ " long, or if as long, distinct-pubescent on the upper part.
- F. Panicle more or less open, the branches spreading or ascending, naked at base. Ligule from $\frac{1}{8}$ to $\frac{3}{16}$ " long. Awn about 2" long.
5. S. eminens Cav.
- FF. Panicle compact, branches erect ascending, the ligule very short, often oblique across the glabrous sheaths. Lower nodes of panicle villous. Awn less than $1\frac{1}{2}$ " long.
6. S. vaseyi Scribn.

1. Stipa neomexicana (Thurb.) Scribn.

Stipa pennata var. neo-mexicana Thurb. in Coulter, Man. Rocky Mount. 408. 1885.

Synonym: Stipa neomexicana (Thurb.) Scribn. 1899.

Culms densely cespitose, erect, glabrous, few-noded, mostly 2 to 3 ft. tall. Sheaths shorter than internodes loosely inclosing the stem, often overlapping each other; slightly pubescent below, glabrous above. Ligule a translucent membrane from $1/16$ to $1/8$ " long. Blade much narrower than sheath, constricted at ligule. Blades slender, firm, involute, slightly scabrous, basal ones 10 to 12" long, scarcely $1/16$ " wide when unrolled. The inflorescence narrow, mostly from 3 to $4\frac{1}{2}$ " long, scaberulose, flowers few on ascending branches. The lowermost pedicels about 1" long, usually 2 spikelets, those above shorter; spikelets pale, older ones shiny. Glumes from equal to unequal, compressed, papery, over all $\frac{1}{2}$ " to 2" long, apex involute $\frac{1}{2}$ to $\frac{3}{4}$ " long, 5-nerved. The lemma at maturity $5/8$ to $6/8$ " long including needle-like callus $3/16$ " long. Near joint of callus erect bristle-like hairs; body of lemma $1/16$ to $3/32$ " in diameter, reddish-brown, 5-nerved, irregular, glaucous to slightly villous, or short hispid at the slightly constricted neck. The awn readily deciduous, 6 to 8" long, often 7". Basal part 1" to $1\frac{1}{2}$ ", straight, strongly twisted, stiff, reddish-brown with a yellowish line following the twist, appressed villous, the

middle segment $\frac{3}{4}$ " long, mostly twice geniculate, and slightly twisted, with short pubescence, the terminal segment not twisted, flexuous, pinnate plumose, the hairs silvery or tawny, 1/16" long, ascending. This species is closely related to the species in Europe and Asia.

Range: Mesas, canyons, and rocky slopes, western Texas, Colorado, Utah, New Mexico, and Arizona. Arizona plants studied and checked from herbarium. Mescal, Thornber May 5, 1906. Mammoth-Oracle, Thornber 1905. Mesilla Valley, New Mexico, Wooton 1905.

Plant reported from Arizona: Santa Rita Mountains, Pringle 1884. Clarks Valley, Rusby 9078. Adamana, Chase 5855. Jacks Canyon, Coville 1005. Ash Fork, Williams 3051. Canyon Padre, Hitchcock 13230. Tucson, Toumey 3051.

2. Stipa speciosa Trin. & Rupr.

Stipa speciosa Trin. & Rupr. Mem. Acad. St. Petersburg. VI. Sci. Nat. 5:45. 1842.

Synonym: Stipa frigida. Phil. 1860.

Stipa californica Vasey 1889.

A perennial grass with many culms from the base, rather coarse, growing from 1 to 2 ft. high in clumps, mostly 2 to 3 nodes, glabrous, scabrous. Sheaths often overlapping each other and inclosing the lower part of the panicle. The old sheaths and leaf bases are yellow-

ish-brown to a dark brown, very numerous. Sheaths glabrous. Ligule consists of a short dense ciliate collar of white hairs. The blade growing above the ligule is much narrower than the sheath, glabrous below, scabrous on inner face, involute, from $1/32$ to $1/16$ " in diameter, 5 to 10" long, slightly twisted and sharp-pointed. Panicle consists of short erect branches protruding from inflated sheaths narrow and compact from 3 to 6" long, pale or tawny. Rachis tapered to the apex, angled; pedicels short, scaberulose, fine. The glumes equal, $\frac{3}{4}$ " long, loosely keeled, tapering above into a long slender point, fimbriate and translucent, lower glume with one strong nerve and two fine lateral ones; second glume three strong nerves and two short fine lateral nerves. Lemma $5/16$ to $3/8$ " long, round, slightly tapered toward apex; densely clothed with short soft, erect, hairs, light yellowish in color. Callus $1/16$ " long, covered with erect shiny hairs, tip pointed and curved. Awn from $1\frac{1}{2}$ to $1\frac{3}{4}$ " long over all, with only one distinct bend, from base to bend about $3/8$ ", twisted; lower $2/3$ strongly plumose with white ciliate ascending hairs $3/16$ " long. Terminal segment bent from 50° to 75° and 1" or a little longer, scabrous, yellowish-brown or tawny.

Range: Deserts, canyons, and rocky hills; Colorado to Southern California, also in Chile, the type locality, and Argentina. Arizona plants studied and checked from herbarium. Yucca. Jones 1884. Lincoln Forest, Pres-

cott, Shoemaker 1926. Mt. Pinos, Ventura County, California, Hall No. 6424 (1905) Utah, Jones 1880.

Plants reported from Arizona: Yucca, Jones 3919. Grand Canyon, Chase 5810. Peach Springs, Tracy 135. Carrizo Mountains, Standley 7515.

3. Stipa comata Trin. & Rupr.

Stipa comata Trin. & Rupr. Mem. Acad. St. Petersburg. VI. Sci. Nat. 5:75. 1842.

Synonym: Stipa juncea Nutt. (1840).

A perennial grass, caespitose, with many old sheaths and leaves at the base from yellowish-brown to gray. Culms erect, from 1 to 2 ft. tall, slender, scabrous or glabrous, inclosed mostly in overlapping sheaths. Sheaths glabrous, loosely inclosing culm and lower part of panicle. Translucent margins of sheath extending up sides of leaf $1/8$ to $3/16$ ". Ligule a brown collar. Blades mostly involute, from the base 6 to 12" long, on the culms 3 to 4" long, scabrous on lower surface. Apex pointed, dry. Panicle narrow from 4 to 10" long, spikelets loosely branched. Glumes about equal or the lower somewhat longer, mostly 1"; both thin and papery, 5-nerved, slightly keeled, body acuminate with long slender apices. Lemma $3/8$ to $7/16$ " long including callus, which is $5/32$ " long, tapering to a sharp point, curved slightly, densely barbed with white or tawny erect short hairs. Lemma angled, from slightly pubescent on ridges to almost glabrous, tawny yellow to brown,

slightly tapered toward very short neck. Awn twice bent twisted loosely or tightly to first bend $\frac{3}{4}$ to $1\frac{1}{4}$ " long, scabrous with scattered short hairs. Second joint compressed, $\frac{3}{8}$ to $\frac{1}{2}$ " long, scabrous, twisted once or twice. Terminal joint scabrous, shiny, flexuous, 3 to $4\frac{1}{2}$ " in length. Awn over all 6" or more in length.

Range: Prairies, plains, and dry hills, Minnesota to Yukon Territory, south to Texas and California. Arizona plants studied and checked from herbarium. Willcox, Thornber 1905. Peach Springs, Jones 1880. Walnut Canyon, Jardine 1911. Flagstaff, Hitchcock 13236; Chase 5835, 5842; Leiberg 5556.

Plants reported from Arizona: Adamana, Chase 5857; Hitchcock 10425. Hell Canyon, Rusby 46. Little De Motte Park, Jones 6056. Grand Canyon, Hitchcock 10445.

3a. Stipa comata intermedia Scribn.

Stipa comata intermedia Scribn. Bot. Gaz. 11; 171.
1886.

Synonym: Stipa tweedyi Scribn. 1898.

Stipa spartea var. tweedyi Jones. 1912.

A hardy perennial grass, with numerous mostly involute leaves at the base, with 2 or 3 extending up the inflorescence inclosed by the sheath. Plants growing from 24 to 36" tall. Inflorescence paniculate, mostly inclosed by sheath, 6 to 10" long, $\frac{1}{2}$ " wide. Branches erect,

naked below, or 1 or 2-flowered. Glumes thin, translucent, equal, flattish or slightly keeled, lanceolate with needle-like awn at apex; 3 to 5-nerves, margins entire, from $\frac{3}{4}$ to 1" long including awn, glabrous. Lemma with callus indistinct covered with erect, white, hairs, merging into the upper terete lemma covered with appressed silky hairs. Lemma $\frac{1}{24}$ to $\frac{1}{30}$ " in diameter, $\frac{1}{2}$ " long, jointed to the twisted awn. The awn twice bent and silvery fine white hairs to second joint. The length to first bend 1", between joints $\frac{3}{4}$ ", terminal segment of awn 3" long, total length 4 to 5". Awn hispidulose. The roots are long and slender not as coarse as most of the perennials in the genus. Very many old and dried leaf sheaths left at base. The new leaves extending up from the dried leaf mats 4 to 6", in color light green, covered with pilose hairs. Scabrous above, mostly involute, others flat. Sheaths glabrous, not scabrous. Ligule fimbriate, $\frac{1}{8}$ " long, decurrent not pubescent, light brown in color.

This plant differs from Stipa comata in the shorter straight third segment of the awn; glumes and lemma averaging a little longer; panicle usually from the uppermost sheath. The ligule is long, as in Stipa comata.

Range: Prairies, plains, and dry hills, in the following states; Montana, Wyoming, Idaho, Washington, Colorado, Utah, New Mexico, Arizona, and California. This variety does not extend as far east as Stipa comata.

Arizona plants studied and checked from herbarium.

Tusayan, Read 1912.

Plants reported from Arizona: Grand Canyon, Hitchcock
10450; Mac Dougal 171; Chase 5805, 5817. Hell Can-
yon, Rusby 877.

4. Stipa pringlei (Beal) Scribn. (Turkey Food)

Oryzopsis pringlei Beal, Bot. Gaz. 15:112. 1890.

Synonym: Stipa pringlei Scribn. 1892.

A perennial grass with slender flat leaves, culms glabrous, erect from 30 to 40" tall, with numerous leaves extending up from the base 10 to 12" long; sheaths about $\frac{1}{2}$ as long as the internodes. Inflorescence loosely paniculate with most branches erect, few-flowered, lower ones somewhat spreading, naked below, 3 to 6" long, Rachis erect, angled, scabrous, very fine white hairs. Glumes equal, broad, membranous, $\frac{1}{2}$ " long, 7 to 9 indistinct green nerves, the central one extending into a short awn, margins wide and translucent. Lemma light to dark brown, $\frac{3}{8}$ " long, $\frac{1}{16}$ " in diameter, outline oblong-elliptical or blunt, appressed sparsely pubescent, short light brown hairs, with a dense short brown tuft at apex around the awn. Awn articulate, twisted to second joint; to first bend $\frac{3}{8}$ ", with very fine short hairs, middle portion about $\frac{1}{4}$ ", last section $\frac{1}{2}$ " long, straight, needle-like, with very fine short hairs. Length over all from 1" to $1\frac{1}{4}$ ". Roots fine, long with numerous fine branches. Many old leaf sheaths

near base; sheaths loosely inclosing glabrous culms, wide transparent margins, strongly striate, glabrous. Ligule decurrent brown-fimbriate, acute, 1/8" long. Leaves on culm 1/16 to 1/8" wide, 2" to 3" long, linear-acuminate. Basal ones 10 to 15" long, 1/8" wide, also linear-acuminate.

Range: Rocky woods and slopes, New Mexico and Arizona to Chihuahua. Arizona plants studied and checked from herbarium. Tusayan, Read 1913. Santa Catalina Mts. at Stone Cabin Canyon, Thornber 1903. Chiricahua Mountains, Blumer 168. Box Springs Sabino Canyon, Livingston and Thornber 1906. Rincon Mountains, Blumer 1909, and one example from the Mogollon Mts. in New Mexico, Metcalfe 1905.

5. Stipa eminens Cav.

Stipa eminens Cav. Incon. Pl. 5:42. ph. 467. f. 1. 1799.

Synonym: Stipa erecta Fourn. 1886.

Stipa flexuosa Vasey. 1888.

A perennial grass growing in clumps, with the stems erect, branched only from the base, slightly compressed to round, scabrous, from 24 to 30" tall, light green in color. The internodes scabrous, from 2 to 4½" long. The collar of the node is slightly depressed with the stem slight contracted below. Sheaths of various lengths, loosely inclosing the stem, split to the base, with the margins overlapping $\frac{3}{4}$ of length, open above. Sheath twisted on stem, upper face scabrous, inner face glabrous, margins

entire, translucent. Ligule membranous, transparent, $1/8$ " long, united at the base with several splits above, acute at apex. Collar yellow $1/64$ " wide. Blade linear-involute or needle-like, 4 to 7" long, diameter $1/16$ ", scabrous and pubescent outer surface, upper glabrous. The inflorescence is narrow loosely paniculate, 6 to 7" long. Rachis twisted, nodes prominent, erect, not branched. Rays erect, scabrous, hair-like, several from each node, pubescent, loosely flowered. Glumes 2, membranous, keeled and lanceolate to acuminate, pale violet-red. Outer glume transparent, at base 3-nerved, at apex 1-nerved extending into a long point, margins entire, faces glabrous, from $5/16$ " to $3/8$ " long, $1/64$ to $1/32$ " wide. Inner glume indurated 3-nerved $1/4$ " to $5/16$ " long, $1/64$ to $1/32$ " wide. Lemma strongly convolute inclosing the palea and seed; terete, with a prominent sharp pointed callus at base, with a pencil of densely appressed silky hairs around articulation. Lemma small, terete, $1/4$ " long, $1/32$ " in diameter, light brown in color. Awn from 1 to $2\frac{1}{2}$ " long, ciliate-plumose, twisted $1/4$ to $1/3$ length, reddish-brown near base, translucent and hair-like above. The seed is yellow-brown, indurated, terete, apex acute.

Range: Rocky hills, Texas to Arizona and south to Central Mexico. Arizona plants studied and checked from herbarium. Foothills at Pearce, Thornber 1905. Gavanza Southern California, Grant 1902. Lower California, Palmer 1889. San Bernardino, Sanbern 1891.

Plants reported from Arizona: Camp Grant, Rothrock 1874.

6. Stipa vaseyi Scribn.

Stipa viridula var. robusta Vasey. Contr. U. S. Nat.

Herb. 1:56. 1890.

A coarse mostly erect perennial grass growing from 30 to 40" tall, sometimes more, with large flat leaves, branches of the panicle erect, and several-flowered. The spike-like panicle 7 to 12" long or more, 1" wide, often interrupted below; compact, pale or greenish, the branches appressed, with 1 to 4 branches at each node; some short others $2\frac{1}{2}$ " long branched 2 or 3 times, pedicels and rachilla scabrous. Glumes about equal, $\frac{3}{8}$ " long; acuminate to a soft fine point $\frac{1}{16}$ " long, transparent, firm; nerves not distinct 2 to 5, dark green. Lemma from $\frac{1}{4}$ to $\frac{5}{16}$ " long, at maturity medium dark brown. Callus $\frac{7}{32}$ " long, blunt, densely set with erect white hairs. Body narrow fusiform, tapering into awn above, villous all over with appressed white hairs those at base slightly longer. Awn short pubescent at base, scabrous toward apex, $\frac{3}{4}$ " long, with 2 slight bends in lower $\frac{2}{3}$, slightly twisted to second bend. Culms erect, often inclosed by several (2 to 3) loosely overlapping sheaths near the base. Sheaths glabrous, margins entire, from 2 to 12" or more long; villous at the throat and for an inch or so along the margins. A strong hispidulous line across the collar. Ligule consisting of a thin brown membrane, sometimes scattered hairs. The leaves linear-acu-

minate, basal $\frac{1}{2}$ flat, from 3.16 to $\frac{5}{16}$ " wide, 12 to 24" long, the upper portion much narrower often involute. Margins entire, glabrous below, slightly scaberulose toward the apex.

Range: Dry plains and hills and dry open woods, Colorado to Northern Mexico. Arizona plants studied and checked from herbarium, Apache Forest, Sizer 1913.

Plants reported from Arizona; San Francisco Mountains, Leiberg 5908; Lemmon 3181. Volunteer Valley, Lemmon 4679.

ALPHABETICAL LIST OF STIPA OF NORTH AMERICA

Synonyms In Parenthesis

1. *Stipa angustifolia* Hitchc.
2. *Stipa arida* Jones
3. *Stipa aristella* L.
4. *Stipa avenacea* L.
5. (*Stipa avenacea* Willd.)
6. *Stipa avenacioides* Nash
7. (*Stipa barbata* Michx.)
8. (*Stipa bloomeri* Boland)
9. (*Stipa brevicalyx* Fourn.)
10. *Stipa californica* Merr. & Davy.
11. (*Stipa californica* Vasey)
12. (*Stipa canadensis* Poir.)
13. (*Stipa capillaris* Lam.)
14. (*Stipa ciliata* Scheele)
15. (*Stipa cirrosa* Fourn.)
16. *Stipa clandestina* Hack.
17. *Stipa columbiana* Macoun.
18. *Stipa columbiana nelsoni* (Scribn.) Hitchc.
19. *Stipa comata* Trin. & Rupr.
20. *Stipa comata intermedia* Scribn.
21. *Stipa comata intonsa* Piper
22. *Stipa constricta* Hitchc.
23. *Stipa coronata* Thurb.
24. *Stipa coronata parishii* (Vasey) Hitchc.
25. (*Stipa debilis* Mez.)
26. (*Stipa demissa* Steud.)
27. (*Stipa diffusa* Walt.)
28. *Stipa editorum* Fourn.)
29. *Stipa elmeri* Piper & Brodie.
30. *Stipa eminens* Cav.
31. (*Stipa erecta* Fourn.)
32. (*Stipa eriostachya* H. B. & K.)
33. (*Stipa expansa* Poir.)
34. (*Stipa fimbriata* H. B. & K.)
35. (*Stipa flexuosa* Vasey)
36. (*Stipa frigida* Phil.)
37. (*Stipa geniculata* Phil.)
38. (*Stipa gynerioides* Phil.)
39. (*Stipa hassei* Vasey)
40. (*Stipa hieronymusii* Pilger.)
41. (*Stipa hymenoides* Roem. & Schult.)
42. *Stipa ichu* (Ruiz. & Pav.) Kunth.
43. *Stipa intermedia* Scribn.
44. (*Stipa jarava* Beauv.)
45. (*Stipa juncea* Michx.)
46. (*Stipa kingii* Boland.)

47. *Stipa leiantha* Hitchc.
48. *Stipa lemmoni* (Vasey) Scribn.
49. *Stipa lepida* Hitchc.
50. *Stipa lepida andersoni* (Vasey) Hitchc.
51. *Stipa lettermani* Vasey.
52. *Stipa leucotricha* Trin & Rupr.
53. (*Stipa linearifolia* Fourn.)
54. (*Stipa macounii* Scribn.)
55. (*Stipa melanocarpa* Muhl.)
56. (*Stipa membranacea* Pursh.)
57. (*Stipa mendocina* Phil.)
58. *Stipa mexicana* Hitchc.
59. (*Stipa minor* Scribn.)
60. (*Stipa mormonum* Mez.)
61. *Stipa mucronata* H. B. & K.
62. *Stipa multinodis* Scribn.
63. (*Stipa nelsoni* Scribn.)
64. *Stipa neomexicana* (Thurb.) Scribn.
65. (*Stipa nuttalliana* Steud.)
66. *Stipa occidentalis* Thurb.
67. (*Stipa oregonensis* Scribn.)
68. (*Stipa oreophila* Speg.)
69. (*Stipa parishii* Vasey.)
70. *Stipa parviflora* Nutt.
71. (*Stipa patens* Willd.)
72. (*Stipa pauciflora* Rasp.)
73. *Stipa pinetorum* Jones
74. *Stipa porteri* Rydb.
75. (*Stipa pratensis* Phil.)
76. *Stipa pringlei* (Beal) Scribn.
77. (*Stipa pringlei lemmoni* Vasey)
78. *Stipa pulchra* Hitchc.
79. (*Stipa pungens* Nees & Mey.)
80. *Stipa richardsoni* Link.
81. (*Stipa robusta* Scribn.)
82. (*Stipa robusta* Willd.)
83. (*Stipa sanluisensis* Speg.)
84. *Stipa saxicola* Hitchc.
85. *Stipa scribneri* Vasey.
86. (*Stipa sericea* Michx.)
87. (*Stipa setigera* Presl.)
88. *Stipa spartea* Trin.
89. *Stipa spartea curtiseta* Hitchc.
90. *Stipa speciosa* Trin. & Rupr.
91. *Stipa spicata* Walt.
92. *Stipa stillmanii* Boland.
93. (*Stipa stricta* Vasey)
94. (*Stipa subulata* Fourn.)
95. *Stipa tenuissima* Trin.)
96. *Stipa thurberiana* Piper
97. (*Stipa trochlearis* Nees & Mey.)

- 98.(*Stipa tweedyi* Scribn.)
- 99.(*Stipa vaginata* Phil.)
- 100. *Stipa vaseyi* Scribn.
- 101.(*Stipa villosa* Walt.)
- 102. *Stipa virescens* H. B. & K.
- 103.(*Stipa virginica* Pers.)
- 104. *Stipa viridula* Trin.
- 105. *Stipa williamsii* Scribn.

2. Aristida L.

Triple-awned Needlegrass. Dogtown Grass.

Tufted grasses, with narrow usually involute leaf-blades with short ciliate ligules and narrow or open panicles. Spikelets 1-flowered, disarticulating above the glumes. Glumes narrow, acute, or acuminate, keeled, usually 1-nerved, sometimes awn-pointed. Lemma indurate, narrow, terete, involute, with a hard sharp-pointed pilose callosity at base; lemma usually not articulate at apex to column of awns, often scabrous and twisted, awns usually trifid, or if lateral awns obsolete, column not jointed to lemma. Palea tightly inclosed in lemma.

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KEY TO THE ARIZONA SPECIES OF ARISTIDA

- A. Plants perennial.
- B. Neck of fruit jointed at its base, the awns nearly equal length.
- C. Culms pubescent. Dry sandy soil. Yuma, Arizona.
 - 1. A. californica Thurb.
- CC. Culms glabrous. Sandy soil. Southern Arizona.
 - 2. A. glabrata (Vasey) Hitchc.
- BB. Neck of fruit not jointed at its base to the column of the awns, the awns of different lengths.
- D. Panicle open; the branches divaricate to erect ascending joined by pulvini to rachis, naked at the base; panicle about $\frac{1}{2}$ length of culm. (Group Divaricata)
- E. Central awn prominent, lateral awns minute (less than $\frac{1}{8}$ " long), or wanting.
- F. Awn more or less arcuate; panicle divaricate branched.
- G. Lateral awns obsolete, branches often naked below.
 - 3. A. ternipes Cav.
- GG. Lateral awns not obsolete, erect, bristle-like, $\frac{1}{32}$ to $\frac{1}{16}$ " long; lower branches often enclosed in sheath. 3a. A. ternipes divergens (Vasey) Hitchc.
- FF. Awn not arcuate; panicle not wide spreading; awn bent at a 45° angle, scabrous and twisted below angle.
 - 4. A. schiedeana Trin. & Rupr.
- EE. Central awn not prominent, lateral awns of about the same length as central.
- H. Branches of panicle abruptly spreading or reflexed at base. Glumes equal.
- I. Plants small usually less than 1 ft. tall, forming hemispheric tufts as much as 1 ft. in diameter. Pedicels short (mostly less than 1" long), flexuous.
 - 5. A. havardii Vasey.
- II. Plants larger, 1 to 2 ft. tall, growing in clumps mostly in sheltered places. Pedicels mostly longer than 1", not flexuous.
 - 6. A. divaricata Humb. & Bonpl.
- HH. Branches drooping or ascending, not abruptly spreading at base. Glumes unequal.
 - 7. A. pansa Woot. & Standl.
- DD. Panicle narrow, the branches mostly appressed without a pulvinus. Panicle $\frac{1}{3}$ length of culm or less.
- J. Panicles short (less than 6" long), not compact often flexuous; awn 1" or more long.

- K. Branches of the rather loose and nodding panicle slender and flexuous; pedicels often recurved, lemma about $3/8$ " long, short beaked and tuberculate-scabrous; awns very slender.
8. A. purpurea Nutt.
- KK. Branches of the panicle, more rigid and appressed; lemma $1/2$ " long, gradually narrowed above, not beaked; awns stouter.
- L. Lemma scarcely narrowed above, scaberulous only at the tip; leaves not conspicuously basal.
9. A. longiseta Steud.
- LL. Lemma gradually narrowed above, scabrous on the upper half; leaves mostly in a short curly cluster at the base of the plant.
10. A. fendleriana Steud.
- JJ. Panicle long mostly more than 6" long, compact, not flexuous, but rigid; awns mostly less than 1" long.
- M. Glumes unequal, lower glume $5/16$ " long or shorter, second glume about twice as long. Blades involute, $1/24$ " diameter.
- N. Collar of leaf without pubescent line; panicle few-flowered, with short appressed branches.
11. A. glauca (Nees) Walp.
- NN. Collar of leaf with a pubescent line; panicle several-flowered, with branches 2" long.
12. A. wrightii Nash.
- MM. Glumes equal or nearly so mostly longer than $5/16$ "; blades flat, or part of them involute, $1/12$ " wide.
- O. Glumes equal with awn-points $1/16$ " long; lemma with a twisted beak $3/16$ " long, awns about equal $3/4$ " long; plants 1 to 4 ft. tall.
13. A. arizonica Vasey.
- OO. Glumes slightly unequal, short bristle-pointed; lemma tapered into a short obscurely twisted beak; awns equal to unequal about 1" long; plants 1 to $1\frac{3}{4}$ ft. tall.
14. A. parishii Hitchc.
- AA. Plants annual.
- P. Panicle compact, with short numerous branches overlapping on an erect, rigid panicle.
- Q. Plants larger, culms with many geniculate branches. Summer form.
15. A. adscensionis L.
- QQ. Plants smaller, innovations numerous, culms rarely branched. Winter form.
15. A. adscensionis L.

1. Aristida californica Thurb.

Aristida californica Thurb.; S. Wats. Bot. Calif.

2:289. 1880.

Synonym: Aristida californica var. fugitiva Vasey.

1892.

Plants perennial, growing in clumps in sand washes from 15 to 18" tall. Roots long, coarse, many branched from the base. Culms slender, often geniculate branched, pilose, with the nodes slightly enlarged. The sheaths mostly shorter than the internodes, glabrous, scaberulose, often splitting off from the culm. Ligule consists of a dense ciliate collar of short white hairs, those on the margin somewhat longer; a few scattered hairs on back of ligule. Blades from 4 to 9" long from base; those on stems mostly less than 2" long; narrow to involute, flexuous, scabrous, sometimes with scattered hairs. Panicles short, but numerous due to branched culms, mostly less than 3" long, narrow, erect, Glumes unequal, acuminate, thin, 1-nerved, apex often short-awned or frayed; first glume $\frac{1}{2}$ to $\frac{5}{16}$ " long, second glume $\frac{1}{2}$ to $\frac{5}{8}$ " long, fine tapered to apex. Lemma $\frac{7}{8}$ " long, very slender, twisted, and light colored; callus pilose, sharp-pointed, $\frac{1}{16}$ ", or fruiting lemma $\frac{1}{4}$ " long. Column slender, slightly twisted, scabrous, $\frac{5}{8}$ " long. Awns about equal, divaricate, slender, mostly straight, $1\frac{1}{2}$ to $1\frac{3}{4}$ " long. All parts of the plant slender, rigid, with a light green color, often becoming translucent. Yuma mater-

ial checked well with that from California.

Range: Dry sandy or gravelly soils, southern California, Yuma, Arizona and northwestern Mexico. Arizona plants studied and checked from herbarium. Yuma, Arizona, Thornber 1912. E. D. Ball 1933.

2. Aristida glabrata (Vasey) Hitchc.

Aristida glabrata (Vasey) Hitchc. 1924. Based on Aristida californica var. major Vasey, Proc. Calif. Acad. II. 2:212. 1889.

Synonym: Aristida californica var. glabrata Vasey . Proc. Calif. Acad. II. 3:178. 1891.

Perennial plants growing in dense clumps, in sandy soil, from 12 to 18" tall, with short flat or involute leaves extending up the culm. Roots coarse fibrous and long. Culms branched often geniculate, erect, terete to slightly compressed, glabrous, slender. Internodes 1 to 5" long, internodes enlarged, purple, glabrous; sheaths shorter than internodes, loosely inclosing stem, split to base and often free from culm. Ligule consists of a short ciliate collar with tufts of hair on margins. Blades narrow, flat to involute, at base 2 to 6" long, on culm mostly less than 2", glabrous, to slightly scabrous. Panicle short, branches erect, few-flowered, spikelets single or in pairs on short pedicels 1/8" long. Glumes unequal, lower glume 5/16" long, scaberulose on keel, 1-nerved, translucent,

apex short-pointed. Upper glume $\frac{1}{2}$ to $\frac{5}{8}$ " long, 1-nerved, translucent, apex long-pointed. Lemma $\frac{5}{8}$ to $\frac{3}{4}$ " long, including neck, callus $\frac{1}{16}$ " long, sharp-pointed, white pilose, fertile lemma mottled or dark, $\frac{3}{16}$ " long, slightly enlarged below slender above, jointed to slender column, glabrous; column light colored, slender, slightly twisted and scabrous, $\frac{7}{16}$ " long; awns fine spreading, about equal $1\frac{1}{4}$ " long.

This species differs from A. californica in the glabrous culms, the shorter column, and the longer, more densely flowered panicles.

Range: Open sandy soil, southern Arizona and California.

Plants studied and checked from herbarium in Arizona.

Sandy wash Tucson, Telford 1933. Santa Rita Mountains, Stone Cabin Canyon, Thornber 1903. Steam Pump, Oracle Road, Thornber 1905. Yucca, Jones 1884.

Plants reported from Arizona: Santa Rita Mountains, Griffiths and Thornber 197. Desert Wells, Griffiths 7312. Phoenix, Hitchc. 13665. Sasabe, Griffiths 6931.

3. Aristida ternipes. Cav.

Aristida ternipes. Cav. Incon. Pl. 5:46. 1799.

Synonym: Aristida scabra Kunth, 1829

Muhlenbergia scabra Trin. & Rupr. 1842.

Aristida floridana Vasey, 1885.

A perennial plant growing in dense clumps 1 to 2" in diameter, from 18 to 24" tall. Roots coarse fib-

erous, branched, long. Internodes from 2 to 6" long, $1/16$ " in diameter, glabrous, yellow-green to dark purple where exposed; nodes double-jointed, sometimes geniculate and branched, upper joint of node enlarged, often branched, lower one from which the sheath grows, smaller, both glabrous. Sheath from shorter than to longer than the internodes, mostly loosely inclosing stem, usually split to the base, margins translucent entire, glabrous, smooth on both faces. Ligule short $1/24$ " long, a membranous collar, entire, with a fimbriate margin. Leaves scabrous especially near base on both faces, margins entire, scattered long hairs on inner face, several near base, leaves from $1/16$ to $3/16$ " wide, 6 to 15" long, flat to loosely involute, light green-yellow to purple. Panicle well exserted, open from $\frac{1}{4}$ to $\frac{1}{2}$ the total height of the plant, 12 to 24" long. Rays wide spreading leaving rachis exposed. Rachis angled, often flat, finely scabrous, grooved, from 2 to 5 rays mostly 3 from each joint, rays attached to a distinct pulvinous at base; rays grooved or channelled on inner face. The rays slender from 2 to 4" long, with one or two pedicels, rays scabrous, margins serrulate. One-flowered spikelets, purple to straw-colored. Glumes about equal, the lower one often deciduous, acuminate, 1-nerved, $3/8$ " long; the first scabrous on the keel, the second smooth. Lemma from $3/8$ " long to $7/16$ ", excluding awn, including the hairy callus, triangular, keeled, distinctly grooved with serrulations on margins, scabrous

on sides, dark brown to spotted purple. Callus at base thinly covered with erect white hairs. Awn from apex to lemma $7/16$ to $5/8$ " arcuate, scabrous, nearly terete. The lateral awns obsolete. Examples in which the lateral awns are present should be referred to A. ternipes divergens.

Range: Rocky hills and dry plateaus, Arizona to northern South America; also in southern Florida. Arizona plants studied and checked from herbarium. Ajo Mountains, Babquivari Mountains, Santa Rita Mountains, and on the mesas near Tucson, Telford 1933.

Plants reported from Arizona: Chiricahua Mountains, Blumer 1907; Toumey in 1896. Santa Rita Forest Reserve, Griffiths 5961; Thornber 44. Fort Hauchuca, Willcox 1894. Patagonia, Hitchc. 3653. Tucson, Hitchc. 13251.

3a. Aristida ternipes divergens (Vasey) Hitchc.

Aristida ternipes divergens; based on Aristida divergens Vasey, Contr. U. S. Nat. Herb. 3:48. 1892.

Synonym: Aristida schiedeana var. minor Vasey, 1886.

A perennial, rank-growing grass, in dense clumps, 2 to 4" in diameter, 2 to 6 ft. tall. Panicle usually from $1/3$ to $1/4$ entire height of plant. Lemma with one arcuate awn and two erect bristle-like lateral awns from $1/32$ to $1/16$ " long. Culms cespitose, erect, coarse, several-jointed near the base; sheaths overlapping each

other $\frac{2}{3}$ their length, glabrous below, scabrous above, sometimes villous at the throat. Ligule consisting of a yellowish-brown collar with a ciliate margin and tufts of hairs on each side. Blades mostly involute, narrower than sheaths, tapering into needle-like points $\frac{1}{32}$ to $\frac{1}{16}$ " wide, 4 to 10" long, scabrous, often flexuose. Panicle often partly inclosed by sheath, open divaricately branched. Rachis glabrous, with two mostly scabrous branches from each node, branches distant, mostly naked near base; spikelets appressed at ends of branches. The glumes about equal $\frac{3}{8}$ " long, 1-nerved, outer one scabrous on keel mostly thin, acuminate, light yellowish-brown to purple in color, with awns $\frac{1}{16}$ " long. Lemma very slender throughout; callus very short covered with erect pilose hairs; body glabrous, often compressed or angled. Neck not twisted $\frac{3}{8}$ " long, scabrous on ridges extending into a single scabrous nearly terete arcuate awn $\frac{1}{4}$ to $\frac{3}{8}$ " long; the bristly-like lateral awns $\frac{1}{32}$ to $\frac{1}{16}$ " long, scabrous and erect. The seed flat, light to dark brown, $\frac{3}{32}$ " long.

This plant differs from Aristida ternipes in being larger, with the panicle usually less than $\frac{1}{3}$ the entire length of plant, base often inclosed by sheath, with lateral branches longer. The lateral awns being evident from $\frac{1}{32}$ to $\frac{1}{16}$ " long.

Range: Rocky hills and plains Texas to Nicaragua. Arizona plants studied and checked from herbarium. Tonto

Basin Safford, Christinsen 1921. Tucson, Thornber.
Tucson Mountains, Telford. 1933.

Plants reported from Arizona: Prescott, Hitchcock. Portal,
Eggleston. 10936. Santa Rita Mountains, 3385, Santa
Catalina Mountains, 7059, and White Mountains, 5374,
Griffith. Bisbee, Mearns. 927. Tucson, Hitchc.
3496.

4. Aristida schiedeana Trin. & Rupr.

Aristida schiedeana Trin. & Rupr. Mem. Acad. St. Petersb.
VI. Sci. Nat. 5:120. 1842.

Synonym: Aristida flexuosa Fourn. 1886.

Aristida orcuttiana Vasey 1886.

An erect growing perennial plant with
solid, scabrous, unbranched stems with internodes 3 to 4"
long or longer. The nodes double, not enlarged, purple,
glabrous. Sheaths loosely inclosing internodes, shorter than
the internodes, margins translucent, often violet in color.
Sheath densely villous at the throat and on the well-marked
collar, ligule villous. Blades linear, involute, flexuous
basal ones flat, scabrous, lower ones 4 to 8" long. Pani-
cle very loosely branched about 9" long, or from $\frac{1}{2}$ to $\frac{1}{3}$
length of culm. The rays are ascending or spreading with a
pulvinus at the base, the rachis is wiry, scabrous, erect.
Spikelets 1-flowered, on pedicels of various lengths. Low-
er glume $\frac{5}{16}$ to $\frac{1}{2}$ " long, 1-nerved, keeled, membranous, apex
acuminate. Upper glume shorter, about $\frac{2}{3}$ as long, $\frac{1}{4}$ ", lan-

ceolate, bifid. Lemma from $\frac{1}{4}$ to $\frac{3}{8}$ " long, tubular not hairy at base, scabrous, serrulations on margins, tightly involute. Palea may be separated by pulling on awn. Palea scabrous, slightly tufted at base, light colored to purple-spotted. The fruit including the neck extending into a bent awn. Lemma from $\frac{5}{16}$ to $\frac{3}{8}$ " long, awn from apex of lemma to bend from $\frac{5}{16}$ to $\frac{5}{8}$ ", scabrous and twisted. The apical portion of the awn about $\frac{1}{2}$ as long as the basal part, terete and at right angles to it.

Range: Rocky hills and plains, southwestern United States to Guatemala. Arizona plants studied and checked from herbarium. Santa Rita Mountains, Stone Cabin Canyon, Thornber 1903. Santa Catalina Mountains, Telford 1933.

Plants reported from Arizona: Santa Rita Reserve, Griffiths 5963; Madero Canyon, Wooton 1914; Tucson, Toumey 756; Webber's Camp, Griffiths's 7175; Fort Apache, Wooton 1913; Dragoon Mountains, Griffiths 1866; Prescott, Toumey 82; Fort Huachuca, Willcox 1894; Bowie, Jones 4233; Patagonia, Hitchcock 3711; Chiricahua Mountains, Toumey 1896.

5. Aristida havardii Vasey.

Aristida havardii Vasey, Bull. Torrey Club 13:27. 1886.

A perennial grass growing in hemispherical mats as much as 1 ft. in diameter, and from 8 to 14" tall.

The culms rather fine, unbranched, radiating in all directions, mostly glabrous below, scaberulous above, especially the rachis of the panicle. Sheaths short, often overlapping, glabrous, loosely inclosing the culm. The ligule with a tuft of hairs $1/8$ " long on each margin, and between a short ciliate, white collar. The leaves are fine, flat, or mostly involute, scabrous below, glabrous above, from 3 to 6" long, the tip pointed. Panicle open, divaricate, slightly exserted above sheath, fragile; rachis scabrous with 2 or 3 short, flexuous pedicels at each node at equal intervals from base of rachis to apex; lower pedicels 2 to 4-flowered, above 1 or 2-flowered. At each node of the rachis at the base of the pedicels is a small pulvinus. Pedicels mostly less than 1" long to first flower. Glumes equal, $1/2$ " long, narrow, pointed, one nerved and thin, the lower glume keeled, second glume glabrous. Lemma mostly $7/16$ " long, slightly shorter than glumes; the callus short pilose pointed; fruit slender, tapered to a straight or twisted neck, $3/16$ " long; glabrous below, scaberulose above; awns fine scaberulose, equal to or slightly unequal, $5/8$ to $3/4$ " long, spreading.

Range: Hills and plains, western Texas to Arizona, and central Mexico. Arizona plants studied and checked from herbarium. Sulphur Springs Valley, Hooker's Ranch, Thornber 1905. Pochist, Griffiths 1885, Northern Arizona, Sagie Canyon, Whitehead 1916. Santa Rita Mountains, Peck 1933.

Plants reported from Arizona: Cochise, Griffiths 1885.

San Francisco Mountains, Rusby 447c. Fort Huachuca, Willcox 423.

6. Aristida divaricata Humb. and Bonpl.

Aristida divaricata Humb. and Bonpl.; Willd. Enum. Pl.

1:99. 1809.

Synonym: Aristida humboldtiana Trin. & Rupr. 1842.

Aristida palmeri Vasey. 1883.

A large coarse growing perennial, branched only at the base, in dense clumps 3 to 5" in diameter, from 4 to 5 ft. tall. Panicle large, open with wide-spreading divaricate branches which are joined by distinct pulvinus to the erect rachis. Culm glabrous, often scabrous toward apex. Sheath loosely enclosing internode, often splitting off, glabrous, with entire translucent margins. Ligule very short, ciliate. Blades flat to loosely involute with a few scattered long hairs on inner face; 1/8" wide, from 9 to 15" long, slightly scabrous near apex. Panicle often naked below, with pedicels 1½ to 3" apart on rachis, mostly in pairs lower pedicels from 4 to 8" long, upper ones shorter, few-flowered; those near apex often appressed. Glumes two, about equal, strongly keeled with serrulations, from 3/8 to 7/16" long, apex with a short awn. Lemma dark brown or purple, sometimes speckled, often angled, from 3/8 to ½" long, glabrous, gradually tapered from callus to base of awns, sometimes twisted; callus 1/16" long, pilose, sharp-pointed.

Awns 3, about equal, or central somewhat longer, spreading, not contorted, scabrous, from $\frac{1}{2}$ to $\frac{3}{4}$ " long.

This plant differs from A. havardii in being larger, more rigid, and not growing in hemispheric tufts. The lower portion of panicle in A. divaricata often naked, while in A. havardii the panicle branches equidistant.

Range: Dry hills and plains, Kansas to southern California, south to Guatemala. Arizona plants studied and checked in herbarium. Tucson, Rosemont, Tucson Mountains, Santa Rita Mountains, Thornber 1901. Dragoon Mountains, Griffiths 1900. Santa Rita Mountains, Peck 1933. Santa Catalina Mountains, Telford 1933

Plants reported from Arizona: Pedregosa Mountains, Mearns 839. Santa Rita Mountains, Griffiths & Thornber 25, 296. Fort Huachuca, Willcox 1894. South of Bisbee, Mearns 857. Phoenix, Griffiths 7331. Empire Ranch, Thornber 28. Patagonia, Hitchcock 3701. Santa Catalina Mountains, Griffiths 7072. Oracle, Hitchcock 13259.

7. Aristida pansa Woot. & Standl.

Aristida pansa Woot. & Standl. Contr. U. S. Nat. Herb. 16:112. 1913.

A perennial plant growing in small clumps, from 18 to 24" tall, with a narrow erect panicle; but loosely, divaricate branched, the short pedicels joined

by a pulvinus to the rachis. Culms slender, glabrous, to scaberulose, unbranched. Sheaths overlapping, from 1 to $1\frac{1}{2}$ " long, scabrous, slightly puberulent between the nerves. Ligule consists of a very short dense ciliate collar of white hairs, a tuft of long hairs on either side, back of ligule very slightly short hairy. Blades involute, somewhat flexuous, fine scaberulose, or minutely hairy, from 2 to 6" long, mostly 2 to 3" long. Panicle loose, narrow, with the lower pedicels spreading or all of them erect. Rachis often naked below with pedicels and fruits overlapping above, not compact, florets few. Pulvinus distinct at base of lower pedicels, not developed above. Glumes unequal, lanceolate, short awn-pointed, 1-nerved, lower one finely serrate, on keel, $\frac{5}{16}$ " long, upper glume, translucent, $\frac{7}{16}$ to $\frac{1}{2}$ " long. Lemma with a short pilose callus at base $\frac{1}{24}$ " long, glabrous and speckled below, scaberulose and yellowish above, slender gradually tapered to a short slightly twisted neck, from $\frac{5}{16}$ to $\frac{3}{8}$ " long. Awns 3 slightly unequal, fine scaberulose, from $\frac{3}{8}$ to $\frac{5}{8}$ " long, spreading, often contorted at base.

This species differs from Aristida havardii in the stiff branches, appressed pedicels, and shorter awns, and from Aristida divaricata in the short branches of the panicle, and from both in unequal glumes.

Range: Plains and open ground, western Texas to Arizona.

Plants studied were sent in from New Mexico. Las

Cruces, New Mexico Griffiths 7417, 1904. Jornada Range Reserve, Wootton 1912, and Leon Hurt. 1916. Plants reported from Arizona: Grand Canyon, Hitchcock 15068. Without locality, Lemmon 388.

8. Aristida purpurea Nutt

Arisita purpurea Nutt. Trans. Amer. Phil. Soc. II. 5:145. 1837.

Synonym: Aristida aequiramea Scheele, 1849.

Aristida curtiseta Buckl. 1863.

Aristida fasciculata var. californica Beal 1896.

A perennial plant growing erect in large clumps, often forming plots several feet in diameter. The panicle short, less than 6" long, loose, few-flowered, decidedly flexuous or wavy. Culms 18 to 24" tall, unbranched except near the base, scabrous, slender. Sheaths shorter than internodes, scabrous, loosely inclosing stem, margins entire, translucent. Ligule of short erect hairs, with tufts of hairs on margins. Blades flat to involute, linear-acuminate, striations scabrous, 4 to 10" long from the base, upper ones shorter. Panicle loosely branched, the pedicels fine, slender, often partly recurved, several from a single node. The glumes long, scabrous on keel, transparent; upper glume $\frac{3}{8}$ to $\frac{1}{2}$ " long, including short awn, apex often bifid, this glume not extending above base of awn; lower glume $\frac{3}{16}$ to $\frac{1}{4}$ " long, short awned, often purplish in color. Lemma $\frac{3}{8}$ to $\frac{1}{2}$ " long, over all, angled above, scabrous on

edges, very gradually tapered to base of awns, scarcely beaked; callus 1/24" long, short-pilose, body of lemma usually purplish. Awns nearly equal, slender, scabrous on margins, usually spreading at base not contorted, mostly 1½ to 2" long.

A. purpurea differs from A. longiseta in a longer, flexuous, panicle with glumes not extending above base of awns, and the awns finer and shorter.

Range: Dry hills and plains, Kansas to southern California, south to northern Mexico. Arizona plants studied and checked from herbarium. Tucson Mountains, Thornber 1906. Tucson, Thornber 1903. Oracle Road, Thornber 1915. Tucson, Telford 1932.

Plants reported from Arizona: Santa Catalina Mountains, Griffiths 7125. Santa Rita Mountains, Griffiths & Thornber 310. Tucson, Toumey 808. Santa Rosa, Griffiths 4144. Flagstaff, Griffiths 4965. Camp Lowell, Pringle 1881. Oracle, Hitchcock 13260. Patagonia, Hitchcock 3703.

9. Aristida longiseta Steud.

Aristida longiseta Steud. Syn. Pl. Glum. 1:420. 1854.

Synonym: Aristida purpurea var. longiseta Vasey 1878.

Aristida fasciculata var. nuttalli Thurb. 1896.

A perennial grass growing in dense clumps in sandy soil, from 18 to 24" tall. Culms scabrous,

compressed, rather fine $1/32$ " diameter, not branched, nodes few, purplish in color; sheaths scabrous, overlapping each other at the base, persistent on the culm; ligule a ciliate collar with conspicuous tufts of long hairs on margins; blades narrow, mostly involute, flexuous, scabrous on margins; basal leaves 4 to 6" long, those above shorter. Panicle narrow, erect but not stiff, wavy, few-flowered on a short axis, mostly less than 6" long, The branches ascending or in many cases curved or flexuous, but more rigid than in Aristida purpurea. The spikelets in pairs on pedicels of different lengths. The floret rays are very fine, terete, wire-like, and covered with a very short coarse pubescence. Lower glume $3/8$ to $9/16$ " long, upper glume $3/4$ to 1" long, mostly extending above the base of the awn branches. Both glumes 1-nerved, narrowed to awnless or mucronate apex. Lemma coarse, tapered very slightly above, mostly $5/8$ " long; callus compressed $1/24$ " long, pointed, white-pilose; fertile lemma light colored to spotted, irregularly scabrous, angled or compressed, neck absent; awns from $2\frac{3}{4}$ to 4" long, about equal, spreading, flat with serrations on margins.

Range: Plains and foothills, North Dakota to northern Mexico and westward to Montana, and Arizona. Arizona plants studied and checked from herbarium. Steam Pump, Oracle Road, Thornber 1905. Lincoln Forest, Jalm 1921. Coconino Forest, Sizer 1912. Mescal, Thornber 1906.

Plants reported from Arizona: Canyon Padre, Hitchcock.

13246. Prescott, Wooton 1911. Seligman, Wooton
1911. Tucson, Toumey 1892. Oak Creek, Rusby 23.
Ash Fork, Griffiths 5860. Fort Apache, Palmer 1890.
Adamana, Chase 5851, 5852, 5858. Hackberry, Jones
1884. Carrizo Mountains, Standley 7487. Congress,
Orcutt 2532. Santa Rita Mountains, Griffith and
Thornber 308.

10. Aristida fendleriana Steud.

Aristida fendleriana Steud. Syn. Pl. Glum. 1:420. 1854.

Synonym: Aristida purpurea var. fendleriana Vasey. 1892.

Aristida fasciculata fendleriana Scribn. 1894.

A perennial plant growing in small clumps from 1 to 2½ ft. tall, often forming patches, with numerous short curly leaves at the base. Roots fibrous and branching, with very short rootstocks sending up many stems and leaves from the base. Sheath with very distinct transparent margins, faces scabrous, the margins open above, overlapping below; sheaths from shorter than to longer than internodes. Ligule composed of a strigose collar with ciliate hairs on margins. The leaves are involute, mostly basal, needle-shaped, 3 to 6" long, flexuous, often with hairs near the base. Panicle loose, the rays scattered and ascending, mostly less than 6" long. Pedicels in pairs of unequal length with 2 to 6 spikelets on each, channelled with fine

serrations on margins, fine and wire-like. Glumes 2, unequal, one-nerved, keeled. Lower glume $\frac{1}{4}$ " long, membranous, acuminate, not awned. Upper glume $\frac{7}{16}$ " long, also acuminate. Lemma from $\frac{3}{8}$ to $\frac{1}{2}$ " long, indurated, short-pubescent callus at base, lower $\frac{1}{3}$ glabrous, upper $\frac{2}{3}$ scabrous; neck not prominent or twisted. Awns about equal in length or the central awn a little longer from $\frac{3}{4}$ to $1\frac{1}{2}$ " long, not twisted or bent, scabrous.

Range: Dry plains and hills Nebraska to Texas and Lower California. Arizona plants studied and checked from herbarium. Oracle, Thornber 1905. Empire Mts., Thornber 1902. Snowflake, Thornber 1917. Cosnino, Jones 1884. Navaho Reservation, Vorhies 1916.

Plants reported from Arizona: Santa Rita Reserve, Griffiths 4162. Tucson, Pringle 1884. Mormon Lake, McDougal 91. Flagstaff, Jones 1884. Jerome Junction, Tidestrom. Williams, Barber 51. White Mountains, Gray 5430. Prescott, Hitchcock 13191. Fort Huachuca, Willcox 21. Ash Fork, Griffiths 7353.

11. Aristida glauca (Nees) Walp.

Aristida glauca Nees, Linnaea 19:688. 1847.

Synonym: Aristida reverchoni Vasey. 1886.

Aristida vaseyi Woot. & Standl. 1912.

Perennial plants growing in clumps from 12 to 20" tall with a narrow panicle and mostly longer than 6". The roots are coarse fibrous, with new erect buds

at the crown inclosed in many dried leaf bases. Culms erect, slender branched only at the base, glabrous, scabrous. Sheaths mostly shorter than internodes often overlapping each other, scabrous, tightly inclosing culm. Ligule a white ciliate collar with a small tuft of hairs on margins. Leaves slender, mostly involute, scabrous below, glabrous above, 3 to 12" in length from the base, about 3" long on the culm, flexuous, often in curls. Panicles long, from 6 to 12", erect, few-flowered, branches appressed, bearing 1 or 2 spikelets. Glumes unequal, thin, often with apices blunt or bifid, not awned; lower glume scabrous on keel from $\frac{1}{4}$ to $\frac{5}{16}$ " long; upper glume from $\frac{3}{8}$ to $\frac{5}{8}$ " long. Lemma including neck from $\frac{1}{2}$ to $\frac{5}{8}$ " long, callus short-pilose $\frac{1}{24}$ " long, base of lemma slender, glabrous, tapered into slender neck $\frac{1}{2}$ length of lemma, scabrous, often twisted. Awns three, fine scabrous, spreading, about equal, mostly 1" in length.

Range: Dry or rocky hills and plains, Texas to southern California and south Central Mexico. Arizona plants studied and checked from herbarium. Tucson, Thornber 1903. Grand Canyon, Alice Eastwood. Tucson Mountains, Thornber 1908. Ajo Road, and Pearce, Thornber 1905.

Plants reported from Arizona: Phoenix, Toumey 158. Bright Angel Trail, Grand Canyon, Hitchcock 13067; MacDougal 229. Jerome Junction, Tidestrom 923a. Kingman, Wooton

1911. Tucson, Hitchcock 13669. Santa Rita Mountains, Griffiths 7190. Fort Huachuca, Willcox 1894.

12. Aristida wrightii Nash. (*)

Aristida wrightii Nash in Small, Fl. Southeast. U. S. 116. 1903.

Plants perennial; culms cespitose, erect, glabrous, 1 to 2 ft. tall or sometimes taller; sheaths glabrous or sometimes on the innovations scaberulous, villous at the throat and usually with a more or less hispid or villous line across the collar; blades involute, curved or flexuous, scabrous on the upper surface, glabrous or sometimes scaberulous beneath, 10 to 5" long, about 1/24" wide; panicle erect, narrow, 6 to 8" long, the rather distant branches appressed or ascending, as much as 2 1/2" long, several-flowered, the lower sometimes somewhat flexuous; glumes unequal, 1-nerved, acuminate or mucronate but scarcely awn-tipped, the first 3/16 to 5/16" long, scabrous on the keel, the second about twice as long, glabrous; lemma 3/8 to 1/2" long, the callus about 1/24" long, pubescent, the body glabrous below, gradually narrowed toward the summit, scaberulous on the upper half; awns nearly equal, about 3/4" long, divergent, sometimes nearly horizontally spreading, somewhat contorted at base.

Range: Dry plains and hills, Texas to southern California

(*) This species not represented in our collection; description from Cont. U.S. Nat. Herb. Vol. 22, Pt.7, p559:1924 North American Species of *Aristida*, by A. S. Hitchcock.

and central Mexico.

Plants reported from Arizona: Washingtons Face, Griffiths
2480. Camp Grant, Rothrock 374. Phoenix, Dewy 1891.

13. Aristida arizonica Vasey

Aristida arizonica Vasey, Bull. Torrey Club 13: 27.
1885.

Synonym: Aristida appressa Vasey 1893.

A perennial, erect growing, unbranched grass, caespitose, from 1 to 4 ft. Tall with a narrow erect closely-flowered panicle mostly more than 6" long. Culms are scabrous above, glabrous below. Ligule consists of a dense ciliate collar with tufts of hairs on the margins. Blades from flat to involute especially toward tip, scaberulose above, glabrous below, from 8 to 12" long, 1/16 to 1/8" wide, the older leaves often flexuous. Panicle compact, narrow, erect, from 6 to 10" long, about $\frac{3}{4}$ " wide; rays erect, rather distant but often overlapping, giving the appearance of a crowded spike. Spikelets single-flowered closely set on pedicels. Glumes equal or very slightly unequal, awn-pointed, from 7/16 to 9/16" long, mostly purple, slightly keeled with outer one scaberulose. Lemma from $\frac{1}{2}$ to 9/16" long, with a short pilose callus; body channelled, tapered to a short neck loosely twisted, glabrous below scabrous above. Awns three, spreading, about equal $\frac{3}{4}$ " in length, flat and slightly contorted at base.

Range: Dry plains, stony hillsides, and open forests, mostly

at altitudes of 5,000 ft. or above. Colorado to Paraguay. Plants studied and check from herbarium. Tusayan, Read 1912. Coconino Forest, Pearson 1908. New Mexico, Vasey 1886.

Plants reported from Arizona: San Francisco Mountains, Rusby 1883. Chiricahua Mountains, Toumey 1896. Flagstaff, Chase 5848; Griffiths 5882; Jones 1884; Hitchcock 13240. Coconino National Forest, Pearson 49. White Mountains, Griffiths 5275, 5368. Harts Ranch, Rusby 875.

14. Aristida parishii Hitchcock

Aristida parishii Hitchcock in Jepson, Fl. Calif. 1:101. 1912.

Plants perennial, with numerous old sheaths and geniculate branches near base, growing in clumps from 12 to 21" tall. Culms glabrous, terete, jointed only near the base. Sheaths scabrous toward apex, glabrous below. Ligule a short ciliate membrane with a few scattered long hairs on margins. Blades ascending, flat, or involute, often wavy, scabrous on lower face; 10 to 14" long, 1/16" wide. Panicle narrow, with the branches including fruits spreading mostly 2" wide, 6 to 8" long, branches stout, many-flowered in clusters, appressed, three at each node; lower branches with fruits 2" long. No pulvinus at base of pedicel. Rachis scabrous above, irregular, stout. Glumes slightly unequal short bristle-pointed, 1-nerved, lower one $\frac{1}{2}$ " long, scabrous

on keel, upper glume 9/16 to 10/16" long, glabrous; in color both dark suffused purple; in outline narrow lanceolate. Lemma slender, gradually tapered to base of awns, glabrous below, increasingly scabrous on the upper half toward the straight or obscurely twisted summit; callus short and white pilose. Lemma 9/16 to 10/16" long. Awns divergent, fine, slightly rough; central awn $\frac{3}{4}$ to 1" long, lateral awns 1/8" shorter.

Range: Dry or rocky soil, Arizona and southern California.

Arizona plants studied and checked from herbarium.

Salt River Bridge, Telford 1933, Yucca, Jones 1884.

Northern Slopes Cat Mountain Tucson, 1905. Thornber.

Tucson Mountains, 1908. Thornber, Phoenix, Arizona

Thornber 1891. Arboretum, Telford 1933.

Plants reported from Arizona: Sierra Tucson, Pringle 1884.

Tucson, Toumey 1892. Yucca, Jones 1884. Congress

Junction, Wooton 7020. without locality, Vasey 1889.

15. Aristida adscensionis L.

Aristida adscensionis L. Sp. Pl. 82. 1753.

Synonym: Aristida bromoides H. B & K. 1816.

Aristida fasciculata Torr.

Aristida dispersa Trin & Rupr.

Aristida americana L. 1759.

Plants annual, with culms often geniculate-branched in summer forms, mostly unbranched and cespi-

tose in late fall and winter forms. In the summer form the culms glabrous, often $1/16$ " in diameter, characteristically branched and the yellowish-green color suffused with light purple, especially at the nodes. The sheath inclosing the lower of the two branches at the geniculate nodes, the upper internode slightly above naked, glabrous below scabrous above. Ligule a ciliate collar, without tufts of hairs on the margins. Blades mostly erect, from the base often tufted, from 6 to 9" long, $1/16$ " wide or less, slender, flat to involute, scaberulose. Panicle narrow, long, with many short erect pedicels several-flowered, the axis glabrous below, scabrous above. Glumes unequal, the lower one $3/16$ to $1/4$ " long, scabrous, apex pointed, upper one membranous, $1/4$ to $3/8$ " long. Lemma $1/4$ to $3/8$ " long, angled, scabrous above. Awns slightly unequal the central longer, from $1/4$ to $1/2$ " long.

Range: Rocky hills and plains, southwestern United States to Guatemala. Arizona plants studied and checked from herbarium. Yuma, Thornber 1912. Dragoon, Thornber 1915. Tucson, Thornber 1901. Santa Catalina Mountains, Santa Rita Mountains and Tucson Area, Telford 1933.

Plants reported from Arizona: Santa Rita Mountains, Fringle 1884. Tucson, Griffiths 1528. Phoenix, Wootton 7010. Oracle, Hitchcock 13258. Rincon Mountains, Griffiths 1852.

ALPHABETICAL LIST OF ARISTIDAS OF NORTH AMERICA

Synonyms In Parenthesis

1. *Aristida edscensionis* L.
2. (*Aristida sequiramea* Scheele)
3. (*Aristida affinis* (Schultes) Kunth)
4. (*Aristida americana* L.)
5. (*Aristida antillarum* Poir.)
6. (*Aristida appressa* Vasey)
7. *Aristida arizonica* Vasey
8. *Aristida barbata* Four.
9. *Aristida basiramea* Vasey
10. (*Aristida berlandieri* (Trin. & Rupr.) Hitchc.)
11. (*Aristida beyrichiana* Trin & Rupr.)
12. (*Aristida breviglumis* Mez.)
13. *Aristida brittonorum* Hitchc.
14. (*Aristida bromoides* H. B. & K.)
15. *Aristida californica* Thurb.
16. *Aristida capillacea* Lam.
17. *Aristida chapadensis* Trin.
18. (*Aristida chapmaniana* Nash)
19. *Aristida chaseae* Hitchc.
20. (*Aristida coarctata* H. B. & K.)
21. *Aristida cognata* Trin. & Rupr.
22. (*Aristida combsii* Scribn. & Ball)
23. *Aristida condensata* Chapm.
24. *Aristida cumingiana* Trin. & Rupr.
25. *Aristida curtifolia* Hitchc.
26. (*Aristida curtiseta* Buckl.)
27. *Aristida curtissii* (A Gray) Nash
28. *Aristida curvifolia* Fourn.
29. (*Aristida debilis* Mez.)
30. *Aristida desmantha* Trin. & Rupr.
31. *Aristida dichotoma* Michx.
32. (*Aristida dispersa* Trin. & Rupr.)
33. *Aristida divaricata* Humb. & Bonpl.
34. (*Aristida divergens* (Vasey) Hitchc.)
35. *Aristida eggersii* Hitchc.
36. (*Aristida elegans* Rudge.)
37. (*Aristida elliottiana* Steud.)
38. *Aristida erecta* Hitchc.
39. (*Aristida fasciculata* Torr.)
40. *Aristida fendleriana* Steud.
41. (*Aristida fillipendula* Buckl.)
42. (*Aristida flexuosa* Fourn.)
43. (*Aristida floridana* Nash)
44. (*Aristida fuscata* Poit.)
45. *Aristida geminiflora* Fourn.
46. (*Aristida geniculata* Raf.)
47. (*Aristida geyeriana* Steud.)

48. *Aristida glabrata* (Vasey) Hitchc.
49. *Aristida glauca* (Nees) Walp.
50. (*Aristida gracilis* Ell.)
51. (*Aristida grisebachiana* Fourn.)
52. *Aristida gyrens* Chapm.
53. *Aristida havardii* Vasey.
54. (*Aristida humboldtiana* Trin. & Rupr.)
55. (*Aristida humilis* H. B. & K.)
56. (*Aristida hygrometrica* R. Br.)
57. (*Aristida hypomegas* Mez.)
58. *Aristida implexa* Trin.
59. *Aristida intermedia* Scribn. & Ball
60. *Aristida interrupta* Beauv.
61. (*Aristida jacquiniana* Tausch.)
62. (*Aristida jonesii*. Vasey)
63. *Aristida jorullensis* Kunth.
64. (*Aristida karwinskiana* Trin. & Rupr.)
65. (*Aristida lanata* Poir.)
66. *Aristida lanose* Muhl.
67. (*Aristida lanuginosa* Bosc.)
68. *Aristida leibmanni* Fourn.
69. (*Aristida lemmoni* Scribn.)
70. *Aristida longespica* Poir.
71. (*Aristida longiramea* Presl.)
72. *Aristida longiseta* Steud.
73. (*Aristida macrochaeta* Steud.)
74. (*Aristida manzanilloana* Vasey)
75. (*Aristida maritima* Steud.)
76. (*Aristida megapotamica* Spreng.)
77. (*Aristida micrantha* Nash)
78. (*Aristida micropoda* Trin & Rupr.)
79. *Aristida mohrii* Nash.
80. (*Aristida muhlenbergioides* Fourn.)
81. (*Aristida nana* Steud.)
82. (*Aristida nealleyi* Vasey)
83. (*Aristida neesiana* Trin. & Rupr.)
84. *Aristida neglecta* Leon.
85. (*Aristida nigrescens* Presl.)
86. *Aristida oligantha* Michx.
87. (*Aristida orcuttiana* Vasey)
88. (*Aristida orizabensis* Fourn.)
89. (*Aristida pallens* Nutt.)
90. (*Aristida palmeri* Vasey)
91. *Aristida palustris* (Chapm.) Vasey
92. *Aristida pansa* Woot. & Steudl.
93. (*Aristida paraguayensis* Lindm.)
94. *Aristida parishii* Hitchc.
95. *Aristida patula* Chapm.
96. (*Aristida pauciflora* Buckl.)
97. *Aristida peninsularis* Hitchc.
98. (*Aristida perennis* Panzer)
99. *Aristida portoricensis* Pilgr.

100. (*Aristida pseudospadicea* Hubb.)
101. (*Aristida pungens* Desf.)
102. *Aristida purpurascens* Poir.
103. *Aristida purpurea* Nutt.
104. *Aristida purpusiana* Poir.
105. (*Aristida racemosa* Muhl.)
106. *Aristida ramosissima* Engelm.
107. *Aristida recurvata* H. B. & K.
108. *Aristida refracta* Greseb.
109. (*Aristida reverchoni* Vasey)
110. (*Aristida riedeliana* Trin. & Rupr.)
111. (*Aristida roemeriana* Scheele)
112. *Aristida rosei* Hitchc.
113. (*Aristida sanctae-luciae* Trin.)
114. (*Aristida scabra* Kunth.)
115. (*Aristida schaffneri* Fourn.)
116. *Aristida schiedeana* Trin. & Rupr.
117. *Aristida scribneriana* Hitchc.
118. *Aristida setifolia* H. B. & K.
119. *Aristida simpliciflora* Chapm.
120. *Aristida spadicea* H. B. & K.
121. *Aristida spiciformis* Ell.
122. (*Aristida squarrosa* Trin.)
123. (*Aristida stipoides* R. Br.)
124. *Aristida stricta* Michx.
125. (*Aristida subbiflora* Steud.)
126. (*Aristida subuniflora* Nash)
127. *Aristida swartziana* Steud.
128. *Aristida tenuispica* Hitchc.
129. *Aristida ternipes* Cav.
130. (*Aristida tinctoria* Trin. & Rupr.)
131. *Aristida torta* (Nees) Kunth.
132. *Aristida tuberculosa* Nutt.
133. (*Aristida vaseyi* Woot. & Standl.)
134. *Aristida virgata* Trin.
135. (*Aristida virletii* Fourn.)
136. *Aristida wrightii* Nash.

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