MEDEDEELINGEN VAN 's RIJKS HERBARIUM
LEIDEN
No. 58A. (1932)

A MONOGRAPH OF THE GENUS ARISTIDA

BY

DR. J. TH. HENRARD.

SECOND VOLUME.
(PUBLISHED 1 JULY 1932).

LEIDEN -:- DRUKKERIJ H. BUURMAN.

366578

M1
(GRAM)
(ARIS)
HEN

Compra: Heeneclink 11-8-1957

A MONOGRAPH OF THE GENUS ARISTIDA

BY

J. TH. HENRARD.



SECOND VOLUME.

R. 22.081



SECTION CHAETARIA (BEAUV.) TRINIUS.

We find the interpretation of the genus *Aristida* by BEAUVOIS in his work Essai d'une nouvelle Agrostographie on pag. 33. *Aristida lanata* is the only species mentioned by him and the genus is figured on Pl. VIII. fig. X. This figure is a rather rough sketch and represents *Aristida ciliata* DESF.. In the figures b and c there is a well-developed column and the central awn is plumose, the articulation between lemma and column is omitted or overlooked. *Aristida lanata*, as mentioned by BEAUVOIS, is quite different from the *A. lanata*, described by FORSKÅL, where all the awns are plumose and the glumes are quite different. BEAUVOIS tells us that among all the *Aristidas* he has found in herbaria, this one is the only species where the central awn differs in structure from the lateral ones, the central awn being a true awn (arista) and the lateral ones „setae" only. The genus with these characters he accepted as the genuine *Aristida* and hence described the genus with the 3 awns of equal structure as new under the name of *Chaetaria*. This interpretation of LINNÉ's genus *Aristida* was however wrong. LINNNAEUS based the genus on the *Aristida adscensionis*, the only species mentioned in the description in the year 1753. Both genera *Aristida* and *Chaetaria* are quite identic. Among the 25 species enumerated by BEAUVOIS under *Chaetaria*, we find 4 species with a ? and 2 species, *A. capensis* and *A. vestita*, do not belong to the genus *Chaetaria* (BEAUVOIS could not study them or he overlooked the articulation of the column). *Aristida capensis* has plumose awns and belongs to the section *Stipagrostis* and *A. vestita* belongs to the section *Arthratherum*. BEAUVOIS figures two species of his genus *Chaetaria* (Plate VII. fig. V. and VI.). The first figure is *Aristida stricta* MICHX., the second is *Chaetaria capillaris*, the name is a misprint for *C. capillacea* based on *Aristida capillacea* of LAMARK. TRINIUS accepted in the year 1824 the genus of BEAUVOIS as a section of the genus *Aristida* in his Dissertatio botanica De Graminibus Unifloris et Sesquifloris on p. 175 with the diagnosis: „*Perianthium cum setis non articulatum*".

This section is also accepted in this work, it contains about 200 species, North America and Mexico have about 47 species, Central and South America have about 58 species. The West Indian Islands are comparatively rich in species, about 15. In the Old World we find but one species in Europe, the continent of Africa has about 38 species, Madagascar and the adjacent islands have 7 representatives. There are known 2 species from Nova Caledonia and 29 species on the continent of Australia. Asia has about 10 species.

Key to the species of the section Chaetaria.

1. Awns of the lemma and column never plumose or hairy, glabrous or scabrous only . . . . . 2.

Awns of the lemma and column densely plumose with long white hairs as in the section Stipagrostis.

Densely tufted perennial, up to 40 cm. high; culms simple, strictly erect, terete, very slender, 1-noded; sheaths very tight, striate, hairy all over, except at the nodes, longer than the hairy internodes; blades finely filiform, setaceous, strictly erect, convolute, acute, up to 20 cm. long or nearly as long as the culms, glaucous, hairy below, glabrous or hispidulous above, about $^1/_2$ mm. broad, strongly nerved; ligules ciliate; panicle erect, spike-like, rather dense, linear-oblong, 5-8 cm. long, rhachis hairy, branches 2-3-nate, adpressed, the lower up to $2^1/_2$ cm. long with a short 1-spiculate or sometimes 2-5-spiculate branch at the base, the upper branches 1-spiculate or very sparingly branched, branchlets and pedicels hairy, the latter 3-5 times shorter than the yellowish or purplish spikelets; glumes subequal, villous, the lower 10-11 and the upper 12 mm. long, linear-lanceolate, acuminate, 3-nerved, with sparingly hairy or glabrous hyaline tips; lemma purple, smooth, linear-lanceolate, including the curved densely hairy acute callus up to 6 mm. long, produced without articulation into a short, somewhat twisted, densely villous, about 2 mm. long column, the callus about 1 mm. long; central awn divergent or spreading, about 15 mm. long, the lateral ones erect about 10 mm. long, all densely plumose, except at the very tips, which are scabrous; pale $2^1/_2$ mm. long, obtuse, nerveless, twice as long as the finely nerved lodicules, anthers about 5 mm. long. South Africa: Kalahari Region; Transvaal. (Pl. LXI.) . . . . . **Aristida sericans Hack.**

2. Annual, very slender, elegant and delicate plants; spikelets small, scarcely 4 mm. long; branches of panicle very thin; lemma (excluding the column) $1^1/_2$-2 mm. long . . . . . 3.

Perennial, or sometimes annual, never slender and delicate, branches stouter; spikelets always more than 4 mm. long, the lemmas more than 5 mm. long, if sometimes the lemmas are 4 mm. long and the plants more slender and elegant, than always caespitose perennials. 5.

3. Column well-developed. New World species. . . . . 4.

Column wanting. Old World species.

Mostly 5-10 cm. high, sometimes in more robust specimens up to 25 cm.,

much branched below or sometimes simple, densely caespitose; sheaths smooth, striate, keeled. blades up to 6 cm. long, very narrow, scarcely 1 mm. broad, involute, scabrous on the upper surface and with scattered long white hairs; mouth bearing some long hairs, ligules shortly ciliate, auricles pubescent; panicles half as long as the whole plant or sometimes even longer, somewhat contracted or effuse, branches capillary, scaberulous, naked below, the lower binate or mostly in three's, iterately branched with pedicels as long as or longer than the glumes; axis, branches, branchlets and subclavate pedicels scabrous; glumes glabrous, smooth, the lower broadest, $2^1/_2$ mm. long, shortly mucronate, scabrous on the keel, sub-3-nerved, the upper 3 mm. long, smooth on the keel or slightly scabrous towards the acute tip, 1-nerved; lemma lanceolate or ovate-lanceolate, $1^1/_2$ mm. long, shortly pilose on the callus, minutely scaberulous at the summit, bearing 3 unequal scabrous awns, the central up to 5 mm. long, the lateral ones about 3 mm. long. Distributed from the Senegal to Abyssinia and from British India to Tonkin, Siam, China, and the Philippines. (Pl. LXII.) . . . . . **Aristida Cumingiana Trin. et Rupr.**

4. Glumes acute, without lateral setulae, the lower slightly hairy or pubescent at the tip, up to 2 mm. long, the upper glume 3 mm. long; lemma, including the twisted column, 3 mm. long, awns nearly equal, the central 6 mm., the lateral ones 5 mm. long.
   Densely caespitose, much branched at the base; sheaths keeled, striate, blades folded or involute, very narrow, scabrous above and with scattered long hairs, ligules ciliolate, auricles pubescent, the mouth with a few long hairs; panicles oblong, open, up to 7 cm. long and 3 cm. wide, the branches, branchlets and pedicels as in the preceding species, glumes narrower, the lower sub-3-nerved, the upper 1-nerved, callus shortly pilose, the lemma glabrous below, scaberulous towards the summit, the body of the lemma about as long as the column, awns delicate, somewhat divergent. Mexico to Venezuela, Bolivia to Guiana and Brazil. (Pl. LXI.) . . . . . **Aristida capillacea Lam.**

Glumes slightly bifid at the very acute tips with lateral setulae, glabrous, the lower 3 mm. long or slightly longer, the upper about 4 mm. long; lemma including the column $3^1/_2$ mm. long, awns very unequal, the central 12 mm. long, the lateral ones about 9 mm. long.
Densely caespitose, strictly erect, few-branched, up to 20 cm. high; culms very scabrous, especially below the panicle; sheaths glabrous, striate, many-nerved, keeled; blades folded, somewhat rigid, narrow, very acute, subpungent, glabrous beneath, scabrous on the upper surface, without

long white hairs, ligule a very short, scarcely ciliate rim, auricles scarcely developed, glabrous; panicle narrow, contracted, up to 8 cm. long and about 1 cm. wide, somewhat interrupted, the branches strictly erect, semiwhorled or fascicled, shortly peduncled, the longer ones $1^1/_2$—2 cm., the shorter ones scarcely up to 5 mm. long, all the branches spikelets bearing nearly to the base; axis, branches and pedicels very scabrous; spikelets reddish, very acute, awned; lemma with a very short callus, the latter bearing long hairs much exceeding the true base of the lemma, which is glabrous and smooth at the base and very scabrous towards the summit and about 2 mm. long, excluding the slender, somewhat twisted, scabrous, about $1^1/_2$ mm. long column; awns scabrous, divergent, somewhat flexuous. Brazil. (Pl. LXII.) . . . . . **Aristida Sanctae Luciae Trin.**

5. Central awn spirally coiled at the base, (see Plate LXIII.) spreading or horizontal, the lateral awns straight, shorter than the central one. Annual plants . . . . . 6.

Central awn not spirally coiled at the base, sometimes all the awns loosely contorted in the lower part, but never coiled. . . . . 8.

6. Lateral awns much shorter than the central one, erect, only 1—3 mm. long, not spirally contorted at the base. . . . . 7.

Lateral awns half to two-thirds as long as the central one, somewhat spreading and spirally contorted at the base.

Culms branched at base, erect, rather slender but not delicate, glabrous or slightly scaberulous, up to 50 cm. high; blades flat, involute towards the apex, glabrous, scabrous on the upper surface, strongly nerved and with a few long hairs, up to 15 cm. long and scarcely $1^1/_2$ mm. broad, the sheaths striate, keeled with here and there a few long hairs, ligules densely ciliolate, auricles pubescent, ciliolate not bearded; panicles terminal and axillary, the terminal narrow, loose, 5—10 cm. long, the short branches with a few spikelets, axillary panicles mostly enclosed in the sheaths, breaking through at the side; glumes glabrous, 1-nerved, scabrous on the keel, the lower with the scarcely 1 mm. long awn about 9 mm. long, the upper with the 1 mm. long awn from a slightly bifid apex, up to 15 mm. long; lemma with the densely hairy subobtuse callus about 10 mm. long, glabrous, the keel scabrous or somewhat adpressed-hispid, column wanting, central awn coiled at base in 2—3 loose spirals, somewhat divergent, about 12 mm. long, the lateral awns 8—10 mm. long. North America: Illinois and Wisconsin to Kansas. (Pl. LXIII.) . . . . . **Aristida basiramea Engelm.**

7. Glumes about equal, up to 8 mm. long; lemma 6—6½ mm. long, sparingly adpressed-pilose.

Culms much branched at the base and at the nodes, erect or ascending, glabrous or minutely scaberulous, up to 40 cm. high; sheaths glabrous, blades scabrous, strongly nerved, glabrous beneath, the lower mostly flat, scarcely 10 cm. long and 1 mm. broad, the upper short and involute, ligules ciliolate, the auricles pubescent and sometimes with a few long hairs at the mouth of the sheaths, the same hairs occur also on the upper surface of the blades; panicles terminal and from the upper and middle nodes, narrow, almost spike-like, the terminal less than 10 cm. long with angulous axis and short adpressed scaberulous branches, the lowermost branches as much as 2 cm. long, few-flowered, the upper bearing single spikelets; lateral panicles small, more or less inclosed in the sheaths; glumes scabrous on the keel and slightly scaberulous on the back, both shortly awned from a bifid apex; lemma 3-nerved, compressed above, the callus short, obtuse, sparingly hairy or pubescent, there is no column, only a very short or obsolete beak; central awn with 1–2 coils at base, nearly horizontally bent, up to 6 mm. long, the lateral awns strictly erect, straight, up to 2 mm. long. North America: Maine to Kansas, south to Georgia and Texas. (Pl. LXIII.) . . . . . **Aristida dichotoma Michx.**

Glumes unequal, the second about 10 mm. long, the first half to two thirds as long; lemma glabrous, except the keel, scabrous towards the summit, about 10 mm. long.

Culms slender, branched at the base, but commonly less so than in *A. dichotoma*, minutely scaberulous, up to 40 cm. high; sheaths, blades, ligules and auricles as in the preceding species; panicles narrow, terminal and sometimes from the upper nodes, 5—10 cm. long, nearly simple, looser than in *A. dichotoma*; glumes 1-nerved, the lower scabrous on the keel and on the back in the upper part, the upper smooth on the keel, distinctly bifid at the summit with rather prominent lobes and a well-developed awn from the sinus; the central awn with 1 or 2 spiral coils at base, horizontally bent, about 10 mm. long, the lateral awns erect, 2—4 mm. long. North America: Maryland to Wyoming, south to Florida. (Pl. LXIV.) . . . . . **Aristida Curtissii Nash**

8. Plants much branched at the base and from all the nodes. Annual North American species. . . . . 9.

Plants with simple culms, or branched only at the base or some of the lower nodes, rarely branched from some of the upper nodes, but in that case the plants are perennial. . . . . 10.

9. Central awn spreading or reflexed, about 2 cm. or less long, the lateral ones erect, commonly short or sometimes obsolete; callus oblique, conical, very acute.

Culms slender and wiry, scabrous, up to 50 cm. high; sheaths striate, glabrous, ligule a ciliolate rim, auricles pubescent; blades scabrous and strongly nerved on the upper surface, glabrous beneath, flat or becoming involute, up to 10 cm. long, about 1 mm. broad; panicles terminating the culms and branches, narrow, loose, 8 to 12 cm. long, the axis scabrous, the spikelets single or in pairs, distant, ascending on very short pedicels; glumes glabrous, the lower 5-nerved, scaberulous towards the summit of the keel, acuminate, long-awned from a bifid apex, together with the 3 mm. long awn, about 18 mm. long, the upper 3-nerved, smooth, up to 20 mm. long, including the nearly 7 mm. long awn from a sharply bifid apex; lemma 3-nerved, smooth or scaberulous on the keel, gradually narrowed above into a short, straight, up to 5 mm. long column, up to 17 mm. long, including the 1 mm. long callus and the column; central awn with a semicircular bend at the base, 15—20 mm. long, spreading or reflexed, the lateral awns up to 5 mm. long, somewhat unequal, rarely the lateral awns obsolete or reduced to short points as in var. *uniaristata* A. GRAY, or sometimes up to 10 mm. long as in var. *Chaseana* HENR., which has moreover shorter lemmas and glumes, 15 mm. or less long. North America: Indiana to Louisiana and Oklahoma. (Pl. LXIV.) . . . . . **Aristida ramosissima Engelm.**

Central awn and lateral ones more than 4 cm. long, about equal or somewhat unequal, divergent but not reflexed; callus straight, subterete, obtuse.

Culms slender, very scabrous especially below the nodes and below the panicle, up to 50 cm. high; sheaths glabrous, blades flat or loosely involute, tapering to a fine point, glabrous beneath, scabrous and nerved on the upper surface, up to 20 cm. long not over 1 mm. wide; ligule a ciliolate rim, auricles pubescent or with a few long hairs at the mouth of the sheaths; panicle loose, 10—20 cm. long, axis scabrous, spikelets single on about 1 mm. long pedicels, the lower branches with supplementary short branchlets bearing 1 or 2 spikelets, ascending or spreading; glumes about equal, the first 3—5-nerved, sometimes with a third nerve on one side and sub-7-nerved, including the about 7 mm. long awn from a bifid apex, up to 22 mm. long, the second glume with a nearly 9 mm. long awn from a bifid apex, up to 22 mm. long, 1-nerved, both glumes minutely scaberulous on the keel; lemma 3-nerved, scaberulous on the keel, about 15 mm. long. column obsolete,

the 3 awns divergent, straight, very variable in length, 4–7 cm. long and slightly scabrous. North America: Massachusetts to South Dakota, south to Florida and Texas; also in Oregon and California. (Pl. LXV.) . . . . . **Aristida oligantha Michx.**

10. Internodes with a fugacious adpressed wool below the nodes or lanate-woolly all over, sometimes the lower internodes only woolly or pubescent-lanate and the upper ones glabrous . . . . . 11.
Internodes glabrous or scabrous, rarely with some short hairs, sometimes some internodes scantily hairy below the nodes or all the internodes pubescent, but never with the characteristic woolly indumentum. . . 17.

11. Position of the glumes not inverse . . . . . 12.
Position of the glumes inverse (the lower glume longer than the upper one). Caespitose perennial. Culms erect, with the panicles about 7 dm. long, simple or slightly branched from some of the upper nodes, terete, densely grayish-woolly with glabrous nodes, the uppermost internode long-exserted, sometimes less woolly or pubescent only; sheaths glabrous or minutely pubescent, striate, somewhat compressed, gaping, shorter than the internodes, ligule a ciliolate rim with pubescent auricles; blades curvate, the lower flat and about 3 mm. wide, striate and scaberulous on both sides with thickened margins, the upper blades narrower and convolute scarcely 1 mm. wide with scattered long hairs, setaceously acuminate; panicle about 15 cm. long, contracted and more or less interrupted, axis scaberulous with single or binate branches bearing in the axils some long hairs, branches adpressed, the lowermost 5—6 cm. long, naked at the base, with a shorter few-flowered about 2 cm. long branchlet at the base; spikelets yellowish-green or brownish with scaberulous striate pedicels; glumes unequal, 1-nerved, the lower slightly pubescent on the back and very scabrous on the keel, together with a scabrous, 3 mm. long awn about 1 cm. long, the upper glume glabrous with a smooth keel, including the scabrous 1 mm. long awn from a prominently bifid apex, about $8^1/_2$ mm. long; lemma smooth passing into the scabrous twisted $2^1/_2$ mm. long column, the obtuse callus densely hairy, about $^1/_2$ mm. long, the total length of lemma, callus and column about $7^1/_2$ mm.; awns scabrous, erect or slightly spreading, the central up to 15 mm. long, the lateral ones about 10 mm. long. South Africa: Rhodesia. (Pl. LXVI.) . . . . . **Aristida leucophaea Henr.**

12. Column wanting, there is sometimes a short, never twisted beak. . . . 13.
Column well-developed, distinctly twisted. . . . . 16.

13. Glumes about equal, or the lower 1–2 mm. shorter than the upper; culms not very stout, lanate-pubescent all over at least the lower internodes. . . . . 14.

Glumes very unequal, the lower scarcely half as long as the upper; culms stout with a snow-white fugacious adpressed woolly indumentum below the nodes.

Robust perennial, sheaths glabrous except for some wool near the mouth, the culms about 1 m. long, ligule a flake of fine wool; blades linear, acute, setaceously convolute above, over 30 cm. long, 5 mm. broad near the base, smooth below, asperulous above; panicle dense, contracted, 30—45 cm. long, by $2^1/_2$–4 cm. wide, erect, rhachis stout, smooth, branches fascicled, the lowest up to 15 cm. long, erect, remotely and repeatedly branched, branchlets scaberulous with short lateral pedicels; spikelets yellow, 2–3 at the tips of the branchlets, glabrous; glumes 1-nerved, the lower scabrous on the keel, 5 mm. long, acute, the upper shortly mucronate from a bifid apex, up to 11 mm. long; lemma linear, contracted into a 1 mm. long, densely hairy callus and above into a straight very short beak, the total length of lemma, callus and beak about 9 mm.; awns nearly equal, fine, scaberulous, up to 15 cm. long. South Africa: Natal and Transvaal. (Pl. LXV.) . . . . . **Aristida Sciurus Stapf**

14. Pedicels of the spikelets with a lateral tuft of hairs below the glumes. . 15.

Pedicels naked, scabrous, no lateral tuft of hairs.

Perennial, culms firm, 5—6-noded, sparingly branched, the nodes equally distributed, strictly erect, inclusive of the panicle up to 80 cm. high, densely woolly all over except the region of the nodes, the latter quite glabrous, culm-nodes protruding above the sheath-nodes; sheaths longer than the internodes, slipping from the stems, the internodes nearly visible all over, sheaths striate, more or less villous or the old ones becoming glabrous, the lower ones with 3—4 cm. long blades, the upper blades gradually becoming longer and up to 20 cm. long, narrow, $1^1/_2$ mm. broad, flat, soon becoming involute, with a strong midnerve and margins with a thick band of sclerenchyma, glabrous beneath or sparingly hairy on both surfaces, narrowed into a long setaceous point; ligule a very short ciliolate rim, auricles long-bearded, the collar ciliate; panicle spike-like, rather dense, somewhat exserted, 10 cm. long or longer, the lower part of the axis lanate, the upper part smooth or nearly glabrous, branches single or the lower semiwhorled, 4—5 cm. long, gradually becoming shorter upwards, strictly erect, spikelets bearing nearly to the base or naked only over a short distance, subterete, glabrous and smooth or minutely

scaberulous only, branchlets erect and adpressed, the pedicels nearly smooth, the lateral ones much shorter than the glumes, the uppermost ones of each branchlet commonly as long as or even longer than the glumes; spikelets purplish with a yellowish hue, awns yellowish-brown; glumes linear-lanceolate, unequal, the lower one broadest below, produced and narrowed upwards, acutish but not awned, minutely puberulous all over, 1-nerved, the keel scabrous, about $8^1/_2$ mm. long, upper one narrower than the lower, 1-nerved, minutely pubescent upwards, with a smooth keel, distinctly bifid at the summit with obtuse lobes and a short mucro from the sinus, 10—11 mm. long; lemma as long as the lower glume, fusiform, narrowed upwards but scarcely beaked, glabrous and smooth below, scabrous upwards, the obtuse, equally broad, bearded callus 0,6—0,7 mm. long, awns scabrous, erect or slightly spreading, the central one about 16—17 mm. long, the lateral ones about 3 mm. shorter. South Africa: Rhodesia. (Pl. LXVI.) . . . . . **Aristida eriophora Henr.**

15. Auricles of the sheaths with a minute pubescence only; lower blades flat, glabrous and smooth on the lower surface, rough on the upper; glumes 1-nerved; lemma including the 1 mm. long callus, 10 mm. long.

    Caespitose erect perennial, up to 50 cm. or more high, sparingly branched from some of the lower nodes; sheaths mostly shorter than the internodes, sparingly hirsute with long flexuous hairs, especially along the margins, internodes woolly except the uppermost one, ligule a scarcely ciliate rim; blades up to 20 cm. long, upper convolute, 1-$1^1/_2$ mm. broad, flexuous or curved, many-nerved, ending in a narrow convolute point; panicle long exserted, very narrow, about 15 cm. long, interrupted, culm somewhat hirsute below the panicle, axis scabridulous, branches mostly in pairs, one shortly peduncled, about 4 cm. long, the other nearly sessile, 1-2 cm. long, bearing a single spikelet at the base, upper branches short, bearing but 1 or 2 spikelets; branches and pedicels scabrous or pubescent, the pedicels commonly with long white hairs near the tips; glumes unequal, the lower $5^1/_2$ mm. long, acute, with a scabrous keel, the upper with a smooth keel, including the 1 mm. long awn from a slightly bidentate apex, up to 7 mm. long; lemma slightly punctulate, scaberulous in upper half, up to 9 mm. long, the callus densely hairy; awns scabrous, the central somewhat spreading, about 10 mm. long, the lateral ones erect, 6—$6^1/_2$ mm. long. Queensland. (Pl. LXVII.) . . . . . **Aristida queenslandica Henr.**

Auricles of the sheaths long-bearded; blades narrowly convolute, scabrous on both surfaces; pedicels with a subclavate tip, bearing laterally a tuft of short hairs; glumes 1-nerved, the lower with two short but prominent side-nerves; lemma including the callus about $8^1/_2$ mm. long. Densely caespitose, 60—70 cm. high perennial, branched from the base and some of the lower nodes, lower internodes densely lanate-pubescent, especially below the nodes, upper internodes glabrous and scabrous, culm-nodes swollen and protruding above the sheath-nodes; sheaths shorter than the internodes, striate, scabrous, ligule a scarcely ciliate rim; blades firm, up to 20 cm. long, with a long acute point, old blades curved; panicle narrow, contracted, about 20 cm. long, interrupted at base, rhachis scabrous, branches single, divided nearly from the base, the lower 5—6 cm. long, the upper 2—3 cm. long; branches, branchlets and pedicels scabrous, the latter mostly shorter or as long as the glumes; glumes rather broad, scabrous on the keel, the lower with an about 1 mm. long scabrous awn, up to $6^1/_2$ mm. long, the upper with a 1 mm. long scabrous awn from a slightly bifid apex, up to $7^1/_2$ mm. long; lemma punctulate under a lens, the callus acute, long-hairy, the very short straight beak glabrous, the central awn 8—9 mm. long, divergent, the lateral ones erect, $4^1/_2$—5 mm. long. New Caledonia. (Pl. LXVII.) . . . . . **Aristida pilosa Labill.**

16. Glumes with long flexuous hairs or lanate-pubescent all over; sheaths lanate or densely woolly except a glabrous portion above the nodes; lower blades flat with thickened margins.

Densely caespitose perennial, culms about 1 meter high, erect, scabrous below the panicle, the whole plant densely lanate-pubescent; leaves mostly basal, the blades up to 25 cm. long, 1—2 mm. wide, ending in a long fine point, the old culm-blades flat and curled, the upper blades involute as those of the innovations, ligule a densely ciliate rim, auricles woolly, more or less bearded; panicle up to 25 cm. long, narrow, the branches adpressed, the lowermost up to 10 cm. long, naked below, a short branchlet at base; spikelets on short adpressed pedicels; glumes 1-nerved, acuminate, shortly awned, scabrous on the keels, the lower 6—7 mm. long, the upper about 1—2 mm. longer; lemma with a shortly pilose callus, smooth below, scabrous above, tapering into a scabrous, slightly twisted column, the total length, including callus and column, about 11 mm.; awns somewhat spreading, the central about 15 mm. long, the lateral ones up to 12 mm. long. Mexico. (Pl. LXVIII.) . . . . . **Aristida Scribneriana Hitchc.**

Glumes glabrous or sometimes with a minute pubescence only; lower sheaths lanate, upper ones hirtellous or glabrous; blades convolute, glabrous or with a few long hairs only. . . . . .
. . . . See **Aristida Welwitschii Rendle var. subtomentosa Henr.**

17. Sheaths densely lanate-pubescent all over, or the old ones becoming glabrous, sometimes the lowermost sheaths but sparingly lanate, soon becoming glabrous, sometimes the sheaths very hirsute but in that case with tubercle-based hairs . . . . . 18.

Sheaths glabrous or scabrous, rarely very scantily hairy, sometimes more or less adpressedly and shortly pubescent but never with tubercle-based hairs . . . . . 22.

18. Branches of panicle without a tuft of wool in the axils; first glume as long as the second or slightly shorter; awns about equal or the central one slightly longer than the lateral ones, straight or somewhat spreading. . . . . 19.

Branches of panicle with a prominent tuft of wool in the axils; first glume a little longer than the second; awns unequal, the central one longer, somewhat recurved,

Culms solitary or few in a tuft, erect, rather robust, glabrous, 1 to $1^1/_2$ meter high; sheaths longer than the internodes, blades flat with a fine involute point, glabrous beneath, scabrous on the upper surface, up to 50 cm. long and 4 mm. wide with scabrous margins, ligule a ciliolate rim, auricles woolly and somewhat bearded; panicle narrow, rather loose, as much as 40 cm. long, the lower branches distant, ascending or adpressed, scabrous, up to 10 cm. long, glumes unequal, both 1-nerved, with a scabrous short awn from the bifid apex, lower glume about 12 mm. long, very scabrous on the keel and more or less scabrous all over, the upper smooth with a smooth keel and about 10 mm. long; lemma with a shortly hairy subobtuse callus, scarcely beaked, about 8 mm. long, scabrous on the keel; awns a little contorted at the base, the central one about 20 mm. long, the lateral ones half to two-thirds as long, mostly 14 mm. long, erect or somewhat spreading. North America: Missouri to Florida and Texas. (Pl. LXVIII.) . . . . . **Aristida lanosa Muhl.**

19. Culms slender, 2 mm. or less in diameter, simple or scantily branched from some of the lower nodes; sheaths densely woolly or hirsute, but without tubercle-based hairs; glumes about equal or somewhat unequal, the lower at least 8 mm. long . . . . . 20.

Culms robust. 2—4 mm. in diameter, much branched; sheaths hirsute with tubercle-based hairs, especially above and on the margins; glumes more unequal, hirtellous, scabrous on the keels, the lower one 6 mm. long. 21.

20. Mouth of the sheaths and auricles not bearded, the auricles glabrous or pubescent only; column rather long, about 6 mm.
Densely caespitose perennial; culms strictly erect, about 50 cm. high, branched from some of the lower nodes, rather elegant, scarcely 1 mm. thick, few-noded, uppermost internode by far the longest, minutely striate, some internodes with a scanty pubescense below the nodes or more or less villous, but others glabrous, smooth and shining; sheaths longer than the internodes, striate, tight, rather densely hirsute, especially in the upper part, with spreading or flexuous hairs, ligule a ciliolate rim, auricles pubescent or becoming glabrous; blades narrow, convolute, 15–20 cm. long or less, those of the innovations commonly shorter, scarcely $1^1/_2$ mm. wide when expanded, ending in a fine point, not pungent, scaberulous or smooth on both surfaces, the margins not conspicuously thickened; panicle narrow, contracted, but not dense and spike-like, mostly 10—15 cm. or sometimes up to 20 cm. long, axis smooth, branches, branchlets and filiform pedicels rather smooth, lower branches binate, few-flowered, strictly erect, somewhat lax, the longer ones mostly 3—4 cm., sometimes 7 cm. long, naked at the base, the shorter ones spikelets bearing nearly from the base; spikelets purple, glumes with a short 1 mm. long awn, lower scabridulous, 1-nerved or sub-3-nerved by an additional short side-nerve, upper one 1-nerved, smooth; lemma including the densely hairy, very obtuse, scarcely $^1/_2$ mm. long callus and the scaberulous twisted column, 12—$12^1/_2$ mm. long; awns somewhat spreading, about equal, 13–15 mm. long. East Africa: Nyassa Highlands. (Pl. LXIX.) . . . . . .
. . . . . **Aristida textilis Mez**

Mouth of the sheaths and auricles long-bearded; the column rather short, about $2^1/_2$ mm.
Densely caespitose perennial, culms strictly erect, up to 1 m. high, many-noded, the internodes sometimes with a few long hairs; sheaths densely woolly, striate, the lowermost glabrous, the uppermost becoming glabrous, all longer than the internodes, ligules very short, scarcely ciliolate; blades linear, acuminate, up to 30 cm. long, somewhat rigid, convolute towards the tips, densely lanate on the upper surface, especially at the base, glabrescent upwards (old blades glabrous), strongly, about 8-nerved, with 2 stronger marginal nerves; panicle narrow, linear-

lanceolate, 20—35 cm. long, 1—3 cm. wide, somewhat dense, many-flowered, interrupted, rhachis terete or subangulous, smooth, branches elongate, adpressed, somewhat lax, naked below with scabrous branchlets and pedicels; spikelets erect, linear, yellowish-green to reddish-green, glumes 1-nerved, the lower scabrous on the keel, gradually narrowed into an about 1 mm. long awn, the upper smooth with a somewhat shorter awn from a bifid apex; lemma terete, linear, glabrous, smooth, including the densely hairy, subobtuse, $^1/_2$ mm. long callus and the somewhat twisted, scaberulous column, up to 9 mm. long, the awns scabrous, somewhat unequal, 18—20 mm. long. West Africa: Belgian Congo. (Pl. LXIX.) . . . . . **Aristida Dewildemani Henr.**

21. Panicle long and narrow, up to 35 cm. long and about 3 cm. wide, violaceous or reddish-green; callus 0,8 mm. long, obtuse, rather sparingly and shortly pubescent, the hairs not exceeding the contracted and constricted base of the lemma; awns very unequal, the central one 26 mm. long, the lateral ones 20 mm. long.
Stout perennial, culms somewhat pubescent only below the panicle, sheaths shorter or as long as the internodes, the latter smooth or slightly scabrous, culm-nodes tumid; the sheaths slipping from the stem, densely villous except the region of the nodes, upper and older sheaths glabrous; ligule a scarcely ciliolate rim, collar and auricles hairy, mouth of the sheaths long-bearded; blades of the main stem flat at base, up to 4 mm. broad, many-nerved with two strong lateral nerves near the margins, glabrous and smooth beneath, villous on the upper surface, especially near the base, glabrous towards the tips, very scabrous on the margins, more than 20 cm. long, those of the lateral branches shorter and narrower, involute, 7—15 cm. long, with long acute tips; panicles strict, densely contracted, interrupted at the base, the axis scabrous, lower branches densely semi-whorled, divided nearly to the base, the lower up to 6 cm. long, the upper shorter, pedicels scabrous, about as long as the glumes or somewhat shorter, the lateral pedicels very short; panicles of the lateral branches much shorter, 12—15 cm. long; glumes shortly hairy all over, 1-nerved, the nerves scabrous, the lower including the 1 mm. long awn up to 6 mm. long, the upper scarcely bifid, including the nearly 2 mm. long awn, 7—8 mm. long; lemma including the callus and the short, slightly twisted column or beak, as long as the upper glume, glabrous, scabrous towards the summit; awns scabrous, straight, somewhat divergent. Central Madagascar. (Pl. LXVIII.) . . . . . **Aristida multicaulis Baker**

Panicle shorter and mostly broader, up to 20 cm. long, sometimes as much as 5 cm. broad, rufous or brownish; callus scarcely 0,5 mm. long, subacute, densely hairy, the hairs much longer and exceeding the true base of the lemma; lemmas gradually narrowed at the base, not constricted; awns about equal, 13—14 mm. long.
Perennial with erect, glabrous rigid culms, lowermost sheaths merely broad scales, lower sheaths with short blades, 10 cm. or less long, hirsute, except at the region of the nodes, striate, shorter than the internodes, uppermost sheaths longer than the internodes, mostly glabrous or the hairs delapsed, culm-nodes tumid, protruding, the sheaths slipping from the stem; ligule a ciliolate rim, mouth of the sheaths long-bearded, auricles and collar long-hairy; upper blades very long, 30—40 cm., flat at base, 3 mm. wide, convolute and filiform upwards, ending in a long setaceous point, prominently nerved, glabrous beneath, scabrous and densely hairy on the upper surface, especially near the base, scabrous on the margins; panicle strictly erect, contracted but somewhat loose, the branches whorled, spikelets bearing nearly to the base, rather long, up to 5 or 6 cm., many-flowered, pedicels very short, the lateral much shorter than the glumes; lower glume shortly hairy 1-nerved or sub-3-nerved, the upper about $8^1/_2$ mm. long, subglabrous, both glumes awned, very scabrous on the keels upwards; lemma including the callus and the scarcely twisted, somewhat scabrous 2 mm. long beak or column, up to 7 mm. long, the body scabrous along the keel, punctulate under a strong lens; awns scabrous, straight, somewhat divergent. Comoren Islands (Mayotte); North Madagascar (Diego Suarez, Nossi Bé). (Pl. LXXI.) . . . . . **Aristida rufescens Steud.**

22. Mature spikelets with a central awn, characterized by a semicircular bend at the base, horizontally spreading or sharply reflexed, the lateral awns erect or spreading, sometimes all the awns sharply reflexed; the central awn may be straight in the upper part or regularly curved in a semicircle. (See Plates LXX., LXXII., LXXIV.) . . . . . 23.

Mature spikelets with a central awn which is straight, erect or somewhat spreading, but never with a semicircular bend at the base and never reflexed, sometimes all the awns more or less spirally contorted in the lower part, or the base curved in a warped twist. . . . . 42.

23. Perennial plants; lateral awns spreading, or if erect, more than half the length of the central awn, mostly $^2/_3$—$^3/_4$ as long as the central one or about equal . . . . . 24.

Annual plant; lateral awns strictly erect, much shorter, about $^1/_2$—$^1/_3$ as long as the central one.

Plant branched at the base and from some of the lower nodes, culms erect or geniculate at base, slender, glabrous, up to 40 cm. high; sheaths glabrous or with here and there a few long hairs, ligule a short ciliolate rim, auricles pubescent or glabrous or with some scattered hairs; blades flat or involute at the tip, scabrous and strongly nerved on the upper surface, sometimes with a few long hairs, glabrous beneath, less than 10 cm. long and 1 mm. wide; panicles narrow and slender, the terminal 10—15 cm. long or longer, axis scaberulous, the spikelets adpressed, single or up to 6 on short branches, rather distant below; axillary panicles often much reduced; glumes about equal, nearly 5 mm. long, the lower 3-nerved, very scabrous on the keel, acuminate, minutely awned, the upper glabrous and nearly smooth on the keel, 1-nerved, minutely mucronate or very slightly bifid at the apex; lemma 3-nerved, very scabrous along the keel, scarcely beaked, 4—5 mm. long, the callus short, densely pilose, the central awn sharply curved at base, horizontally spreading or reflexed, 5—15, mostly 10 mm. long, the lateral awns mostly 3 mm. long, sometimes longer, up to 7 mm. long, rarely much reduced and only 1 mm. long. North America: New Hampshire to Michigan, south to Florida and Texas. (Pl. LXX.) . . . . . **Aristida longespica Poir.**

24. Culms branched from the base and nearly all the nodes, almost suffrutescent, the branches fascicled from the lower and the middle nodes. 25.
Culms simple or scantily branched, the branches not fascicled, not suffrutescent . . . . . 26.

25. Blades of the culm-leaves very short, 3—6 cm. long; ligules densely hairy, the collar smooth, auricles pubescent, with a few long hairs; lowermost internode very long, longer than the upper ones; awns equally divergent, nearly horizontal, somewhat contorted at the base. Caespitose, glaucous perennial, culms erect, 20—40 cm. high, subrobust, terete, glabrous, 2—4-noded, with few or wanting innovation shoots, lowermost sheaths merely glabrous shining scales, the upper ones smooth, striate, shorter than the internodes, the culm-branches fascicled, elongate, somewhat spreading, panicle-bearing; blades narrow, linear, acute, more or less convolute, rigid, smooth beneath, strongly nerved and scabrous on the upper surface; panicle linear, subspiciform, 4—6 cm. long, few-flowered, rhachis glabrous and smooth, branches short, adpressed, glabrous, the lower 2—3-nate, the upper solitary, the stronger branches bearing 3—4 spikelets, the other only a single spikelet; spikelets erect, mostly shortly pedicelled, yellowish-green, glumes 1-nerved, both minutely bifid at the apex with a short mucro

from the sinus; the lower glume scabrous on the keel, 6–9 mm. long, the upper with a smooth keel, glabrous, 9—11 mm. long; lemma linear, tubulose, terete, scabrous, including the densely hairy callus and the straight, not twisted beak about 11 mm. long; awns subequal, 10—12 mm. long. Argentina. (Pl. LXX.) . . . . . **Aristida multiramea Hack.**

Blades of the lower culm-leaves strictly erect, 15—20 cm. long, uppermost blades shorter, up to 6 cm. long; ligule a shortly ciliolate rim, the collar and auricles ciliate, auricles of the innovations long-bearded; internodes about equal in length; awns unequally divergent, the central arcuate and reflexed, the lateral spreading, somewhat contorted at the base.

Caespitose perennial, about 50 cm. high, not glaucous, branched at base and from the lower nodes; basal sheaths reduced to scales, the lower internodes naked, upper sheaths shorter or as long as the glabrous, smooth internodes, slightly scabrous; innovation shoots many, at the base of the slender culms and from the lower internodes, culm-nodes somewhat tumid; blades involute, with an acute scabrous point, subjunciform, glabrous beneath, scaberulous on the upper surface; panicles long-exserted, very narrow, up to 10 cm. long, the rhachis terete or subtriquetrous, the branches solitary, erect, divided nearly to the base, each branch bearing but a few spikelets, branchlets and subclavate pedicels scabrous, the latter about as long as the spikelets or the lateral ones with very short pedicels, glumes scabrous, 1-nerved, both with a slightly emarginate apex and a mucro, the lower 5—6 mm. long, scabrous on the keel, the upper 8—9 mm. long, smooth on the keel, minutely ciliolate at the summit, the short lobes rounded; lemma with a strong keel, including the 1 mm. long, obtuse callus and the scarcely twisted, very short, scaberulous beak, about 10 mm. long; the central awn scabrous, 15 mm. long, the lateral ones 10 mm. long or as long as the central one. New Caledonia. (Pl. LXXI.). . . . . **Aristida Novae Caledoniae Henr.**

26. Lateral awns erect or spreading, never sharply reflexed; panicles slender, rather few-flowered, narrow, linear, but rather loose, interrupted all over or at least at the base, the branches distant; lemmas not furrowed. 27.

Lateral awns as well as the central one with a semicircular bend at base, all sharply reflexed; panicles dense and spike-like, many-flowered; lemmas deeply furrowed on the ventralside.

Caespitose perennial, culms erect, robust, 60—80 cm. high, glabrous, sheaths striate, terete or compressed upwards, smooth, longer than the

internodes, ligule a very short minutely ciliolate rim, auricles glabrous; blades of the flowering-culms flat at base, about 3 mm. wide, involute upwards, acute, glabrous beneath, scaberulous on the strongly nerved upper surface, shortly hairy at the base, margins smooth, the blades up to 40 cm. long, those of the innovations shorter, narrower and filiform; panicles erect, about 15 cm. long, very slightly interrupted at the base, very dense upwards; rhachis scaberulous, subterete or angulous, striate; branches subsolitary, strictly erect, much divided from the base with erect scabrous branchlets and subclavate pedicels, the lateral pedicels subsessile, the other ones up to 3 mm. long; glumes subequal or the lower slightly longer or shorter than the upper, linear, subulate, very acute and awned, 1-nerved, 10—12 mm. long or slightly longer, the first scabrous on the keel; lemma about 11 mm. long, including the scarcely 1 mm. long, subacute callus, scarcely beaked, with a strong keel, slightly scabrous upwards, awns scabrous up to 20 mm. long. Brazil. (Pl. LXXII.) . . . . . .
. . . . . **Aristida subaequans Doell**

27. Central awn straight, curved at the base only and sharply horizontally spreading. . . . . 28.
Central awn more or less regularly curved in a semicircle . . . . . 40.

28. Position of the glumes very distinctly inverse.[1]) . . . . . 29.
Position of the glumes not inverse, or but slightly so, the glumes subequal or the lower much shorter. . . . . 30.

29. Panicle narrow, usually more than 20 cm. long, $^1/_3$ to $^1/_2$ the length of the whole plant; branches erect or laxly adpressed; lemmas about 7 mm. long.
Perennial, with intra- and extravaginal innovations; culms caespitose with pale scales at the base, erect, slender, glabrous, up to 70 cm. high, not rarely as much as 1 meter long; sheaths glabrous, the lower not rarely more or less hairy, compressed or slightly keeled, ligule a ciliolate rim, auricles glabrous or scarcely pubescent, blades flat in the lower part over a long distance, convolute and flexuous upwards, ending in a long setaceous point, scabrous on the upper surface, sometimes with a few long hairs, especially towards the base, glabrous beneath, 10—20 cm. long and about 2 mm. wide, the margins scabrous. Whole plant dark or light green, sometimes very glaucous (var. *glaucissima*

[1]) *Aristida virgata* has sometimes a slightly inverse position of the glumes, thus approaching *A. purpurascens*, but the latter is always to distinguish by the much longer lower glumes and much longer lemmas.

KEARN.). Panicle erect, sometimes nodding at the summit, the branches binate, one rather short, 1—2 cm. long, the other longer, the uppermost ones solitary, axis, branches and pedicels scaberulous; glumes narrow, the lower distinctly hairy on the back and very scabrous on the keel, 1-nerved or sub-3-nerved by an additional side-nerve, gradually narrowed above into a fine awn, up to 11 mm. long, the upper glabrous with a smooth keel, distinctly bifid at the apex with a short awn from the sinus, about 7 mm. long; lemma glabrous, pubescent on the about $^1/_2$ mm. long subobtuse callus, scabrous on the keel and minutely so below the awns, the latter somewhat unequal, the central one about 2 cm. long or slightly longer, the lateral ones erect or divergent, about $1^1/_2$ cm. long or slightly longer. North America: Massachusetts to Florida, west to Missouri and Texas. (Pl. LXXIII.) . . . . . **Aristida purpurascens Poir.**

Panicle rather loose, mostly 10 cm. long or sometimes up to 15 cm. long, much shorter than half the length of the whole plant; branches rather lax, nodding; lemmas about 10 mm. long.
Caespitose perennial, culms erect, slender, glabrous, about 50 cm. high, few-noded, the uppermost internode long-exserted; sheaths glabrous, ligule a short ciliolate rim, auricles glabrous or minutely pubescent; blades flat, involute upwards, narrowed to a fine point, those of the innovations involute, glabrous beneath, scabrous on the upper surface, up to 20 cm. long and 2 mm. wide; panicle erect 10—15 cm. long, the lower branches rather distant, ascending or adpressed, often nodding at the summit, as much as 4 cm. long, spikelets bearing from the base; glumes acute, narrow, 1-nerved, glabrous, the lower about 10 mm. long, scabrous on the keel, the upper 8 mm. long, glabrous and smooth on the keel, the lemmas about 10 mm. long, punctulate under a strong lens, scaberulous on the keel and on the very short, scarcely twisted beak, the callus about $^1/_2$ mm. long, obtuse and densely hairy; awns scabrous, about 20—23 mm. long. Southern Mexico to Guatamala. (Pl. LXXIII.) . . . . . **Aristida Liebmanni Fourn.**

30. Lateral awns strictly erect, $^2/_3$ to $^3/_4$ as long as the horizontally spreading central awn . . . . . 31.
Lateral awns spreading, about as long as the spreading central awn . . 33.

31. Glumes 6—$6^1/_2$ mm. long, or sometimes the upper 7—8 mm. long . . . 32.
Glumes about 12 mm. long.
Culms caespitose from a hard thickened base, with extravaginal

innovations, pale scales at the base, stiffly erect, glabrous, rather stout, up to 1,5 m. high; sheaths glabrous, naked at the throat, ligule a scarcely ciliolate very minute membrane, auricles smooth or minutely pubescent; blades flat, loosely involute upwards with a fine involute point, glabrous beneath, scabrous on the upper surface, up to 30 cm. long and 3 mm. broad; panicle narrow and virgate, up to 50 cm. long, the branches rather distant but not rarely overlapping, the lower as much as 10 cm. long, sometimes naked at the base, all the branches stiffly erect and adpressed, the axis, branchlets and pedicels nearly smooth or minutely scabrous only; glumes mucronate, the lower mostly with a distinct nerve on one side, scaberulous on the back, scabrous on the keel, the upper one 1-nerved, glabrous, smooth on the keel; lemma about 8 mm. long, glabrous, somewhat scaberulous on the 1 mm. long beak, the callus about 1 mm. long, subobtuse and densely pubescent; awns scabrous, the central one $1^1/_2$—3 cm. long, the lateral ones up to 2 cm. long. North America: Carolina to Florida and eastern Texas. (Pl. LXXIV.) . . . . . **Aristida palustris Vasey**

32. Blades short, 3—5 cm. long or but slightly longer, involute throughout or flat only at the very base; culms many-noded, nodes commonly more than 10; sheaths very short, up to 3 cm. long; the central awn but slightly recurved at the base, spreading but not horizontally bowed. . . . . See **Aristida vilfifolia Henr.**

Blades long, up to 30 cm., flat, involute only in the upper part; culms few-noded; sheaths 8 cm. or more long; central awn strongly curved and horizontally bowed.

Culms caespitose from a rather soft base, glabrous, up to 80 cm. high, or as much as 1 meter; sheaths glabrous, terete, ligule a minutely ciliolate rim, auricles glabrous or slightly pubescent; blades lax, tapering to a fine point, glabrous beneath, scabrous on the upper surface, not over 2 mm. wide; panicle slender, erect but not very stiff, rather loosely flowered, 1/3 to 1/2 the length of the culm, the branches mostly short and adpressed, about 1—2 cm. long, not closely overlapping, bearing several approximate spikelets, axis, branchlets and pedicels scaberulous or nearly glabrous; glumes 6—7 mm. long, acuminate or shortly awned, 1-nerved or the lower with an additional side-nerve, the lower glume scabrous on the back and on the keel, the upper glabrous and smooth; lemma 4—5 mm. long, often mottled, slightly compressed, glabrous, with a very short scaberulous beak and a

pubescent, about $^3/_4$ mm. long callus; awns scabrous, the central one 1,5—2 cm. long, the lateral ones up to 13 mm. long. North America: New Jersey to Florida and Mississippi. (Pl. LXXIV.) . . . . . **Aristida virgata Trin.**

33. Rhizomes present, always distinctly developed . . . . . 34.
Rhizomes absent, if occasionally short rhizomes present, the plant always with a characteristic woolly pubescence at the mouth of the sheaths. 35.

34. Glumes acute only, not awned, panicle rather short and loose, 5—10 cm. long. Culms long and thin, elegant, including the panicle about 50 cm. high, simple, terete, glabrous, only 1—2-noded, the nodes congested at the base of the stem, leaves almost basal, the uppermost internode very long; sheaths glabrous, striate, terete, shorter than the internode; ligules obsolete, minutely ciliolate, auricles of the innovations bearded, those of the culm-leaves dark-coloured, glabrescent; blades flat, acuminate, up to 9 cm. long, glabrous on the lower, scabrous or hirtellous on the upper surface, long-bearded at the mouth or glabrescent, innovation-blades short, acute, convolute, setaceous; panicle with smooth rhachis and branches, the latter binate, the longer ones 4 cm., naked in lower half, few-flowered, the shorter ones bearing 1—2 spikelets on long, filiform, smooth pedicels; glumes unequal, 1-nerved, glabrous, acuminate, smooth on the keels, the lower 8 mm., the upper 10 mm. long; lemma smooth, including the scarcely $^1/_2$ mm. long, obtuse or truncate, shortly hairy callus, about 8 mm. long; awns scaberulous, at first erect, soon divaricately spreading, the central one 35 mm. long, more arcuately deflexed than the 30 mm. long lateral ones. North-east Rhodesia. (Pl. LXXV.) . . . . . **Aristida denudata Pilg.**

Glumes long-awned; panicle long and narrow, much interrupted.
Culms simple, erect, up to 80 cm. high, inclusive of the panicle, terete, slightly striate, smooth, few-noded, the nodes subbasal, the uppermost one very long, a few leaves at the base of the stems; sheaths glabrous, striate, terete, longer than the lower internode, the old ones fibrous; ligules minute, nearly obsolete, auricles pubescent, mouth of the sheaths with some long hairs, especially those of the innovations; blades erect, firm, flat at the base, inrolled upwards, slightly scabrous above, smooth beneath, up to 10 cm. long, up to 2 mm. wide at the base, those of the innovations convolute, more or less flexuous, longer than the culm-blades; panicle with a slightly flexuous axis, up to 30 cm. long, the branches binate, very distant, especially the lower

ones, suberect or somewhat spreading upwards, few-flowered, spikelets bearing from near the base or naked below over a short distance, the lower ones up to 7 cm. long, gradually becoming shorter, axis and branches striate, smooth; spikelets somewhat congested on erect scaberulous pedicels, glumes about equal or the lower slightly shorter than the upper one, yellowish or the lower tinged with purple, both 1-nerved or sometimes the lower one with 2 additional side-nerves, close to the midnerve, lower glume very narrow, smooth, minutely scabrous only on the keel, including the about 6 mm. long awn, up to 15 mm. long, second glume perfectly smooth, including the 6 mm. long awn up to 17 mm. long; lemma glabrous, 9—10 mm. long, slightly narrowed upwards and shortly beaked, the callus scarcely 1 mm. long, sharp-pointed, rather shortly bearded on the sides above, awns scabrous, about equal, the central one slightly longer, somewhat curved, sharply reflexed by a semicircular bend at the base, 20—24 mm. long, lateral awns up to 20 mm. long, spreading or suberect, the base twisted in a loose spiral at maturity. North America: Florida. (Pl. LXXV.)
. . . . . **Aristida rhizomophora Swallen**

35. Blades involute or flat at the base, mouth of the sheaths, auricles and lower portion of the blades not provided with a flake of wool, sometimes auricles and collars densely short-villous or pubescent but never with the characteristic woolly tuft. . . . . 36.

Blades involute, mouth of the sheaths, auricles and upper surface of the blades near the base with a characteristic flake of wool or if at maturity the flake is deciduous, the innovations always with this woolly tuft. Caespitose perennial, rarely with short rhizomes; culms strictly erect, 50 cm. to 1 m. high, glabrous, sheaths glabrous, striate, mouth distinctly villous at the throat; blades very long, firm, somewhat flexuous, closely involute all over, glabrous beneath, scabrous on the upper surface and villous at the base, sometimes the upper surface with here and there a few long hairs, about 30 - 40 cm. long and 1 mm. thick when inrolled, ligule a densely ciliolate rim, mostly covered by the flake of wool; panicle very long and slender, narrow, about 30 cm. long or longer with adpressed branches, the lower ones rather distant and up to 5 cm. long, spikelets bearing nearly from the base, axis, branchlets and pedicels nearly smooth or the pedicels slightly scaberulous; glumes glabrous, about equal, both manifestly awned, the awns from a distinctly bifid apex, the lower scaberulous on the keel, up to $12^1/_2$ mm. long, 1-nerved or sometimes with an additional nerve on one side, the upper 1-nerved, glabrous throughout; lemma smooth, scarcely beaked, the densely pubescent, very acute callus about 1 mm.

long, the body of the lemma 6—7 mm. long; awns subequal, scaberulous, the central one horizontally spreading at maturity, 1—1½ cm. long, the lateral ones divergent or spreading, a little shorter. North America: South Carolina to Florida and Mississippi. (Pl. LXXVI.) . . . . . **Aristida stricta Michx.**

36. Lemma without column, never twisted at the summit. . . . . 37.
Lemma with a well-developed distinctly twisted column or beak . . . . 39.

37. Panicles very narrow and slender, 10—30 cm. long, spikelets solitary or in pairs, culms many-noded, the internodes not very unequal in length, or the uppermost one commonly longer than the others, uppermost blades not approximate in pairs. . . . . 38.

Panicles narrow, 4—5 cm. long, branches more than 2-flowered, culms few-noded, internodes very unequal, alternately very long (10—12 cm.) and very short (scarcely 1 cm.), the uppermost blades approximate in pairs.
Caespitose perennial with erect, about 70 cm. long, scarcely 1 mm. thick, terete, glabrous culms; sheaths striate, terete, glabrous, ligules shortly ciliolate, auricles bearded, the hairs finally deciduous; blades narrow, convolute or flat only at the very base, with a few long hairs on the upper surface, scarcely 1 mm. broad, the lower blades 6–10 cm. long, the upper ones only 1—2 cm. long, glabrous beneath, scaberulous on the upper surface. Panicles scarcely ½ cm. wide, contracted and subspiciform with scaberulous rhachis, branches binate or subsimple, adpressed, the lowermost up to 3 cm. long, naked at the base; glumes about equal, glabrous, 1-nerved, the lower about 6½ mm. long, acute and short-awned, upwards with a scabrous keel, the upper 7 mm. long, narrow, aristulate with a smooth keel; lemma with a scarcely ½ mm. long, obtuse, hairy callus, about 6 mm. long, punctulate, very scabrous in upper part, especially below the awns, narrowed above but slightly beaked; awns slightly contorted at the very base, the central one strongly curved and horizontally spreading, about 1½ cm. long, the lateral ones erect or somewhat divergent, about 10 mm. long. British East Africa, Rhodesia and Transvaal. (Pl. LXXVI.) . . . . . **Aristida macilenta Henr.**

38. Glumes 6—7 mm. long; spikelets mostly in pairs.
Culms caespitose from a rather delicate base, slender and erect, glabrous, up to 60 cm. high; sheaths glabrous, shorter than the internodes, ligule a ciliolate rim, auricles minutely pubescent; blades flat,

with a fine involute point, glabrous beneath, scabrous on the upper surface, bearing sometimes a few scattered white hairs, 5—15 cm. long, about 1 mm. wide; panicles slender, 10—20 cm. long, few-flowered, the spikelets in pairs, one with a long, the other with a short pedicel, the lower pairs distant, the branches adpressed; glumes sometimes up to 8 mm. long, gradually narrowed, awn-tipped, the lower scabrous on the back and on the keel, the upper glabrous, scabrous on the keel; callus very obtuse, densely hairy, scarcely $^1/_2$ mm. long, lemma punctulate, scaberulous at the scarcely beaked summit, up to 6 mm. long, the central awn reflexed, about $1^1/_2$ cm. long, the lateral ones spreading, slightly contorted at the very basy, a little shorter. North America: Florida. (Pl. LXXVII.) . . . . . **Aristida simpliciflora Chapm.**

Glumes about 10 mm. long; spikelets mostly solitary.

Culms erect, somewhat geniculate at base, slender, glabrous, 40—60 cm. high; sheaths glabrous, the lower pilose at the throat; blades flat, those of the innovations involute, glabrous beneath, scabrous or pilose on the upper surface, the margins thickened, mostly 10—15 cm. long, 1—2 mm. wide, the uppermost reduced; panicle slender and strict, as much as 30 cm. long, the spikelets adpressed, distant, pedicels firm, 2—3 mm. long; glumes equal, firm, stramineous, rather broad towards the summit, glabrous, the lower scaberulous on the keel, both slightly bifid or emarginate with a mucro from the sinus; lemma 9 mm. long, the callus very acute, densely hairy, about 1 mm. long, the scarcely beaked summit of the lemma slightly scabrous, the body punctulate; awns about equal, 15 mm. long, somewhat contorted at the very base, the central one reflexed, the lateral ones commonly horizontally spreading. North America: Alabama. (Pl. LXXVII.) . . . . . **Aristida Mohrii Nash**

39. Blades as much as 15 cm. long; panicles 10—20 cm. long, rather open, the branches stiffly ascending and naked at base, 4—8 cm. long, spikelets adpressed towards the summit of the branches.

Caespitose perennial with stiffly erect, slender, scaberulous or puberulous culms, 20—40 cm. high; sheaths striate, distinctly puberulous, densely shortly villous at the throat and with a very prominent villous line across the collar, ligule a ciliolate rim, auricles densely villous, more or less prominently bearded; blades involute, more or less flexuous, scabrous or puberulent on the upper surface, glabrous beneath, only $^1/_2$ mm. thick when inrolled, ending in a fine point; panicles stiffly erect, narrow but not dense, more or less effuse with scaberulous rhachis,

branches, especially the lower ones, binate, the upper solitary, the lowermost up to 7 or 8 cm. long, sometimes flexuous and somewhat spreading, the branchlets and pedicels subterete, scaberulous; glumes unequal, 1-nerved, acuminate or awn-pointed, the lower scabrous on the keel, 6–7 mm. long or slightly shorter, the upper smooth on the keel, 7—8 mm. long or sometimes up to 10 mm. long; lemma including the ³/₄ mm. long, densely hairy subobtuse callus, about 8 mm. long, smooth in the lower part, very scabrous above and gradually narrowed into a scabrous slightly twisted about 2 mm. long beak; awns about equal, divergent, at maturity nearly horizontally spreading, slightly curved at the very base, about 15 mm. long, sometimes up to 20 mm. long. North America: Texas, New Mexico and Arizona. (Pl. LXXVIII.)
. . . . . **Aristida pansa Woot. et Standley**

Blades usually not over 5 cm. long, often shorter; panicles 5—10 cm. long, branches few-flowered, distant, 1—2 cm. long.
Loosely caespitose perennial with thin and very elegant, erect, wiry, glabrous culms, 40—60 cm. high, more or less branched from nearly all the nodes or at least from most of the lower ones, nodes slightly swollen and protruding; sheaths glabrous, slightly compressed, with rather broad hyaline margins, striate, rather short, scarcely 1¹/₂ cm. long, much shorter than the internodes, distributed equally along the culms, the leaves not clustered at the base at all, ligule a short ciliate membrane, auricles, especially those of the young leaves long-bearded; blades stiff and firm, involute, pungent, glaucous, less than 1 mm. wide, glabrous beneath, scabrous to puberulent on the upper surface; panicle narrow, contracted but loose and interrupted at the base, rather few-flowered, branches rather stiffly ascending or somewhat spreading, mostly solitary and bearing 1—2-flowered branchlets at the base, branches at first minutely pubescent in the axils, afterwards becoming smooth, branchlets and pedicels scaberulous; glumes subequal, 7—9 mm. long, both 1-nerved, the lower scaberulous, the upper smooth on the keel, acuminate or shortly awn-pointed; lemma smooth, including the 3—4 mm. long, twisted scaberulous column about 10 mm. long, the callus densely pilose, subacute, about ¹/₂ mm. long; aws subequal, divergent, finally nearly horizontally spreading, very slightly contorted at the base, 10—15 mm. long. West Indian Islands: Cuba. (Pl. LXXVIII.)
. . . . . **Aristida neglecta Leon**

40. (*27*). Lemma without a column, even a beak is not present; panicles dense or contracted, the branches not filiform, pedicels rather short. South American species . . . . . 41.

Lemma with a distinctly twisted, rigid, 12 mm. long column, panicles not dense, rather loose with filiform branches and long pedicels.

Caespitose perennial with strictly erect, terete or subcompressed, glabrous, slightly striate culms, about 40 cm. high, simple or branched only from some of the lower nodes; sheaths shorter than the internodes, slightly compressed, striate, glabrous and smooth or minutely scaberulous, ligules very short, densely ciliolate, auricles shortly bearded; blades narrow, linear, convolute, acuminate, scarcely 1 mm. wide and about 10 cm. long, smooth or slightly scaberulous beneath, hirtellous on the upper surface; panicles narrow, very interrupted, with scabrous, angulous rhachis, branches solitary or the lower subbinate, more or less spreading, few-flowered, sometimes bearing but 1 spikelet, scaberulous; glumes purplish, unequal, acute, shortly awned, glabrous and smooth, the lower 11 mm. long, 3-nerved or with two additional side-nerves, slightly scaberulous on the keel, the upper somewhat narrower, 15 mm. long, 1-nerved with a smooth keel; lemma terete, about 10 mm. long with a scabrous keel and very rough upwards, the very acute, densely bearded callus about $2^1/_2$ mm. long, the column somewhat longer than the body of the lemma and but slightly narrower; awns very heterogeneous, very unequal, the central one in the lower part as thick as the column, about 3,5 cm. long, strongly curved and even reflexed at the summit, the lateral ones much thinner, erect and laxly curved only, all the awns scabrous. Australia: New South Wales. (Pl. LXXIX.) . . . . . **Aristida heterochaeta Henr.**

41. Glumes distinctly awned; lemmas rather short, $3^1/_2$—4 mm. long; central awn strongly curved in a semicircle, the lateral ones much shorter and thinner, somewhat flexuous, $^1/_3$ as long as the central one and about as long as the body of the lemma.

Caespitose perennial, culms few-noded, together with the panicle 50—60 cm. high, simple, the uppermost internode long-exserted, subcompressed below, terete upwards, glabrous; sheaths longer than the internodes, terete or slightly compressed, striate, glabrous or minutely puberulent, ligule a minute scarcely ciliolate rim, auricles pubescent or hairy, the hairs deciduous, those of the innovations bearded with reflexed hairs; blades elongate, complicate, very long, rigid, mostly overtopping the panicle and more than 30 cm. long, scabrous on the upper surface and with long deciduous hairs on the lower part, ending in a fine point, 1 mm. broad when inrolled, expanded about 2 mm. wide; panicle erect, strict, contracted but interrupted, about 15 cm. or more long, the axis striate and minutely puberulous

or scabrous, branches semiwhorled, erect, adpressed or but slightly spreading, much divided from the base, the longer ones naked in the lower part over a short distance, the shorter ones spikelets bearing from the base; branches, branchlets and pedicels angulous, minutely pubescent or scabrous; glumes acuminate, awned, longer than the lemmas, slightly unequal, the lower 6 mm. long. scabrous on the back and on the keel, 1-nerved or with two additional short lateral nerves, the upper 7 mm. long, glabrous with a smooth keel, 1-nerved; lemmas with a very short, very obtuse, slightly hairy callus, keeled, punctulate and very scabrous upwards, slightly narrowed but not beaked, the awns scabrous, the central one up to 15 mm. long, the lateral ones about 5 mm. long. South America: Brazil. (Pl. LXXX.) . . . . . **Aristida torta Kunth**

Glumes shortly awned or acute only; lemmas longer, up to $5^1/_2$ mm. long; all the awns of the lemma longer than the body, the central one but slightly curved in a semicircle, the lateral ones straight, $^1/_3$ shorter than the central one.
Caespitose, up to 70 cm. high perennial, not rarely up to 1 meter long, simple or with a few panicle-bearing branches from some of the upper nodes, about 4-noded, terete or compressed below, glabrous; lower sheaths longer than the internodes, upper ones shorter, slightly compressed, glabrous, ligule a minutely ciliolate rim, auricles glabrous or somewhat puberulous, those of the innovations bearded, the hairs deciduous; blades acute very narrow and convolute, sometimes flat at the very base, not overtopping the panicle, 20—30 cm. long or shorter, up to 2 mm. wide at the base when expanded, scabrous on the upper surface, sometimes with scattered long hairs near the base, glabrous beneath; panicle erect, contracted but rather loose, mostly more than 15 cm. long, axis terete, scaberulous, branches binate, the lowermost up to 8 cm. long, the shorter ones up to 4 cm. long, all naked at the base over a rather long distance, erect or mostly somewhat spreading with more flexuous branches and branchlets than in A. torta, branchlets and pedicels scaberulous; glumes cuspidate-acuminate or shortly awned, subequal or the lower slightly shorter or longer, longer than the lemmas, the lower 7—$7^1/_2$ mm. long, scabrous on the keel and on the back, 1- or sub-3-nerved, the upper one glabrous, smooth on the keel, 7—8 mm. long, 1-nerved; lemma about 7 mm. long, punctulate, scabrous upwards, not beaked; awns scabrous, the central one about 25 mm. long, the strictly erect lateral ones about 15 mm. long. South America: Costa Rica and Panama to Venezuela and from British Guiana, Surinam and French Guiana

to Brazil. Intermediate specimens between A. torta and A. tincta occur in Brazil. (Pl. LXXX.) . . . . . .
. . . . . **Aristida tincta Trin. et Rupr.**

42. (22.) Internodes equal or somewhat unequal, the leaves not very short and at the same time approximate in pairs. . . . . 43.

Internodes very unequal, the lowermost long, the following very short, enclosed by the sheaths, alternately long and short, thus bringing the leaves together approximately in pairs; sheaths and blades short, mostly less than 2 cm. long.

Culms erect, glabrous, stiff and wiry, 20—40 cm. or sometimes up to 60 cm. high, from a hard and suffrutescent base, glaucous; sheaths glabrous, 5—10 mm. long, bearded at the mouth, ligule a ciliolate rim, the auricles pubescent and commonly with a few long hairs; blades thick, stiffly spreading or suberect, flat at the very base, soon becoming involute, glabrous beneath, scabrous on the upper surface, 5—20 mm. long, $^1/_2$—1 mm. wide, the upper mostly much reduced, the basal ones sometimes longer; panicles narrow, nearly simple, 5—10 cm. long, the spikelets subsessile or on short, about 5 mm. long, erect branches; axis, branchlets and pedicels scaberulous; glumes about equal, 8 mm. long, 1-nerved, glabrous, the keel of the lower one scabrous only in the upper part, both acute or awn-pointed; lemma punctulate, scabrous on the nerve and on the straight, not twisted beak, the latter short, together with the subacute, densely hairy, 0,5—0,7 mm. long callus, up to 7 mm. long; awns subequal, scabrous, spreading, not contorted at the base, the central one 12 mm. long, the lateral ones up to 10 mm. long. Cuba. (Pl. LXXX.)
. . . . . **Aristida curtifolia Hitchc.**

43. Callus with a bifid prolongation . . . . . 44.
Callus not bifid, obtuse, acute or sometimes oblique . . . . . 45.

44. Panicle loose and open; glumes rather firm, not awned, rounded at the back, obtuse or slightly emarginate, the lower scarcely half as long as the upper one; lemma produced into a very short, mostly 2 mm. long, slightly twisted beak, the body smooth, the callus bifid with erect lobes.

Tufted glabrous perennial with slender, erect, few-noded culms, sheathed all along; sheaths firm, glabrous, ligule a line of short hairs; blades involute, setaceous, curved or flexuous, the upper exceeding the panicle, smooth below, scabrous on the upper surface; panicle 20 cm. long or longer, with smooth rhachis, branches 2—3-nate about 15 cm. long, scantily branched, filiform, scaberulous or smooth below, branchlets

very fine, flexuous, pedicels mostly as long as the spikelets; spikelets yellowish, nodding, lower glume 1-nerved, rather broad, keel glabrous, 6 mm. long with obtusely emarginate apex, upper glume narrow with glabrous keel, about 13 mm. long with subacute but slightly bifid apex; lemma including the short beak and the short long-hairy callus, about 12—13 mm. long; awns fine, somewhat unequal, scabrous, the central up to 23 mm. long, the lateral ones about 20 mm. long. South Africa: Kalahari Region. (Pl. LXXXI.) . . . . . **Aristida Burkei Stapf**

Panicle dense and spike-like or somewhat open and interrupted; glumes not firm, papery, keeled, acuminate and long-awned, the lower longer than the upper; lemma produced into a long, mostly up to 15 mm. long, densely twisted scabrous column, the body of the lemma rough under a lens, the callus bifid with spreading lobes.

Densely caespitose robust perennial; culms simple, erect, glabrous, terete, up to 1 meter or more long, striate, smooth; sheaths tight, the lower ones slipping from the stem, longer than the internodes, striate, glabrous, the mouth long-bearded; ligules dark, short, ciliolate, auricles dark, hairy; blades up to 30 cm. long or longer, 3—5 mm. wide at the base, flat, narrowly convolute upwards, long-acuminate, many-nerved, scabrous on the upper surface, smooth on the lower, glaucous-green; panicle exserted, erect, contracted, interrupted at the base, up to 20 cm. long, axis terete and smooth below, compressed or angulous and scabrous upwards, branches 2—3-nate, subfascicled, short, erect, scabrous, the lower ones naked at the base over a short distance; spikelets erect, fasciculate, with subclavate scabrous angulous pedicels; glumes subulate, cuspidately awned, 1-nerved, the lower 13 mm. long, scabrous on the keel, the upper one about 10 mm. long; lemma narrowly linear, together with the densely hairy, 1 mm. long callus, about $7^1/_2$ mm. long; awns subequal, somewhat spreading, scabrous, the central about 27 mm. long, the lateral ones up to 23 mm. long. South America: Brazil to Bolivia. (Pl. LXXXII.) . . . . . **Aristida riparia Trin.**

Panicle shorter than in the type, up to 12 cm. long and about $1^1/_2$ cm. broad, dense and spiciform, not interrupted, the spikelets somewhat shorter, lower glume with the 3 mm. long awn about 13 mm. long, scabrous on the back, upper glume with the 2 mm. long awn about 12 mm. long, the lemma with the scarcely 10 mm. long column up to 15 mm. long or somewhat longer, the awns spreading or divergent, the central one scarcely 25 mm. long,

the lateral ones up to 20 mm. long, callus of the lemma shorter than in the type, scarcely $^1/_2$ mm. long but very distinctly bifid. Bolivia. . . . . **var. andina Henrard**

45. Panicles effuse, open, the branches remote and divaricate, stiffly spreading or reflexed or drooping at maturity, naked at the base and spikelets bearing only in the upper half, or if branched from the very base, the branchlets and pedicels divaricately spreading; sometimes the branches at first ascending and afterwards spreading but in that case always naked at the base, or rarely with a 1—2-flowered short basal branchlet. . . . . 46.

Panicles dense and spike-like or laxly contracted and more or less interrupted, the branches and branchlets never divaricately spreading or drooping but strictly erect and adpressed, spikelets bearing from the very base or if sometimes the lower branches are somewhat naked at base, they are always adpressed with a many-flowered shorter sessile branchlet at their base. . . . . 88.

46. Column well-developed, very variable in length, sometimes very long, 2 cm. and longer or much shorter and only up to 5 mm. long, but always very prominent and distinctly twisted. . . . . 47.

Column wanting, sometimes there is a short, not or scarcely twisted beak, about 2 mm. long. . . . . 57.

47. Position of the glumes inverse. . . . . 48.

Position of the glumes not inverse, the lower glume distinctly shorter than the upper one. . . . . 51.

48. Column rather short, mostly not over 10—15 mm. long; glumes shorter than 15 mm., commonly not over 10 mm. long. . . . . 49.

Column long, about $2^1/_2$ cm., elegant; lower glume about 22 mm. long, the upper one 18—19 mm. long.

Panicle loose and open, the lower branches up to 20 cm. long, afterwards spreading. Caespitose erect, simple, robust perennial, including the panicle up to 1,5 meter high; culms glabrous, lower sheaths shorter than the internodes, upper ones longer, glabrous, smooth, striate, culm-nodes slightly swollen and somewhat protruding above the glabrous, dark sheath-nodes, thickened at the junction of the blades and dark and shining there, ligule a scarcely ciliolate rim, auricles ciliate, becoming glabrous; blades narrow, 2—4 mm. wide, convolute, up to 15 cm. long, obtuse, glabrous and smooth on both surfaces, the margins smooth, the lateral nerves thickened; panicles

very long, up to 40 cm., nodding at the summit, axis terete or angulous upwards, glabrous or somewhat scabrous, the branches binate, the axils slightly pubescent or glabrous; branches at first erect, afterwards spreading and drooping, naked in the lower part, reiterately branched with binate adpressed naked branchlets, pedicels rather smooth, short or scarcely half as long as the glumes; spikelets narrow, purplish, smooth, glumes gradually narrowed, short-awned, the lower 3-nerved, the upper 1-nerved; lemma including the densely hairy, very acute, 1 mm. long callus and the up to $2^1/_2$ cm. long, scaberulous, rather thin, twisted column, up to $3^1/_2$ cm. long; awns straight, somewhat unequal, the central about $5^1/_2$ cm. long, the lateral ones up to $4^1/_2$ cm. long. South America: Brazil. (Pl. LXXXI.) . . . . . .
. . . . . **Aristida chapadensis Trin.**

49. Panicles lax, the spikelets congested at the end of the branches and branchlets; awns of the lemma very unequal, the lateral ones much shorter than the central awn; lemmas scabrous but not aculeolate. . 50.

Panicles lax and open but the spikelets distant, equally disposed with rather long pedicels; awns of the lemma about equal or slightly unequal; lemmas very scabrous and aculeolate above.

Caespitose perennial with erect, terete, elegant culms, 60 cm. high or sometimes up to 1 meter long, glabrous, about 5-noded, branched from nearly all the nodes; sheaths subcompressed, glabrous, about as long as the internodes; ligule a short ciliolate rim, auricles ciliate or puberulous, those of the innovations bearded; blades narrow, linear, setaceously acuminate, somewhat rigid, about 2 mm. wide, flat, becoming involute, not junciform, the lower about 20 cm. long, the upper ones mostly up to 10 cm. long, erect or spreading, never overtopping the panicle, glabrous and smooth beneath, scabrous on the upper surface with spreading long hairs at the base, the margins scabrous with a very thick sclerenchym-band, the old blades curved and flexuous; panicle elliptic to oblong, up to 25 cm. long with scabrous rhachis, the branches thin, binate, scabrous, undivided in lower $^1/_3$ part, erectly spreading, the lowermost about half as long as the panicle, the other shorter, bearing up to 6 distant spikelets; glumes linear-subulate, purplish, 1-nerved, the lower broadest, 3-carinate (only 1-nerved), including the $1^1/_2$ mm. long scaberulous awn up to $13^1/_2$ mm. long, with a scaberulous keel, the upper one 7—8 mm. long with a smooth keel; lemma terete, green, mottled, 8—9 mm. long, including the short, hairy, very obtuse callus, the body of the lemma very scabrous and aculeolate above, gradually narrowed into the twisted, scabrous, 3—5 mm. long column; awns scabrous, the central one up to 25 mm.,

the lateral ones about 20—22 mm. long, all the awns slightly spreading. South America: Bolivia to Paraguay. (Pl. LXXXII.) . . . . . **Aristida Hassleri Hack.**

50. Column rather short, shorter than the body of the lemma; lower glume scabrous, 3-nerved in well-developed spikelets, upper glume acute or scarcely bifid.

Caespitose erect perennial, 70 cm. or more high, culms terete, striate, scaberulous and pubescent especially below the panicle; sheaths narrow, striate, scaberulous, longer than the internodes, ligule a minutely ciliolate rim, auricles and collar bearded; blades flat at the base, convolute upwards, long-acuminate, 30 cm. long or longer, 1—3 mm. broad, pubescent or hirtellous on both surfaces or glabrous beneath, with thickened margins; panicle large, 40 cm. or more long, at first somewhat contracted or subeffuse, afterwards divaricately spreading, rhachis terete, pubescent on the lower part, branches binate or solitary upwards, with thickened and hirtellous axils, widely spreading at maturity, 20—25 cm. long, the upper ones gradually becoming shorter, naked at the base over a long distance, with densely congested fascicled spikelets at the top of the branches and branchlets, spikelets sessile or pedicels very short and somewhat clavate; glumes unequal, the lower acute or shortly awned, lanceolate, the lateral nerves shorter than the midnerve or sometimes wanting, the keel scabrous, minutely scaberulous on the back, about 13 mm. long, upper glume narrower, up to 10 mm. long, keel smooth, lemma fusiform, glabrous below, very scabrous upwards, the 1 mm. long, obtuse callus densely hairy, the body about 7—8 mm. long, gradually passing into a very scabrous, twisted, about 4 mm. long column; awns very scabrous, very unequal, central one spreading or divergent, 10—12 mm. long, the lateral ones mostly 3—4 mm. long. Mexico. (Pl. LXXXII.) . . . . . **Aristida Lagascae Henr.**

Column as long as or longer than the body of the lemma; lower glume pubescent or becoming glabrous, always 1-nerved, upper glume distinctly bifid with an awn from the sinus.

Caespitose perennial, up to 1 meter high, culms firm, scaberulous or hirtellous, sheaths longer than the internodes, striate, hirtellous or becoming glabrous, terete, striate, ligule a ciliolate rim, auricles and collar bearded; blades flat, the lower about 3 mm. wide, flexuous or curved, narrowed upwards and involute with a long setaceous point, scabrous on both surfaces or becoming glabrous beneath; panicles effuse or at first slightly contracted, afterwards widely spreading with

very long divaricate and more or less flexuous, remote branches, the axils of the panicle slightly thickened and prominently ciliate, branches binate or subsolitary more than 15 cm. long, or the upper gradually becoming shorter, scaberulous, the spikelets congested at the end of the branches and branchlets, forming narrow, elongate false spikes, pedicels strictly erect, about half as long as the glumes, pubescent or glabrous; at maturity, the pubescent glumes become nearly glabrous, the lower 11 mm. long, acute, distinctly awned, very scabrous on the keel, the upper one with a rather smooth keel, scarcely 10 mm. long, including the 1 mm. long, very scabrous awn from the distinctly bifid apex, the lateral setae acute; lemma smooth below, scabrous upwards, the obtuse, densely but shortly hairy callus about $^1/_2$ mm. long, the strongly twisted scabrous column about 9 mm. long, the lemma including column and callus about 18 mm. long; central awn spreading, about 10 mm. long, the lateral ones about half as long, or, in var. *subaequilonga* HENR. the awns much longer, the central one up to 20 mm. and the lateral ones up to 15 mm. long, all the awns very scabrous. Mexico and Ecuador. (Pl. LXXXIII.) . . . . . .
. . . . . **Aristida Jacquiniana Tausch**

51. Branches of panicle solitary or binate, pedicels short . . . . . 52.
Branches of panicle numerous in a whorl, the spikelets solitary on long pedicels.

Caespitose erect perennial, up to 1 meter high: culms terete, smooth, shining, erect, few-noded, the uppermost internode by far the longest, longer than all the other internodes together; sheaths terete, smooth, substriate, shorter than the internodes, ligule a ciliolate rim, auricles, especially those of the innovations bearded, those of the culm-blades well-developed, becoming glabrous; blades linear, up to 30 cm. long or longer, 1—2 mm. broad, or the lower sometimes 5 mm. broad, flat at the base, becoming involute-setaceous, long-pointed, glabrous or scabrous beneath, scabrous on the upper surface and along the margins, many-nerved, without lateral bands of sclerenchyma; panicles effuse, pyramidal, about 30 cm. long and up to 7 or 8 cm. broad, the axis striate or grooved, scaberulous; the branches in several whorls, axils not bearded, naked in the lower part, 6—10 cm. long, bifurcate and reiterately branched, scaberulous, the thin subclavate pedicels longer than the spikelets; glumes linear-lanceolate, 1-nerved, the lower 9 mm. long, scabrous on the keel, the upper $10^1/_2$ mm. long, smooth on the keel, both very acute but scarcely awned; lemma including the hairy, obtuse, about $^1/_2$ mm. long callus and the scabrous, twisted, about 5 mm. long column, up to 11 mm. long; awns subequal, central

one 25—26 mm. long, the lateral ones 22—23 mm. long, spreading or suberect. Cochinchina to the Philippines. (Pl. LXXXIII.) . . . . . **Aristida culionensis Pilg.**

52. Glumes very unequal, the lower $^1/_3$ shorter. . . . . 53.
Glumes about equal, the lower but very slightly shorter than the upper. 54.

53. Lower glume 9—12 mm. long, upper one not bifid, 15—18 mm. long, column up to 10 mm. long, shorter or as long as the lemma, callus very acute, central awn up to 4 cm. long.
Densely caespitose perennial, culms erect, simple, up to 1 meter high, about 4-noded, glabrous, smooth; sheaths smooth, striate, the lowermost bearded at the mouth, ligule a short ciliate rim; blades convolute-setaceous, up to 20 cm. long, up to $2^1/_2$ mm. wide when expanded, rigid, curved, smooth below, scaberulous on the upper surface and along the margins; panicles erect, effuse or but slightly contracted, 20—30 cm. long, up to 15 cm. wide with long 2—3-nate up to 15 cm. long branches, undivided for 5—6 cm., like the filiform, flexuous or straight branchlets scabrous; pedicels up to 10 mm. long, spikelets yellowish or brown, glumes rounded at the back, linear-lanceolate, pointed, 1-nerved, the lower broader than the upper one; lemma linear, smooth, including the about 2 mm. long, acute, hairy callus and the 8—10 mm. long, twisted scaberulous column, up to 18 mm. long; awns spreading, the central 35—40 mm. long, the lateral ones 25—30 mm. long. Palea elliptic, subtruncate, short, $1^1/_2$ mm. long. Somaliland. (Pl. LXXXIV.) . . . . . **Aristida somalensis Stapf**

Lower glume 6—7 mm. long, upper one bifid at the apex, 10 mm. long, column about 6 mm. long, as long as the body of the lemma, callus subobtuse, central awn up to 2 cm. long.
Perennial, up to 60 cm. high, erect, branched from the lower nodes, slightly striate, terete, scaberulous; sheaths scaberulous, striate, compressed, slipping from the stem, shorter than the internodes, ligules short, ciliolate, auricles bearded; blades narrow, acute, convolute, flat at the very base, with some long hairs, 20 cm. long or the upper ones much shorter, margins not thickened, scaberulous on both surfaces; panicle about 30 cm. long, erect, rhachis terete or nearly so, branches distant, scabrous binate, the lower up to 15 cm. long, the upper ones gradually becoming shorter, naked below, suberect or somewhat spreading, branchlets very scabrous, short, few-flowered, the spikelets congested, pedicels scabrous; glumes lanceolate, green, 1-nerved,

glabrous, the lower acute or aristulate with a scabrous keel, the upper one smooth on the keel with a 1 mm. long awn from the sinus; lemma smooth below, scabrous upwards, together with the scaberulous, twisted about 6 mm. long column and the rather obtuse shortly hairy $^3/_4$ mm. long callus, about 12 mm. long; awns scabrous, erect or somewhat spreading, the central one 18–19 mm., the lateral ones about 16 mm. long. North Australia. (Pl. LXXXIV.) . . . . . **Aristida macroclada Henr.**

54. Branches of panicle divaricate, stiffly and abruptly spreading, forming at maturity an angle of 90 degrees with the main-axis, sometimes the branches reflexed at the base but always strict. . . . . 55.

Branches of panicle not abruptly spreading or reflexed at base, very slender, ascending and drooping at the summit.

Erect, caespitose perennial, up to 1 meter high, culms terete, striate, pubescent or scaberulous, few-noded, the uppermost internode long-exserted; sheaths slightly compressed, striate, glabrous, longer than the internodes, ligule a ciliolate rim, auricles bearded and with a villous line across the collar, the hairs deciduous; blades flat at the base, the old ones flexuous or curved, becoming involute, narrowed into a setaceous tip, scaberulous or hirtellous on both surfaces, or glabrous beneath, as much as 40 cm. long and 1–3 mm. wide, the margins not conspicuously thickened; panicle large and open, 15–30 cm. long, the axis scabrous or hirtellous, sometimes the lowermost axis-internode nearly glabrous, the branches mostly solitary, naked below, drooping and flexuous, very scabrous, axils pubescent, all the branches divided above the middle, the spikelets adpressed along the upper part of the branches and branchlets, forming short false spikes, branchlets very short; glumes about equal or slightly unequal, 10–11 mm. long, awn-pointed, 1-nerved, the lower scabrous on the keel and on the back, the upper one with a smooth keel and sometimes with a slightly bifid apex; lemmas with column exserted above the glumes, the callus hairy, subobtuse, about $^1/_2$ mm long, the body of the lemma mottled and glabrous below, very scabrous upwards, the scabrous twisted column about 5 mm. long, the total length of callus, lemma and column 12–14 mm.; awns slightly divergent or the lateral ones commonly erect, about half as long as the 10 mm. long central one, or in var. *Karwinskiana* Henr. much shorter and only up to 3 mm. long and at the same time with shorter, 7–9 mm. long glumes and shorter 6–7 mm. long lemmas, or in var. *longiramea* Henr. the awns subequal and about 15 mm. long. Mexico to Ecuador. (Pl. LXXXV.) . . . . . **Aristida laxa Cav.**

55. Blades mostly 10—20 cm. long, sometimes somewhat shorter, not clustered at the base of the stems; panicles open, the branches as much as 15 cm. long, spikelets not densely congested, or if so, than always on very long branches. . . . . 56.

Blades short, about 2—4 cm. long, nearly totally clustered at the base of the stems; panicles short, at first contracted, soon becoming effuse, with divaricate, solitary, rather stiff, scarcely 5 cm. long branches, the spikelets densely congested at the end of the branchlets.

Densely caespitose perennial, 10—15 cm. high, culms simple, glabrous, subcompressed, ascending, puberulous below the panicle; sheaths tight, striate, smooth, with hyaline margins, longer than the internodes, ligules short, densely ciliolate, auricles long-bearded, the collar pubescent; blades narrow, filiform, convolute, rigid, subpungent, the margins not thickened, glaucous, glabrous and smooth on the lower surface, scaberulous on the upper one; panicle shortly exserted, 7—8 cm. long, axis triquetrous, scabrous, the branches solitary or sometimes with a short branchlet at the base and subbinate, scabrous, puberulous at the axils, naked in lower half part, branchlets fascicled, the pedicels scabrous; spikelets narrow, glabrous, glumes subequal, acute or shortly awned, 10 mm. long, 1-nerved, keels scabrous, the keel of the upper one smooth at the base only; lemma smooth, including the 1 mm. long, subobtuse, densely but shortly hairy callus and the 3—4 mm. long, twisted, scabrous column, about 8—9 mm. long; awns scabrous, about equal, 14—15 mm. long, or the lateral ones up to 11 mm. long. Bolivia to Argentina. (Pl. LXXXV.) . . . . . **Aristida Asplundii Henr.**

56. Culms forming hemispheric tufts as much as 30 cm. in diameter, the culms rather stiffly radiating in all directions; branchlets and pedicels divaricate and implicate or flexuous, branches with a basal branchlet, thus the spikelets equally distributed through the panicle.

Perennial, culms glabrous, slender, 15—30 cm. high; sheaths glabrous, striate, mostly longer than the internodes; ligule a short ciliolate rim, auricles bearded, the collar slightly hispidulous; blades involute, 10 cm. long or somewhat shorter, scarcely 1 mm. wide when expanded, glabrous or slightly scabrous on the lower surface, scabrous or pubescent on the upper one, scaberulous only near the tip and on the margins; panicle about half the length of the whole culm, axis scabrous, branches divaricately spreading or reflexed, mostly 3—6 cm. long, solitary or in pairs, without a long naked base, branchlets and pedicels scabrous; glumes subequal or slightly unequal, acute and shortly awned, the lower 1-nerved or sometimes with an additional side-nerve, scabrous

on the keel, about 10 mm. long, upper one 1-nerved, smooth on the keel, up to 12 mm. long; lemma smooth, including the densely hairy, obtuse, about 1 mm. long callus and the slightly twisted scabrous sometimes only 2 mm. long column or beak, about 10 mm. long; awns nearly equal, 14—15 mm. long, sometimes up to 20 mm. long, scabrous, straight, somewhat divergent. Western Texas and Arizona to central Mexico. (Pl. LXXXVI.) . . . . . **Aristida barbata Fourn.**

Culms not forming hemispheric tufts, erect or often prostrate or nearly so, branches divaricate, quite naked at the base, without a basal branch, branchlets and pedicels not divaricate and implicate or flexuous, but usually adpressed and clustered along the upper part of the branches. Caespitose perennial, culms glabrous or scabrous, 30 to 60 cm. long or sometimes longer; sheaths striate or grooved, keeled, glabrous or scabrous, ligule a ciliolate rim, auricles bearded, collar with a prominent villous line; blades flat, becoming loosely involute, as much as 20 cm. long, the innovations narrowly involute, much shorter, often curved and flexuous, all the blades more or less glaucous, strongly nerved and scabrous on the upper surface and with sometimes a few hairs near the base, glabrous beneath, 1—3 mm. wide; panicles stiff, large and diffuse, about half the entire length of the culms, not rarely longer, axis scabrous or pubescent, angulous or keeled, branches spreading and reflexed, mostly in pairs or solitary and divided nearly from the base, scabrous, as much as 15 cm. long, axils thickened, pubescent or ciliate; branches reiterately branched, the branchlets and scabrous pedicels adpressed, forming false spikes at the end of the branches; glumes about equal, up to 15 mm. long, acuminately awned, 1-nerved, the lower scabrous on the keel, the upper one smooth; lemma about 12 mm. long, with a densely hairy, about $^1/_2$ mm. long callus, the body of the lemma glabrous below, gradually passing into a scabrous, more or less twisted column or beak, the latter very variable in length, sometimes shorter, sometimes exserted from the glumes; awns about equal, scabrous, divergent, quite straight at the base, the central up to 18 mm. long, the lateral ones about 15 mm. long or all the awns shorter. North America: Kansas and Texas, New-Mexico and Arizona to southern Mexico. (Pl. LXXXVI.) . . . . . **Aristida divaricata Humb. et Bonpl.**

57. (*46.*) Position of the glumes inverse . . . . . 58.

Position of the glumes not inverse, glumes subequal or the lower much shorter than the upper one . . . . . 66.

58. Lower glume about 2 mm. or rarely but 1 mm. longer than the upper one. 59.
Lower glume much longer than the upper one, the lower 11—12 mm., the upper only 7—8 mm. long.
Caespitose erect perennial, 50 - 70 cm. high, culms terete, smooth below, scaberulous or pubescent especially below the panicle; sheaths longer than the internodes, striate, glabrous or minutely pubescent upwards, ligule a densely ciliate rim, auricles bearded, collar and especially the mouth of the sheaths with long hairs; blades involute, narrow, those of the culms 10 cm. or more long, ending in a fine point, scaberulous on the upper, smooth on the lower surface, margins slightly thickened, with a few long hairs near the base, about 1 mm. wide when expanded, those of the innovations narrower with more prominently bearded collars and auricles; panicle long, very diffuse and open, about half as long as the whole culm, sometimes longer, axis striate, puberulous, branches divaricate, very remote, solitary, divided just above the base into two about equal branches, the axils densely bearded. the branches naked over a long distance, branchlets slightly spreading or mostly adpressed, the spikelets more or less congested, erect and adpressed, branches, branchlets and pedicels very scabrous, the spikelets brown or yellowish at maturity; glumes acute, both 1-nerved and shortly awned, the lower broader, very scabrous on the keel, the upper one narrower and smooth; lemma quite smooth, tubulous, slightly narrowed but not beaked at all, 7 mm. long, the densely hairy callus about 1 mm. long; awns scabrous, somewhat spreading, the central about 14 mm. long, the lateral ones up to 11 mm. long. Tonkin to China and Formosa. (Pl. LXXXVIII.) . . . . . **Aristida chinensis Munro**

59. Callus acute or subacute rather long, up to 1 mm., rarely a little shorter. 61.
Callus very obtuse, very short, scarcely $^1/_2$ mm. long. . . . . 60.

60. Lemmas nearly smooth; spikelets not imbricate, distant, not forming elongate false spikes at the end of the branches.
Caespitose perennial, glaucous-green, with rather short oblique rhizome, culms erect or ascending, simple, terete or compressed below, glabrous or slightly puberulous, few-noded, about 30 cm. high or sometimes much longer; sheaths shorter than the internodes, the lower short, compressed, firm, persistent, the upper loose in the upper part, smooth and striate; ligule a densely ciliolate rim, auricles long-bearded, sometimes the collars more or less hairy; blades narrow, linear, acute, up to 10 cm. long, the lowermost scarcely 3 cm. long, up to 2 mm. wide when expanded, rigid, curved and folded, smooth below,

scabrous on the upper surface, strongly nerved, the midnerve and marginal nerves whitish and very prominent; panicle effuse, up to 15 cm. long, 7–12 cm. broad, very lax with straight or somewhat flexuous, flattened or angulous very scabrous rhachis; branches spreading, solitary and distant, the lower up to 10 cm. long, mostly bipartite just above the base, the axils pubescent only, naked over a long distance, very scantily and remotely branched, the filiform, straight branchlets with 1 or few spikelets at the tips, pedicels rather long, adpressed, the lateral ones shorter or very short; glumes 1-nerved, yellowish at maturity, sometimes purplish, linear-lanceolate, mucronate or shortly awned, the lower with a scabrous keel above, the upper one smooth, sometimes slightly emarginate, 6—6½ mm. long, the lower about 7½ mm. long; lemma tubulous, not beaked, mostly slightly shorter than the glumes, about 6 mm. long, smooth or punctulate above only, the callus shortly bearded; awns subequal somewhat divergent, straight, scabrous, 7 - 10 mm. long. South Africa. From the Coast Region to Orange Free State and Natal. (Pl. LXXXIX.) . . . . . **Aristida bipartita Trin. et Rupr.**

Lemmas very prominently hispidulous nearly all over; spikelets densely congested, imbricate, forming elongate small spike-like panicles at the top of the branches.

Caespitose, erect, glaucous-green perennial, inclusive of the panicle up to 70 cm. high, culms terete, striate, glabrous or slightly scaberulous, 2–3-noded, the uppermost internode long-exserted; sheaths much shorter than the internodes, the lowermost compressed and keeled, strongly nerved, the upper ones subterete striate and slightly keeled, scaberulous, tight, sometimes slightly gaping at the summit, nodes not protruding, ligule a short ciliate rim, auricles pubescent and slightly bearded, collar smooth; blades rather short, those of the innovations 5–8 cm. long, rather stiff, complicate or inrolled, obtusely pointed, with strong bands of sclerenchyma along the margins, glabrous and smooth beneath, scaberulous or puberulous on the upper surface, upper blades flat only at the very base, inrolled, many-nerved, with at least 5 prominent bands of sclerenchyma, up to 8 cm. long and scarcely ½ mm. thick when inrolled; panicle long-exserted, 10–14 cm. long, the axis terete, striate, somewhat flexuous upwards, branches very distant, solitary or the lower ones sometimes binate, at first erect, afterwards spreading or divaricate, rather stiff, naked in lower half part, somewhat compressed, the branchlets much shorter peduncled, strictly erect and adpressed, the spikelets densely congested, pedicels scabrous, compressed; spikelets sessile or with pedicels shorter

than the glumes, reddish-green to yellowish-green. glumes linear-lanceolate, prominently unequal. the lower 9—9$^1/_2$ mm. long, 1-nerved or with short lateral nerves and sub-3-nerved, scaberulous on the back and slightly so on the keel, narrowed upwards but not awned, the upper glume smooth on the keel, 1-nerved, slightly scaberulous at the tip, about 6 mm. long; lemma fusiform, about 5 mm. long, scabrous and hispidulous in lines nearly all over, except at the very base, slightly narrowed upwards but scarcely beaked, the callus scarcely $^1/_2$ mm. long, very obtuse, densely and rather long-bearded, awns scabrous, erect, the central one about 8 mm. long the lateral ones slightly shorter. South Africa: Rhodesia. (Pl. LXXXIX.) . . . . . **Aristida hispidula Henr.**

61. Branches distant and spreading, but the branchlets adpressed, the spikelets clustered at the tips and not equally distributed through the panicle; pedicels short or very short, if sometimes the branchlets are not stiffly adpressed but ascending, the pedicels are in that case always shorter than the glumes or those of the terminal spikelets scarcely as long as the glumes . . . . . 62.

Branches distant and spreading, the branchlets and pedicels never adpressed but divaricate, the spikelets equally distributed, with 1$^1/_2$—2$^1/_2$ cm. long pedicels, 2-3-times longer than the glumes or the pedicels of some lateral spikelets somewhat shorter than the glumes.

Caespitose, elegant up to 30 cm. high perennial, culms simple erect or ascending, terete, slightly striate and hirtellous, especially below the panicle; sheaths scaberulous, compressed, striate, terete, longer than the internodes with hyaline margins, ligule a densely ciliolate rim, auricles bearded, the collar pubescent or hirtellous; blades linear, complicate but flat at the base, glaucous, scabrous on both surfaces, very scabrous along the margins, very acute, 10-20 cm. or more long, scarcely 2 mm. wide when expanded; panicle at first enclosed in the uppermost sheath, soon becoming exserted, very lax and loose about 30 cm. long and 20 cm. broad, the axis terete or somewhat compressed below, angulous upwards and hirtellous; branches scabrous, solitary, branched nearly from the very base, the axils pubescent or ciliolate, the lower ones about 10 cm. long, the branchlets rather few-flowered, divaricately spreading, the pedicels scabrous; glumes narrow, brownish or purplish, acuminate with a 1 mm. long awn, 1-nerved, the lower about 13 mm. long, scabrous on the keel, the upper one 12 mm. long with a smooth keel; lemma tubulous, mottled, smooth, scabrous on the keel, with a subacute about 1 mm. long, hairy callus, the body of the lemma minutely narrowed but not beaked,

awns erect, scabrous. about equal, 15—17 mm. long. Southern Mexico to Guatamala. (Pl. LXXXVII.) . . . . . **Aristida mexicana Scribn.**

62. Lemmas at maturity with inrolled margins, deeply furrowed on the ventral side; awns rigid, triquetrous or flat at the base; axils of the panicle-branches thickened but quite smooth and glabrous. . . . . 63.

Lemmas at maturity with overlapping margins, tubulous, never furrowed on the ventral side; awns thin and delicate not triquetrous or flattened below; axils of the panicle-branches more or less thickened, pubescent or ciliolate. . . . . 64.

63. Body of the lemma smooth, punctulate only under a lens; lower branches of the panicle rather flexuous and up to 10 cm. long.

Caespitose perennial with few innovations, culms strictly erect, branched only from the base, terete, striate, glabrous, 80—90 cm. high; sheaths gaping, subcompressed, glabrous, mostly longer than the internodes, ligules shortly ciliate, auricles long-bearded, the collar puberulous; blades flat below, about $2^1/_2$ mm. wide, convolute in upper part, gradually acuminate, glabrous or slightly scaberulous beneath, hirtellous on the upper surface, nerves very prominent, the margins of the blades thickened, the culm-blades up to 20 cm. long; panicle large, 40—50 cm. long, about 15—20 cm. wide, very lax and interrupted, the rhachis terete or angulous upwards, branches binate, erectly spreading or divaricate and flexuous, naked below, scabrous, the more or less divaricate branchlets rather short and few-flowered, pedicels short, scabrous; spikelets yellowish, glumes 1-nerved, glabrous, the lower acute or minutely awned with a scabrous keel, 13—14 mm. long, the upper one abruptly truncate and awned, with a smooth keel, about 11—12 mm. long; lemma with a 1 mm. long, subobtuse, densely bearded callus, up to 10 or 11 mm. long, yellowish, mottled, scarcely constricted at the summit, the awns dilatated, scabrous, about equal, up to 20 mm. long. Australia: Queensland. (Pl. LXXXVIII.) . . . . . **Aristida praealta Henr.**

Body of the lemma smooth on the back, at the ventral side with rows of rigid spiny hairs; lower branches of the panicle rather stiff, divaricately spreading or somewhat ascending, much shorter, scarcely 5 cm. long, commonly still shorter.

Caespitose perennial with few innovations; culms strictly erect, inclusive of the panicles up to 60 cm. high, simple below, fastigiately branched

from some of the nodes, terete or subcompressed, striate, more or less scaberulous, lower internodes 10—15 cm. long, naked; sheaths much shorter than the internodes, terete, tight, striate, scaberulous, ligule a short ciliolate rim, auricles pubescent and more or less bearded with long hairs; blades glaucous, flat only at the very base, convolute nearly throughout, up to 10 cm. long, $1^1/_2$—$2^1/_2$ mm. wide when expanded, glabrous or scaberulous on the upper surface with scabrous thickened margins, gradually acuminate; panicle exserted, up to 30 cm. long, very interrupted at maturity and up to 8 cm. broad, at first more or less contracted, afterwards very effuse and loose, axis of the panicle angulous, glabrous, or scaberulous upwards, thickened at the axils, branches solitary or subgeminate at first erectly ascendent, at maturity divergent and horizontally spreading, branchlets adpressed, scabrous, few-flowered, the pedicels subcompressed, subclavate and scabrous; spikelets pale yellowish or coloured, erect and adpressed, glumes lanceolate, the lower 10—11 mm. long, gradually narrowed but scarcely awned, slightly scaberulous, scabrous on the keel, sub-3-nerved, the lateral nerves much shorter and anastomosing with the midnerve, upper glume 8--9 mm. long, narrower, 1-nerved, smooth on the keel, distinctly emarginate at the summit, bilobed, shortly awned from the sinus; lemma mottled, with involute margins, sulcate at the ventral side with erect or curved spiny hairs in the furrow, callus subacute, about 1 mm. long, densely hairy, the body of the lemma about 8 mm. long inclusive of the callus, awns flat at the very base, triquetrous above, very scabrous, unequal, the central one up to 20 mm., the lateral ones 12—15 mm. long. Australia: Central Queensland. (Pl. LXXXVII.) . . . . . **Aristida armata Henrard**

64. Glumes gradually narrowed to the acute or shortly awned tip, the upper one scarcely bifid at the summit; axils of panicle-branches pubescent only. . . . . 65.

Glumes abruptly awned, the awns 2 mm. long, upper glume distinctly bifid at the apex; axils of panicle-branches bearded.

Caespitose perennial, culms strictly erect, elegant, about 1 meter high, about 2 mm. thick below, slightly compressed or terete, simple, glabrous, few-noded, the nodes glabrous; sheaths glabrous, longer than the internodes, pilose at the mouth, ligule a short ciliolate rim, auricles pubescent and bearded, the hairs deciduous; blades linear, gradually acuminate, up to 25 cm. long, flat below, convolute upwards, those of the innovations very narrow, scabrous on the upper surface, glabrous and smooth on the lower, the margins very thick, cartilagineous;

panicle large, very effuse up to 50 cm. long and about 20 cm. broad, rhachis striate and angulous, scabrous, branches solitary, tripartite from the base, the upper ones bipartite, somewhat flexuous, subequal, remote, naked at the base over a long distance, scaberulous; spikelets densely congested at the summit of the branches, pedicels variable in length, scaberulous, rather thin; glumes linear-lanceolate, the lower $11^1/_2$ mm. long with a scabrous awn, 1-nerved, scabrous on the keel, the upper one about $10^1/_2$ mm. long, with a 2 mm. long awn from the bifid apex, smooth on the keel; lemma linear-lanceolate, tubulous, minutely punctulate, 10 mm. long, slightly narrowed into a scarcely 1 mm. long scaberulous beak, the callus acute, bearded, 1 mm. long; awns scabrous, erect, the central about 20 mm. long, divergent, the lateral ones erect about 13 mm. long. Indo China: Annam. (Pl. LXXXVII.)
. . . . . **Aristida annamensis Henr.**

65. Sheaths with a bearded line across the collar, the hairs long, erect and adpressed.

Loosely caespitose erect perennial with short rhizomes, as much as 1 meter high, culms smooth, slightly striate only, few-noded, the nodes congested at the base of the stem; sheaths longer than the internodes, striate, slightly compressed, glabrous, ligule a minutely ciliolate rim, auricles more or less coloured, pubescent and distinctly bearded; blades firm, flat at the base, soon becoming involute with a long setaceous point, glabrous beneath, scaberulous on the upper surface, as much as 50 cm. long and 2—4 mm. wide; panicles loose and open, $^1/_3$—$^1/_2$ the length of the whole culm, axis terete below, smooth, branches binate or the upper ones solitary, distant, erectly spreading, the longer ones often drooping at the summit, naked below, branching above the middle, scabrous, as much as 20 cm. long, the axils pubescent or sometimes with some longer hairs and slightly bearded; spikelets on short pedicels, adpressed at the ends of the branchlets, glumes slightly unequal, awn-pointed, 1-nerved, the lower one 11—13 mm. long or sometimes slightly longer, scabrous on the keel, the upper one 10—11 mm. long, nearly smooth on the keel; lemmas mostly somewhat longer than the lower glume, up to 12 mm. or rarely up to 15 mm. long, glabrous and smooth below, gradually narrowed into a very rough and striate, straight, about 2 mm. long beak, the pubescent rather obtuse callus about $^3/_4$ mm. long; awns very unequal, scabrous, the central one strictly erect, straight, 20—25 mm. long, the lateral ones much shorter, 5—7 mm. long or rarely up to 10 mm. long. North America: Florida. (Pl. XC.) . . . . . **Aristida patula Chapm.**

Sheaths without a villous line across the collar, the auricles only bearded laterally, the collar glabrous.

Densely caespitose perennial with few innovations, strictly erect or somewhat ascending, up to 1 meter high, sometimes still longer, sometimes scantily branched at the base; culms 1—2-noded, terete, slightly striate, glabrous or scaberulous; sheaths as long as or longer than the internodes, somewhat keeled, striate, smooth or scaberulous, ligule a ciliate rim, auricles pubescent, or more or less bearded, the hairs deciduous; blades convolute, flat at the base only, up to 20 cm. long, very narrowly inrolled, glabrous beneath, scabrous on the upper surface, 2—3 mm. wide at the base when expanded, ending in a long setaceous point; panicle erect, exserted, often more than half the length of the whole plant, axis striate and puberulous, terete, angulous or subtriquetrous upwards, branches solitary, bipartite or tripartite just above the base, axils thickened and puberulous or smooth, branches divaricate, very remote, strict or somewhat curved and flexuous, the lower ones 10—15 cm. long, the upper ones gradually shorter and quite straight, erectly spreading, all the branches naked below over a long distance, scabrous. branchlets short, adpressed, pedicels scabrous, shorter or the lateral ones much shorter than the glumes, the spikelets strongly adpressed and clustered at the end of the branchlets forming false spikes; glumes acute, awned, 1-nerved or the lower glume sometimes with an additional side-nerve, the lower glume about 14 mm. long, very scabrous on the keel, glabrous or shortly pubescent on the back, the upper one smooth on the keel, about 13 mm. long; lemma with a densely hairy, subacute about $^3/_4$ mm. long callus, glabrous below, scabrous upwards and on the keel, slightly narrowed into the very scabrous, straight, short beak, the latter scarcely 2 mm. long, the lemma about 11 mm long; awns slightly unequal, scabrous, somewhat divergent, the central one about 15 mm. long, the lateral ones up to 12 mm. long, or in var. *breviaristata* Henr. the lateral awns much shorter and only 4—6 mm. long. North America: Arizona to Mexico. (Pl. XC.) . . . . . .
. . . . . **Aristida gentilis Henr.**

66. (57.) Lateral awns only $^1/_3$ as long as the central awn. . . . . 67.
Lateral awns as long as the central awn or but slightly shorter. . . . . 68.

67. Branches of panicle very long and thin, capillary with one or two spikelets at the summit.

Laxly caespitose perennial with oblique rhizome, about 50 cm. high, culms strictly erect, few-noded, the nodes congested at the base of

the stem, the latter rather short, internodes glabrous or shortly pubescent, terete; sheaths longer than the internodes, striate, scabrous or puberulous, ligule a short ciliolate rim, auricles erectly bearded, collar quite smooth; blades very narrowly convolute, erect, rather rigid, filiform, setaceous, up to 30 cm. long, overtopping the base of the panicle, gradually narrowed into a long fine point, $^1/_2$ mm. thick or 1 mm. wide when expanded. glabrous beneath, scaberulous on the upper surface, the margins scarcely thickened; panicle more than half the length of the whole plant, scarcely exserted from the uppermost sheath, very elegant, rhachis very scabrous, angulous, branches very long, remote, binate, the lower ones sometimes up to 2 dm. long, erectly spreading with a few spikelets at the summit, the upper ones gradually shorter bearing but 1 or 2 spikelets, axils of the panicle-branches scaberulous only, the branchlets and short pedicels scabrous, spikelets erect, those of the lower branchlets congested; glumes acute, 1-nerved, the lower one about 8 mm. long, very scabrous on the keel, rather abruptly narrowed into the short awn, the upper one about 10 mm. long, gradually narrowed, shortly awned, smooth on the keel; lemma about 12 mm. long, slightly narrowed upwards, very scabrous above and on the keel, the callus about $^3/_4$ mm. long, acute and shortly hairy; awns strictly erect, the central one about 15 mm. long, sometimes somewhat flexuous, the lateral ones erect, about 5 mm. long. South America: Brazil. (Pl. XC.) . . . . . **Aristida flaccida Trin. et Rupr.**

Branches of panicle long and robust, never capillary but firm and rigid, all the branches many-flowered, the spikelets clustered at the summit. Caespitose perennial, covered at the base with the coarse old sheaths, robust, glaucous, about 4-noded, the uppermost internode much longer than all the other ones together; culms erect or ascending, as much as 4 mm. thick, more than 1 meter or not rarely up to 1.5 meter high, mostly compressed; sheaths mostly shorter than the internodes, striate, glabrous, ligule a minute distinctly ciliate rim, auricles scarcely developed, with few long deciduous hairs, collar smooth, junction of the blades very fragile; culm-blades very long green or glaucous as long as the whole plant, flat at the base and about 4 mm. wide, soon becoming complicate or involute, setaceously pointed, glabrous beneath, scabrous on the upper surface and with long adpressed hairs especially near the base, blades of the innovations much narrower and shorter, almost filiform; panicle at first contracted and enclosed in the uppermost sheath, soon becoming widely spreading. 60 cm. or more long and 20 cm. or more broad, axis firm, glabrous and terete below,

angulous and scabrous upwards, branches subsolitary, 3—5-partite just above the base, very long, angulous or keeled and very scabrous, naked in the lower half part, the branchlets adpressed or slightly spreading, the adpressed scabrous pedicels short, scarcely half as long as the glumes, axils of panicle-branches smooth or pubescent; glumes acuminate, unequal, both awned, 1-nerved, the lower about 10 mm. long, scabrous on the keel, the upper one 12 mm. long, keel smooth; lemma smooth below, scaberulous on the keel and at the summit, slightly narrowed but scarcely beaked, 12 mm. long, not rarely up to 15 mm. long, the acute densely hairy callus about 1 mm. long; awns erect, scabrous, straight, the central one 2,5 cm. long or longer, the lateral ones up to 1,5 cm. long. South America: Brazil. (Pl. XCI.) . . . . . **Aristida longifolia Trin.**

68. Annuals, rather delicate plants. . . . . 69.
Perennials, more robust plants. . . . . 74.

69. Awns not rigid, thin and rather delicate. . . . . 70.
Awns rigid, coarse, triquetrous or flat and winged at the base.
Panicle very lax, erect, with remote, spreading or divaricate, only 1—5 spikelets bearing branches; lemmas very rigid, complicate, grooved on the ventral side, 10-12 mm. long, glabrous, the keel serrulate-scabrous; awns erect or slightly spreading, scarcely as long as the lemma. East Africa: Eritrea. Insufficiently known species, allied to *Aristida rhiniochloa* HOCHST. and *A. andoniensis* HENR. and probably only a variety of these species. . . . . **Aristida serrulata Chiov.**

70. Glumes very acute, prominently awned; lemmas shorter than the glumes. 71.
Glumes obtuse or acute only, not awned, or the upper one slightly bifid with a mucro from the sinus; lemmas as long as or longer than the glumes. . . . . 72.

71. Branches of panicle with effuse branchlets, the spikelets more or less scattered.
Culms ascending, elegant, without the panicle 20—30 cm. high, terete, glabrous, about 3-noded, branched from nearly all the nodes; sheaths lax, the lower ones slipping from the stems, terete or slightly keeled, striate, glabrous or more or less scaberulous, ligules and auricles densely and shortly ciliate, collar smooth; blades linear, gradually narrowed, 6—16 cm. long, 1—2½ mm. wide, rather rigid, glabrous beneath, scaberulous and hirtellous on the upper surface with very

scabrous, thickened margins; panicles terminal and lateral, the former 16—30 cm. long or about as long as the culms, the latter much shorter, ovate in outline, very lax and open, rhachis and branches scabrous, filiform and sometimes flexuous, the axils thickened and smooth or slightly puberulous, branches elongate, binate, the lower ones sometimes more than half as long as the panicle, naked in the lower part, reiterately branched, the branchlets 1—2-flowered, the spikelets more or less scattered, rather shortly pedicelled; spikelets linear, purplish, glumes linear-lanceolate, both very scabrous on the keel and scabrous on the back, the lower one including the awn 5—6 mm. long, with a 2 mm. long awn from a slightly bifid summit, the upper one deeply bilid, 7—7½ mm long, the lateral setae very acute and commonly about 1½ mm. long; lemmas linear, tubulous, slightly keeled, about 6 mm. long, very aculeolate-scabrous nearly all over except at the very base, purplish to greenish, darkly mottled, slightly narrowed at the summit but not beaked, callus about ½ mm. long, densely bearded, acute; awns erect or somewhat spreading, very scabrous, the central one 10 mm. long, rarely longer, the lateral ones slightly shorter. South Africa: Transvaal to Rhodesia. (Pl. XCI.) . . . . . **Aristida scabrivalvis Hack.**

Branches of panicle narrow, the spikelets congested at the end of the branches, forming spike-like secondary panicles.

Culms erect or ascending, less elegant, without panicles about 50 cm. high, compressed, striate, scaberulous, many-noded, branched from nearly all the lower nodes; sheaths tight, or slipping from the stems, compressed, striate, shorter than the internodes, with scattered long hairs especially along the margins, ligules ciliate and not rarely with long hairs, auricles pubescent and more or less bearded, collar smooth; blades flat at the base, 2 mm. wide, gradually narrowed, acutish, inrolled upwards. 15 cm. long or longer, scabrous on both surfaces with a thick midnerve and scabrous more or less thickened margins; panicle terminal, exserted, up to 30 cm. long, strictly erect, open, at first somewhat contracted, axis angulous and scaberulous, the axils thickened and smooth, branches elongate, erectly spreading at about an angle of 45 degrees or more, in twos or threes, naked below, the lower ones much shorter than half the length of the whole panicle, up to 12 cm. long, the shorter ones of each fascicle 9 10 cm. long, all the branches gradually becoming shorter upwards, branches at the top of the panicle much shorter, up to 4 cm. long, adpressed and nearly sessile, forming there a narrow spike-like small panicle; branchlets adpressed with 2—4 erect congested spikelets on short

pedicels; spikelets yellowish, linear, glumes linear-lanceolate, long-awned, both scabrous on the back and on the keels 1-nerved or sometimes with additional side-nerves close to the midnerve, the lower one about 6 mm. long, rather abruptly passing into the scabrous about 3 mm. long awn, the upper glume about as long as the lower one, bifid at the summit with an awn about 3 mm. long and very acute about 1 mm. long lateral setulae; lemma tubulous, including the rather acute, densely bearded $^3/_4$—1 mm. long callus, 6 mm. long, punctulate below and prominently scabrous-aculeate upwards, gradually passing into the very scabrous awns, the latter flat below, nearly equal and about 18—20 mm. long, or the central one slightly longer. Central Africa: Mozambique District, Portuguese East Africa, Boruma. (Pl. XCI.) . . . . . **Aristida borumensis Henr.**

Note: An allied insufficiently known species, *Aristida filiformis* Henr., occurs in Rhodesia. The lemmas are shorter than the glumes and it is therefore placed near *A. scabriralvis* and *A. borumensis*, but differs from both species in the nearly smooth lemmas. In the characters of the panicle it agrees with *A. borumensis*, on account of the very distant, stiffly spreading, long, filiform branches, which are naked at the base, with congested spikelets at the end of them, forming short small false spikes. In the vegetative parts it differs in the leaves and sheaths, which are glabrous, lacking the long white hairs. The dimensions of the spikelets are: lower glume lanceolate, 1-nerved, with a scabrous keel, scabrous on the back, about 6 mm. long, passing into a scabrous, about 2 mm. long awn, upper glume narrower, smooth, remotely scabrous on the keel, manifestly bifid at the apex, with acute lobes and a scabrous $1^1/_2$—2 mm. long awn from the sinus, the total length of the glume about 9 mm.; lemma smooth or minutely scaberulous upwards, about 5 mm. long, the awns scabrous, erect, about equal, 15 mm. long, callus obtuse, about $^1/_2$ mm. long. (Pl. CXVII.)

72. Glumes about equal or very slightly unequal, the upper one never bifid at the summit. . . . . 73.
Glumes unequal, the upper distinctly bifid with a mucro from the sinus. . . . . See under the *varieties of* **A. adscensionis L.**

73. Lower glume scabrous or puberulous upwards, rather broad, upper glume glabrous, much narrower, very obtuse, abruptly truncate and ciliolate at the summit.

Culms elegant, branched; sheaths compressed, keeled, striate, scabrous; blades, ligules and auricles as in *A. scabrivalvis;* terminal panicles up to 15 cm. long and about 15 cm. wide, the lateral panicles much shorter, very diffuse and open, axis glabrous, branches solitary or binate, elongate, subcapillary, strict or flexuous, naked in the lower half part; spikelets densely congested at the ends of the branchlets with longer or shorter pedicels, the latter scaberulous, glumes linear-lanceolate, purplish, the lower one about $7^1/_2$ mm. long, acutish, scarcely awned, glabrous below, scabrous upwards, the keel very scabrous especially in upper half, 1-nerved, upper glume 8 mm. long, narrowly linear, glabrous, very obtuse, with a glabrous and smooth keel; lemma narrowly linear, about 10 mm. long, tubulous, not narrowed above, light brownish, mottled, very scabrous on the keel upwards and more or less so below the awns, the latter erectly spreading, scabrous, the central one somewhat longer and up to 16 mm. long, the lateral ones up to 13 mm. long. South West Africa: Great Namaqualand to South Angola (Pl. XCII.) . . . . . **Aristida Waibeliana Henr.**

Lower glume quite glabrous on the back, upper one acute and shortly awned.

Culms erect, elegant, up to 35 dm. high inclusive of the panicle, terete, glabrous, branched from most of the lower nodes; sheaths loose, often slipping from the stem, compressed, keeled, striate, glabrous, ligules short, truncate, ciliate; blades linear, gradually narrowed, up to 12 cm. long, about 2 mm. wide, flat or somewhat keeled, glaucous-green, somewhat rigid, smooth beneath, puberulous on the upper surface, margins very scabrous, rather thick; terminal panicles 15—18 cm. long, ovate in outline, very lax, spreading, rhachis smooth, branches scaberulous, binate or tripartite, rather filiform, divaricately spreading, naked in lower half part, branched above, the spikelets more or less congested; glumes linear-lanceolate, purplish, very acute, glabrous, the lower 7 mm. long, gradually narrowed into the short awn, scabrous on the keel, the upper one 8 mm. long, shortly awned with a smooth keel; lemma linear, tubulous, about 9 mm. long, the keel aculeolate-scabrous especially on the upper part, the body yellowish-green and mottled, scarcely narrowed above; awns suberect or somewhat spreading, very scabrous, the central 12 mm. long, the lateral ones up to 10 mm. long. South West Africa: Damaraland. (Pl. XCII.) . . . . . **Aristida effusa Henr.**

74. (*68.*) Lemmas shorter than, or sometimes as long as the glumes, the tips of the glumes reaching or somewhat surpassing the branching-point of the awns. . . . . 75.

Lemmas much longer than the glumes, the tips of the glumes never reaching the branching-point of the awns; panicles with very distant, divaricate branches, the branchlets and pedicels commonly spreading at right angles.

Caespitose perennial, up to 50 cm. high or sometimes higher with a rather thick rootstock, innovations intra- and extravaginal, glaucous-green; culms erect, 3—4-noded, nodes equally distributed, terete, striate, nearly smooth, simple or branched from the lower nodes only; sheaths tight, terete, striate, glabrous or minutely scaberulous, much shorter than the internodes, ligule a densely ciliolate rim, auricles more or less bearded, the collar smooth; blades narrowly convolute or flat at the base only, ending in a setaceous point, up to 10 cm. long, scarcely $1^1/_2$ mm. wide when expanded, scaberulous or smooth beneath, scabrous or puberulous on the upper surface and with long hairs near the base, many-nerved, the margins not conspicuously thickened, the lower blades and those of the innovations almost filiform and much shorter; panicle exserted, stiff, but open, 10—15 cm. long, up to 7 cm. broad, at first somewhat contracted, afterwards spreading, the branches spreading at right angles, axis terete and smooth below, angulous upwards with nearly smooth branchlets and pedicels branches binate or the upper ones solitary, up to 5 cm. long with a short 1- or few-flowered branchlet at the base, the upper gradually becoming shorter, pedicels shorter than the glumes or the terminal ones as long as or slightly longer, axils thickened, quite smooth; spikelets purplish, glumes 1-nerved, the lower lanceolate, acute, scarcely awned, about 4 mm. long or sometimes shorter, subobtuse; lemma purplish, gradually narrowed but scarcely beaked 9 10 mm. long, nearly quite smooth or the keel minutely scaberulous upwards, the callus rather obtuse, $^3/_4$ mm. long, densely bearded; awns scabrous, nearly equal, 11—13 mm. long, erectly spreading or at maturity often curved and sometimes horizontally reflexed. Australia: Queensland, New South Wales and Victoria. (Pl. XCIII.) . . . . . **Aristida vagans Cav.**

75. Spikelets rather large, the upper glume always 10 mm. long or mostly longer. . . . . 76.

Spikelets small, the lower glume 5—$5^1/_2$ mm. long the upper one 7 - $7^1/_2$ mm. long.

Caespitose erect very elegant perennial with thin culms from a rather thick rootstock, scantily branched only from the lower nodes; culms about $^1/_2$ mm. thick, erect, terete, striate, glabrous, glaucous, few-noded, nodes equally distributed: sheaths striate, minutely scabrous or smooth, shorter than the internodes, ligules obsolete, minutely ciliolate, auricles

nearly smooth and shining, thickened; blades very narrow, filiform, setaceously involute, pointed, glabrous and smooth, up to 15 cm. long or mostly shorter; panicle exserted, elegant, 15—20 cm. long or sometimes longer, very lax but somewhat contracted with a very thin, smooth rhachis, branches solitary or subbinate, erectly spreading, the lower ones up to 10 cm. long, the upper ones gradually becoming shorter, with capillary somewhat flexuous branchlets, pedicels very long, those of the lateral spikelets much shorter, scabrous; spikelets linear-lanceolate, light purplish or yellowish-green, glabrous, glumes unequal, linear, acute, 1-nerved, bidenticulate, mucronate or very shortly awned, lower glume scabrous on the keel, the upper one with a smooth keel; lemma but slightly exserted from the glumes, linear, tubulous, 8 mm. long, smooth with a scabrous keel upwards, narrowed above but scarcely beaked, callus subobtuse, about $^1/_2$ mm. long, bearded; awns erect or somewhat spreading, scabrous, the central 13—15 mm. long, the lateral ones up to 10 mm. long. Australia: Queensland to New South Wales. (Pl. XCIII.) . . . . . **Aristida gracilipes Henr.**

76. Branches and longer pedicels capillary or filiform, rather short, as much as 5 cm. long, more or less curved or flexuous, nodding at the summit, naked at the base only for 1—2 cm.; lower glume about half as long as the upper one. New World species. . . . . 77.

Branches and pedicels never capillary, never curved or flexuous, always straight, rather stout and firm, mostly longer than 5 cm., naked at the base over a long distance and the spikelets at the summit of them somewhat drooping, or if shorter than 5 cm. and at the same time branched nearly from the base, the branches are stiffly spreading; lower glume nearly always more than half as long as the upper, or the glumes subequal. . . . . 79.

77. Body of the lemma quite smooth or scaberulous only just below the awns, sometimes also on the uppermost part of the lemma, never tuberculate-scabrous in lines. . . . . 78.

Body of the lemma tuberculate-scabrous in lines from below the middle to the summit, the raised parts at maturity whitish, the background purplish. . . . . See p. 268 **Aristida purpurea laxiflora Merr.**

78. Spikelets long, lower glume 8—10 mm., upper one 16—20 mm. long; body of lemma perfectly smooth and shining, not narrowed at the summit. . . . . See p. 269 **Aristida rariflora Henr.**

Spikelets very long, lower glume 13–15 mm. or sometimes up to 20 mm. long, upper glume 25—50 mm. long. . . . . .
. . . . . See **A. uruguayensis** and **A. pallens** under 159.

Spikelets shorter, lower glume 5–8 mm. long or sometimes up to 10 mm. long, upper one 9—12 mm. or rarely up to 14 mm. long; body of lemma punctulate under a lens, scabrous only at the summit or below the awns, sometimes glabrous, distinctly narrowed upwards or slightly beaked. . . . . .See p. 270 **Aristida Roemeriana Scheele**

79. Panicle-branches divaricately spreading at 90 degrees or more or less ascending. branched from the very base or nearly so, the branches not naked in lower part or only over a short distance. the basal branches rather short, spikelets thus equally distributed over the panicle. 80.

Panicle-branches divaricately spreading, naked at the base over a long distance, no basal branches or if they are present, they are also naked at their base over a long distance, the spikelets not equally distributed over the panicle, the branchlets and pedicels mostly adpressed and the spikelets more or less congested at the end of the branches. . . 82.

80. Panicle-branches not bearded at the axils, the axils smooth or slightly pubescent only. . . . . 81.

Panicle-branches distinctly bearded at the axils.

Caespitose perennial, rootstock thick; culms robust rather short, without the panicles 15 cm. long or not rarely up to 60 cm. high, stiff and strictly erect or prostrate and ascending at the base, more or less branched from the lower nodes, smooth, terete, striate; sheaths much shorter than the internodes, compressed, slipping from the stem, rather broad. striate, smooth, with hyaline margins, ligule a ciliolate short membrane, auricles bearded with mostly reflexed hairs; blades 10 cm. long or longer, flat below, convolute upwards with a long setaceous point, smooth beneath, scaberulous on the upper surface, the margins not conspicuously thickened, glaucous; panicle nearly as broad as long, at first somewhat contracted, afterwards open, 15 - 20 cm. long, rhachis nearly straight, rigid, terete and smooth below, angulous and scaberulous upwards, branches erectly spreading or at maturity divaricate, solitary, bipartite just above the base, reiterately branched, pedicels much shorter than the glumes, branchlets and pedicels scaberulous; spikelets green or yellowish at maturity, glumes 1-nerved, glabrous, rather broad and papery, the lower 12 mm. long with an about 2 mm. long awn, keel scabrous, the upper one 18 mm. long, shortly awned and subbifid at the summit; lemma quite smooth, inclusive of the callus about as long as the lower glume,

not beaked or narrowed at the summit, the callus very acute, densely hairy, 2 mm. long or slightly longer; awns firm, scaberulous, flattened at the base, the central $3^1/_2$ –4 cm. long, erectly spreading and slightly curved, the lateral ones strictly erect, 3 cm. long. British India: Deccan Peninsula, from the Concan and Central Provinces southward (Pl. XCIV.) . . . . . **Aristida Hystrix L. f.**

81. Auricles not bearded, shortly ciliolate only; branches of panicle not very distant, branched nearly from the base: spikelets not congested at the end of the branchlets, panicles nearly as long as broad.
Caespitose erect perennial from a much branched rootstock, 30—40 cm. high; culms rather thin scarcely $^3/_4$ mm. wide, terete, striate, smooth or slightly scaberulous upwards, 3—4-noded, nodes equally distributed, the uppermost internode long-exserted; sheaths much shorter than the internodes, striate, terete, glabrous, ligule a shortly ciliolate rim; blades very narrow, flat at the base only, convolute, acuminate, setaceously pointed, 5—10 cm. long, scarcely $1^1/_2$ mm. wide when expanded, glabrous beneath, hirtellous on the upper surface, margins not thickened; panicle very lax, rather short and broad, orbicular-ovoid in outline, about 10 cm. long and nearly as broad, branches divaricately spreading, binate or subsolitary, bipartite just above the base, reiterately branched, axils thickened, smooth, branchlets and pedicels angulous, scaberulous, the latter much shorter than the glumes; spikelets erectly spreading, distant; glumes unequal, 1-nerved, the lower acuminate, awned, scabrous on the keel, 6—8 mm. long, the upper one smooth on the keel, shortly awned, 10—12 mm. long; lemma about 10 mm. long, tubulous, smooth or the keel upwards minutely rough, callus acute, 1 mm. long, densely hairy, awns somewhat unequal, erectly spreading, scabrous, the central one 3 cm. long, the lateral ones $2^1/_2$ cm. long. Australia: Queensland. (Pl. XCIV.) . . . . . **Aristida Leichhardtiana Domin.**

Note: See also the variety under *Aristida obscura* Henr., where the panicle is looser and more open, the spikelets thus more scattered, sothat in habit it somewhat resembles *A. Leichhardtiana*. It is to recognize however by the bearded auricles, the villous line across the collar and the characteristic hirtellous internodes, moreover the spikelets are longer.

Auricles bearded; branches of panicle distant, the longer ones naked at the base; spikelets more or less congested at the end of the branchlets, panicles much longer than broad.

Caespitose perennial, mostly forming large tufts, very slender, more or less branched from the base, inclusive of the panicle 50—60 cm. high; culms thin, scarcely $^1/_2$ mm. thick, smooth striate, erect or ascending at the base; sheaths much shorter than the internodes, terete, grooved upwards, ligule a short ciliolate rim, mouth of the sheaths with a few long hairs; blades narrowly involute, glabrous beneath, scabrous on the upper surface and with scattered long weak hairs especially near the base or on the lower part, mostly 5—10 cm. long and scarcely 1 mm. thick when inrolled, curved or somewhat flexuous; panicles narrow but very loose, rhachis terete below, angulous and scaberulous upwards, up to 20 cm. long, commonly shorter, the distant branches rather stiffly ascending, the longer ones naked at the base, the shorter ones mostly floriferous from the base, bearing rather few adpressed spikelets, axils smooth or slightly puberulous, branchlets and pedicels scaberulous; glumes unequal, awn-pointed, 1-nerved, the lower scabrous on the keel and on the back, 8 mm. long or sometimes up to 10 mm. long, the upper one smooth on the keel and sometimes more or less scabrous on the back, 11—12 mm. long; lemma about 12 mm. long, often slightly exserted above the glumes, narrowed upwards into a sometimes minutely twisted scabrous beak 2—3 mm. long, the callus acute, hairy, nearly 1 mm. long; awns somewhat unequal, scabrous, divergent, the base slightly curved or warped, the central one 3 cm. long, the lateral ones $2^1/_2$ cm. long or slightly longer. West India: Porto Rico. (Pl. XCV.) . . . . . .
. . . . . **Aristida portoricensis Pilg.**

82. Glumes acute or awned. . . . . 83.

Glumes obtuse or truncate, the mucro from a bilobed apex.

Perennial with few innovations; culms erect, elegant, scarcely branched, about 4-noded, terete, striate, slightly scaberulous below the nodes, inclusive of the panicle up to 7 dm. high; sheaths shorter than the internodes, slightly compressed, striate, glabrous or scaberulous, ligule a ciliolate rim, auricles of the culm-leaves and the innovations pubescent; blades narrow, linear, 20 cm. long or longer, involute or flat only at the very base, scarcely 1 mm. wide when expanded, glabrous or scaberulous beneath, hirtellous on the upper surface, with thickened scabrous margins; panicle erect, rather lax not rarely contracted, up to 20 cm. long, rhachis angulous or triquetrous, scabrous, branches remote, binate or solitary upwards, naked at the base over a long distance, or in less developed panicles very shortly peduncled, spikelets at the end of the branchlets densely congested, erect, adpressed with scaberulous short pedicels, yellowish-green, glumes 1-nerved, unequal, the lower 8 mm. long,

scaberulous, the keel thickened upwards and scabrous, subobtuse, emarginate or subbifid, the lateral setulae very obtuse, mucronate from the sinus, the upper one up to 11 mm. long with a smooth keel, shortly awned or mucronate from a subbifid apex; lemma 10 mm. long, smooth, not narrowed upwards into a beak, the subobtuse callus 1 mm. long and densely bearded; awns scabrous, about equal, 15 mm. long. South Africa: Orange Free State to Transvaal and Rhodesia. (Pl. XCV.) . . . . . **Aristida canescens Henr.**

83. Both glumes manifestly awned, the awns 2 mm. long or longer. . . . . 84.
Both glumes acute only, unawned or if slightly awned, the awn scarcely 1 mm. long. . . . . 85.

84. Blades firm, very rigid, involute, except at the very base, almost junciform; sheaths longer than the internodes, nodes quite hidden.
Tall, stout, caespitose perennial, 1—2 meter high; culms 3 mm. thick at the base, terete, minutely striate, smooth, rather few-noded, the uppermost internode by far the longest, commonly longer than all the other ones together; lowermost sheaths straw-coloured, broad and papery, shining, with hyaline overlapping margins, the lower ones striate, sparingly adpressedly hairy upwards, especially pilose on the margins, uppermost sheaths glabrous, innovations narrowly setaceous, intravaginal for I aught know, ligule a densely ciliolate rim, auricles a triangular, brown, laterally bearded spot; blades soon becoming inrolled, up to 30 cm. long, smooth on both surfaces, the margins not thickened and quite smooth, $3^1/_2$—4 mm. wide at the base; panicles long-exserted, erect, 30—40 cm. long, contracted but loose, the branches afterwards spreading, rhachis subterete, angulous and scaberulous upwards, branches capillary, erect or flexuous, not very remote, binate, bipartite or tripartite just above the base, naked below over a long distance, the longer branches up to 20 cm. long, reiterately branched, axils puberulous or ciliate, branchlets and pedicels slightly scaberulous; spikelets purplish, straw-coloured at maturity, glumes glabrous, 1-nerved, the lower about 15 mm. long, gradually passing into the awn, the keel scaberulous, upper one up to 20 mm. long, with a smooth keel, inclusive of the 5 mm. long awn from the bilobed summit, lateral lobes obtuse; lemma smooth, slightly narrowed but scarcely beaked, up to 15 mm. long, the about 1 mm. long, acute, oblique callus densely but rather shortly hairy; awns scabrous, somewhat unequal, divergent, the central one about 4 cm., the lateral ones about $3^1/_2$ cm. long. British India: Western Himalaya to the Panjab and Afghanistan. (Pl. XCVI.) . . . . . **Aristida cyanantha Steudel.**

Blades soft and weak, rather thin, flat in the lower half or nearly so, narrowly convolute upwards; sheaths shorter than the internodes, the nodes visible.

Densely caespitose perennial from an oblique rhizome, erect or ascending, culms together with the panicle 50—70 cm. long, 1—1½ mm. thick, terete, smooth, slightly striate, scantily branched from the lower and middle nodes; sheaths tight below, gaping upwards and slipping from the stem, striate, smooth; ligule a ciliolate rim, auricles densely bearded; blades up to 40 cm. long, about 2 mm. wide in the lower part, very narrow and convolute upwards ending in a very long setaceous point, smooth on both surfaces, the scarcely thickened margins scaberulous; panicle 20—30 cm. long, at first contracted and enclosed in the uppermost sheath, afterwards exserted and very loose and open, rhachis angulous and scabrous below, keeled or winged and very scabrous upwards, the branches tripartite from the very base, bipartite in the upper part of the panicle, erectly spreading, axils ciliate-pubescent, up to 20 cm. long or longer, remote, reiterately branched with very scabrous branchlets and very long pedicels; spikelets solitary at the end of the branchlets, not congested, yellowish-green, glumes very variable in length, 1-nerved, the lower scabrous on the keel, 12—16 mm. long, more or less gradually narrowed into the awn, the upper one 15—24 mm. long, smooth on the keel, abruptly narrowed into the long awn, the awn from a minutely bifid apex or the lateral setulae minutely developed; lemma smooth, 12—15 mm. sometimes up to 20 mm. long, not beaked, callus acute, ¾ mm. long, densely bearded; awns 2½—3½ cm. long, the lateral ones sometimes only 1½—2 cm. long. Australia: Queensland to New South Wales. (Pl. XCVI.)

. . . . . **Aristida leptopoda Benth.**

85. Body of the lemma smooth or scabrous only just below the awns, sometimes also more or less scabrous upwards, but never aculeolate-tuberculate. 86.

Body of the lemma very prominently aculeolate-tuberculate from below the middle.

Caespitose perennial with intravaginal innovations, culms 30 cm. or more long, erect, striate, terete or nearly so, glabrous; sheaths subcompressed, manifestly striate, scaberulous or hirtellous, with hyaline margins, longer than the internodes, glaucous; ligule a ciliolate rim, auricles bearded with long hairs, the collar with a villous line; blades erect or somewhat spreading, flat below, becoming convolute, gradually narrowed, acuminate, 15—20 cm. long, about 1½ mm. wide when expanded, puberulous or hirtellous on both surfaces or glabrous beneath, those of the innovations much shorter, only 5—6 cm.

long, all the blades with scattered long white hairs on the upper surface; panicle effuse, about 20 cm. long or longer, rhachis subterete below and glabrous, angulous or triquetrous and scabrous upwards, branches binate, scabrous, divaricately spreading, about 10 cm. long, gradually becoming shorter, the axils thickened, smooth and shining, branches naked in lower part for $^1/_3-^1/_2$ of the length, branchlets and pedicels erect, adpressed the spikelets congested at the end of the branchlets, the pedicels very short or those of the terminal spikelets rather long; spikelets purplish-green to yellowish, glumes about equal or the lower slightly shorter, 1-nerved, both shortly awned, the awn scarcely 1 mm. long, lower glume 12–13 mm. long, scabrous on the keel, upper one 14—15 mm. long, smooth on the keel, both narrowly linear-lanceolate, acuminate; lemma at maturity fuscous or grayish, 10—11 mm. long, slightly narrowed above but scarcely beaked, tubulous, with aculeolate or spiny hairs from below the middle or sometimes nearly all over, callus subobtuse, densely hairy, about 1 mm. long; awns erect or spreading, the central up to 23 mm. long, the lateral ones 17—18 mm. long. North America: Arizona. (Pl. XCVII.) . . . . . **Aristida hamulosa Henr.**

86. Auricles of the sheaths bearded; callus acutish, $^3/_4$ - 1 mm. long. North American species. . . . . 87.

Auricles not bearded, slightly pubescent only; callus obtuse, scarcely $^1/_2$ mm. long. South American species.

Perennial, probably caespitose; culms erect, simple, elegant, up to 60 cm. high, terete, glabrous; sheaths terete, tight, substriate, glabrous, longer than the internodes, ligule a short ciliolate rim, auricles scarcely developed, puberulous; blades narrowly linear, gradually long-acuminate, subflexuous, convolute, 20 cm. or more long, glabrous and smooth beneath, scabrous on the upper surface and on the margins, without long white hairs; panicle about 25 cm. long, or somewhat longer, strictly erect but lax, rhachis scaberulous especially upwards, branches much longer than the internodes of the panicle, suberect or more or less spreading, solitary or binate, scabrous, up to 15 cm. long, naked in lower half part, spikelets adpressed, congested, with short pedicels; glumes subequal, linear-lanceolate acuminate, 1-nerved, glabrous, the lower 7 mm. long, very scabrous on the keel, the upper one $8-8^1/_2$ mm. long, smooth on the keel; lemma narrowly linear, tubulous, $8\ 8^1/_2$ mm. long, minutely punctulate, narrowed upwards into a scabrous, scarcely or minutely twisted beak, the very short, truncate and very obtuse callus shortly hairy; awns erect, not contorted or twisted at the base, scabrous, the central about 14 mm. long, the lateral ones up to 11 mm. long. South America: Argentina. (Pl. XCVII.) . . . . . **Aristida Parodii Henr.**

87. Panicle-branches rather stiffly ascending with a much shorter subsessile few-flowered basal branch or with a single spikelet at the base; sheaths densely hairy at the throat and with a very prominent villous line across the collar; lemma with a slightly twisted about 2 mm. long beak; awns about equal, divergent or at maturity nearly horizontally spreading, slightly curved at the base, 15—20 mm. long. . . . . See p. 180 **Aristida pansa Woot. et Standley.**

Panicle-branches more or less divaricately spreading, binate. or tripartite, all naked at the base; sheaths bearded at the auricles, the collar without a villous line; lemma not beaked or twisted at the summit; awns unequal, strictly erect, straight, 8 - 13 mm. long.

Densely caespitose, rigid perennial, glaucous-green; culms strictly erect, simple, together with the panicle 50—60 cm. high, terete, glabrous, substriate; sheaths subcompressed, striate, puberulous or hirtellous, longer than the internodes, ligules densely and shortly ciliate with a row of long hairs behind it, auricles densely ciliate and bearded; blades strictly erect, convolute, or flat in the lower part, scaberulous or hirtellous beneath, hirtellous on the upper surface, with long white hairs on the lower part at base, about $1^1/_2$ mm. broad, 10 cm. long or longer, long-acuminate, somewhat pungent; panicle long-exserted, lanceolate or ovate-oblong in outline, effuse, about 20 cm. long and 10—12 cm. broad, rhachis smooth below, angulous and scaberulous upwards, branches puberulous and thickened at the axils, strict and divaricate at maturity, binate, the longer one 6 - 8 cm., the shorter one 4—6 cm. long; spikelets yellowish to purplish, adpressed, imbricate, forming false spikes at the ends of the branches, pedicels very short, angulous and scaberulous; glumes linear-lanceolate, acute, glabrous and smooth, 1-nerved, the lower about 9 mm. long, shortly awned, scaberulous on the keel upwards, the upper one about 10 mm. long, smooth on the keel, aristulate from a bidenticulate apex; lemma linear, tubulous about 10 mm. long, glabrous, scaberulous upwards, especially below the awns, the callus about 1 mm. long, obtuse, densely bearded; awns rather unequal, scabrous, the cental about 13 mm. long, the lateral ones up to 9 mm. long North America: Texas. (Pl. XCVIII.). . . . . **Aristida imbricata Henr.**

Note: *Aristida Parishii* Hitchc. has sometimes a more open panicle with divaricately spreading branches, naked at the base. It is to distinguish in that case by the much longer spikelets, the glumes are 12 mm. long ore even longer, the awns are also much longer, the central one 20—25 mm., the lateral ones 15 - 20 mm. long. See afterwards under that species.

88. (45.) Column well-developed, very variable in length, mostly very long or sometimes only 3–5 mm. long, but distinctly twisted. . . . . 89.
Column wanting or the lemma is produced into a short, sometimes up to 3 mm. long beak, which is however not or scarcely twisted. . . . . 124.

89. Lower glume longer than the upper one, position of the glumes inverse. 90.
Lower glume shorter or as long as the upper one. . . . . 101.

90. Column of awns in mature spikelets at least 10 mm. long, not rarely much longer and sometimes up to 8 cm. long. . . . . 91.
Column of awns shorter than 10 mm., mostly only 3—8 mm. long. . . . 94.

91. Callus very acute, 1–3 mm. long. . . . . 92.
Callus very obtuse, only about $^1/_2$ mm. long.

Caespitose, erect, mostly simple, robust, about 1 meter high perennial, culms somewhat scabrous, especially below the panicle, culm-nodes swollen and protruding above the glabrous sheath-nodes; sheaths longer than the internodes, glabrous, smooth, striate, ligule a scarcely ciliolate rim, auricles bearded with long erect hairs; blades narrow, linear, 60–70 cm. long, overtopping the panicle, flat at the base, convolute upwards, ending in a very long setaceous point, smooth beneath, scaberulous on the upper surface especially along the margins; panicle dense and spike-like or somewhat interrupted at base, up to 20 cm. long, inclusive of the awns, 4–5 cm. broad at the summit, rhachis angulous, scaberulous, branches subsolitary, slightly bearded at the axils, divided from the base, the many short branchlets densely fascicled, inclusive of the awns up to 5 cm. long, pedicels short, scabrous or hirtellous, angulous or triquetrous; spikelets narrow, purplish, glumes awned without lateral setae, the lower 3-nerved, scabrous, 13—14 mm. long, the upper one smooth 1-nerved, 9 mm. long; lemma inclusive of the shortly hairy callus and the about 10 mm. long, scabrous, twisted, rather thin and elegant column, about 16—17 mm. long; awns somewhat unequal, thin, straight or slightly curved, the central up to 28 mm. long, the lateral ones about 20—23 mm. long. South America: Brazil and Paraguay to Argentina. (Pl. XCVIII.). . . . . **Aristida oligospira Henr.**

92. Glumes 1-nerved, or the lower one sometimes sub-3-nerved. . . . . 93.
Glumes 3—5-nerved.

Caespitose perennial, up to 70 cm. high inclusive of the panicle; culms strictly erect, simple, few-noded, glabrous or slightly scabrous; sheaths longer than the internodes, terete, striate, scaberulous, ligule a short,

rather long-bearded rim, auricles bearded with erect hairs; blades narrow, linear, acute, up to 20 cm. long, scarcely 3 mm. wide, scabrous or hirtellous on both surfaces, convolute, many-nerved; panicle erect, very narrow, few-flowered, not dense, up to 20 cm. long, very interrupted, branches solitary or nearly so, inclusive of the awns 10—12 cm. long, strictly erect or the lower ones sometimes ascending or slightly spreading, naked in the lower part with a few spikelets at the base, rhachis terete, striate, scaberulous or smooth, branches not bearded at the axils, pedicels triquetrous, scaberulous; spikelets brown or red, glumes gradually narrowed, acute, not awned, the lower about 4 cm. long, 5-nerved, the upper one $3^1/_2$ cm. long, 3-nerved; lemmas smooth, about 10 mm. long, contracted just above the callus, the latter 3 mm. long, shortly but densely hairy, especially along the margins, the naked point very acute, column loosely twisted, smooth, thick, up to $4^1/_2$ cm. long, or in immature spikelets not yet developed and not yet twisted; awns about equal, 8—9 cm. long, coarse, spreading, slightly curved. Tropical Africa: Belgian Congo to Angola and Rhodesia. (Pl. XCIX.) . . . . . **Aristida Vanderysti Dewild.**

93. Column about 10 mm. long; the densely hairy very acute callus about 1 mm. long; lower glume 13 mm long, the upper one 11 mm. long. Caespitose elegant perennial, about 1 meter high, inclusive of the panicle; culms simple, 1 - $1^1/_2$ mm. thick, terete, glabrous and smooth; sheaths shorter or the uppermost scarcely as long as the internodes, glabrous, smooth, striate, culm-nodes slightly swollen and protruding above the sheath-nodes, ligule nearly wanting or a scarcely ciliolate rim, auricles shortly pubescent; blades very narrow, flat at the base, 2 mm. broad, involute upwards, up to 20 cm. long, gradually narrowed into a long setaceous point, those of the innovations shorter, about 8 cm. long, glabrous and smooth on both surfaces, the margins very thick: panicle exserted, about 30 cm. long, narrow, 1—2 cm wide, strictly erect, somewhat interrupted at the base, rhachis smooth, subterete, branches subsolitary, about 6 cm. long or the lower ones 9—10 cm. long, with smooth axils, divided from the base, branchlets densely fascicled, strictly erect, adpressed, smooth and subterete, pedicels subtriquetrous, scarcely scaberulous, very short or the lateral scarcely $^2/_3$ the length of the glumes; spikelets narrow, glabrous and smooth, glumes 1-nerved, the lower scarcely scabrous on the keel, both gradually narrowed into the short awn; lemma inclusive of the callus and the scabrous, twisted column, up to 16 mm. long; awns straight, thin, scaberulous, the central 28 mm. long, the lateral ones up to 25 mm. long. Habit of

A. riparia TRIN., but easy to recognize by the very acute, pointed, not bifid callus. South America: Brazil. (Pl. XCIX.) . . . . . **Aristida Trinii Henr.**

Column always more than 2 cm. long; the densely hairy, acute callus $1^1/_2$—3 mm. long; lower glume with the awn always more than 2 cm. long. Densely caespitose, robust, erect perennial, 80 cm. or up to 1 meter high; culms terete, smooth, striate, simple; sheaths glabrous, terete, scaberulous, striate, longer than the internodes, culm-nodes slightly swollen and protruding, ligule a short ciliolate rim, auricles shortly hairy, becoming glabrous, those of the innovations long-bearded; basal blades up to 40 cm. long, flat at the base, 2–4 mm. wide, becoming involute, ending in an involute, setaceous point, upper blades narrower, scabrous on both surfaces with spreading long hairs, especially near the base, the margins scabrous and thickened; panicle exserted or at first sheathed by the uppermost leaf, spike-like, many-flowered, not interrupted, up to 25 cm. long, inclusive of the awns, very dense, the branches short and adpressed, subsolitary, bearing fascicles of few-flowerd, 5–10 mm. long branchlets, the pedicels 1–2 mm. long, scabrous; spikelets erect, adpressed, glumes rather abruptly narrowed into the long awns, the lower sub-3-nerved, scabrous on the back, together with the 7 mm. long awn up to 32 mm. long, the upper one smooth, 1-nerved, with the nearly 2 mm. long awn up to 24 mm. long; lemmas 6—9 mm. long, scabrous under a lens or smooth with a $1^1/_2$—3 mm. long, densely pubescent oblique callus, the column very variable in length, scaberulous, strongly twisted, sometimes 6–8 cm. long; awns subequal, divergent, loosely contorted or not, 3–5 cm. long. South America: Brazil to Paraguay and Argentina. (Pl. C.) . . . . . **Aristida megapotamica Spreng.**

Column very long, robust, thick, glumes very long, the lower one about 3 cm. long or longer.

Column commonly 6—8 cm. long, the awns contorted at the base in a loose spiral, lemma glabrous or slightly scabrous upwards, inclusive of the callus about 9 mm. long, lower glume 30—32 mm., upper one 24 mm. long, awns at least 5 cm. long. . . . . **var. longipes Henr.**

Column not very robust, thinner and elegant, glumes shorter, the lower one less than 3 cm. long.

Awns contorted in a loose spiral, column 4 cm. long, lemmas distinctly scaberulous upwards, inclusive of the callus about 8 mm. long, lower glume 24, upper one about 18 mm. long, awns about 4 cm. long. . . . . **var. genuina Henr.**

Awns not contorted, perfectly straight, column 2—3 cm. long, lemma perfectly smooth throughout. inclusive of the callus 6—8 mm. long, lower glume 22—26 mm., upper one 18—19 mm. long, awns 3 cm. long or sometimes up to 5 cm. long. . . . . **var. brevipes Henr.**

94. Upper glume without tubercle-based hairs, pedicels scabrous or pubescent 95.
Upper glume with spreading, tubercle-based. about 3 mm. long hairs on keel and back, pedicels with long hairs
Densely caespitose perennial, 80—100 cm. high, culms simple or slightly branched from some of the lower nodes, strictly erect, few-noded, the uppermost one by far the longest, 60 cm. long or longer, terete, glabrous, smooth; sheaths shorter than the internodes, terete, striate, scaberulous, ligule a short ciliolate rim, auricles bearded; blades rather rigid, mostly flat or becoming involute, glabrous beneath, scaberulous and puberulous on the upper surface, mouth somewhat bearded, setaceously acuminate, 1—2 mm. wide, 15 cm. long or shorter, the old blades curved; panicle strictly erect, very narrow but somewhat lax, straw-coloured, 30 - 35 cm. long, the branches strictly erect and adpressed, the lower ones 5—6 cm. long, gradually becoming shorter upwards, rhachis scaberulous; spikelets very narrow, the pedicels short or those of the ultimate spikelets longer; glumes linear-lanceolate, the lower 13—14 mm. long, acuminate, shortly awned, 5-nerved, the nerves scabrous, upper glume 12 13 mm. long, narrower, 1-nerved, with a 2—3 mm. long awn, bearing scattered tubercles, the hairs deciduous afterwards but the tubercles always prominent; lemma narrow, linear, tubulous, smooth below, scabrous in upper half, inclusive of the densely hairy very acute, 1 mm. long callus and the strongly twisted scabrous 7—8 mm. long column, 16—17 mm. long; awns unequal, scabrous, erect or slightly spreading, the central about 20 cm. (14—23), the lateral ones about 15 mm. (9—17) long. Australia: Queensland. (Pl. XCVIII.) . . . . . **Aristida perniciosa Domin.**

95. Blades rather short, the lower about 20 cm. long, the upper ones mostly 10 cm. long, erect or spreading, never overtopping the panicles. . . 96.

Blades very long, the lower up to 70 cm. long or longer, the upper ones about 40 cm. long, strictly erect, overtopping the culms and the panicles.

Caespitose perennial, culms inclusive of the panicle about 50 cm. long, elegant, terete, simple, about 3-noded, scaberulous, the nodes congested in the lower $^1/_3$ part of the culm, nodes slightly swollen; sheaths longer than the internodes, tight, terete, glabrous, ligule a short ciliolate rim, auricles long-bearded; blades narrow, linear, convolute, subjunciform, setaceously acuminate, many-nerved, 2—$2^1/_2$ mm. wide when expanded, smooth beneath, densely puberulous on the upper surface, margins smooth with a thick band of sclerenchyma; panicle oblong, rather lax and open, about 20 cm. long with scabrous rhachis, lower branches somewhat spreading, very fine, scabrous, binate, mostly divided from the base, bearing spikelets from the lower $^1/_4$ part, the upper ones shorter, erect and adpressed; spikelets dark brown, crowded at the end of the branchlets with short, about 2 mm. long, scabrous, subclavate pedicels; glumes lanceolate, subulate, shortly awned, especially the lower one distinctly awned, lower glume 1-nerved with 2 lateral short anastomosing side-nerves, inclusive of the 1 mm. long awn up to 11 mm. long, aculeolate on the back and on the keel, upper glume 1-nerved, glabrous and smooth, linear, narrower, acute, mucronate, about 7 mm. long; lemma with a shortly hairy about $^1/_2$ mm. long, very obtuse callus, scabrous on upper half, about 6 mm. long, more or less abruptly narrowed into a firm, very scabrous, strongly twisted, 6—7 mm. long column; awns spreading, scabrous, slightly curved or warped, the central about 20 mm., the lateral ones 17 mm. long. South America: Brazil to Paraguay and Argentina. (Pl. C) . . . . . **Aristida macrophylla Hack.**

96. Body of the lemma smooth, punctulate under a lens or slightly scaberulous only below the column or on the uppermost part; awns shorter than 3 cm. . . . . 97.

Body of the lemma prominently scabrous nearly all over; awns at least 4 cm. long.

Densely caespitose perennial with a short rhizome, culms erect, rather thin, up to 20 cm. long inclusive of the panicle, striate, terete, sheathed over its whole length; sheaths manifestly striate, glabrous and smooth, the lower ones straw-coloured, slipping from the stems, gaping at the summit, the upper ones more or less tight, with more or less distinct hyaline margins, ligule a minute ciliolate rim, auricles distinctly pubescent and slightly bearded, collar smooth, innovations shorter with thinner and softer leaves than those of the culms; blades numerous,

the lower ones shorter than the culms, the upper ones reaching but not overtopping the panicle, narrowly involute with scaberulous margins, smooth beneath, slightly scaberulous on the upper surface, curved or flexuous, 4—7 cm. long, the upper ones shorter, all about 1 mm. broad when expanded, ending in a fine point, the junction with the sheath thickened; panicles 6—10 cm. long, narrowly contracted but not very dense and spike-like, the branches strictly erect and adpressed, branchlets and pedicels angulous or compressed, scabrous, the pedicels more or less thickened at the tips, the lateral pedicels half as long as the spikelets, the other ones $^2/_3$—$^3/_4$ as long as the glumes; spikelets purplish, glumes 1-nerved, acute, gradually narrowed above and shortly awned, the lower one 13—14 mm. long, scabrous on the keel and more or less so on the back upwards, the upper one about 12 mm. long, smooth on the keel; lemma linear, tubulous, very scabrous except at the very base, gradually passing into the very scabrous, twisted column, the callus rather obtuse, densely hairy and about $^3/_4$ mm. long, the body of the lemma inclusive of the about 4 mm. long column, 12—13 mm. long; awns about equal, scabrous, erect or somewhat spreading, the lateral ones $3^1/_2$ cm. long, the central one somewhat longer. South America: Uruguay. (Pl. CI.) . . . . . .
. . . . . **Aristida Hackeli Arechav.**

97. Spikelets rather large, glumes and lemmas not shorter than 10 mm., not very unequal; panicles long, rather dense and more or less spike-like or interrupted only at the base, 10 cm. long or mostly longer. New World species. . . . . 98.

Spikelets small, glumes and lemmas shorter or much shorter than 10 mm., unequal; panicle short, contracted but rather loose, about 7 cm. long or shorter. Old World species.

Caespitose perennial with few or wanting innovations, culms strictly erect together with the panicle 50—60 cm. high, simple or branched from the upper nodes, elegant, terete, scarcely 1 mm. thick, glabrous, substriate; sheaths half as long as the internodes, terete, tight, glabrous, substriate, ligule a thickened shortly ciliate rim, auricles long-bearded; blades narrow, linear, convolute or flat at the base, glaucous, 5—7 cm. long, scarcely $1^1/_2$ mm. wide, glabrous beneath, puberulous and with some scattered long hairs on the upper surface, gradually narrowed, margins thickened; panicle erect rather small about 1 cm. broad, rhachis scaberulous, the short branches binate or the upper ones solitary, few-flowered, erect; spikelets narrow, erect, purplish-brown with long, scabrous pedicels, glumes linear, 1-nerved, the lower awned, scabrous on the keel, $8^1/_2$ mm. long, the upper one smooth on the

keel, bidenticulate at the summit with an awn or mucro from the sinus, about 6 mm. long; lemma tubulous, smooth, with the very short, obtuse, long-bearded callus, 6—7 mm. long, gradually passing into the short, scabrous, distinctly twisted column; awns unequal, erect or somewhat divergent, the cental 16—18 mm. long, the lateral ones 10—12 mm. long. South Africa: Natal. (Pl. CI.) . . . . . **Aristida monticola Henr.**

98. Glumes narrow, lower one pubescent on the back and scabrous on the keel. . . . . 99.
Glumes rather broad, lower one glabrous and smooth, scabrous only on the keel. . . . . 100.

99. Panicles somewhat contracted but not spiciform, rather loose.
Caespitose erect perennial, culms few-noded, simple, terete, glabrous or minutely scaberulous, elegant, inclusive of the panicle up to 60 cm. high; sheaths longer than the internodes, terete or slightly keeled, striate, glabrous, ligule a short cilate rim, auricles bearded; blades narrow, setaceously convolute, the upper 30 cm. long and 1 mm. wide, exceeding the culms but not overtopping the panicles, rigid, the lower ones much shorter, sometimes flat at the base, glabrous beneath, scabrous and hirtellous on the upper surface and sometimes with scattered long white hairs below, margins with a thick band of sclerenchyma; panicle contracted but somewhat loose, mostly included at the base by the uppermost sheath, up to 20 cm. long and about 2 cm. wide, rhachis subtriquetrous, scaberulous, branches solitary, 3 - 5-partite from the base, fascicled and semiwhorled, very unequal, the longer ones up to 6 cm. long, the shorter ones 1—2 cm. long, rather few-flowered, sometimes 1-flowered, triquetrous, scabrous, axils smooth or scaberulous; spikelets more or less congested, shortly pedicelled, strictly erect, pedicels scabrous; glumes straw-coloured or somewhat purplish, very narrowly linear, acute and distinctly awned, 1-nerved, the lower 11 mm. long, scabrous and pubescent on the whole surface, longer awned than the upper one which is smooth all over and about $9^1/_2$ mm. long; lemma with an obtuse scarcely $^1/_2$ mm. long, shortly hairy callus, tubulous and very narrow, smooth, scabrous only at the summit, gradually passing into the short, but distinctly twisted, about 3 mm. long, scabrous column; lemma about as long as the lower glume; awns slightly unequal, scabrous, erect or divergent, the central 18 mm. the lateral ones up to 15 mm. long. South America: Costa Rica to Columbia. (Pl. CII.). . . . . **Aristida sorzogonensis Presl**

Panicles densely contracted, spiciform.

Caespitose erect perennial with few innovations, culms strictly erect, without the panicles about 60 cm. high, 1—2-noded, the glabrous nodes nearly basal, simple below, branched from some of the nodes, terete, scarcely striate, very scabrous, smooth below the nodes, the lowermost internode naked and about 6 cm. long; the old lower sheaths stramineous, slipping from the stems, the upper sheaths elongated, tight, subcompressed, striate, scabrous, glaucous, longer than the internodes, ligule a short ciliolate rim, auricles ciliolate or with a few long hairs; blades flat at the base, 2–3 mm. broad, convolute upwards, gradually setaceously acuminate, up to 20 cm. or more long, glaucous, grooved on the upper surface, very scabrous on both sides; panicle exserted, the peduncle very long and about 30 cm., the panicle contracted, dense, cuneate at the base and subinterrupted, the axis visible below, 20 cm. long and about 1 cm. broad, the axis subterete, very scabrous, angulous upwards, the branches solitary, much divided and spikelets bearing to the base, 4—6 cm. long, longer than the internodes of the panicle, gradually becoming shorter with very short, scabrous branchlets; spikelets strictly erect with very scabrous, short pedicels, the spikelets nearly sessile, glumes greenish to glaucous, 1-nerved, the lower one 12 mm. long, the keel scabrous especially upwards, the back hirsute or shortly pubescent, gradually narrowed and shortly awned, the awn scabrous, the lower glume subplicate, the upper glume narrower, glabrous with a smooth keel, slightly bifid at the apex and distinctly awned, about 10—11 mm. long, the awn about 1 mm. long, lemma glabrous, tubulous, gradually passing into the about 6 mm. long, scabrous, distinctly twisted column, the total length of lemma and column about 12—13 mm., the callus densely bearded, subobtuse, about $^1/_2$ mm. long; awns somewhat unequal, suberect or more or less spreading, scabrous, the central one 16—18 mm. long, the lateral ones 12—14 mm. long. South America: Argentina. (Pl. CII.). . . . . .
. . . . . **Aristida decipiens Henr.**

100. Glumes 11—10 mm. long, lemma about 12 mm. long inclusive of the 3 mm. long column and the $^3/_4$ mm. long callus; awns unequal, the central 16–18 mm. long, the lateral ones 8–10 mm. long.

Caespitose perennial, culms strictly erect, simple, with the panicle about 70 cm. high, terete, slightly striate, pubescent or scaberulous, few-noded, quite smooth below the nodes; sheaths tight, shorter than the internodes, at least the lower ones, striate, scaberulous, ligule a short pubescent rim with a row of long hairs behind it, auricles long-

bearded and slightly pubescent on the collar; blades narrowly linear, flat in the lower part, convolute upwards, expanded up to 3 mm. wide, 15 cm. or more long, erect or somewhat spreading, scabrous beneath, scaberulous to hirtellous on the upper surface with thickened margins; panicle about 25 cm. long, narrow, about 1 cm. wide, subinterrupted, with scabrous rhachis, branches short, adpressed, solitary, 5—6 cm. long, spikelets bearing nearly from the base, branchlets and pedicels scabrous; spikelets purplish or yellowish-brown, glumes linear-lanceolate, 1-nerved, acute or very shortly awned, the lower glabrous or somewhat scaberulous, very scabrous on the keel, shortly awned, the upper one narrower, smooth on the keel, truncate or emarginate and subbifid, with a mucro from the sinus; lemma punctulate. scaberulous above, gradually passing into the column, the obtuse callus densely bearded; awns scabrous. Southern Mexico. (Pl. CII.). . . . . **Aristida Hitchcockiana Henr.**

Glumes longer than 15 mm., mostly up to 17—19 mm. long, lemma about 15 mm. long inclusive of the 4 mm. long column and the about $1^1/_4$ mm. long callus; awns longer not so unequal, the central 30 mm. long, the lateral ones about 25 mm. long.

Densely caespitose glaucous perennial, 50—70 cm. high or sometimes higher, culms strictly erect, smooth, terete, few-noded, the uppermost internode by far the longest; sheaths longer than the internodes, nodes obtected, terete or subcompressed, striate and grooved, smooth, ligule a ciliolate rim, auricles of the culm-blades pubescent or ciliolate, those of the innovations bearded, the collar glabrous; blades 20 cm. or more long, 2 mm. wide, flat below, inrolled upwards, gradually narrowed into a setaceous point, glabrous beneath, scabrous on the upper surface, the margins scabrous, not conspicuously thickened, the older ones usually curved; panicles exserted, strictly erect, narrow, sometimes up to 30 cm. long, sometimes much shorter and only 10 cm. long, axis terete, striate, glabrous below, subtriquetrous or angulous and scabrous upwards, axils glabrous; branches solitary, divided nearly from the base, strictly erect, adpressed, the branchlets and pedicels scaberulous, the spikelets congested, dark brown or yellowish, sometimes purplish, glumes awned, the awns 1—2 mm. long, 1-nerved, the lower scabrous on the keel and sometimes also on the sides, the upper one quite smooth; lemma smooth below, scabrous at the summit, the column very scabrous, the callus subacute and densely bearded; awns scabrous, erect or somewhat spreading. North America: New Mexico and Arizona to Central Mexico. (Pl. CIII.). . . . . **Aristida arizonica Vasey**

101. (*89.*) Column always much shorter than 5 cm., mostly scarcely 3 cm. long or only 5—20 mm. long; awns much shorter than 10 cm. . . . . 102.
Column at least 5 cm. long, mostly up to 6 cm. long; awns at least 10 cm. long.
Caespitose perennial with intra- and extravaginal innovations, culms simple, strictly erect, terete, glabrous, glacous, up to 80 cm. high; sheaths terete, tight, glabrous, longer than the internodes, ligule a scarcely ciliolate small membrane, auricles but slightly developed, minutely pubescent; blades erect, rigid, glabrous, or scaberulous on the upper surface, many-nerved, narrowly linear, acute, mostly convolute, those of the culms up to 20 cm. long and 3–4 mm. wide when expanded, those of the innovations narrower, up to 70 cm. long; panicles very dense, contracted, spiciform, about 30 cm. long, very narrow at the base, cuneiform it outline, inclusive of the awns up to 10 cm. broad at the summit, with smooth axis and branches, the latter binate, about 2 cm. long, branched from the base with adpressed densely congested spikelets, pedicels very short; spikelets linear-lanceolate, greenish or tinged with purple, glumes very long, unequal, 1-nerved, awned, the lower inclusive of the awn, 45 mm. long, scabrous on the keel, the upper one 55 mm. long, quite smooth; lemma linear, nearly smooth, inclusive of the 3—4 mm. long callus up to 15 mm. long, the callus shortly hairy along the margins, very acute with a naked point; awns very long, capillary, about equally divergent, scaberulous, with a fine point, the central one 12 cm. long, the lateral ones about 1 cm. shorter; palea obtuse, denticulate, about $^1/_4$ the length of the lemma. South America: Paraguay. (Pl. CIII.) . . . . . **Aristida macrantha Hack.**

102. Glumes acute or obtuse, shortly awned, or if sometimes longer awned, the glumes in that case very narrow. . . . . 103.
Glumes abruptly long-awned, the awns at least 4 mm. long, but mostly longer and up to 12 mm. long.
Caespitose, 50 cm. to 1 meter high perennial, culms glabrous, strictly erect; sheaths mostly shorter than the internodes, glabrous, ligule a short ciliolate rim, auricles small, those of the culm-blades scarcely ciliolate, those of the innovations long-bearded; blades erect, usually inrolled or tightly involute, scabrous-pubescent on the upper surface, glabrous beneath, up to 30 cm. long, 1—3 mm. wide; panicle erect up to 15 cm. long, densely spike-like, the branches short and adpressed, the whole panicle more or less spirally twisted; glumes 1-nerved, rather abruptly awned, the lower about 4 mm. long, scabrous on the keel, ending in a 10—12 mm. long awn, or sometimes the awn but

4—5 mm. long, the upper glume 7—10 mm. long, nearly smooth, the awn 10—12 mm. or sometimes only 4—7 mm. long; lemma inclusive of the very acute, densely pubescent, about 2 mm long callus, 5—6 mm. long, extending into a slender, twisted, 1—3 cm. long column, the latter not rarely only 7—9 mm. long; awns about equal, 2—3 cm. long or sometimes the central longer than the only 10—12 mm. long lateral ones, all the awns divergent or spreading, more or less curved or warped at base. South Carolina to Florida and Texas, Cuba and Porto Rico, also in Brazil. (Pl. CIV.) . . . . . **Aristida spiciformis Ell.**

Note: The species was found in Brazil only by GLAZIOU sub no. 15624, but without further indication of the locality. The specimens are in HACKEL'S Herb. at Vienna and the same number was seen in the WARMING Herb. at Kopenhagen.
The specimens belong to the long-awned form of the species, they have the following dimensions of the spikelets: total length of gl. I. 11—13 mm., gl. II. 17—18 mm., lemma 6 mm., callus 1 mm., column about 2 cm., lateral awns 3 cm., central one $3^1/_2$ cm. long. The vegetative parts of the specimens agree perfectly with those of *A. spiciformis*.

103. Glumes acute or acuminate, rather thin and papery, sometimes with a bifid apex but always acute and manifestly awned from the sinus; blades not very firm, never subjunciform. . . . . 104.

Glumes both very obtuse, firm, mucronate, lobed at the summit, the lobes rounded with a mucro between them; blades very firm, curved, subjunciform.

Densely caespitose perennial, culms erect, wiry, glabrous, 20—40 cm. high, branched from some of the lower nodes; sheaths longer than the internodes, glabrous or slightly puberulous, terete, striate, tight, the margins slightly pubescent just below the auricles, ligule a densely, rather long-hairy rim, auricles long-bearded with flexuous hairs; blades involute, glabrous beneath, hispidulous or densely hirtellous on the upper surface, the mouth long-bearded, 5—20 cm. long, pungent, erect or curved and flexuous afterwards; panicle erect, narrow, mostly less than 15 cm. long, or sometimes 5 cm. long or up to 20 cm. long, exserted, interrupted at the base, the branches stiff and adpressed, solitary, rather few-flowered, spikelets bearing nearly from the base, branchlets and pedicels hispidulous, the latter very short or if long, always shorter than the glumes; lower glume

ovate-lanceolate, about 7 mm. long, scabrous on the keel, upper one somewhat narrower, smooth on the keel, about 10—11 mm. long, both with a minutely pubescent or ciliolate, rounded, two-lobed tip; lemma smooth at the base, scabrous above, gradually passing into the scaberulous, twisted, 2—3 mm. long column, inclusive of the column and the densely hairy, $^3/_4$ mm. long subobtuse callus, about 10—11 mm. long; awns equal, scabrous, erect, straight or slightly curved at the base, mostly about 15 mm. long or sometimes only 10 mm. long. Mexico. (Pl. CIV.) . . . . . **Aristida curvifolia Fourn.**

104. Glumes unequal, the lower about half as long as the upper or as much as $^2/_3$ in some species. . . . . .105.

Glumes about equal or but slightly unequal, the upper one only 1—$1^1/_2$ mm. longer than the lower one. . . . . .110.

105. Glumes 1-nerved or rarely the lower with 1 additional lateral nerve and thus 2-nerved, or sometimes the lower glume with 2 very short lateral nerves at the base only. . . . . .106.

Lower glume manifestly 3-nerved, the upper one 1-nerved.

Densely caespitose perennial up to 70 cm. high, culms erect, branched from some of the lower and middle nodes, elegant, terete, smooth, substriate; sheaths tight, terete, glabrous, shorter than the internodes, nodes slightly swollen and protruding, ligule a short ciliolate rim, auricles bearded with few long hairs; blades narrowly linear, rigid, convolute, gradually narrowed into a fine point, erect or somewhat curved, $1^1/_2$ mm. wide when expanded, 10—12 cm. long, smooth beneath, hirtellous on the upper surface, with some long hairs at the mouth; panicle narrow, erect, interrupted at base, up to 20 cm. long and scarcely 1 cm. wide, the branches erect and adpressed, subsolitary, the lower up to 6 cm. long, the upper ones gradually becoming shorter, divided nearly from the base with few-flowered branchlets, the spikelets forming short clusters, rather equally distributed along the rhachis of the branches, pedicels short, scabrous; spikelets narrow, lower glume 7 mm. long, scabrous on the nerves, minutely bidentate at the apex with a short awn, the upper smooth on the keel, about 12 mm. long, subbifid at the apex with a scabrous awn from the sinus; lemma scaberulous under a lens, inclusive of the acute, densely hairy, about $1^1/_4$ mm. long callus and the 5—6 mm. long, scabrous, twisted column, up to 12 mm. long; awns unequal, erect or spreading, the central 27—28 mm. long, the lateral ones 20—23 mm. long or sometimes only 15 mm. long. Australia: Northern Territory. (Pl. CV.) . . . . . **Aristida Schultzii Mez**

106. Column rather short, 6 to 10 mm. long, much shorter or as long as the body of the lemma. . . . . 107.

Column long, 15 - 20 mm., much longer than the body of the lemma.

Densely caespitose perennial, culms erect, simple, more or less glaucous, rigid, glabrous, without the panicle up to 40 cm. high; sheaths tight, shorter than the internodes, glabrous and nearly smooth, ligule a short ciliolate rim, auricles slightly bearded; blades narrowly convolute, rather rigid, curved, glabrous and smooth, about 20 cm. long, scarcely 1 mm. wide when inrolled; panicles very long, depauperate, commonly as long as the culms or longer, lax and interrupted, the branches fascicled, some of them long, others short, all bearing but a few spikelets, sometimes the panicles very reduced and the branches with one spikelet only; glumes straw-coloured, aristulate, glabrous, the lower one 12—14 mm. long, scabrous on the keel, the upper one 17 - 19 mm. long, smooth on the keel; lemma narrowly convolute, tubulous, smooth, 6—7 mm. long, inclusive of the $1^1/_2$ mm. long, very acute, densely hairy callus, column strongly twisted, scabrous; awns subequal, scaberulous, about 35—40 mm. long. Australia: Northern Queensland. (Pl. CV.) . . . . . **Aristida holathera Domin**

107. Column much shorter than the body of the lemma, scarcely $^1/_3$ its length and rarely half as long. Old World species. . . . . 108.

Column about as long as the body of the lemma. New World species.

Densely caespitose perennial, culms erect, simple, glabrous or puberulous, 20 - 40 cm. high, few-noded; sheaths glabrous or densely puberulous, tight, striate, about as long as the internodes, sometimes shorter, sometimes longer; ligule a minute ciliolate rim, auricles especially those of the innovations bearded and pubescent, the hairs deciduous, collar glabrous or with a villous line in those specimens where the sheaths and blades are hirtellous; blades glaucous, involute, mostly curved or flexuous, glabrous or pubescent beneath, scabrous and hirtellous on the upper surface and along the margins, about 1 mm. wide, mostly up to 10 cm. long, or sometimes scarcely 5 cm. long; panicle narrow, erect and rather few-flowered, mostly 8—15 cm. long, the branches binate or solitary, inclusive of the awns up to 5 cm. long, stiffly adpressed or slightly ascending, few-flowered; glumes more or less mucronate or awn-pointed, both with a slightly bifid apex, the lower scabrous on the keel, 6—8 mm. long, the upper one smooth on the keel, sometimes about twice as long as the lower one and at least $1^1/_2$ times as long; lemma glabrous, punctulate under a lens, inclusive of the obtuse, densely hairy, about 1 mm. long callus and the scabrous twisted column, about 10 - 12 mm. long; awns divergent or somewhat spreading

afterwards, 20—25 mm. long, or sometimes only 15 mm. long. North America: Texas to southern California and Mexico. (Pl. CVI.) . . . . . **Aristida glauca Walp.**

108. Lemma together with callus and column at least 10 mm. long or longer; awns equal or unequal but the central one always about 20 mm. long or longer. . . . . 109.

Lemma together with callus and column scarcely 6 mm. long; awns somewhat unequal, the central 12–13 mm. long, the lateral ones 9–10 mm. long. Densely caespitose perennial, culms elegant, erect, branched from some of the lower nodes, terete, glabrous and smooth, 40—60 cm. high, inclusive of the panicle; sheaths glabrous, smooth, tight, terete, shorter than the internodes ligule minute, ciliolate,. auricles pubescent, sometimes with some hairs; blades narrow, convolute, finely pointed, up to 10 cm. long or longer, scarcely 1 mm. wide, glabrous and smooth on both surfaces; panicle about 7—10 cm. long, contracted but somewhat loose, subinterrupted, up to 1 cm wide, exserted, rhachis rather smooth, scaberulous above only, the branches solitary or binate, branchlets fascicled, about 1½ cm. long, the pedicels scaberulous; glumes awn-pointed, the upper somewhat abruptly passing into the awn, the lower about 4½ mm. long. with a very short awn, slightly scaberulous on the keel, more or less 3-keeled but 1-nerved only, the upper one with a scarcely 1 mm. long scaberulous awn, 7—8 mm. long, smooth on the keel; lemma scaberulous under a lens, tubulous, with a very obtuse, scarcely ½ mm. long, densely hairy callus, the column short, scabrous, twisted, scarcely 2–3 mm. long; awns afterwards somewhat divergent, the base slightly curved in a very loose spiral. Madagascar. (Pl. CVI.) . . . . . **Aristida similis Steudel**

109. Lemma together with callus and column about 10 mm. long; awns very unequal, the central about 20 mm. long, the lateral ones 12—13 mm. long. Densely caespitose perennial, culms up to 60 cm. high or sometimes longer or much shorter, scantily branched, suberect, smooth, terete, wiry, with glabrous nodes; sheaths tight, glabrous, striate, the margins rather broad and hyaline, ligule a densely hairy short rim, auricles densely pubescent and rather long-bearded; blades narrow, convolute, scarcely 1—2 mm. wide, long and stiff, wiry, gradually tapering to a fine point, glabrous and smooth on the lower surface, scaberulous or densely hirtellous on the upper one, with some long hairs near the mouth, reaching over 30 cm. in length; panicle somewhat flexuous and supple, rather dense, subinterrupted, 10–20 cm. long, the branches

slender, erect or slightly spreading, solitary or subbinate, up to 5 cm. long, gradually becoming shorter, axils pubescent, branchlets and pedicels hispidulous, the latter shorter than the spikelets; glumes pale green or tinged with purple, sometimes minutely pubescent, lower one narrowly lanceolate-acuminate, 1-nerved, scabrous on the keel, inclusive of the about 1½ mm. long, scabrous awn, 5 mm. long, upper one linear, up to 8 mm. long, smooth on the keel, rather abruptly narrowed into a short, about 1 mm. long awn; lemma somewhat scaberulous above, linear-oblong, the obtuse, densely hairy callus about ½ mm. long, the about 3 mm. long column very scabrous, the awns scaberulous, erect or slightly spreading. Africa: from Lower Guinea to Transvaal and southern Cape land. (Coast Region). (Pl. CVII.) . . . . . **Aristida Welwitschii Rendle**

Plants much smaller, commonly only 10—20 cm. high, panicle much shorter and stiffer, 5—7 cm long, the glumes often purplish. Angola. . . . . **var. minor Rendle**

Culms nearly simple, lower internodes subtomentous below the nodes or with a woolly line, upper ones glabrous, lower sheaths lanate, upper ones hirtellous or glabrescent, glumes slightly longer than in the typical form, lower 7½ mm., upper about 10 mm. long, the lemma however shorter, up to 8 mm. long, lateral awns about as long as the central one. Angola. . . . . **var. subtomentosa Henr.**

Lemma together with callus and column up to 15 mm. long or but slightly shorter; awns equal or nearly so, about 25 mm. long.

Caespitose erect perennial with intravaginal innovations, without the panicle about 40 cm. high; culms terete, striolate, smooth or slightly scabrous below, about 2-noded, the uppermost internode (peduncle) very long, more than half the length of the whole culm, lower nodes swollen and protruding; basal sheaths delapsed, the lower internode naked, upper sheaths more or less inrolled and slipping from the stem or the uppermost one tight, about as long as the internodes, more or less keeled, or terete upwards, striate, glabrous or slightly scaberulous, ligule a ciliolate rim, auricles and collar slightly ciliolate; blades flat, the tip only inrolled, gradually acuminate, scabrous or hirtellous on both surfaces, the marginal nerves not very conspicuously thickened, up to 15 cm. long and about 1½ mm. broad, innovations

much shorter and narrower or the lowermost sometimes very short, mostly convolute all over, the auricles bearded or pilose, the collars more distinctly ciliate or pilose than those of the culm-blades; panicle erect, 20 cm. long or longer, rather narrow but not spike-like, somewhat loose and interrupted, about 3 cm. broad, the axis striate, angulous and slightly scabrous, visible at the base, branches solitary, binate, or tripartite from the base, thin, erect or somewhat ascendent, angulous and scaberulous, loosely flowered, spikelets bearing nearly to the base or very shortly peduncled, the branchlets erect and few-flowered, the flowers more or less congested, pedicels of the spikelets short or some of them nearly as long as the glumes, angulous and scaberulous, slightly thickened at the tip; spikelets greenish to brownish or tinged with purple, glumes unequal, narrowly lanceolate, 1-nerved, very acute, shortly awned, lower 6—7 mm. long, scabrous on the keel and minutely hirtellous on the back upwards, upper one glabrous, nearly smooth on the keel, 10—12 mm. long, lemma tubulous, smooth, the callus densely hairy especially upwards with long hairs much exceeding the true base of the lemma, very acute, about 1 mm. long, the body of the lemma about 8 mm. long, passing into the distinctly twisted 3—4 mm. long column, awns suberect or spreading, scabrous, about equal, 25 mm. long. Australia: Queensland. (Pl. CXLII.) . . . . . **Aristida psammophila Henrard**

110. (*104.*) All the awns curved, forming a loose erect spiral. . . . . 111.
All the awns perfectly straight, erect or divergent. . . . . 112.

111. Glumes 10 and 11 mm. long, inclusive of the long awns; body of the lemma 6 mm. long, gradually passing into a short, slightly twisted column. Caespitose perennial, culms simple, with the panicle up to 70 cm. high, striate, glabrous or minutely pubescent, few-noded; sheaths shorter than the internodes, striate, glabrous or puberulous, ligule very short, a ciliolate rim, auricles pubescent, collar glabrous; blades linear, the lower flat at the base, convolute upwards, curved or flexuous, glabrous beneath, scabrous on the upper surface, the margins with thick bands of sclerenchyma, upper blades narrowly convolute, 10—20 cm. long, scarcely 1 mm. wide, gradually narrowed into a long setaceous point; panicle dense, spiciform, long-exserted, slightly interrupted at the base only, 10—20 cm. long, branches binate, divided from the base, the spikelets fascicled, branchlets and pedicels very short, scabrous; glumes 1-nerved, about equal, subulate-acuminate, awned, longer than the lemmas, lower glume scabrous on the keel and on the back, the awn 2 mm. long, upper glume slightly narrower, the awn up to 5 mm. long, glabrous, smooth on the keel; lemma

with a densely and long-hairy, about $^1/_2$ mm. long, very obtuse callus and a very scabrous beak or column, the body punctulate under a lens and mottled; awns spreading at the base, straight upwards, scabrous, the central about 15—20 mm. long, the lateral ones slightly shorter. South America: Brazil. (Pl. CVII.) . . . . . **Aristida Neesiana Trin. et Rupr.**

Glumes $7^1/_2$ and $8^1/_2$ mm. long, inclusive of the short awns; body of the lemma 3 mm. long, passing into the 3 mm. long, distinctly and manifestly twisted column.

Densely caespitose perennial up to 1 meter high, inclusive of the panicle, culms simple, compressed and keeled below, terete upwards, glabrous or minutely puberulous, few-noded, the nodes congested in the lower part of the culm; sheaths longer than the internodes, the lower slipping from the stem, straw-coloured, the upper ones terete, tight, striate, glabrous, ligule a ciliolate rim, auricles pubescent, collar smooth; blades curved and flexuous, flat at the base, 30—40 cm. long, 2—$2^1/_2$ mm. wide, the upper ones convolute and setaceously pointed, glabrous beneath, scabrous on the upper surface, with scattered long hairs, especially on the lower part, margins with a thick band of sclerenchyma; panicle up to 25 cm. long dense, somewhat interrupted below, axis subterete and hirtellous below, subtriquetrous and scabrous upwards, the branches binate, strictly erect and adpressed, the longer ones up to 7 cm long, naked at the base, the shorter ones and the upper ones divided nearly from the base, branchlets and short pedicels scabrous; spikelets livid-purplish, congested, glumes 1-nerved, acute and shortly awned, the awns only $^1/_2$ mm. long, the lower glume scabrous on the keel and sometimes pubescent on the back, the upper one glabrous with a smooth keel; lemma rather abruptly narrowed into the very scabrous, densely twisted column, the body glabrous and smooth nearly all over, the short obtuse callus scarcely $^1/_2$ mm. long and more or less bearded; awns erect and straight upwards, divaricately spreading at the base, about 10 mm. long or the lateral ones slightly shorter. South America: Brazil. (Pl. CVI.) . . . . . **Aristida recurvata H. B. K.**

112. Blades very long, 80 cm. long or longer, gradually narrowed into a very long setaceous point, overtopping the panicle which is dense and spike-like and 50 cm. long or longer. . . . . 113.

Blades not over 20—30 cm. long, rarely slightly overtopping the panicle, but in that case the panicle very short or scarcely up to 20 cm. long. 114.

113. Column shorter than the body of the lemma, only about 4 mm. long; nodes of the culm not equally distributed, groups of 3 nodes separated by long internodes.

Caespitose erect perennial, culms about 1 meter high, many-noded, terete, striate, glabrous; sheaths glabrous, substriate, smooth, terete, tight or the lower ones slipping from the stem, longer than the internodes, slightly scaberulous only at the summit, ligule a ciliolate rim, auricles long-bearded; blades about 5 mm. wide at the base, convolute upwards, firm, very scabrous, those of the innovations narrower, margins without a band of sclerenchyma; panicle strictly erect, very narrow, about 1 cm. wide, more than 30 cm. long, axis angulous and scabrous, branches 10 cm. long or longer, solitary, divided nearly from the base, slightly bearded at the axils, strictly erect and adpressed, the branchlets with fascicled spikelets, scabrous like the subclavate short pedicels; glumes glabrous, 1-nerved, very narrow, the lower 7—8 mm. long, rather abruptly passing into a scabrous 5—7 mm. long awn, the keel scabrous, the upper one with a slightly bifid apex and an awn from the sinus, the awn 3 mm. long, the glume about 10 mm. long, slightly scaberulous on the keel; lemma terete, smooth, inclusive of the 1 mm. long, acute, densely hairy callus and the scabrous, twisted, 4 mm. long column, about 10 mm. long; awns scaberulous, erect or somewhat spreading, the central 25—35 mm. long, the lateral ones 20—30 mm. long. Southern Asia: Cochinchina. (Pl. CVIII.) . . . . . .

. . . . . **Aristida Balansae Henr.**

Column longer than the body of the lemma, about 10 mm. long; nodes of the culm equally distributed, no groups of nodes separated by long internodes.

Very robust caespitose perennial, up to 1,3 m. high, inclusive of the panicle, culms strictly erect, simple, firm, terete, slightly striate, glabrous, $2^1/_2$—3 mm. thick, 4—5-noded, the nodes rather equally distributed, very swollen and protruding, basal sheaths straw-coloured, slipping from the stems, lower ones purplish, terete, gaping only upwards, much longer than the internodes, slightly striate, scaberulous, mostly inrolled upwards, ligule a ciliate rim, auricles thickened and glabrous or very rarely with a few hairs, junction with the blade very fragile, collar scaberulous; blades very long, not rarely over 60 cm. long, narrowly inrolled, gradually long-acuminate, sometimes flat or less inrolled at the base and up to 3 mm. broad when expanded, scabrous on both surfaces, about 6-nerved and with 2 broader thick sclerenchyma bands along each margin; panicle very long and narrow,

enclosed at base by the uppermost sheath, axis scaberulous, subterete, deeply grooved laterally, the internodes very long, the axils minutely pubescent or scabrous only, the branches very remote and strictly erect, very long, binate or more or less fascicled in the upper part of the panicle, the longer lower ones naked at the base for about 3 cm., the peduncles scabrous, very stiff and flattened, branchlets shorter, strictly erect and adpressed, congested; spikelets erect, the pedicels angulous or subtriquetrous, scabrous, about 3 mm. long, green or tinged with brown or purple, glumes very narrow, 1-nerved, the lower one together with the 3–4 mm. long awn, about 14 mm. long, scabrous on the keel and also on the back along the margins, with adpressed soft short hairs in longitudinal rows, the scabrous awn from a deeply bifid apex, the lateral lobes of the glume very distinct and acute, upper glume together with the 4–5 mm. long awn about 18 mm. long, scaberulous only on the keel upwards, bifid at the summit but the lateral lobes much shorter and more obtuse than those of the lower glume, lemma together with the column about as long as the upper glume, the column very thin and elegant but distinctly twisted and about 10 mm. long, callus very obtuse, sparingly and rather shortly hairy, about $^1/_2$ mm. long or slightly longer, awns thin, straight, scabrous, slightly spreading, about equal and 30 mm. long. Northern Argentina. (Pl. CXXX.) . . . . . **Aristida pedroensis Henrard**

114. Column of awns much shorter than 10 mm., mostly only up to 6 mm. long. 115.
Column of awns at least 10 mm. long.

Caespitose, erect, glaucous perennial, culms simple, elegant, 40—80 cm. high, terete, glabrous, few-noded, nodes somewhat swollen and protruding; sheaths glabrous, tight, striate, with hyaline margins, the lower shorter, the upper ones as long as or longer than the internodes, ligule a minute rim, auricles pubescent; blades linear, flat or becoming involute, very acute, curved, the lower 20 cm. long, the upper ones shorter, mostly 5 cm. long, glabrous and smooth beneath, scabrous and pilose on the upper surface, especially near the mouth, many-nerved, the margins with a thick band of sclerenchyma; panicle linear-lanceolate, somewhat interrupted, 15—20 cm. long, scarcely $1^1/_2$ cm. wide, with smooth axis, branches solitary, strictly erect, scabrous, the lowermost up to 6 cm. long, pedicels very short, scabrous; spikelets glabrous, linear-lanceolate, acuminate, lower glume 12 mm. long, scabrous on the keel, the upper one 14 mm. long, smooth on the keel; lemma smooth, inclusive of the acute, hairy, 1 mm. long callus about 9 mm. long, column elegant, strongly twisted, scabrous; awns scabrous, erect or somewhat spreading, the central 25–30 mm. long,

the lateral ones 20–23 mm. long. South America: Brazil, Parana. (Pl. CVIII.) . . . . . **Aristida Ekmaniana Henr.**

115. Panicle dense and spike-like, somewhat interrupted only below, the branches short and spikelets bearing from the base, spikelets clustered, pedicels very short. . . . . 116.

Panicle linear-oblong, contracted or somewhat lax and open, but not dense and never spike-like. . . . . 117.

116. Both glumes inclusive of the well-developed awns, 13 mm. long or the lower one sometimes $^1/_2$—1 mm. longer.

Caespitose perennial, culms simple, robust, about 80--90 cm. high and 2 mm. wide, terete, glabrous, striate, few-noded, the uppermost internode by far the longest; sheaths glabrous, striate, tight or scarcely slipping from the stem, violaceous, longer than the internodes, ligules short, truncate, ciliolate, auricles pubescent, the collar a minutely pubescent line; blades narrowly linear, 20—30 cm. long, flat at the very base, involute upwards, ending in a setaceous point, scabrous on both surfaces, many-nerved, the margins not conspicuously thickened, blades of innovations much narrower with bearded auricles; panicle narrow, strictly erect, dark-coloured, purplish, 13–20 cm. long and about 2 cm. wide, branches solitary, 2—3 cm. long or shorter, erect, adpressed, scaberulous, the lower ones somewhat naked at the base, the few-flowered branchlets and pedicels scabrous; spikelets narrowly linear, purplish-green, glumes narrow, hyaline, both acuminate, without lateral setulae, the lower 1-nerved or sometimes with an additional faint nerve, scabrous on the keel and on the back, the upper one quite smooth; lemma narrowly linear, punctulate under a lens, inclusive of the subacute, $^3/_4$ mm. long, densely long-hairy callus and the strongly twisted, scabrous, about 5–6 mm. long column, up to 13 mm. long; awns erect or slightly spreading, the central up to 25 mm. long, the lateral ones up to 20 mm. long. South America: Bolivia. (Pl. CIX.) . . . . . **Aristida Mandoniana Henr.**

Lower glume inclusive of the short awn, not over 10 mm. long, the upper one scarcely up to 11 mm. long.

Densely caespitose perennial, culms strictly erect, few-noded, branched from some of the lower nodes or simple, terete, conspicuously scabrous below the panicle, 30—80 cm. high, mostly 50 cm., inclusive of the panicle; sheaths terete, tight, or the lower ones slipping from the stems, striate, scaberulous, longer than the internodes, ligules short, truncate, densely shortly ciliate, auricles densely pubescent, sometimes with long white hairs, especially those of the innovations; blades

glaucous, up to 40 cm. long, about 2 mm. wide when expanded, ending in a long setaceous point, many-nerved, the margins not conspicuously thickened, scaberulous on both surfaces, sometimes the collar minutely pubescent, blades of the innovations shorter and narrower; panicle up to 25 cm. long, axis scabrous, branches solitary, divided from the base, the lower up to 5 cm. long, gradually becoming shorter, adpressed to the axis, densely flowered, the pedicels scabrous; spikelets light brownish or purplish, glumes 1-nerved, acute, shortly awned, lower scabrous on the keel and sometimes on the back, upper smooth, mostly with more or less developed lateral setulae. South America: Argentina. (Pl. CIX.) . . . . . **Aristida achalensis Mez**

Lemma smooth, inclusive of the short, very obtuse, densely hairy, $^1/_2$ mm. long callus and the scabrous, strongly twisted up to 5 mm. long column, about 13 mm. long, exserted above the glumes; lower glume 9 mm., scabrous, upper one 11 mm. long, the lateral setulae inconspicuous; awns somewhat unequal, the lateral 11—12 mm. long, the central one 14—15 mm. long, lower glume mostly scaberulous on the back. Córdoba. (Pl. CX.) . . . . . **var. elongata Henr.**

Lemma not or scarcely exserted above the glumes; lateral setae of the upper glume conspicuous, lower glume scabrous on the keel, mostly smooth on the back.

Panicle rather short, about 9 cm. long, narrow, dense, not interrupted at the base; lemma inclusive of the obtuse, densely hairy, 0,6 mm. long callus and the about $3^1/_2$ mm. long, twisted column, up to 10 mm. long, lower glume $7^1/_2$ mm., upper one $9^1/_2$ mm. long, awns as in var. *elongata*. Tucuman. (Pl. CX.) . . . . . **var. tucumana Henr.**

Panicle rather long, about 20 cm., dense but interrupted at the base; lemma inclusive of the obtuse, densely hairy, 0,5 mm. long callus and the 4 mm. long, twisted column, up to $10^1/_2$ mm. long, lower glume 10 mm., upper one 11 mm. long; central awn 20 mm., lateral ones 15—16 mm. long. Sierra Achala de Córdoba. . . . . **var. genuina Henr.**

117. Spikelets not very small, the glumes about 10 mm. long or longer. . . . 118.
Spikelets small, the glumes much shorter than 10 mm., only 5 and $6^1/_2$ mm. long.

Caespitose perennial; culms simple below, dichotomously branched from all the nodes with elongated panicle-bearing branches, elegant, about $^1/_2$ mm. thick and up to 35 cm. high inclusive of the panicles, strictly erect, very glaucous, striate, terete, smooth or slightly scaberulous, the old leaves at the base pale coloured, slipping from the stems, the lowermost internode rather long, up to 10 cm. or longer, the upper sheaths all slipping from the stems, much shorter than the internodes, only 2—3 cm. long, slightly compressed or subterete, striate and glabrous with somewhat hyaline margins, ligule minute, shortly ciliolate, auricles not bearded, minutely puberulous only; culm-leaves narrow, the blades convolute, dried scarcely $^1/_2$ mm. broad, expanded about 1 mm., setaceously acuminate, 2—3 cm. long or sometimes up to 7 cm., glabrous or minutely scaberulous beneath, scabrous to hirtellous on the upper surface with somewhat thickened scabrous margins; panicle narrow and depauperate, somewhat lax, 3 5 cm. long or those of the lateral branches shorter, scarcely exserted, the peduncle sheathed by the uppermost leaf, the axis subangulous, scaberulous or smooth, the branches solitary, bipartite from the base, up to 2 cm. long, erect and adpressed, spikelets bearing to the base or shortly peduncled with short, erect branchlets, the spikelets congested, shortly pedicelled, the pedicels scaberulous; flowers pale or greenish, small, erect, glumes acute, 1-nerved, the lower scarcely 5 mm. long, with a scabrous keel, shortly awned, the awn scabrous, upper glume 6—$6^1/_2$ mm. long, smooth on the keel, minutely subtruncate-acuminate at the summit with a scabrous very short awn; lemma smooth, tubulous, narrowed above and distinctly stipitate, the scabrous twisted column about 2 mm. long, the callus scarcely $^1/_2$ mm. long, very obtuse and densely hairy, the lemma inclusive of callus and column up to 6—7 mm. long, the awns of the lemma unequal, scabrous the central one divergent 8—9 mm. long, the lateral ones erect, about 4—5 mm. long. South Africa: Transvaal. (Pl. CXI.) . . . . . .
. . . . . **Aristida transvaalensis Henr.**

118. Blades setaceously convolute or filiform. . . . . .119.
Blades flat at least in the lower part, convolute only in the upper part. 120.

119. Lower glume pubescent all over with ciliolate margins.
Widely caespitose perennial, 30—40 cm. high, culms very slender, erect, fastigiately branched, nodes slightly swollen and protruding; sheaths striate, glabrous, tight, shorter than the internodes, ligule a densely ciliolate rim, auricles pubescent and with a few long hairs; blades narrow, linear, mostly less than 10 cm. long, scarcely 1 mm.

wide, setaceous, scaberulous beneath, scabrous and hirtellous on the upper surface, the margins very scabrous with thick bands of sclerenchyma; panicle lax, 6–10 cm. long, strict and meagre, the axis scaberulous, branches few, subsolitary, 4—4½ cm. long, adpressed, naked in lower part with a short branchlet at the base, all the branchlets bearing but a few spikelets, pedicels very short, scabrous; spikelets blue-purple, strongly cuspidate, lower glume inclusive of the awn, 9—10 mm. long, upper one 10—11 mm. long, smooth throughout, both 1-nerved; lemma together with the shortly hairy, scarcely 1 mm. long callus and the scabrous column, up to 9 mm. long, the column but 2 mm. long or mostly the column better developed and up to 4 mm. long, the total length of lemma and column up to 12 mm.; awns subequal, scabrous, the central one about 20 mm. long, the lateral ones up to 15 mm. long. West Africa: Lower Guinea. (Pl. CXI.) . . . . . **Aristida huillensis Rendle**

Lower glume glabrous and smooth, minutely pubescent only at the tip.

Densely caespitose glabrous perennial, culms slender, terete, erect, simple, about 40 cm. high, smooth, about 3–4-noded; sheaths shorter than the internodes, tight, smooth, ligule a minutely ciliolate rim, auricles minutely pubescent, sometimes with a few long hairs; blades setaceously convolute, up to 10 cm. long, rather firm, curved, smooth beneath, minutely puberulous on the upper surface, with scabrous margins; panicle linear-oblong, contracted or somewhat lax and open, up to 10 cm. long, with filiform rhachis, branches remotely 2–3-nate or the upper solitary, erect, the longest up to 5 cm. long, divided from the middle, the others simple, subcapillary, scaberulous, with 1—3 spikelets on very short pedicels; glumes linear-lanceolate, 1-nerved, the lower rather broad at the base, up to 10 mm. long or slightly longer, sometimes the lower somewhat shorter, both shortly mucronate from a minutely 2-toothed tip, the lateral setulae and the mucro puberulous; lemma linear-convolute, inclusive of the short, densely hairy callus and the about 5 mm. long, strongly twisted scabrous column, up to 12 mm. long, upper part of the lemma minutely scaberulous; awns subequal, capillary, suberect, or slightly spreading, scaberulous, the central 30 mm. long, the lateral ones somewhat shorter, 27–28 mm. long, palea oblong, acute, about 1 mm. long. South Africa: Transvaal. (Pl. CXII.) . . . . . **Aristida aequiglumis Hack.**

120. Lemma smooth, scabrous only at the summit, gradually narrowed into a column, much shorter, or sometimes as long as the lemma. . . . . 121.

Lemma very scabrous from below the middle, gradually narrowed into a column as long as the body of the lemma, rarely slightly shorter. Densely caespitose glaucous perennial, culms simple, glabrous, robust, without the panicle up to 50 cm. high, sheathed all along or only in the lower half part, lower sheaths very broad with hyaline margins, longer than the internodes, glabrous, striate, ligule a short, densely ciliate rim, the hairs about 1 mm. long, auricles bearded with long white hairs; blades rigid, very long, up to 40 cm., flat, setaceously convolute only at the tip, many-nerved, glabrous, mouth not hairy, smooth beneath, scabrous on the upper surface, 2--3 mm. wide, at first erect, afterwards curved and contorted, the margins with a more or less developed band of sclerenchyma; panicle narrow, very long, up to 50 cm., somewhat interrupted, not very dense, pale-yellowish, the lower branches elongate, subsolitary, erect, many-flowered, branchlets and pedicels scabrous; spikelets rather small as to the size of the plant, glumes subequal, glabrous, 1-nerved, about 10 mm. long or the upper slightly longer, the lower scabrous on the keel, acuminate, awn-pointed, the upper one smooth on the keel, awned from a prominent bifid apex, the lateral setulae short, subacute; lemma inclusive of the very shortly hairy, very obtuse, about $^3/_4$ mm. long callus and the strongly twisted very scabrous up to 6 mm. long column, about 13 mm. long; awns subequal, scabrous, somewhat spreading or suberect, the lateral ones about 20—25 mm. long, the central one up to 30 mm. long. North Australia and Queensland to West Australia, south to New South Wales and South Australia. (Pl. CXII.) . . . . . **Aristida latifolia Domin**

121. Glumes about 10 mm. long or slightly longer and up to 11 mm. long, sometimes shorter and about $8^1/_2$ mm. long. . . . . 122.

Glumes longer, mostly 14—15 mm. long or not rarely 17—19 mm. long, position of the glumes in well-developed spikelets inverse, but in the same panicle also less-developed or damaged spikelets, where the position of the glumes is not inverse. . . . . See pag. 222. **Aristida arizonica Vasey**

122. Upper glume very distinctly bifid at the apex with acute lateral setulae, distinctly awned from the sinus; lower glume very acute and awned. 123.

Upper glume obtuse or emarginate, truncate and minutely bifid only with a mucro, position of the glumes in well-developed spikelets inverse or the glumes subequal in length, lower glume acute only and mostly 1 mm. longer than the upper one. . . . . See pag. 222. **Aristida Hitchcockiana Henr.**

123. Lemma inclusive of the column scarcely exceeding the glumes, column much shorter than the body of the lemma; lower glume glabrous, 1-nerved but 3-keeled, the midnerve scabrous, not rarely the keels more or less hispidulous.

Caespitose erect perennial, culms simple or scantily branched at the base only, 60—80 cm. high, terete, smooth or slightly scaberulous below the panicle, the nodes but slightly swollen; sheaths glabrous, striate, subcompressed. tight or slipping from the stems afterwards, shorter than the internodes, ligule a scarcely ciliolate rim, auricles minutely pubescent; blades about 20 cm long or sometimes longer, mostly $1^1/_2$ mm., or scarcely 2 mm. wide, greenish-glaucous, many-nerved, the margins with a strong band of sclerenchyma, flat, the upper part more or less involute and setaceously pointed, curved and flexuous especially in the lower part, glabrous and smooth beneath, scabrous and hirtellous on the upper surface, especially along the margins and near the base with long, flexuous, scattered hairs; panicle 20—30 cm. long, narrow but not very dense, rather lax and interrupted, 2—4 cm. wide, the branches strictly erect and somewhat distant, adpressed or ascendent, solitary. bipartite from the base, the longer ones up to 6 cm. long, naked at the base, the shorter and lateral ones spikelets bearing from the base, branchlets and pedicels scaberulous; spikelets rather densely crowded along the branchlets; glumes about equal, the lower scabrous on the keels, shortly awned, about 10 mm. long, the upper one smooth on the keel. awned from a bidentate apex, the setulae short and acute, the awn about 1 mm. long; lemma inclusive of the densely hairy, very obtuse, about $^3/_4$ –1 mm long callus and the twisted, about 3 mm. long, scabrous column, 9—$9^1/_2$ mm. long; awns strictly erect or slightly divergent, perfectly straight, scabrous, subequal, the central about 12 mm. long, the lateral ones 9—10 mm. long. Southern Mexico. (Pl. CXIII.) . . . . . **Aristida orizabensis Fourn.**

Lower glume $8^1/_2$ mm. long, upper one 9—$9^1/_2$ mm. long, callus 1 mm. long; lemma inclusive of the callus and the short, twisted, scabrous beak about 10 mm. long, central awn about 30 mm. long, the lateral ones up to 25 mm. long, all the awns distinctly contorted at the very base. British Honduras. . . . . **var. pseudospadicea Henr.**

Lemma inclusive of the column much exceeding the glumes, column about as long as the body of the lemma or slightly shorter; lower glume scabrous on the keel and hispidulous on the back.

Densely caespitose erect perennial with a rather thick rootstock, inclusive of the panicle 80 cm. high or not rarely more than 1 meter high, culms very slender, simple, terete, rather few-noded, the nodes equally distributed, slightly swollen, uppermost internode by far the longest not rarely more than 30 cm. long, densely pubescent or becoming glabrous; sheaths tight, striate, smooth, shorter than the internodes, ligule a short ciliolate rim, auricles pubescent and more or less bearded, those of the innovations densely bearded; blades up to 30 cm. long, flat at the base, convolute and setaceously pointed upwards, about 1 mm. wide, those of the innovations much shorter and convolute throughout, smooth beneath, scaberulous and hirtellous on the upper surface and with scattered long white hairs on the lower part, the collar sometimes a pubescent line; panicle 20–30 cm. long, narrow, the branches solitary or binate, adpressed, the lower ones up to 10 cm. long or longer, naked below, even the shorter lateral branches naked at the base but all the branches strictly erect and the branchlets and spikelets adpressed, axis, branches and pedicels pubescent or becoming more or less glabrous, pedicels short; spikelets congested, forming false spikes, glumes slightly unequal, lower $10^1/_2$ mm. long, inclusive of the about 1 mm. long awn, very scabrous on the keel, hirtellous on the back, upper one narrower, quite smooth, up to 12 mm. long, acute, awned from a distinct but slightly bifid apex; lemma punctulate under a lens, together with the scarcely 1 mm. long, subobtuse, densely hairy callus and the column up to 16 mm. long, the scabrous, twisted column 7–8 mm. long; awns scabrous, strictly erect or somewhat divergent, central one 20 mm. long, lateral ones 15—17 mm. long. Southern Mexico. (Pl. CXII.) . . . . . .
. . . . . **Aristida appressa Vasey**

Spikelets somewhat smaller, the column scarcely exceeding the glumes, awns about equal; agreeing in the vegetative characters with typical *A. appressa*, in the characters of the flowers more approaching the *A. orizabensis*, but the panicle-characters are those of *A. appressa* Southern Mexico.. . . . . .
. . . . . **var. brevior Vasey**

124. (88.) Position of the glumes inverse, the lower longer than the upper one. 125.
Position of the glumes not inverse, the lower slightly or much shorter than the upper one. . . . . .146.

125. Upper glume very short, about 3 mm. long, totally hidden by the much longer lower one. . . . . 126.
Upper glume always much longer than 3 mm., not hidden by the lower one. 127.

126. Lower glume very distinctly bidentate at the summit with an awn from the sinus; auricles pubescent, collar smooth.
Densely caespitose perennial with a rather robust oblique rhizome, culms erect or somewhat ascending, 70 cm. to more than 1 meter high inclusive of the panicle, elegant, terete, smooth, many-noded, simple or commonly branched from the lower nodes; sheaths terete, tight, glabrous, striate, shorter than the internodes, the lower ones slipping from the stems, the nodes slightly swollen and protruding, ligules short, truncate, ciliolate, auricles pubescent only, collar a glabrous thickened line; blades narrowly linear, complicate but flat at the base, setaceously acuminate, up to 30 cm. long, scarcely 1 mm. wide when inrolled, erect, rather rigid, glabrous and smooth beneath, minutely scaberulous on the upper surface, the margins scabrous with a band of sclerenchyma; panicle linear-oblong, shortly exserted, 20—30 cm. long, contracted and rather densely flowered, about 1 cm. wide, axis smooth, subterete, branches binate, erect, the longer ones up to 8 cm. long, naked at the base, many-flowered, scaberulous, the shorter ones spikelets bearing nearly from the base, few-flowered, the spikelets equally distributed along the branches, forming false spikes, pedicels slightly scaberulous, much shorter than the spikelets; spikelets linear, pale-green, lower glume linear-lanceolate, 1-nerved, keel scabrous, about 12 mm. long, upper one only 3—4 mm. long, lanceolate, subacute or somewhat obtuse, membranaceous, 1-nerved, not keeled, quite smooth; lemma 7—8 mm. long, linear, tubulous, callus about $^1/_2$ mm. long, subobtuse, densely hairy, the body of the lemma scabrous upwards, slightly narrowed above but not beaked; awns strictly erect or slightly spreading afterwards, nearly equal, about 30 mm. long, palea oblong, nerveless, $1^1/_2$—2 mm. long. South America: Southern Bolivia and Northern Argentina. (Pl. CXIII.) . . . . . **Aristida inversa Hack.**

Lower glume acute only, not bidentate at the summit; auricles bearded.
Caespitose erect more or less glaucous perennial, fasciculately branched below, culms rather thin, elegant, 30—60 cm. high, terete, striate, slightly scaberulous or smooth, 3–5-noded, the nodes equally distributed; sheaths striate, glabrous, subcompressed, broad and papery at the base, slipping from the stems or the upper ones tight, shorter than the internodes, ligule a ciliolate rim, auricles long- and densely

bearded, collar a minute pubescent line; blades narrowly linear, up to 10 cm. long, mostly the lower ones much shorter, sometimes longer and up to 25 cm. long, 1 mm. wide, flat below, curved and flexuous, ending in a long setaceous point, glabrous beneath, scabrous and hirtellous on the upper surface and with long hairs near the base, margins with a thick band of sclerenchyma; panicle strictly erect, very narrow, not dense, rather loose, 20 cm. long or mostly much shorter, scarcely $^1/_2$ cm. wide, often linear, axis terete below, angulous above, smooth or the branches and pedicels slightly scaberulous, branches solitary, erect, with a short few-flowered branchlet at the base; spikelets yellowish-green, tinged sometimes with purple, lower glume 8—9 mm. long, acute, 1-nerved very scabrous on the keel especially above, sometimes up to 11 mm. long, lower glume glabrous throughout, 3 - 4 mm. or sometimes up to 6 mm. long; lemma smooth, scaberulous above only, about 9 mm. long, the acute, densely hairy callus about $^1/_2$ mm. long; awns erect or slightly divergent, scabrous, subequal, about 20 mm. long or the central one slightly longer. South America: Argentina. (Pl. CXIV.) . . . . . **Aristida mendocina Phil.**

Lower glume 12—13 mm. long, the upper one 4 mm. long, awns much longer, the central 35 mm., the lateral ones 30 mm. long. Bolivia. . . . . **var. macrantha Henr.**

127. Lemma not subulate, not produced into a well-developed beak, the latter totally wanting or scarcely developed. . . . . 128.

Lemma subulate, produced into a glabrous, straight not or minutely twisted beak, the latter sometimes as long as the body of the lemma.

Densely caespitose perennial, culms strictly erect, 60 - 90 cm. high, branched, somewhat compressed, smooth, about 6-noded, culm-nodes swollen and protruding; lower sheaths shorter, upper ones longer than the internodes, compressed, striate, glabrous, ligule a very short ciliolate rim, auricles shortly bearded; lower blades up to more than 30 cm. long, the upper shorter, very narrow, glaucous, about 2 mm. wide, convolute, flat at the base only, smooth beneath, scabrous on the upper surface and with long rigid hairs especially at the base and near the mouth; panicle about 15 cm. long or sometimes up to 30 cm. long, contracted, somewhat dense and subspiciform with scabrous rhachis and branches, the longer branches somewhat naked at the base, 7—8 cm. long, the shorter ones fascicled or divided from the base and densely flowered; spikelets with scabrous or nearly smooth

pedicels, straw-coloured, glumes lanceolate, acuminate, 1-nerved, shortly awned, the lower one inclusive of the 2 mm. long awn, about 9 mm. long, scabrous on the keel, the upper one narrower, with the 1 mm. long scabrous awn, about 7 mm. long, smooth on the keel; lemma with a very short, densely hairy and very obtuse callus, the hairs much surpassing the true base of the lemma, the latter slightly punctulate, rather broad, inclusive of the $3^1/_2$ mm. long column, about 7 mm. long; awns scabrous, the central 12 mm. long, somewhat spreading, the lateral ones 10 mm. long, suberect. South America: Brazil. (Pl. CXIV.) . . . . . **Aristida gibbosa Kunth**

128. Annual species; awns very rigid, triquetrous or winged at the base, strictly erect or spreading but never curved or warped. . . . . 129.
Perennial species; awns not so very rigid or if somewhat rigid they are curved at the base or warped, straight and capillary upwards. . . 130.

129. Lemmas with longitudinal rows of spiny hairs.

Up to 50 or 65 cm. high, branched in the lower part and from the middle-nodes, erect or geniculately ascending; lower sheaths slipping from the stems, prominently striate, compressed and keeled, very scabrous and retrorsely hispidulous especially on the nerves, shorter than the retrorsely hispidulous, grooved internodes, nodes slightly pubescent, upper sheaths longer than the internodes, ligules long-ciliate, auricles with a tuft of long hairs; blades flat, 2–4 mm. wide, 10–15 cm. long, glaucous, many-nerved, very scabrous on both surfaces; panicles exserted, somewhat diffuse but contracted, up to 20 cm. long with very scabrous axis, branches and pedicels, the axils densely shortly hairy, branches binate, more or less peduncled with 1 or 2 few-flowered short branchlets at the base, upper branches shortly peduncled mostly solitary, bearing clustered spikelets on subsessile pedicels, or some of them with a 5 mm. long pedicel; spikelets coarse, reddish-green with a black spot at the base, glumes broad, very acute, shortly hairy on the back, 1-nerved, keels not so very scabrous, rather smooth, lower glume acuminate, with the scabrous awn, up to 12 mm. long, sometimes 15–17 mm. long, the upper with the very scabrous awn and 2 short lateral teeth, up to 11 mm. long or slightly longer; lemmas inclusive of the densely hairy subobtuse callus, up to 10 mm. long, strongly nerved, the nerves with rows of aculeolate antrorsely curved hyaline sharp hairs, the back somewhat keeled, deeply grooved on the ventral side, the margins inrolled; awns very scabrous, nearly equal or the central slightly longer, 20—25 mm. long or sometimes up to 40 mm. long. Abyssinia and Eritrea to Rhodesia, Angola and Damaraland. (Pl. CXV.) . . . . . **Aristida rhiniochloa Hochst.**

Lemmas smooth, the midnerve scabrous only.

Panicle long and narrow, up to 28 cm. long and about 2 cm. wide, culms puberulous and striate below the panicle, rhachis puberulous, striate, angulous, axils minutely pubescent; branches binate, strictly erect, naked at the base for $1^1/_2$—2 cm., pedicels scabrous, lateral ones very short, ultimate pedicels longer and sometimes as long as the glumes; spikelets purple, lower glume 15–16 mm. long, distinctly 3-nerved, the lateral nerves half as long (or somewhat longer) than the midnerve, (in *A. rhiniochloa* there are only 2 very short lateral nerves at the base), the nerves scaberulous, pubescent on the back, acute, shortly awned, upper glume about 14 mm. long, bifid at the apex with a 1 mm. long awn from between the lobes; lemma with the subobtuse, about 1 mm. long, bearded callus, about 12 mm. long, margins inrolled, the ventral side furrowed, the body glabrous and smooth, slightly keeled, the keel minutely scaberulous; awns strictly erect, triquetrous and winged, very scabrous, up to 30 mm. long. South West Africa: Damaraland. . . . . .
. . . . . **Aristida andoniensis Henr.**

130. Glumes 1-nerved, sometimes the lower one with an additional side-nerve; awns not rigid, straight or slightly contorted at the base only. . . . 131.

Glumes 3-nerved; awns rather rigid, curved and warped at the base in a loose spiral.

Densely caespitose erect perennial, up to 50 cm. high, culms simple, erect, rigid, striate, scaberulous below, very scabrous above and below the panicle, 3—4-noded, the uppermost internode long-exserted; sheaths reddish-brown, longer than the internodes, striate, glabrous, tight, the upper ones scaberulous, ligules and auricles shortly pilose; blades convolute, acute, erect, rigid, 15—25 cm. long, glabrous beneath or the upper ones scaberulous, upper surface scaberulous, the margins very scabrous, not thickened, without bands of sclerenchyma, scarcely 2 mm. broad at the flat base; panicle densely spike-like, oblong, 6—10 cm. long, 2—$2^1/_2$ cm. wide, axis, branchlets and pedicels very scabrous and hirsute, branches short, branchlets densely fascicled, the pedicels very short or the longer ones 3—5 mm. long; spikelets yellowish-brown or reddish, together with the awns 3—4 cm. long, glumes acuminate, lanceolate, glabrous and smooth, the lower 2—$2^1/_2$ cm. long, scabrous on the keel, the upper one about $1^1/_2$ cm. long, not so acute, smooth on the keel; lemma linear, subfusiform, glabrous and smooth, the callus densely bearded and very acute, pungent, about $1^1/_2$ mm. long, the body of the lemma not narrowed above, 12—15 mm. long; awns rigid, flat, especially below, very scabrous, contorted,

forming a loose spiral, spreading, about equal, 2–2½ cm. long; palea oblong, obtuse. Madagascar. (Pl CXV.) . . . . . **Aristida Perrieri Camus**

131. Margins of the lemma inrolled over their whole length, the lemmas thus deeply furrowed at the ventral side. . . . . 132.
Margins of the lemma overlapping, ventral side not furrowed, lemmas tubulous. . . . . 141.

132. Robust or rather robust Australian species, glaucous, with 8–10 dm. high culms or sometimes much shorter; blades mostly flat in lower part and 2½–3 mm. wide or sometimes convolute nearly throughout. 133.
Not very robust, elegant, South American species, not glaucous, with 1–5 dm. high culms; blades always very narrow and convolute. . . 137.

133. Margins of the inrolled lemmas with rows of spiny hairs. . . . . 134.
Margins of the inrolled lemmas without rows of spiny hairs, sometimes there is an indication of some small tubercles along the inrolled margins. 135.

134. Lower glume at least 5 mm longer than the acute upper one; awns longer than 3 cm.
Caespitose erect perennial, culms robust, more than 1 meter high, 2 mm. thick, glabrous and smooth, 4–5-noded, the uppermost internode very long, nodes swollen and protruding; sheaths glabrous and smooth, slipping from the stem or the upper ones tight, about as long as or longer than the internodes, ligules densely ciliate, auricles scarcely developed, pubescent or glabrous; blades very long, rigid, 3 mm. wide, mostly more than 30 cm. long, glabrous and very glaucous beneath, scabrous and hirtellous on the upper surface, the scabrous margins not thickened; panicle exserted, straw-coloured, very long, mostly up to 70 cm., interrupted at the base, narrow and contracted but somewhat loose, not rarely nodding at the summit, axis terete and smooth below, scaberulous and angulous upwards, branches binate, scaberulous, the longer ones 12–14 cm. long, naked at the base, longer than the internodes of the rhachis, many-flowered, erect or ascending and somewhat flexuous, the shorter ones few-flowered, spikelets bearing from the base, all the spikelets erect and adpressed, forming false spikes; glumes acute, shortly awned, 1-nerved, the lower slightly scabrous on the keel upwards, about 16 mm. long, the upper one smooth on the keel, 8–10 mm. long or sometimes slightly longer; lemmas much shorter than the glumes, the acute very densely hairy, long-bearded callus about 1 mm long, the body of the lemma glabrous,

punctulate under a lens, mottled, pale below the awns, deeply furrowed with some rows of very characteristic spiny hairs at the ventral side, scarcely narrowed above, 5 mm. long, or sometimes up to 8 mm. long; awns erect or slightly spreading, 35—40 mm. long or the central one up to 50 mm. long. Australia: Queensland. (Pl. CXVI.) . . . . . **Aristida inaequiglumis Domin**

Lower glume only about 2 mm. longer than the erosely dentate or bifid upper one; awns mostly less than 2 cm. long.
See immature specimens of **Aristida armata Henr.,** where the panicle-branches are erect and adpressed and not yet diffuse and spreading.

135. Culm-blades more or less convolute, mostly inrolled throughout, expanded only about $1^1/_2$ mm. broad. . . . . 136.

Culm-blades flat or involute only at the tip, about 3 mm. broad.
Densely caespitose robust perennial, culms simple, with the panicles more than 80 cm. high, glabrous, terete, slightly striate, the whole plant very glaucous and pruinose; lower sheaths shorter, upper ones as long as or longer than the internodes, glabrous, smooth, ligules densely ciliolate, auricles well-developed, pubescent, those of the innovations long-bearded; blades very long, rigid, flat and about 3 mm. wide, those of the innovations convolute, erect, glabrous and smooth beneath, scabrous or hirtellous on the upper surface, the scabrous margins not thickened; panicle elongate, narrow, somewhat interrupted at the base, but not spike-like, more or less contracted but rather loose, about 40 cm. long, pale-coloured, branches binate, naked at the base, strictly erect and adpressed, the lower ones up to 15 cm. long, gradually becoming shorter, axis of panicle terete and smooth below, subangulous and slightly scabrous above, the branchlets and pedicels scabrous; spikelets rather long-pedicelled, erect, glabrous, glumes 1-nerved, smooth on the keels or nearly so, the lower one somewhat scabrous only on the keel below the awn, 14 mm. long or sometimes up to 16 mm. long, upper one 10 mm. long; lemma smooth or slightly scaberulous upwards, 7—8 mm. long, the densely hairy, long-bearded callus about 1 mm. long, body of the lemma not narrowed above; awns scabrous, flat at the base, the central one 30—35 mm. long, the lateral ones shorter, 25—30 mm. long. Australia: West Queensland to West and Central Australia. (Pl. CXVI.) . . . . . **Aristida pruinosa Domin**

136. Spikelets small, glumes 6 and 5 mm. long only, the awns of the lemma not over 10 mm. long.
Caespitose elegant perennial; culms erect, simple or slightly branched

from some of the lower nodes, about 1 mm. thick, up to 60 cm. high inclusive of the panicles, 2—3-noded, internodes about equal or somewhat unequal, terete, slightly striate, glabrous; sheaths tight, some of them slipping from the stems, subterete or slightly compressed below, terete and striate upwards, much shorter than the internodes, glaucous, glabrous, ligule a short ciliolate rim, auricles pubescent and somewhat bearded, those of the innovations more prominently bearded, collar glabrous; blades of the culms flat only at the base and about 1 mm. broad there, convolute or inrolled upwards, setaceous, scarcely $^1/_2$ mm. thick, up to 15 cm. long, ending in a subpungent scaberulous point, commonly shorter and about 10 cm. long, those of the innovations convolute throughout, mostly much shorter than 10 cm.; panicle long-exserted, the peduncle up to 15 cm. long about as long as the panicle, the latter not rarely shorter and up to 10 cm. long, narrow, up to 1 cm. broad, loose and more or less interrupted especially below, axis terete and smooth below, scaberulous upwards, branches distant, binate or bipartite from the base, naked below for 1—2 cm., very thin, capillary, scaberulous like the branchlets, up to 4 cm. long, flexuous or curved, erect or ascending or sometimes more or less nodding, rather few-flowered, gradually becoming shorter upwards, iterately branched, the spikelets somewhat remote, scarcely congested, the slightly scabrous, subclavate pedicels mostly as long as the glumes or the lateral pedicels much shorter; spikelets small, yellowish-purple, erect, glumes linear-lanceolate, 1-nerved, the lower scabrous on the keel and minutely scaberulous all over, about 6 mm. long, acuminate, awn-pointed or slightly awned, upper glume narrower, quite smooth, about 5 mm. long, deeply bifid at the apex with a short, about $^1/_2$ mm. long awn from between the acute lobes; lemma punctulate and mottled, slightly compressed laterally, not or scarcely narrowed above, about 5 mm. long inclusive of the subacute about $^1/_2$ mm. long, very densely hairy callus, the inrolled margins glabrous; awns flat at the base, very scabrous, erect or somewhat spreading, unequal, the central one about 10 mm. long, the lateral ones only 5—6 mm. long. Australia: Queensland. (Pl. CXVII.) . . . . . .
. . . . . **Aristida Benthami Henr.**

Spikelets rather long, the glumes 10—8 mm. long, the awns of the lemma always longer than 10 mm., mostly 15—20 mm. long.

Erect caespitose perennial with extravaginal innovations, innovation-buds covered with imbricate, short, ovate, acutish, yellow scales; culms inclusive of the panicles 80 cm. or more high, many in a tuft, strictly erect, more or less branched, the branches erect and adpressed,

2—3-noded, the nodes placed in lower half part of the culm, internodes 10 cm. long or longer, quite naked, the sheaths of the lower ones delapsed, culms terete, nearly smooth or minutely striate and scaberulous, culm-nodes protruding above the annular dark sheath-nodes; sheaths if present, slipping from the stems and brownish, upper ones green, tight or gaping, striate and minutely scaberulous, much shorter than the internodes, commonly terete or somewhat keeled above with subhyaline margins, ligule a short ciliolate rim, auricles pubescent, mostly with a ciliolate line across the collar; blades flat below, convolute upwards, about 1 mm. broad or slightly broader, up to 10 cm. long or shorter, strictly erect, gradually narrowed and pointed, many-nerved, the margins not thickened, glabrous or nearly so beneath, scabrous on the upper surface; panicle long-exserted, about 25 cm. long or shorter, somewhat contracted but very loose and open, much interrupted, the branches very distant especially below, axis subterete or subtriquetrous and glabrous below, very scabrous and angulous upwards, branches binate, scabrous, erectly spreading or ascending, the longer ones not rarely somewhat divergent and naked at the base for about 2 cm., inclusive of the spikelets 5—7 cm long, the shorter branches naked only for 1 cm. or the upper ones subsessile and few-flowered, erect and adpressed, the scabrous compressed pedicels about as long as the glumes or shorter, or the lateral pedicels very short; spikelets subcongested, erect, purplish, glumes lanceolate, acuminate, scaberulous, or glabrous, the lower 9—10½ mm. long, shortly awned or very acute, 1-nerved, or sometimes with more or less distinct, short, lateral nerves, keel remotely scabrous, upper glume about 1 mm. shorter than the lower one, 9—9½ mm or sometimes only 8 mm. long, smooth on the keel, narrower, rather abruptly acuminately awned at the apex; lemma slightly compressed, inclusive of the 1 mm. long callus, about 9 mm. long, punctulate and mottled, scarcely narrowed upwards, the densely bearded callus subacute, the body of the lemma with inrolled margins, the furrow narrow; awns very scabrous, flat at the base, erectly spreading or somewhat divergent, unequal, the central one 18—20 mm. long, the lateral ones 12—15 mm. long. Australia: Queensland to New South Wales. (Pl. CXVII.)
. . . . . **Aristida glumaris Henr.**

137. (*132.*) Glumes not very unequal, the lower one 10—12 mm. long, the upper one 9 mm. long; awns of the lemmas 2—3½ cm. long. A group of much allied South American „small species". . . . . .138.

Glumes more unequal, the lower 14—16, not rarely up to 20 mm. long, the upper one 10—12 mm. long; awns of the lemmas 3½—4 cm. long or 6—7 cm. long, not rarely 8—9 cm.

Densely caespitose elegant erect perennial with intravaginal innovations, with the panicle 10—30 cm. high; culms simple, many in a tuft, terete, smooth, striate, 1—2-noded, the nodes congested at the base of the stems; sheaths up to 10 cm. long, striate, glabrous or scaberulous upwards, tight, or gaping above, ligule a short ciliolate rim, auricles pubescent or ciliolate, especially those of the innovations long-bearded, collar smooth; blades narrowly convolute or quite inrolled, setaceous, filiform, about as long as the culms, reaching the base of the panicle, ending in a fine point, soft, not rigid, erect or slightly curved, the uppermost blades shorter, about 5 cm. long, scarcely $^1/_3$ mm. wide, expanded nearly 1 mm. broad, glabrous and smooth beneath, scaberulous on the upper surface, few-nerved, the scaberulous margins not conspicuously thickened; panicle strictly erect, contracted, dense but not spiciform, slightly interrupted, 8—14 cm. long or sometimes only 6 cm., the axis striate and scaberulous, branches filiform or capillary, strictly erect, binate, bipartite from the base, few-flowered, the longer ones naked at the base, the shorter ones with very short peduncles, pedicels slighty thickened above; glumes papery, membranaceous, lanceolate-subulate, the lower one 1-nerved or sometimes with an additional side-nerve or sub-3-nerved, scabrous on the keel, about 14—20 mm. long, upper one 1-nerved, smooth on the keel, both distinctly awned; lemma glabrous, punctulate under a lens or smooth, margins inrolled, about 12 mm. long, slightly narrowed above and scaberulous below the awns, the latter erect or slightly divergent, very variable in length. South America: Uruguay and Argentina. (Pl. CXVIII.)
. . . . . **Aristida Spegazzinii Arechav.**

Culms not exserted, sheathed all along, panicles 12—14 cm. long, the branches 2—3-partite, the primary ones naked at the base for 2—3 cm., rather few-flowered; spikelets purplish, glume I. 15—16 mm., acute, mucronate, glume II. 11—12 mm. long, acuminate, mucronate, not bifid, lemma 12 mm. long, awns 6—7 cm. long. . . . . .
. . . . . **var. genuina Hack.**

Culms long-exserted, naked above without sheaths, panicles 10 cm. long, branches 2—3-partite, shorter, the primary ones naked at the base only for 1 cm., 2-flowered, the secondary ones very short, bearing but 1 flower; spikelets yellowish-green or tinged with brown, glume I. 14 mm. long, bidenticulate, or bifid at the apex, glume II. 11 mm.

long, bidenticulate, mucronate from the sinus; lemma 12 mm. long, awns $3^1/_2$—4 cm. long. . . . . **var. abbreviata Hack.**

Culms exserted or more or less sheathed all along, panicles 20 cm. long, branches binate, the primary ones long, branched, 5-6-flowered; spikelets pale or the awns purplish, glume I. 16—18 mm. long, sometimes up to 20 mm., acute, mucronate, glume II. 10—13 mm. long, bifid, mucronate from the sinus, lemma 9-10 mm. long, sometimes scaberulous, awns 8—9 cm. long. . . . . **var. pallescens Hack.**

138. Lemmas not beaked or only minutely so; both glumes acute not bifid or rarely in the same panicle spikelets with slightly bidentate or subbifid glumes. . . . . 139.
Lemmas narrowed into a short straight beak; both glumes bifid with more or less conspicuous lateral setulae. . . . . 140.

139. Blades linear, flat at the base, up to 30 cm. long or longer, as long as the culms, straight, not curved or flexuous.
Caespitose perennial, culms erect, elegant, about 40 cm. high or sometimes longer, terete, glabrous, simple, 2—3-noded, the uppermost node above the middle of the culm; sheaths tight or slipping from the stem upwards, longer than the internodes, terete, glabrous, ligule a short ciliolate rim, auricles pubescent, those of the innovations somewhat bearded; blades narrowly acuminate, those of the innovations narrower and convolute, up to 30 cm. long, those of the culms up to 10 cm. long, rather rigid, scarcely 1 mm. wide when inrolled, erect, smooth beneath, scaberulous on the upper surface, margins without a strong band of sclerenchyma, not conspicuously thickened; panicle linear-oblong, subcontracted, but not very dense, about 25 cm. long and 3 cm. wide, rhachis glabrous, branches binate or tripartite, capillary, erect or ascending, scabrous, the lower primary ones up to 5 cm. long, naked at the base for 1—$1^1/_2$ cm., the branchlets 1—2-flowered, congested and adpressed ad the ends of the branchlets, shortly peduncled; spikelets linear, brownish, glumes linear-lanceolate, subulate-acuminate, prominently awned, 1-nerved, glabrous, the lower one 10—13 mm. long, scabrous on the keel, the upper one 9--10 mm. long, smooth on the keel; lemma linear about 9—10 mm. long, punctulate under a lens or nearly smooth, the callus acute, bearded, about $^3/_4$ mm. long; awns erect or spreading, scabrous, capillary, scarcely

contorted at the base, the central about 30 mm. long, the lateral ones up to 25 mm. long. South America: Brazil, Rio Grande do Sul. (Pl. CXVIII.) . . . . . **Aristida acuminata Hack.**

Blades narrowly linear, not flat at the base, convolute throughout, strongly curved and flexuous.

Densely caespitose perennial, from an oblique rhizome, culms elegant, elongate, strictly erect, together with the panicles 60—75 cm. high, terete, substriate, smooth, few-noded, the slightly swollen nodes congested in the lower part of the culms; sheaths striate, smooth, lower ones shorter than the internodes, upper ones longer, ligule a ciliolate rim, auricles pubescent, those of the innovations more or less bearded; blades much shorter than the culms, very narrow, convolute and setaceous, spirally curved or flexuous, some of the lower older blades sometimes more or less flat, those of the innovations always convolute, filiform or setaceous, 20—30 cm. long, the culm-blades subjunciform, about 2 mm. broad when expanded and about 20 cm. long, the upper ones shorter but exceeding the base of the panicle, blades glabrous beneath, scaberulous on the upper surface, the margins conspicuously thickened with a band of sclerenchyma; panicle elegant, very lax and loose, often nodding at the summit, 15—20 cm. long, the axis thin and smooth below, angulous and scaberulous above, the branches capillary, scabrous, binate or tripartite, naked at the base, erectly ascending or somewhat spreading, the longer ones up to 7 cm. long, the shorter ones only 1 cm. long, few-flowered and shortly peduncled, pedicels scabrous, shorter than the glumes; spikelets purplish, becoming straw-coloured at maturity, imbricate but not very densely congested, glumes papery or membranaceous, linear-lanceolate, somewhat abruptly cuspidately awned, the awns 1 mm. long, 1-nerved, the lower 10 mm. long, scaberulous on the keel, the upper one 9 mm. long, smooth on the keel; lemma glabrous. punctulate under a lens, linear-lanceolate, scarcely narrowed above, 8—10 mm. long, the acute densely hairy callus about $^3/_4$ mm. long; awns scabrous, slightly flattened at the base and contorted or slightly curved in a very loose spiral, straight upwards, spreading, the central 30—35 mm. long, the lateral ones 20—30 mm. long. South America: Brazil, Paraguay, Northern Argentina and Bolivia. (Pl. CXX.) . . . . . **Aristida circinalis Lindm.**

140. Blades nearly convolute throughout, flat only at the very base, awns of the lemma $3^1/_2$—4 cm. long.

Caespitose erect perennial, culms erect, 50–80 cm. high, elegant,

terete, glabrous, about 3-noded, simple; sheaths tight, subterete, glabrous, longer than the internodes, ligules shortly ciliolate, auricles especially those of the innovations bearded; blades linear, gradually narrowed into a setaceous point. flat at the very base, convolute, about 30 cm. long, 2 mm. wide at the base, glabrous beneath, scaberulous on the upper surface, margins with a thick band of sclerenchyma, glaucous-green; panicle linear-oblong, erect, up to 25 cm. long and 4—5 cm. wide, contracted and somewhat dense but not spiciform, rhachis scaberulous, branches semiwhorled, suberect, capillary, scabrous, the longer ones naked in lower half part, many-flowered, the shorter ones few-flowered, spikelets bearing from the base, spikelets rather congested, rather shortly pedicelled, linear, green, tinged with purple, glumes acute, awned, the awns about $1^1/_2$ mm. long, lower one 10—11 mm. long, 1-nerved, not conspicuously keeled, the midnerve scabrous only above, upper one about 9 mm. long, smooth on the midnerve; lemma linear, glabrous and smooth, 11—12 mm. long, the shortly bearded, acute callus about 1 mm. long; awns scaberulous, thin, capillary, erect or divergent, straight, scarcely contorted or curved at the base, the central up to 4 cm. long, the lateral ones about 3,5 cm. long. South America: Paraguay and North Argentina. (Pl. CXIX.)
. . . . . **Aristida leptochaeta Hack.**

Blades flat below, convolute only upwards, awns of the lemma $2^1/_2$—3 cm. long.

Caespitose elegant perennial from an oblique rhizome, culms erect, simple, terete, smooth, few-noded, the uppermost internode long-exserted; sheaths longer than the internodes, terete, glabrous, ligule a short ciliate rim, auricles long-bearded, especially those of the innovations; blades light-green, flat, involute upwards, ending in a long setaceous point, up to 20 cm. long about $1^1/_2$ mm. wide, smooth beneath, scaberulous and hirtellous on the upper surface, the margins with a thick band of sclerenchyma, the innovations much shorter, setaceously convolute throughout; panicle narrow, contracted but not dense, somewhat loose, up to 20 cm. long, 1—2 cm. wide, interrupted at the base, axis thin, angulous and scaberulous, branches binate, the lower up to 6 cm. long, naked at the base, the shorter ones spikelets bearing from the base, branchlets erectly adpressed, scaberulous, the scabrous pedicels rather short, only 2 mm. long; spikelets congested along the branches, forming false spikes, yellowish, glumes 1-nerved, both very deeply bifid at the apex, manifestly awned from the sinus, lower glume slightly scaberulous on the keel, $10^1/_2$—11 mm. long, upper one smooth on the keel, 9—$9^1/_2$ mm. long; lemma smooth, punctulate under a lens, scabrous only below the awns, 10—13 mm.

long, tubulous, narrowed above but not beaked; awns scabrous, very thin, the central about 30 mm. long, the lateral ones up to 25 mm. long. South America: Eastern Peru. (Pl. CXIX.) . . . . . **Aristida tarapotana Mez**

141. (*131.*) Nodule at the summit of the lemma, just below the branching-point of the awns, present and very distinct. . . . . 142.
Nodule at the summit of the lemma wanting. . . . . 144.

142. Auricles of the sheaths bearded; lemmas scabrous only below the awns. 143.
Auricles of the sheaths not bearded; lemmas very scabrous from below the middle to the summit.
Densely caespitose perennial with intravaginal innovations, culms erect, simple or scantily branched, many-noded. the internodes very unequal, some of the nodes congested, up to 50 cm. high or sometimes longer, 1 mm. thick, subterete or slightly compressed, striate, minutely scaberulous; sheaths tight, or somewhat gaping at the summit, glabrous, shorter than the internodes, ligule a short ciliolate rim, auricles pubescent not bearded; blades narrow, convolute, sometimes here and there flat at the very base, glabrous and smooth beneath, scaberulous on the upper surface, 2 mm. wide when expanded, 8—10 cm. or more long, setaceously acuminate, those of the innovations narrower, complicate; panicle about 15 cm. long, somewhat contracted but lax, interrupted, axis angulous, scaberulous upwards, branches solitary or bipartite, unequal, the longer ones naked below, densely flowered upwards, erect or spreading, the shorter ones sessile and few-flowered; spikelets erect, yellowish-green or stramineous, the pedicels short and up to 5 mm. long, angulous, scaberulous and subclavate, glumes 1-nerved, the lower 7—9 mm. long, scabrous on the keel, the upper one 6—7 mm. long, smooth on the keel, both acute, scarcely awned; lemma about 6—8 mm. long, very scabrous on the keel and from below the middle to the summit, tubulous, not beaked, the acute, densely hairy callus $^1/_2$–$^3/_4$ mm. long; awns scabrous, erectly spreading, straight, the central up to 20 mm. long, the lateral ones op to 15 mm. long. South America: Venezuela and Columbia. (Pl. CXVIII.) . . . . . **Aristida venesuelae Henr.**

143. Culms much branched from nearly all the nodes; innovations few; lower glume 7—9 mm. long, upper one $5^1/_2$–$6^1/_2$ mm. long, lemma 5–6 mm. long; awns about 15 mm. long.
Densely caespitose perennial, culms erect, many-noded, terete, striate, smooth, together with the panicle 50 cm. or more high; sheaths

somewhat shorter than the internodes, the lower straw-coloured, slipping from the stems, the upper ones tight and longer than the internodes, compressed, striate, smooth, ligules short, ciliolate, auricles pubescent and long-bearded; blades narrow, convolute, setaceous, acuminate, pointed, scarcely 1 mm. wide when expanded, up to 15 cm. long, those of the innovations shorter, slightly scaberulous beneath, scaberulous on the upper surface, with scattered long white hairs especially near the base; panicle narrow but lax and interrupted, 20 cm. or more long, branches binate or subsolitary, erect or somewhat spreading, rather few-flowered, branchlets and short pedicels slightly scaberulous; spikelets yellowish-green or brownish, glumes acute but scarcely awned, the lower 1-nerved or sometimes with an additional side-nerve, scabrous on the keel, the upper one 1-nerved, smooth on the keel: lemma narrowly tubulous, slightly narrowed above, scabrous in upper part below the awns, callus densely bearded, subacute, $^1/_2$ mm. long; awns scabrous, erect or slightly divergent, straight. West Indian Islands: St. Eustatius, St. Croix, St. Thomas. (Pl. CXXI.) . . . . . **Aristida Suringari Henr.**

Culms simple or nearly so, sometimes sparingly branched at the base only; innovations numerous; lower glume 11—12 mm. long, upper one 8 mm. long, lemma $6^1/_2$—7 mm. long; awns unequal, the central one 20—25 mm. long, the lateral ones 17—20 mm. long.

Densely caespitose perennial with intravaginal innovations, culms strictly erect, striate, nearly smooth, 20- 30 cm. high, elegant; sheaths equally distributed along the culms, the lowermost slipping from the stems, the upper ones tight, shorter than the internodes or the uppermost one slightly longer, striate, nearly smooth; blades narrowly linear, 20 cm. long, glabrous beneath, scabrous on the upper surface, finely acuminate, convolute, somewhat curved, those of the innovations shorter, ligules short, truncate, ciliolate, auricles especially those of the basal leaves long-bearded; panicle strictly erect, contracted, rather dense, linear-lanceolate, up to 10 cm. long, scarcely 1 cm. broad, at first enclosed by the uppermost sheath, afterwards exserted, the axis subterete and nearly smooth, lower branches binate, upper ones subsolitary, filiform, strictly erect, few-flowered, the branches, branchlets and pedicels scaberulous; spikelets yellowish, shortly pedicelled, glumes 1-nerved, very acute, shortly awned, the lower scabrous on the keel, the upper one quite smooth; lemma smooth, scabrous only on the keel upwards and below the awns, tubulous, slightly narrowed but scarcely beaked, callus long-bearded, acute, about $^3/_4$ mm. long; awns

scabrous, erect or the central one slightly spreading, straight. West Indian Islands: Aruba and Curacao. (Pl. CXXI.) . . . . . **Aristida arubensis Henr.**

144. Glumes not very unequal, the upper always more than half as long as the lower one, mostly but 1—2 mm. shorter than the lower glume. . . 145.

Glumes very unequal, the upper only 6 mm. long, about half as long as the lower one.

Robust caespitose perennial, culms strictly erect, many-noded, branched from nearly al the nodes, nodes swollen and protruding, terete, glabrous, up to 1 meter or more high, 3 mm. wide, the lower internodes up to 20 cm. long; sheaths half as long as the internodes, glabrous, striate, smooth, subterete, lax, slipping from the stems, ligule a short, ciliolate rim, auricles densely ciliolate and bearded, collar not rarely minutely pubescent; blades about 40 cm. long, convolute or the lower flat at the base and 3 mm. wide, rather rigid, narrowly acuminate, many-nerved, glabrous beneath, scaberulous on the upper surface, margins scabrous not very conspicuously thickened; panicle strictly erect, narrow, contracted but not spiciform, interrupted at the base, 30—40 cm. long or the lateral panicles shorter, rhachis terete, smooth, branches binate, elongate, adpressed, thin and subflexuous, the axils minutely bearded, very unequal, the longer ones about 10 cm. long, naked in lower half part, branched above, the branchlets erect and few-flowered, the shorter ones spikelets bearing nearly from the base, pedicels scaberulous, subclavate, shorter than the glumes; spikelets linear-lanceolate, yellowish-green, glumes acuminate, shortly awned, 1-nerved, the lower one about 11 mm. long, scabrous on the keel, the upper one narrower, scarcely 6 mm. long, smooth on the keel; lemma glabrous, the keel scabrous, linear, tubulous, scarcely narrowed above, 7—8 mm. long, callus very acute, bearded, about 1 mm. long; awns scabrous, unequal, erect or slightly divergent, straight, the central one 22—23 mm. long, the lateral ones 17—18 mm. long. South America: Brazil, Minas. (Pl. CXXII.) . . . . . **Aristida Glaziovii Hack.**

145. Sheaths longer than the internodes, blades as much as 1 meter long; lower glume 3-nerved or one of the lateral nerves indistinct and the glume 2-nerved; lemma scabrous at the summit and not narrowed above. Robust perennial, culms erect, stout, glabrous, as much as $1^1/_2$ meter high; sheaths very long, terete, glabrous, striate; ligule a minutely ciliolate rim, auricles pubescent and distinctly bearded, the collar a minutely pubescent line; blades flat in lower part, becoming involute especially towards the much attenuate tips, as much as 1 meter long

and 3—5 mm. wide at the base, glabrous or scaberulous beneath and very antrorsely scabrid upwards, scabrous on the upper surface, margins scabrous, not conspicuously thickened; panicle narrow, contracted but not spike-like, as much as 50 cm. long, axis angulous and scabrous, the numerous, very scabrous, solitary or 2—3-partite branches ascending or adpressed, the lower ones 10—20 cm. long, all spikelets-bearing from the base, the spikelets more or less crowded with erect, rather short, very scabrous, 2—3 mm. long pedicels; spikelets greenish, tinged with brown or purple, glumes acuminate or awn-pointed, the lower scabrous on the keel and not rarely on the back, 12—15 mm. long, the upper one quite smooth, about 10—11 mm. long; lemmas tubulous, glabrous, punctulate, scabrous below the awns only, not beaked, 9—10 mm. long or slightly longer, callus shortly pilose, acute, about 1 mm long; awns scabrous, erect or divergent, sometimes more spreading but not curved or warped at the base, the central 25—30 mm. long, the lateral ones about 20 mm. long. West Indian Islands: Cuba. (Pl. CXXII.) . . . . . .
. . . . . **Aristida erecta Hitchc.**

Sheaths shorter than the internodes, blades only 20 cm. long or somewhat longer; lower glume 1-nerved; lemma glabrous throughout, distinctly narrowed above.

Tall perennial, culms rather robust, together with the panicle $1^1/_2$ meter or more high, 2—$2^1/_2$ mm. thick below, terete, smooth, slightly striate, few-noded, the internodes very long; sheaths long, tight, striate, glabrous below, scaberulous upwards, ligule a scarcely ciliolate rim, auricles glabrous or slightly pubescent; blades convolute or flat at the base, expanded 3 mm. wide, scaberulous or glabrous beneath, hirtellous on the upper surface, margins conspicuously thickened; panicle long, more than 20 cm., narrow but lax, interrupted, about 3 cm. wide, the axis visible, subterete, smooth, branches binate, strictly erect, very scabrous, naked at the base, the longer ones up to 10 cm., the shorter ones about 5 cm. long; spikelets erect, golden-yellow and shining, congested, pedicels very scabrous, shorter than the glumes, the latter smooth, 1-nerved, acute, shortly awned and sometimes minutely emarginate at the apex, lower one $11^1/_2$—12 mm. long, the awn scarcely 1 mm. long, smooth on the keel, the upper one 11 mm. long, quite smooth; lemma smooth, beaked but a true column not present, callus bearded, subacute, about 1 mm. long; awns scabrous, strictly erect, the central one about 25 mm. long, the lateral ones 18—20 mm. long. South Africa: Angola. (Pl. CXXII.) . . . . . .
. . . . . **Aristida chrysochlaena Henr.**

146. (*124.*) Panicles not forming very dense and compact ovoid or oblong heads nearly as long as broad. . . . . 147.

Panicles very dense, spiciform or elliptic, forming ovoid-oblong heads 2 cm. long and about as broad, sometimes up to 4 cm. long.

Caespitose perennial, culms erect or ascending, scabrous or slightly pubescent, 15—40 cm. long, elegant, somewhat rigid, subterete or compressed, striate, about 3-noded, branched from the lower nodes; sheaths shorter than the internodes, slipping from the stems, striate, compressed and somewhat keeled, scabrous, ligule a short ciliolate rim, auricles pubescent and bearded, collar glabrous; blades about 5—15 cm. long, flat at the base, 2—3 mm. wide, slightly curved, convolute upwards, striate, scaberulous beneath, hirtellous on the upper surface, with long hairs especially near the mouth; panicle long-exserted, $2^1/_2$—4 cm. long, dense, glomerate-spiciform, elliptic or ovoid, obtuse, rhachis angulous, branches very short, very scabrous, fascicled, bearing up to 15 spikelets; spikelets densely congested, subsessile, lanceolate, glumes 1-nerved, yellowish to purplish, lower one acute, rather abruptly awned, the keel and awn very scabrous, the back scaberulous, about 8—9 mm. long, upper one about as long as the lower or slightly longer, shortly awned, sometimes minutely emarginate below the awn, smooth on the keel; lemma 6 mm. long, lanceolate-oblong, 3-nerved, very scabrous especially on the keels, furrowed at the ventral side, callus very short, scarcely $^1/_2$ mm. long, the upper part of the callus densely long-bearded; awns scabrous, erect or slightly spreading about 15 mm. long, or the central one slightly longer. South America: Brazil. (Pl. CXXII.) . . . . . **Aristida elliptica Kunth**

147. Lower glume 1-nerved or sub-3—5-nerved, the lateral nerves sometimes indistinct or obsolete, if well-developed and distinct mostly much shorter than the midnerve, not arching and anastomosing. . . . . 148.

Lower glume 5-nerved, the marginal nerves about half as long as the midnerve, the interjacent nerves about $^1/_3$ as long, all the nerves arching and anastomosing with the midnerve.

Densely caespitose elegant perennial with intra- and extravaginal innovations, culms many in a tuft, simple, erect, very elegant, thin, terete, glabrous, slightly striate, 1—2-noded, the nodes almost at the base of the stems, 20—40 cm. long, inclusive of the panicle; sheaths short, terete, striate, tight, ligule a ciliolate rim, auricles densely bearded, collar smooth; blades nearly basal, very narrowly convolute, pointed, sometimes slightly curved, setaceous, up to 10 cm. long, scarcely 1 mm. wide when expanded, about as long as the culms,

mostly reaching the base of the inflorescence, sometimes flat at the very base, glabrous beneath, scaberulous on the upper surface, with some long hairs at the base near the mouth, margins rather conspicuously thickened, innovations numerous, setaceous; panicle long-exserted, narrow, erect but rather loose and interrupted, very elegant, up to 10 cm. long or sometimes longer, rhachis subterete, slightly striate, glabrous, the branches remote, binate, few-flowered, not rarely but 1-flowered, shortly peduncled with a basal branchlet or sessile spikelet, branches and short pedicels scaberulous; spikelets purple, narrowly lanceolate, glumes very acute, the lower 17—18 mm. long, glabrous, very scabrous on the midnerve, the lateral nerves very characteristic, awn about 3—4 mm. long, the upper glume much narrower, 1-nerved, acute, gradually narrowed, 30 mm. long, smooth on the keel; lemmas punctulate under a lens, 12—15 mm. long, tubulous or slightly compressed, the acute callus densely, but rather shortly bearded, about 1 mm. long; awns very thin, capillary, erect or slightly spreading, commonly purplish, the central one 80—90 mm. long, the lateral ones about 70 mm. long South America: Southern Bolivia, Paraguay, Uruguay and Southern Brazil. (CXXIII.) . . . . . **Aristida venustula Arechav.**

148. Perennial plants. . . . . 149.
Annual plants. . . . . 214.

149. Lemmas longer than the glumes. Australian species. . . . . 150.
Lemmas as long as or much shorter than the glumes, rarely exceeding 1 mm above the tips of the glumes. . . . . 153.

150. Panicle very narrow, contracted, dense or spike-like, the branchlets and spikelets strictly erect or adpressed, sometimes the panicle somewhat loose and interrupted, the branches ascending, but in that case the panicle is not shorter than 10 cm. . . . . 151.
Panicle broadly oblong-ovate in outline, not dense, 3—6 cm. long and $2^1/_2$—$3^1/_2$ cm. wide, the branches and branchlets short, divaricately spreading or ascending, spikelets bearing nearly from the base, the spikelets never congested, rather equally distributed over the panicle. Caespitose erect perennial with extravaginal innovations, culms numerous, branched from nearly all the nodes, the branches erect or ascending, glaucous, minutely striate, terete, scaberulous, rather rigid but elegant, nodes slightly swollen and protruding, together with the panicles up to 50 cm. high, the internodes long and naked; sheaths much shorter than the internodes, commonly only a few cm. long,

slipping from the stems or those of the branches tight, striate, glabrous, ligules and auricles shortly ciliate, collar smooth; blades narrowly linear, somewhat rigid, flat only at the very base, commonly only a few cm. long or sometimes the uppermost one up to 10 cm. long, erectly spreading, slightly scaberulous beneath, more or less hirtellous on the upper surface, the margins but slightly thickened; panicle long-exserted, axis subterete, or angulous above, scaberulous or hirtellous, branches solitary, not more than 2 cm. long (inclusive of the spikelets and the awns), divided from the base, 3—5-partite, the branchlets and pedicels very short, hirtellous, the spikelets often subsessile and more or less secund, at maturity perpendicular to the rhachis, purplish; glumes broadly ovate-lanceolate, acute, shortly awned from a subbifid apex, the lateral lobes more or less obtuse, 1-nerved, the keels scabrous, the backs more or less scaberulous or glabrous, the lower 3—4 mm. long, the upper one 5—6 mm. long or somewhat longer, rarely as long as the lemma, the latter tubulous, punctulate under a lens, scabrous or hirsute on the keel upwards, not or but slightly narrowed, 7,—8 mm. long or slightly longer, the densely hairy, subacute callus about $^3/_4$ mm. long; awns dark-coloured, scabrous, 9—12 mm. long, the lateral ones mostly slightly shorter than the central one. Australia: Queensland to New South Wales. (Pl. CXXIV.) . . . . . **Aristida caput-medusae Domin**

151. Lemma not or scarcely narrowed above, smooth, or sometimes scabrous below the awns, not beaked, panicles rigid not very delicate. . . . 152.

Lemma narrowed above, very scabrous from below the middle to the summit, manifestly beaked, panicle very narrow and delicate.

Caespitose perennial, innovations few or wanting, culms erect, 40—50 cm. or more high, rigid, terete, striate, scabrous, many-noded, branched from nearly all the nodes, the branches fascicled or binate, all elongate and panicles bearing; sheaths much shorter than the internodes, terete, substriate, tight or soon slipping from the stems, very retrorsely scabrous by minute hyaline small tubercles, ligules densely and very shortly ciliolate, auricles pubescent; blades rigid, flat only at the base, convolute above, narrowly linear, gradually acuminate, subpungent, 1 mm. or scarcely $1^1/_2$ mm. wide, the lower ones 10 cm. long, the upper ones up to 4 cm. long, scaberulous beneath, hirtellous or hirsute on the upper surface, strongly nerved, the margins slightly thickened; panicle linear, contracted, dense, spiciform up to 10 cm. long, those of the lateral branches much shorter and commonly only 5 cm. long and scarcely $^1/_2$ cm. wide, slightly interrupted only at the base, axis thin, scaberulous, the branches binate or more or less fascicled, very

short, suberect, the longer ones 3–5-flowered, somewhat naked at the base, the other ones 1—2-flowered, subsessile, pedicels shorter than the glumes; spikelets narrow, light-green tinged with purple, glumes 1-nerved, the lower rather broad, $4^1/_2$ mm. long, acuminate, bifid at the apex with an awn from the sinus, scabrous on the keel, the upper one bidentate, awned, about 7 mm. long, smooth on the keel; lemma narrowly linear, tubulous, exserted, smooth at the base only, very scabrous above, gradually passing into a very scabrous, about 2 mm. long, minutely twisted beak, up to 10 mm. long, callus acute, shortly bearded, $^1/_2$ mm. long; awns scabrous, thin, erect or slightly divergent, about equal, 15 mm. long. Australia: Queensland. (Pl. CXXIV.) . . . . . **Aristida longicollis Henr.**

152. Panicle narrow and somewhat contracted but not dense and spike-like, always more or less open and loose, the branches ascending or more or less spreading, never strictly erect and closely adpressed; glumes short, about 4—5 mm. long. . . . . See pag. 205. **Aristida vagans Cav.**

Panicle dense and spike-like, interrupted, sometimes only at the base, the branches always strictly erect, stiff and adpressed.

Densely caespitose perennial with extra- and intravaginal innovations, culms robust, with the panicle up to 80 cm. high, 3–5-noded, erectly branched from all the nodes, about $1^1/_2$ mm. thick, striate, slightly scaberulous or smooth, the culm-nodes slightly swollen and protruding above the dark-coloured, annular sheath-nodes; sheaths about half as long as the internodes or not rarely longer, striate, scaberulous or smooth, dark-brown or reddish, broad at the base, slipping from the stems, about 5–7 cm. long, ligule a shortly ciliolate rim, auricles ciliate or bearded, the hairs deciduous, those of the innovations more distinctly bearded; blades narrowly linear, flat only at the base, convolute upwards, up to 10 cm. long, those of the innovations much shorter and convolute throughout, smooth or scaberulous beneath, scabrous and hirtellous on the upper surface, the margins not conspicuously thickened; panicle very narrow, dense, exserted, long-peduncled, 10—20 cm. long, or those of the lateral branches shorter, axis terete, striate, smooth, angulous and scaberulous upwards, nearly totally visible, the binate strictly erect branches somewhat secund, naked at the base for scarcely 1 cm., the longer ones up to 5 cm. long, many-flowered, the shorter ones sessile, 2–3-flowered, branchlets and pedicels very scabrous; spikelets strictly erect, adpressed, dark-brown or dark-purple, glumes slightly unequal, 6—$7^1/_2$ mm. long, 1-nerved,

firm, the lower acute, scabrous on the keel, the upper abruptly narrowed and shortly awned, smooth on the keel; lemma 9 mm. long, mottled, tubulous, nearly smooth, scarcely narrowed above, the ventral side not furrowed or but slightly so, (in *A. calycina* deeply furrowed!), callus acute, densely long-hairy, up to 1 mm. long; awns very scabrous, stiff, slightly unequal, the central one 13–15 mm. long, the lateral ones 10–11 mm. long. Australia: Queensland and New South Wales. (Pl. CXXV.) . . . . . **Aristida ramosa R. Br.**

Glumes shorter than in typical *A. ramosa*, more unequal, 5 and 6 mm. long, commonly scaberulous nearly all over, lemmas sparingly setuliferous upwards, especially below the awns, the stiff hairs whitish, the background dark purple at maturity. New South Wales. . . . . **var. scaberula Henr.**

Glumes longer, the lower 7 mm., the upper one 9 mm. long; spikelets erect, long-pedicelled, the ultimate pedicels up to 15 mm. long, the lateral ones about 10 mm. long; awns about equal, about 15 mm. long. New South Wales. . . . . **var. speciosa Henr.**

153. Glumes very unequal, lower one about half as long as the upper one, or if more than half as long as the upper, the upper one always longer than 2 cm. . . . . 154.

Glumes equal or unequal, the lower one more than $^2/_3$ as long as the upper one. . . . . 170.

154 Spikelets not very small, the glumes, at least the upper one, up to 10 mm. long or but slightly shorter; awns always more than 10 mm. long, mostly much longer or very long. . . . . 155.

Spikelets small, the lower glume 3—4 mm. long, the upper one 5—7 mm. long; awns short, about 7 mm. long or slightly longer; panicles small and lax.

Densely caespitose low perennial with intravaginal innovations, culms exserted, erect, very elegant, about 10—20 cm. high, subcompressed, glabrous, simple, 1-noded, the node almost basal or the internode about 5 cm. long; sheaths subterete, glabrous, striate, the outer ones lax, gaping, the inner ones tight, about half as long as the culms, ligule a shortly ciliolate rim, auricles bearded, the collar smooth; blades almost basal, setaceously involute, about $^1/_2$ mm. wide, narrowed upwards, obtuse or pointed, the lower ones 9—10 cm. long, the uppermost one much shorter and often only 2 cm. long, striate, smooth beneath, scaberulous above, with long hairs at the base or near the mouth; panicle ovate-lanceolate, 5—7 cm. long, and up to 3 cm. wide,

very lax but not very diffuse, axis filiform, smooth, scaberulous upwards, branches capillary, scaberulous, flexuous, ascending, binate or 3—5-partite, naked in lower $^1/_3-^1/_2$ part, the lower ones about 3 cm. long, with shorter, few-flowered branchlets at the base, the spikelets somewhat congested, the pedicels as long as the glumes or some of them very short or subsessile; spikelets lanceolate-linear, dark-purple, lower glume 3-keeled but 1-nerved, the keel scabrous, shortly awned, ovate-lanceolate, the upper one 1-nerved, quite smooth, linear-lanceolate, mucronate only; lemma tubulous, narrowed upwards, smooth, slightly scaberulous only below the awns, about 4-5 mm. long, the very obtuse callus with a few hairs only; awns scabrous, about equal or the lateral ones slightly shorter. West and South Africa: Guinea and Angola to Natal. (Pl. CXXV.) . . . . . **Aristida recta Franch.**

155. Internodes of the culm smooth or slightly scaberulous only. . . . . 156.

Internodes with an adpressed very characteristic pubescence.

Laxly caespitose perennial with thick rhizomes, culms erect, with the panicle about 25 cm. high, many-noded, branched from all the nodes, the branches solitary and short, terete, internodes with adpressed hairs which are placed rather regularly in lines; sheaths subterete, striate, slipping from the stems, longer or shorter than the internodes, scaberulous or slightly pubescent with hyaline margins, ligules shortly ciliolate, auricles distinctly bearded, with a more or less distinct villous line across the collar, blades narrowly linear, gradually setaceously acuminate, flat at the base and 2 mm. wide, convolute upwards, up to 10 cm. long, erect, many-nerved, smooth or puberulous beneath, scaberulous or hirtellous on te upper surface, the scaberulous margins not conspicuously thickened; panicle rather small, erect, 7—8 cm. long, shortly exserted, contracted but not dense, rhachis compressed, angulous, scabrous or hirtellous, the branches solitary or subbinate, shortly bearded at the axils, at first erect, afterwards spreading or divergent, very short, 2—3-flowered or the basal branches but 1-flowered, pedicels very short, pubescent; spikelets erectly spreading or divergent, purplish-green, glumes glabrous, 1-nerved, acute but not or scarcely awned, the lower 6—8 mm. long, scabrous on the keel, the upper 13—14 mm. long, smooth on the keel; lemma 12 mm. long, slightly narrowed upwards, punctulate, the callus subobtuse, bearded and about 1 mm. long; awns scabrous, erect or slightly spreading, about equal, 25—30 mm. long. Australia: New South Wales. (Pl. CXXVI.) . . . . . **Aristida obscura Henr.**

Panicle longer, inclusive of the awns up to 15 cm. long and 8—9 cm. broad, looser and more effuse, the branches longer

than in the type; spikelets longer, lower glume 15 mm., upper one about 20 mm. long, both distinctly awned, the awns not rarely 2–3 mm. long, lemma as in the type, but somewhat more scabrous upwards, the awns equal and about 4 cm. long. New South Wales. . . . . **var. luxurians Henr.**

156. Panicle without the awns short, rather dense or subspiciform, ovoid or V-shaped in outline. . . . . 157.
Panicle long and lax, if in some cases short, than always very lax with flexuous branches and nodding spikelets. . . . . 158.

157. Panicle oblong or oviform in outline, the spikelets not adpressed or congested but somewhat spreading; sheaths with bearded auricles and a villous line across the collar.
Caespitose erect or ascending perennial with a thick rootstock, innovations extra- and intravaginal, culms simple, 20—30 cm. long, inclusive of the panicles, about 3-noded, sheathed all along, terete, slightly striate, glabrous; sheaths longer than the internodes, subcompressed, striate, smooth, tight or somewhat gaping at the summit, rather broad, with broad hyaline margins, ligule a ciliolate rim, auricles long-bearded, the hairs spreading or reflexed, a long-bearded line of erect hairs across the collar; blades flat at the base, convolute upwards, ending in a fine point, up to 10 cm. long or rarely longer, 2 mm. wide at the base, striate, many-nerved, smooth beneath, slightly scaberulous or hirtellous on the upper surface, the margins not conspicuously thickened, sometimes with a few long hairs near the base; panicles shortly exserted, at first enclosed by the uppermost sheath, 5 - 8 cm. long and nearly as broad, axis terete, smooth, branches binate or tripartite from the base, slightly bearded at the axils, the branches shortly peduncled, scaberulous, bearing 6 - 10 spikelets, pedicels subclavate at the tips, scabrous, much shorter than the glumes, almost sessile, erect, afterwards divergent, straw-coloured, tinged with purple, glumes 1-nerved, the lower with a 1 mm. long awn, scabrous on the keel, lanceolate, about 10 mm. long, the upper one narrower, with a very scabrous up to 3 mm long awn, the keel smooth below, 17—20 mm. long; lemma smooth, 12—13 mm. long, tubulous, not narrowed, callus acute, densely hairy, about 1 mm. long; awns thin, scabrous, purplish in upper part, erect or divergent afterwards, slightly unequal, the central 35—40 mm. long, the lateral ones up to 30 mm. long or slightly longer. Australia: New South Wales to Victoria. (Pl. CXXVI.) . . . . . **Aristida Behriana F. v. M.**

Panicle V-shaped in outline, the spikelets erect and adpressed, densely congested, never spreading; sheaths with bearded auricles but without a villous line across the collar, the collar smooth.
Densely caespitose erect perennial, with a short, creeping, thick rhizome, innovations extravaginal, with scales at the base, culms 20—40 cm. long, rarely longer, erect or ascending, 1-noded, the node nearly basal, terete, slightly striate, glabrous and smooth, long-exserted; sheaths tight or somewhat slipping at the summit, the uppermost about half as long as the culm, terete or subcompressed, striate, smooth or slightly scaberulous between the nerves, the basal sheaths not flabellate-compressed, the margins not overlapping, ligule a ciliolate rim, auricles pubescent or slightly hairy, those of the innovations conspicuously bearded; blades about half as long as the culms, rarely reaching the base of the panicle, flat at the very base and about 1—2½ mm. wide, convolute upwards, those of the innovations convolute throughout, many-nerved, the nerves and scaberulous margins not conspicuously thickened, glabrous beneath, hirtellous on the upper surface, ending in a long setaceous point; panicle very narrow at the base, together with the awns up to 10 cm. long, flabellately spreading at the summit, axis angulous, scaberulous, strictly erect, branches binate or bipartite from the base, strictly erect, the longer ones naked below for 1 cm., 5-flowered, the shorter ones shortly peduncled or subsessile, 3-flowered or sometimes bearing but 1 spikelet, pedicels scaberulous, short or nearly sessile, sometimes there is a more or less, up to 2 cm. long-peduncled simple branch at some distance below the panicle; spikelets erect, pale, tinged with purple or purplish throughout, glumes acute, awned, 1-nerved, the lower sometimes with additional side-nerves and sub-3-nerved, scabrous on the keel, 12—14 mm. long, the upper one quite smooth, about 22—24 mm. long or slightly longer; lemma smooth or punctulate under a lens, the keel minutely scabrous above, 15—16 mm. long or slightly longer, the about 1 mm. long callus acute and densely hairy; awns erect or spreading and divergent at maturity, straight, scabrous, purplish upwards, the central one up to 7 cm. long, the lateral ones 6 cm. long or somewhat longer. South America: Brazil to Uruguay and Argentina. (Pl. CXXIX.) . . **Aristida murina Cav.**

158. Upper glume very long, 3—5 cm., rarely slightly shorter than 3 cm., never less than 2½ cm. long. . . . . 159.
Upper glume not so very long, mostly shorter than 2 cm., rarely slightly longer, but never up to 2½ cm. long. . . . . 160.

159. Lower sheaths tight, terete, not or indistinctly distichous or flabellate, the margins not overlapping; innovations intra- and extravaginal.
Caespitose, perennial, culms strictly erect, with the panicle 50 cm. or more high, subrobust, 2 mm. thick, terete, glabrous, 1—2-noded, nodes congested in lower part of the culm; sheaths subterete, tight, longer than the internodes, glabrous, striate-sulcate, ligule a short ciliate rim, auricles pubescent, those of the innovations bearded; blades rigid, glaucous-green, flat at the base, complicate upwards, 2—3 mm. wide, up to 30 cm. or more long, gradually long-acuminate, scabrous or hirtellous, glabrous beneath, the scabrous margins not conspicuously thickened; panicle lax, 15 cm long, diffuse, sometimes nodding at the top, the axis terete and smooth below, angulous and scabrous above, branches binate, scabrous, about equal, filiform, erectly spreading, more or less flexuous and nodding, naked in the lower half part, 8—10-flowered or the shorter ones 4—5-flowered, the spikelets shortly pedicelled and more or less congested, glumes linear-lanceolate, acuminate, awned, lower 13—14 mm., 1-nerved, the base sometimes 3-nerved, scabrous on the keel, upper one 27—28 mm. long, 1-nerved, keel smooth; lemma 15—17 mm. long, smooth, scaberulous on the keel, the callus densely bearded, about 1 mm. long; awns scabrous, spreading, up to 10 cm. long. Hybrid between *Aristida murina* Cav. and *Aristida pallens* Cav. *var. Tragopogon* Tr. & Rupr. South America: Uruguay and Argentina, probably also in Brazil. . . . . **Aristida uruguayensis Henr.**

Lower sheaths compressed laterally, gaping, distichous and more or less flabellate, the margins overlapping at the base; intravaginal innovations few, extravaginal ones wanting.
Caespitose erect perennial, culms simple, many in a tuft, erect, elegant or more or less rigid, sometimes robust, without the panicle 10—15 cm., or sometimes up to 30 cm. long, the exserted uppermost internode 15—20 cm. long, terete, striate, smooth, 2-noded, one node nearly basal, the other a few cm. from the base; sheaths striate, smooth, mostly basal, the uppermost half as long as the culm and tight, ligule a short ciliolate rim, auricles pubescent or in some varieties bearded, collar smooth, auricles of the innovations always bearded; blades rather thin or somewhat rigid, setaceously convolute, filiform, glaucous, 10—20 cm. long or longer, about as long as the culms, or much shorter, somewhat pungent, striate, glabrous beneath, scaberulous on the upper surface, sometimes the blades exceeding above the base of the panicle in some varieties; panicles erect, contracted but loose and open, without the awns up to 10 cm. long, often rather few-flowered

and bearing only 7—12 spikelets, in some varieties more effuse and spreading, axis angulous, striate, glabrous below, scabrous in upper part, sometimes 25—35 cm. long and pendulous, the branches erect, capillary, solitary and 1—2-flowered, or binate, the longer ones with 5—6 flowers, sometimes the lower branches very long, ascending or spreading or drooping, branchlets and pedicels scabrous, the latter not rarely as long as or longer than the glumes; spikelets pale-coloured or reddish-purple, glumes acuminate, manifestly awned, the lower very variable in length, 15—20 mm. or sometimes up to 30 mm. long, 3-nerved, the lateral nerves shorter and about half as long or shorter, than the midnerve, upper glume 30—50 mm. long, 1-nerved, smooth on the keel or not rarely scaberulous; lemmas smooth, slightly punctulate, 10—20 mm. long, or in some varieties very scabrous on the upper part or below the awns, with or without membranaceous prolongations at the margins below the awns, the latter very variable in length, 8—20 cm. long, about equal, scabrous, erect or sometimes divaricately spreading. South America: Chili, Argentina, Brazil, Uruguay and Paraguay. (Pl. CXXVII.) . . . . . **Aristida pallens Cav.**

Margins of the lemmas hyaline, with 2 erect membranaceous prolongations just below the awns, the appendages mostly adpressed to the base of the lateral awns; panicles drooping, awns very long.

Lemmas quite smooth, about 10 mm. long, auricles of the culm-blades distinctly bearded, spikelets long-pedicelled, drooping, awns 15—16 cm. long, lower glume about 30 mm., upper one 50 mm. long, not rarely with distinct lateral setulae. Brazil and Paraguay, probably also in Argentina. (Pl. CXXVIII.). . . . . **var. Tragopogon Trin. et Rupr.**

Lemmas distinctly scabrous in upper half and on the keel, about 12—17 mm. long, auricles bearded, spikelets long-pedicelled, drooping, awns 15—20 cm. long, lower glume 25—35 mm., upper one 40—50 mm. long, lateral setulae sometimes distinct. Southern Brazil, Uruguay, Paraguay and Argentina. (Pl. CXXVIII.) . . . . . **var. jubata Arechav.**

Margins of the lemmas less hyaline, without membranaceous appendages or these are scarcely indicated; panicles erect, the branches only somewhat spreading, awns much shorter.

Lower branches long, ascending or somewhat spreading,

panicles rather loose and open, auricles of the culm-blades not bearded, those of the innovations bearded, lemmas smooth, awns spreading, about 10 cm. long. Brazil. . . . . **var. patula Trin. et Rupr.**

Lower and upper branches strictly erect, not spreading, or but slightly so, panicles rather narrow.

Auricles of the culm-blades conspicuously bearded, lemmas slightly but distinctly scaberulous above, lower glume 16—20 mm., upper one 30—35 mm. long, lemmas about 20 mm. long, awns 10—15 cm. long. Uruguay. . . . . **var. filifolia Arechav.**

Auricles of the culm-blades pubescent only, not bearded, lemmas quite smooth.

Awns 7—8 cm. long, glumes 15—20 and 30—35 mm. long, lemmas 10—12 mm. long, panicles few-flowered, plants rather low and small. Chili to Argentina. . . **var. genuina Trin. et Rupr.**

Awns 8—10 cm. long, glumes 25 and 35 mm. long, lemmas 18—20 mm. long, plants very tall, panicles few-flowered bearing about 3—8 dark-coloured, purplish spikelets, blades very narrowly filiform. Uruguay. . . . . **var. rubelliana Arechav.**

Awns 12 cm. long, culms 12—15 cm. long, glumes and lemmas as in the var. genuina, but the awns erect and coloured in upper half. Together with the var. *genuina* and connected by intermediate forms. Commonly robuster than var. *genuina*. Argentina. . . . . **var. intermedia Trin. et Rupr.**

Awns up to 14 cm. long, lemmas 15 mm. long, glumes and lemmas as in var. *intermedia*, but the awns more spreading. Argentina. . . . . **var. macrochaeta Hack.**

160. Panicles rather loose, sometimes somewhat nodding at the top, with slender and flexuous branches. . . . . 161.

Panicles erect, somewhat loose or contracted, the branches not flexuous, strictly erect or somewhat spreading, or sometimes the lowermost somewhat flexuous. . . . . 163.

161. Body of the lemma glabrous and smooth throughout or sometimes slightly scaberulous only just below the awns, but never tuberculate-scabrous in lines. . . . . 162.

Body of the lemma tuberculate-scabrous in lines from below the middle to the summit, at maturity the raised parts whitish, the background dark, usually purplish.

Densely caespitose erect perennial in large tufts with numerous intravaginal innovations, forming a basal cushion, culms erect or somewhat ascending, especially in the outer part of the tuft, glabrous, striate, smooth, about 30—50 cm. high, the uppermost internode long-exserted, rather few-noded; sheaths striate, glabrous or puberulous, the lower ones longer than the internodes, some of the upper ones shorter, ligule a ciliolate rim, auricles densely bearded, the collar smooth; blades usually involute throughout, rarely some of the culm-blades flat at the base, scabrous on the upper surface, the margins scabrous, not conspicuously thickened, glabrous or scaberulous beneath, often curved or flexuous, about 10 cm. long or less, gradually narrowed into a setaceous point, about 1—1½ mm. wide, those of the innovations sometimes up to 20 cm. long, involute with densely bearded auricles; panicles nodding at the top, narrow, rather lax and open, commonly 10—20 cm. long or longer, sometimes rather short, axis striate, glabrous and smooth below, scaberulous upwards, branches capillary, scaberulous, binate or tripartite from the base, more or less curved or flexuous or not rarely erect or ascending, as much as 5 cm. long, some of them naked at the base for 1—2 cm., the pedicels capillary and scabrous, the spikelets remote or in forms with erect branches and denser panicles, the spikelets are more congested and imbricate, forming sometimes false spikes, axils not bearded; spikelets commonly purplish, not rarely pale, glumes 1-nerved, acuminate, awned, the awns 1—2 mm. long, both glumes distinctly bifid at the apex, the awns from the sinus, the lateral setulae slender and thin, lower glume 6—8 mm. long, scabrous on the keel, upper one about twice as long, commonly 12—13 mm. long, smooth on the keel; lemma very characteristic, about 10 mm. long, the bearded callus about ½ mm. long, gradually narrowed, slightly beaked, smooth at the base, scabrous in lines upwards; awns about equal, scaberulous, very slender, scarcely

contorted at the base, erect or finally widely spreading, mostly 3—5 cm. long. North America: From Kansas and Texas to southern California and northern Mexico. (Pl. CXXIX.) . . . . . **Aristida purpurea Nutt.**

Glaucous-green, about 40 cm. high plant, with numerous, very long, involute, as much as 30 cm. long blades. Texas. . . . . **var. capillarifolia Scribn. et Merr.**

Panicle very short, open, few-flowered, branches mostly solitary, 1—3-flowered, capillary, very flexuous, vegetative parts and spikelet-characters as in the species. Texas, New Mexico and Arizona. . . . . **var. laxiflora Scribn. et Merr.**

Panicle narrower, the branches more or less contracted, sometimes nearly sessile and erect, spikelets commonly somewhat shorter and narrower, glumes shortly awned, the lower 6—7 mm., the upper one $12^1/_2$—14 mm. long, lemmas 9—10 mm. long, scabrous in lines only on the upper half, beak 1 mm., awns about 35 mm. long, slightly flattened and contorted at the base. Texas. . . . . **var. Berlandieri Trin. et Rupr.**

Between *A. purpurea* and *A. Wrightii* there occur hybrids, these are to recognize from *A. purpurea* by the narrower, more strictly erect panicles, the branches not very curved or flexuous but rather stiff and more or less adpressed. In the panicle-characters they agree more with *A. Wrightii*, the blades and sheaths are often more scabrous and the villous line across the collar is partly indicated in the hybrid. See afterwards under *A. Wrightii* on p. 273.

162. Spikelets rather large, lower glume 8—10 mm., upper one 16—20 mm. long, body of lemma perfectly smooth and shining, not beaked.
Densely caespitose erect or somewhat ascending perennial, branched from some of the lower nodes or simple, 20—40 cm. high, culms few-noded, elegant, terete, striate, scaberulous or smooth; sheaths shorter than the internodes, tight, terete or subcompressed, striate, glabrous or scaberulous with broad hyaline margins, ligule a short ciliolate rim, auricles of the culm-blades pubescent only, the collars smooth, auricles of the innovations densely bearded, the collars more

or less pubescent; blades rather short, up to 10 cm. long, mostly shorter, those of the culms sometimes flat at the base, mostly convolute throughout or complicate, curved, glabrous and smooth beneath, scaberulous on the upper surface, margins not conspicuously thickened, ending in a setaceous point; panicle erect, few-flowered, well-developed but rather depauperate, delicate, up to 15 cm. long, the axis thin, angulous and scaberulous, branches distant, strict or curved and flexuous, binate, often each branch bearing but one pedicelled or sessile spikelet, the longer branches bearing 2—3 flowers, pedicels thickened above, scaberulous; spikelets purplish, erect or not rarely nodding, glumes lanceolate, rather abruptly mucronate only, 1-nerved, about 10 and 20 mm. long, the keel of the lower one very prominent and scabrous; lemmas equally broad, the summit minutely constricted below the awns, 12 mm. long inclusive of the 1 mm. long, acute, densely hairy callus; awns rather firm, thick and flat at the base and slightly curved there, spreading, up to 7 cm. long. Texas. (Pl. CXXX.). . . . . .
. . . . . **Aristida rariflora Henr.**

Spikelets smaller, lower glume 4—5 mm. long, upper one 8—10 mm. long, body of lemma punctulate under a lens, glabrous or slightly scabrous upwards, not rarely distinctly beaked.

Densely caespitose, erect, glaucous-green perennial, branched from some of the lower nodes; culms slender, erect, 3—4-noded, terete, striate, puberulous, 30—50 cm. high; sheaths shorter than the internodes, tight, striate, subterete, scaberulous, especially upwards, ligule a minute ciliolate rim, auricles and collar pubescent, auricles of the innovations densely bearded; blades narrow, linear, flat at the very base only, involute nearly throughout, scabrous on the upper surface, glabrous or more or less scabrous beneath, mostly less than 10 cm. long, rarely up to 20 cm. long, ending in a setaceous point, the margins not thickened, about 1 mm. wide when expanded; panicle very elegant, narrow, lax, usually pale or greenish, 10—20 cm. long, axis subterete or compressed, smooth below, scaberulous upwards, capillary, branches very thin, capillary, suberect or curved and flexuous, binate or tripartite from the base, naked below, intermixed with shorter ones, several-flowered, branchlets and short pedicels minutely scaberulous only or smooth; spikelets linear, erect or sometimes nodding, acuminate, 1-nerved, lower glume $4^1/_2$—$6^1/_2$ mm., not rarely $7^1/_2$—8 mm. long, or sometimes 9—10 mm. long, scabrous on the keel and sometimes slightly so on the back, the upper one smooth on the keel, about twice as long, $8^1/_2$—12 mm., or sometimes 13—14 mm. long, both slightly bifid at the summit with a mucro from the sinus; lemma

7—8 mm. long, the densely hairy, obtuse callus about $^1/_2$—$^3/_4$ mm. long, sometimes up to 1 mm. long, the body glabrous, or scabrous on the keel, also below the awns and on the beak, the latter $^1/_2$ to 2 mm. or sometimes up to 3 mm. long; awns scabrous, slender, spreading or somewhat divergent, slightly contorted at the base, about 2—$2^1/_2$ cm. or not rarely 3—4 cm. long. North America: Texas and New Mexico to San Luis Potosi in Mexico. (Pl. CXXXI.) . . . . . **Aristida Roemeriana Scheele**

163. Plants not very robust, mostly much shorter than 40 cm., or rarely up to 60 cm. high, inclusive of the panicle; blades 10—20 cm. long; panicles not over 20 cm. long, upper glume shorter than 20 mm. . . 164.

Plants robust, inclusive of the panicles 70—80 cm. high; blades 30 cm. long or longer; panicles up to 30 cm. long, upper glume more than 20 mm. long.

Densely caespitose tall perennial with intravaginal innovations, culms erect, about $1^1/_2$ mm. thick, 1-noded, the node nearly basal, terete or subcompressed, glabrous, slightly striate; sheaths about 20 cm. long, striate, subterete, gaping and complicate above, scaberulous or glabrescent, ligule a short ciliolate rim, auricles pubescent and with scattered long hairs; blades narrowly involute or complicate, expanded scarcely $^3/_4$ mm. wide, elongate, scabrous on both surfaces, long-acuminate, setaceously pointed and subpungent, those of the innovations convolute, setaceous, as long as or longer than the culms; panicles narrow, contracted but loose, very interrupted, the axis quite visible, terete, smooth, scaberulous above, branches binate, divided from the base or tripartite, naked below, erect or ascending, the longer ones without the awns up to 8 cm. long, few-flowered; spikelets erect, the subclavate pedicels about 5 mm. long or the lateral ones shorter pedicelled, yellowish-green, glumes narrow, the lower $12^1/_2$—$15^1/_2$ mm., commonly 13—14 mm. long, very acute, shortly awned, 1-nerved, scabrous on the keel, the upper one 20—25 mm., commonly 23—24 mm. long, smooth on the keel, gradually narrowed, awned; lemma 11—13 mm. long, tubulous, quite smooth, gradually narrowed into a very distinct smooth beak, purplish, the densely hairy, obtuse callus about $^1/_2$ mm. long; awns coloured, thin, scaberulous, slightly flat at the very base and subcontorted, about equal, up to 7 cm. long. South America: Argentina, Misiones. (Pl. CXXXI.) . . . . . **Aristida valida Henr.**

164. Sheaths with a villous or hispidulous line across the collar. . . . . 165.

Sheaths without a villous line across the back at the collar, the latter quite smooth. . . . . 167.

165. Panicles not very interrupted, rather dense, mostly more than 15 cm. long, the branches not distant, many-flowered; plants more or less robust. . . . . .166.

Panicles much interrupted, 3—10 cm. long, with very distant, 2—4-flowered or not rarely 1-flowered very short branches; plant elegant with thin culms.

Caespitose slender perennial, culms erect or decumbent at base, simple or sparingly branched, few-noded, the nodes placed in the lower part of the culms, terete, somewhat striate and slightly scaberulous or glabrous, 20 - 40 cm. high, inclusive of the panicle; sheaths glabrous or scaberulous, especially above, longer than the internodes, terete, striate, tight or the lower ones slipping from the stems, ligule a ciliolate rim, auricles densely pubescent and more or less bearded, especially those of the sterile culms, a prominent, shortly hairy or villous line across the collar; blades involute, glabrous beneath, scaberulous or birtellous on the upper surface, falcate or flexuous, mostly less than 10 cm. long or much shorter, scarcely 1 mm. wide when expanded; panicle narrow, axis terete or somewhat angulous, scaberulous upwards, branches thin, slightly scabrous, binate, strictly erect and adpressed or ascending, one shortly peduncled, the other nearly sessile, not rarely the branches with but one spikelet at the base, pedicels scaberulous, those of the lateral spikelets very short, the other spikelets longer pedicelled, the pedicel sometimes about half as long as the glumes; spikelets pale-coloured or yellowish-green, erect and adpressed, more or less congested, glumes glabrous, 1-nerved, the lower one $5-6^1/_2$ mm. long, rather obtuse and slightly bifid at the apex with a mucro from the sinus, scabrous on the keel, the upper one 10—11 mm. long, glabrous on the keel, obtuse, subbifid and mucronate; lemma $8^1/_2-10$ mm. long, gradually narrowed but not beaked, smooth below, distinctly scabrous on upper half, especially on the keel, the densely bearded, subacute callus about 1 mm. long; awns scabrous, about equal, 20—25 mm. long, erect or spreading or sometimes horizontal at maturity, somewhat flat at the base, scarcely contorted. West Indian Islands: Cuba. (Pl. CXXXII.) . . . . . **Aristida Eggersii Hitchc.**

166. Lower glume as much as $^2/_3$ as long as the upper one or nearly so; blades rather short, up to 7 cm. long or not over 10 cm. long; awns of the lemma up to 5 cm. long.

Densely caespitose erect perennial with intravaginal innovations; culms about 1-noded or sometimes 2-noded, the upper node placed at $^1/_3-^1/_5$ of the culm below, terete, simple, naked upwards, strictly

erect, slightly striate, glabrous or minutely scaberulous, without the panicles about 20 cm. long, scarcely 1 mm. thick; sheaths shorter than the internodes, the lower ones stramineous, short, rather lax, slightly keeled and striate with broad margins, the upper ones tight, ligule minute, densely and shortly ciliolate, auricles densely bearded with a prominent ciliolate or villous line across the collar; blades glaucous, strictly erect or slightly curved, rather firm, convolute, almost cylindrical, scarcely $^1/_2$ mm. in diam., subpungent, expanded about 1 mm. broad, scaberulous or nearly glabrous beneath, slightly shortly hirtellous on the upper surface, 4—5 cm. long or those of the innovations up to 7 cm. long; panicle long-exserted, 15 cm. long or longer, strictly erect, narrow and contracted but not spiciform, interrupted below, somewhat lax, axis subterete, slightly scaberulous, branches strictly erect, binate or subsolitary upwards, few-flowered, the pedicels subclavate at the tip and very scabrous; spikelets grayish-purple or yellowish afterwards, erect, glumes 1-nerved, linear-lanceolate, the lower one acute and shortly mucronate, scabrous on the keel, 8—$9^1/_2$ mm. long, the upper smooth on the keel, 14—$15^1/_2$ mm. long, distinctly bifid at the apex and shortly awned, lemma linear-tubulous, scarcely narrowed above, not beaked, 10 mm. long inclusive of the acute, densely bearded about 1 mm. long callus, glabrous and smooth in lower half part, tuberculate-scaberulous in lines to the summit; awns flattened at the base and slightly contorted there, scabrous, subequal, 4—5 cm. long, the lateral ones sometimes slightly shorter than the central one. South America: Argentina. (Pl. CXXXII.) . . . . . **Aristida trachyantha Henr.**

Lower glume only half as long as the upper one or nearly so; blades longer, up to 20 cm. long; awns of the lemmas commonly 2 cm. long or sometimes longer and up to 5 cm. long.

Glaucous, densely caespitose, rather robust perennial with a thick rootstock, culms erect, simple or branched at the base and the lower nodes, 30—60 cm. high or sometimes longer, terete, striate, scaberulous or not rarely puberulous, 2—3-noded or sometimes but 1-noded in small specimens; sheaths terete or slightly compressed and keeled, mostly longer than the internodes, ligule a short ciliolate rim, auricles pubescent and bearded or villous, with a very prominent densely villous or hispid line across the collar; blades convolute, curved and flexuous or more or less straight, scabrous or pubescent on both surfaces, sometimes glabrous beneath, 10—20 cm. long or in small specimens much shorter, those of the innovations commonly shorter, about 1 mm. wide when expanded, sometimes flat at the very base

only, margins scabrous, not conspicuously thickened, ending in a fine setaceous somewhat pungent tip; panicles more or less exserted, erect, narrow, rather dense or somewhat interrupted, especially in depauperate panicles, 15–20 cm. long, the axis angulous or subterete, scaberulous, or smooth below, the branches binate, somewhat distant, erect or adpressed or ascending, as much as 6 cm. long in very robust specimens, many-flowered or in depauperate panicles much shorter and rather few-flowered, the branches and pedicels scaberulous, the axils not rarely slightly pubescent, the longer branches shortly peduncled with a basal subsessile branchlet, sometimes in very depauperate panicles all the branches reduced and bearing but one flower, the lower branches not rarely somewhat flexuous; spikelets erect, subcongested, greenish or straw-coloured, more or less tinged with purple, glumes 1-nerved, acuminate and mucronate but scarcely awned, the lower 6—7 mm. long, scabrous on the keel, rather abruptly narrowed into the very short awn, the upper one smooth on the keel, narrower, subobtuse or subbifid with a mucro; lemma narrowly linear, tubulous, the densely hairy callus about 1 mm. long, the body glabrous and punctulate below, mottled, very scabrous on the upper half, gradually narrowed but not or scarcely beaked; awns nearly equal, very scabrous, commonly about 2 cm. long, not rarely 3—5 cm. long, erect or divergent, sometimes much spreading, slightly contorted at the very base. North America: Texas to Mexico. (Pl. CXXXIII.) . . . . . **Aristida Wrightii Nash.**

[Observation: There occur hybrids between *A. Wrightii* and *A. purpurea*, they agree in habit commonly with the former, but the villous line across the collar is not very prominent and consists only of a more or less developed lateral tuft of hairs, the branches are more spreading and flexuous and the awns commonly much longer, in these characters they agree more with *A. purpurea*. See the observation under *A. purpurea* on p. 268.]

167. Body of the lemma quite smooth or scaberulous only upwards and below the awns, never tuberculate-scabrous in lines from below the middle. North American species. . . . . .168.

Body of the lemma very rough, denticulate-scabrous in lines from below the middle to the summit.

Caespitose perennial, culms erect, inclusive of the panicle up to 30 cm. high, few-noded, about $^1/_2$ mm. thick, terete or subcompressed, slightly striate; sheaths tight, subcompressed, striate, glabrous, ligules shortly

ciliolate, auricles pubescent more or less long-bearded; blades narrow, complicate, glaucous, those of the culms rather short, about 5 cm. long, scarcely 1 mm. wide when expanded, scaberulous on both surfaces or becoming glabrous beneath, gradually long-acuminate, those of the innovations much longer and more or less flexuous, margins not thickened; panicle narrow, rather loose, subinterrupted, erect, about 15 cm. long, axis angulous, smooth or scaberulous, branches strictly erect, binate, the longer ones without the awns 3—4 cm. long, naked below, few-flowered, shorter ones sessile, spikelet-bearing from the base, only 2—3 cm. long, 1—2-flowered, pedicels angulous and scaberulous: spikelets straw-coloured or brownish, erect, glumes narrow, sub-3-nerved or 1-nerved, the lateral nerves indistinct or wanting, the lower glume 9—10 mm. long, awned, scabrous on the keel, upper one 19—20 mm. long, acuminate-awned, smooth on the keel; lemma tubulous, 8—11 mm. long, smooth or punctulate below, very scabrous upwards, gradually narrowed but not beaked, the awns subequal about 70 mm. long, very scabrous, erect or somewhat spreading, not contorted at the base, quite straight. South America: Argentina, Santa Fé. (Pl. CXXXIII.) . . . **Aristida vexativa Henr.**

168. Lemmas gradually narrowed above, sometimes more or less beaked, scaberulous on the upper half or at least in upper $^1/_3$ part; axis of the panicle elongate. . . . . 169.

Lemmas not or scarcely narrowed above, equally broad, smooth or minutely scaberulous only at the summit; axis of the panicle short, only a few cm. long or sometimes up to 10 cm. long.

Densely caespitose, glaucous-green perennial, often forming large bunches with numerous intravaginal innovations, culms simple, strictly erect, glabrous, terete, smooth, 20—30 cm. high, sometimes only 10 cm. long or less, few-noded, the nodes nearly basal, sometimes but 1-noded; sheaths much longer than the internodes, glabrous or puberulous, terete or subcompressed, tight, ligule a densely ciliolate rim, auricles bearded with long white hairs, collar smooth; blades involute or sometimes flat at the very base, strictly erect or curved and flexuous, usually 10—15 cm. long or not rarely the lower ones only 5 cm. long, narrowed into a setaceous point, glabrous or scaberulous beneath, scabrous or hirtellous on the upper surface, scarcely 1 mm. wide when expanded; panicle erect, narrow but loose, not stiff, few-flowered, the axis subterete, angulous and scaberulous above, only a few cm. long or rarely up to 10 cm. long, branches ascending or adpressed, sometimes the lower ones more or less curved and flexuous, scaberulous, compressed, binate, naked at the base, bearing but 1—3 spikelets on

long, scaberulous pedicels; glumes pale, more or less tinged with purple, 1-nerved, distinctly but shortly awned, lower one 10—12 mm. long, gradually narrowed and awned, scabrous on the keel, upper one 20—22 mm. long, smooth on the keel, minutely but distinctly bifid at the apex with a short awn from the sinus; lemma terete, tubulous, about as long as the lower glume or not rarely up to 15 mm. long, the acute callus densely and shortly hairy, about $1^1/_2$ mm. long, the body of the lemma only slightly narrowed above, glabrous and smooth below, the summit scaberulous but not tuberculate-scabrous in lines as in *A. purpurea;* awns about equal, erect, spreading or somewhat divergent, 6—8 cm. long, very scabrous, purplish, somewhat flat at the very base and not rarely a little contorted. North America: North Dakota to northern Mexico and westward to Montana and Arizona (Pl. CXXXIV.) . . . . . **Aristida longiseta Steudel**

Taller and more robust, 30—50 cm. high; panicles longer and stiffer, the branches stiffly ascending, not curved and flexuous, spikelets larger, the lower glume not rarely up to 15 mm. long, the upper one up to 25 mm. long, lemma up to 18 mm. long, the awns commonly shorter and only 4—5 cm. long. North America: Same range as the species but extending more westward to Idaho, Oregon, Washington and British Columbia. . . . . **var. robusta Scribn. et Merr.**

169. Leaves mostly in a short cluster at the base of the plant; panicles erect and narrow, few-flowered, nearly simple, the pedicels adpressed, single or the lower pedicels in pairs.

Densely caespitose perennial, forming short, 7—8 cm. high cushions in large bunches, with numerous, short, curved leaves and long-exserted panicles, sometimes with more or less sheathed longer peduncles and the basal tufts much longer; culms 10-30 cm. long, erect, striate, terete, glabrous, naked above, sheathed mostly at the base only, few-noded or but 1-noded, sometimes the uppermost node at about half the length of the culm but mostly placed nearly basal; sheaths glabrous, slightly striate, tight, longer than the internodes, ligule a short ciliolate rim, auricles long-bearded, collar glabrous; blades involute, curved or flexuous, less than 10 cm. long, commonly only 5 cm. long, rarely in very robust specimens some of the upper blades up to 20 cm. long, scarcely 1 mm. wide when expanded, glaucous-green, glabrous or slightly scabrous beneath, scabrous or hirtellous on the upper surface, narrowed into a somewhat pungent rather stiff tip;

panicle erect, narrow, rather stiff, nearly simple, 2—6 cm. long without the awns, the axis terete below, angulous and scaberulous above, branchlets and pedicels scaberulous, the branches binate, sessile or naked at the base over a short distance, the longer ones several-flowered with a short, 1-flowered branchlet at the base, commonly all the branches consisting of but one pedicelled erect adpressed spikelet, the uppermost branches simple and 1-flowered; spikelets yellowish, tinged with purple, glumes 1-nerved, acute, shortly awned, the lower 6—7 mm. long, slightly scaberulous on the keel, rather abruptly narrowed into the short awn, the upper one smooth on the keel, 10—12 mm. long, slightly bifid at the apex with a short awn from the sinus; lemma 8—12 mm. long, inclusive of the acute, densely bearded, about $1^1/_2$ mm. long callus, the body glabrous below, gradually narrowed to the summit, more or less scabrous on the upper half; aws scabrous, about equal, erect or somewhat spreading, 2—5 cm. long. North America: From Kansas and Nebraska to Wyoming, extending south to Texas, New Mexico, Arizona and California. (Pl. CXXXIV.) . . . . . **Aristida Fendleriana Steudel**

Leaves not clustered at the base of the plants, culms sheathed; panicles lax and loose, the branches and pedicels curved or more or less flexuous, many-flowered. . . . . See p. 270. **Aristida Roemeriana Scheele**

170 (*153*). Branches of panicle pilose at the axils with white hairs; panicles always contracted and densely spike-like, interrupted at the base only. 171.
Branches of panicle with smooth or minutely pubescent axils; panicles contracted, mostly rather loose or not so very dense. . . . . 172.

171. Glumes somewat unequal, very shortly awned, not much longer than the lemmas, the latter shorter or scarcely as long as the upper glume which is distinctly bifid with a short awn from the sinus.
Caespitose perennial with intravaginal innovations, culms erect, elegant, about 35 cm. high, simple, glabrous or slightly scaberulous, terete or subcompressed, 1-noded, naked above, the node placed about 5 cm. above the base of the culm; sheaths striate, subcompressed, scaberulous, longer than the internode, ligules short, truncate, ciliolate, auricles pubescent, those of the innovations bearded; blades narrowly linear, convolute, glaucous-green, 7—14 cm. long, scarcely 1 mm. wide when inrolled, rather rigid, obtuse, more or less curved, glabrous beneath,

scaberulous on the upper surface, the margins not or scarcely thickened; panicle narrow, contracted, subinterrupted, about 12 cm. long, 1 cm. wide, axis and branches scaberulous, more or less striate, branches short, solitary, erect and subadpressed, 3 - 4-flowered, the axils with long weak hairs, branchlets fascicled, the spikelets very shortly pedicelled, congested, linear-lanceolate, rufous or pale yellowish-brown, tinged with purple, glumes 1-nerved, glabrous, the lower about $8^1/_2$ mm. long, acute, scabrous on the keel, the upper one about 10 mm. long, smooth on the keel, bifid with a short awn; lemma about 8 mm. long, punctulate, scabrous above, not beaked, callus densely hairy, obtuse, scarcely $^1/_2$ mm. long; awns about equal, very scabrous, suberect, or slightly spreading, the central one about 20 mm. long, the lateral ones up to 17 mm. long. British East Africa: Mount Kenia. (Pl. CXXXV.)
. . . . . **Aristida furfurosa Henr.**

Glumes equal, both long-awned, without lateral setulae or bifid summit, always distinctly longer than the lemma.

Caespitose rather robust perennial, inclusive of the panicle 25—60 cm. high or sometimes up to 80 cm. long, culms erect, 1—2-noded, nodes placed in the lower part of the culms, the uppermost internode very long and exserted, glabrous, slightly striate, terete; sheaths tight, terete or subcompressed, striate, or more or less furrowed, glabrous or somewhat scaberulous at the summit, shorter than the internodes, nodes but slightly swollen, ligule a ciliate rim, auricles strongly developed, pubescent and densely bearded, especially those of the innovations, those of the culm-blades with deciduous hairs, collar glabrous; blades erect, straight, narrow, involute or scarcely flat at the base, up to 20 or 25 cm. long, scarcely 1 mm. wide when inrolled, expanded about 2 mm. wide, glabrous beneath, scabrous or hirtellous on the upper surface, ending in a setaceous point, the scabrous margins not thickened, blades of the innovations much shorter, scarcely 10 cm. long, or even much shorter, curved and flexuous; panicles narrow and spike-like, interrupted below, 10 cm. long or sometimes up to 20 cm. long, without the awns about 1 cm. wide, axis terete and glabrous below, scaberulous and angulous upwards, branches short, erect, fascicled, solitary, divided or bipartite nearly from the base, shortly peduncled, pedicels very short, the spikelets densely congested, branchlets and pedicels scaberulous; spikelets yellowish-brown tinged with purple, strictly erect and adpressed, glumes 1-nerved, acute, both scaberulous on the keel above, gradually long-awned with scabrous awns, inclusive of the 2 mm. long awns, 12—14 mm. long; lemma 9 mm. long, tubulous, slightly narrowed above but not beaked, glabrous or

punctulate below, scabrous especially on the keel above, callus densely bearded, subacute, $^1/_2$—$^3/_4$ mm. long; awns strictly erect, very antrorsely scabrous, flat or triquetrous at the base with winged hyaline margins; slightly unequal, the central one about 25 mm. long, the lateral ones about 20 mm. long. Africa: Abyssinia and Eritrea to British East Africa. (Pl. CXXXV.) . . . . . **Aristida adoensis Hochst.**

172. Lateral awns half as long as or but slightly longer. than the central one. 173.
Lateral awns as long as the central one or somewhat shorter, never nearly about half as long. . . . . 174.

173. Glumes longer than the about 5 mm. long lemma, the lower 6—7 mm., the upper one up to 8 mm. long; panicle not dense, rather loose and interrupted.
Laxly caespitose perennial with extravaginal innovations, culms erect, with the panicles 50 cm. or more high, terete, slightly striate, elegant, thin, scarcely $^1/_2$ mm. thick, simple or sparingly branched, about 8—10-noded, the nodes equally distributed: sheaths shorter than the internodes, only about 3 cm. long, tight, slightly striate, glabrous or scaberulous, not rarely with some spreading hairs, ligule a short ciliolate rim, auricles pubescent and with some long white hairs, collar glabrous; blades 3—7 cm. long, contracted at the base, convolute, sometimes flat at the very base, scaberulous on both surfaces with thickened margins, the upper surface with long white hairs especially near the base, the blades scarcely $^1/_2$ mm. thick when inrolled, expanded scarcely 1 mm. wide; panicle long-exserted, the peduncle very long and scaberulous above, subspiciform, narrow, subinterrupted, 10—15 cm. long or longer, axis more or less angulous and very scabrous, branches binate or subsolitary, unequal, scaberulous, filiform, the longer one naked in lower half, 1—2 cm. long, few-flowered, the shorter one sessile, 1-2-flowered; spikelets congested, erect, grayish-green or pale-purple with scabrous pedicels, glumes narrow, 1-nerved, the lower acute, pubescent or scaberulous on the back, very scabrous on the keel, the upper one acuminate, glabrous, smooth on the keel; lemma smooth, scabrous only on the keel above, not beaked, with a subacute, bearded, $^1/_2$ mm. long callus; awns scabrous, unequal, the central one erect or but slightly curved, not contorted, about 15 mm. or up to 20 mm. long, the lateral ones erect up to 10 mm. long. West Indian Islands: Cuba. (Pl. CXXXV.). . . . . **Aristida vilfifolia Henr.**

Glumes as long as or scarcely longer than the about $4^1/_2$ mm. long lemma; panicle contracted, not or scarcely interrupted, somewhat dense but not quite spike-like.

Imperfectly known species, the basal parts unknown but probably a perennial, culms glabrous slightly compressed and striate, inclusive of the panicle more than 40 cm. long, certainly much longer, sheathed nearly all over, the uppermost internode exserted; sheaths tight, glabrous and smooth, striate, compressed, up to 4 cm. long, approximate, longer than the internodes, ligules very minute, scarcely ciliolate, auricles pubescent, scarcely developed, collar smooth; blades strictly erect, adpressed to the culm, rigid, up to 10 cm. long, gradually narrowed into a fine pungent tip, glabrous and smooth beneath, keeled, subulate-canaliculate or complicate, involute upwards, scarcely 1 mm. wide or 2 mm. when flattened, scabrous or hirtellous on the upper surface, many-nerved, the margins not thickened, peduncle of the inflorescence slightly scaberulous, distinctly compressed; panicle contracted, about 15 cm. long, scarcely or slightly interrupted below, strictly erect, rather dense, about 1 cm. wide, axis subterete and scaberulous below, angulous and scabrous above, straight, branches alternate, solitary, divided or multipartite nearly from the base, the branchlets fascicled, inclusive of the awns 3—4 cm. long, gradually becoming shorter, the axils puberulous, branchlets naked at the base for 3—5 mm., strictly erect and adpressed, many-flowered, scaberulous, pedicels short, scabrous; spikelets erect, fasciculate, congested, yellowish-brown, tinged with purple, glumes about equal, both awn-pointed, 1-nerved, about 5 mm. long, the lower scaberulous on the back and scabrous on the keel, the upper one quite smooth; lemma tubulous, glabrous, slightly scaberulous on the keel, not narrowed above, the callus rather obtuse, short; awns erect, scabrous, the central one about $2^1/_2$ cm. long, the lateral ones about 1 cm. long. Probably South American species allied to *Aristida tincta* and *A. torta*. (Pl. CXXXVI.)

. . . . . **Aristida rigida Cav.**

174. All the awns at maturity distinctly spirally and equally contorted at base, the base of the awns finally forming a loose spiral. South eastern North American and West Indian species. . . . . .175.

All the awns perfectly straight at maturity or sometimes minutely twisted or contorted only at the very base. . . . . .180.

175. Blades flat, inrolled only in upper half part or the summit involute only. 176.

Blades convolute or inrolled throughout. . . . . .177.

176. Panicles slender, very narrow and elongate, with short, rather distant, few-flowered branches.

Caespitose perennial, more or less branched from the lower nodes, culms strictly erect or slightly ascending, slender, terete, glabrous, somewhat striate, 5—6-noded, nodes slightly swollen, inclusive of the panicle 60 cm. to more than 1 meter high; sheaths longer than the internodes, glabrous, compressed-keeled above, rounded on the back below, striate, more or less slipping from the stems or the upper ones tight, ligule a short ciliolate rim, auricles shortly pubescent, not bearded, collar smooth; blades flat, 10—20 cm. long, narrowed into an involute point, 1—2 mm. wide, glabrous and smooth beneath, scabrous on the upper surface and bearing some scattered long hairs, many-nerved, the margins thickened with a band of sclerenchyma; panicle exserted, long-peduncled, very narrow, sometimes reaching about half the length of the culm or mostly shorter, axis striate, glabrous and smooth below, somewhat angulous and scaberulous upwards, straight, branches distant, strictly erect and adpressed, the panicle much interrupted, especially at the base, binate, one about 3—4-flowered, shortly pedicelled, the other sessile and bearing but one spikelet, pedicels scabrous, very short or nearly sessile, the uppermost spikelet of each branch sometimes with a pedicel half as long as the glumes; spikelets yellowish-green or pale-brownish, glumes slightly unequal, acute, the lower 1-nerved with a lateral nerve on one side, scabrous on the keel and scaberulous on the back between the nerves, about 8 mm. long, with a short scaberulous awn, the upper one 1-nerved, glabrous on the keel, about 9 mm. long, slightly bifid at the apex with a short awn from the sinus; lemma punctulate, glabrous, dark-coloured, bluish or mottled, inclusive of the acute, bearded, nearly 1 mm. long callus, about 6—7 mm. long, tubulous, scarcely beaked; awns about equal, 12—15 mm. long, scaberulous, spreading or somewhat reflexed, distinctly spirally contorted at the base. North America: Florida. (Pl. CXXXVI.) . . . . . **Aristida tenuispica Hitchc.**

Panicles stout, not very narrow, with rather densely many-flowered up to 10 cm. long branches.

Caespitose, erect, rather robust, leafy perennial, up to 1 meter high or sometimes taller, culms erect, stout, simple, terete, smooth, rather few-noded; sheaths overlapping, longer than the internodes, 1—1,5 dm. long, the lower purple, striate, smooth, the lower ones sparingly adpressed-villous, ligule a ciliolate rim, auricles pubescent, collar smooth; blades rigid, linear, flat, soon becoming involute towards the summit, ending in a long subulate point, as much as 30 cm. long,

2—3 mm. wide, glabrous beneath, scabrous on the upper surface, many-nerved, rough on the margins with a band of sclerenchyma; panicle large, contracted but not spike-like, as much as 30 cm. long or longer, strictly erect or somewhat flexuous, axis terete, scaberulous, branches long, erect or ascending, densely flowered, straight or flexuous, scabrous, solitary or binate, one short and few-flowered, the lower ones longer, 5—10 cm. long, naked at the base for $^1/_4$ their length, branchlets and pedicels erect, scaberulous; spikelets shortly pedicelled, or the uppermost one of each branchlet with a pedicel half as long as the glumes, the lateral spikelets commonly almost sessile, glumes light greenish-brown, equal, 1-nerved, 8-9 mm. long, the lower scabrous on the keel, distinctly bifid at the apex, with a scabrous, sometimes up to 2 mm. long awn from the sinus, the lateral setulae acute, the upper one with a smooth keel, slightly bifid at the apex with a mucro or very short awn; lemma tubulous, 6—8 mm. long, the very acute, densely bearded callus over 1 mm. long, the body of the lemma glabrous, mottled, slightly narrowed above into a very short, scaberulous beak; awns about equal, scabrous, divergent or horizontally spreading at maturity, the base more or less contorted, finally forming a loose spiral, the central one about 15 mm. long, the lateral ones 10—13 mm. long. North America: Georgia and Alabama to Florida. (Pl. CXXXVI.)
. . . . . **Aristida condensata Chapm.**

Sheaths quite glabrous, without adpressed-villous hairs. Florida. .
. . . . . **var. Combsii Henr.**

177. Callus of the lemma not very slender, $^1/_2$—1 mm. long. . . . . 178.
Callus of the lemma very slender and $1^1/_2$ mm. long.

Caespitose, erect, elegant, slender perennial, culms very thin, filiform, inclusive of the panicle 40—70 cm. high, mostly shorter, 1—2-noded, the uppermost internode long-exserted, strictly erect, terete, striate, glabrous or minutely scaberulous, purple; sheaths narrow, terete, tight, striate, glabrous, much shorter than the internodes, 2—3 cm. long, ligule a short, ciliolate rim, auricles pubescent, collar glabrous; blades very narrow, involute, filiform, setaceous, striate, 10—15 cm. or the uppermost one only 5 cm. long, scarcely $^1/_2$ mm. wide, glabrous beneath, scabrous or hirtellous on the upper surface, ending in a setaceous fine point, often with scattered long hairs, especially towards the base; panicle very slender, erect, few-flowered, rather lax, much interrupted, nearly simple, purple, 15 cm. long or sometimes up to 30 cm. long, axis striate, subterete, slightly scaberulous, branches distant, adpressed

not overlapping, binate or solitary, bearing few, adpressed, strictly erect spikelets, sometimes the more developed branches bearing up to 5 or 6 flowers, not rarely all the branches with but one flower, the lower branch with a scabrous pedicel about as long as the glumes, the basal branch with a nearly sessile spikelet, glumes purple, very unequal, the lower 1-nerved, not rarely with an additional faint nerve on one side, 7—8 mm. long, scaberulous on the keel, rather abruptly awned, truncate or notched at the apex, the upper one smooth on the keel, gradually acuminate, awned, 10—11 mm. long; lemma terete, smooth, mottled. the very long, acute, densely but shortly hairy callus $1^1/_2$ mm. long, lemma with the callus and the very short scaberulous or glabrous beak, about 6 mm. long, the beak scarcely $^1/_2$ mm. long, at maturity lighter coloured than the body; awns about equal, divergent, 10—15 mm. long, all scabrous. about equally contorted at base in a loose spiral. North America: Georgia to Florida. (Pl. CXXXVII.) . . . . . **Aristida gyrans Chapman**

178. Awns of the lemmas only about 1 cm. long. . . . . 179.
Awns of the lemmas up to 2 cm. long, not shorter than $1^1/_2$ cm.
Plants perennial, culms rather stout, erect, glabrous, about 60 cm. high; sheaths glabrous, ligule a ciliate membrane, about $^1/_2$ mm. long; blades firm, involute, glabrous beneath, scabrous on the upper surface, stiffly erect, the basal ones as much as 20 cm. long and 0,8 mm. in diameter when inrolled; panicle narrow, interrupted, 30 cm. long, the branches adpressed, the lower as much as 5 cm. long; glumes unequal, both acuminate, the lower one 7—10 mm. long, distinctly awned, linear-lanceolate, scabrous on the back, very scabrous on the keel, the upper one 10—12 mm. long, narrower, linear, quite smooth, gradually narrowed, acute, not awned, both 1-nerved; lemma about 7 mm. long, the body glabrous, punctulate, terete, scarcely narrowed into the glabrous or slightly scabrous beak, the latter scarcely 1 mm. long, callus very acute and sharp, about 1 mm. long, densely but shortly bearded; awns scabrous, nearly equal, 15—20 mm. long, all contorted in a loose spiral at base, the upper parts straight and nearly parallel. West Indian Islands: Cuba. (Pl. CXXXVII.) . . . . . **Aristida Brittonorum Hitchc.**

179. Lower glume glabrous and smooth throughout, even the keel scarcely scaberulous; upper glume acute only, not bifid; lemma smooth and glabrous throughout, callus with short hairs, rather obtuse.
Plants perennial, culms caespitose, slender, wiry, glabrous, erect or somewhat spreading at base, 30—50 cm. high; sheaths glabrous much

shorter than the internodes, villous at the throat, the auricles bearded, ligule a very short ciliate membrane, less than $^1/_2$ mm. long; blades involute, ascending or spreading, scabrous on the upper surface, glabrous beneath, mostly less than 5 cm. long, sometimes as much as 10 cm. long; panicle narrow, rather lax, 5—15 cm. long, the branches and pedicels delicate, somewhat lax or flexuous, ascending or adpressed, few-flowered, the lower distant; glumes distinctly unequal, 1-nerved, perfectly glabrous and smooth throughout or the lower minutely scaberulous at the summit of the keel only, the first glume about 5 mm. long, linear-lanceolate, acuminate, slightly awned, the second glume about 7 mm. long, narrower, linear, acuminate, more or less mucronate; lemma 5—6 mm. long, terete, glabrous and smooth, slightly narrowed above into a scarcely $^1/_2$ mm. long, perfectly smooth beak, the callus very obtuse, about $^1/_2$ mm. long, rather sparingly shortly hairy, the hairs not surpassing the true base of the lemma; awns scabrous or somewhat rough only, about equal, divergent, about 1 cm. long, the base of each contorted in a loose spiral. West Indian Islands: Haiti and San Domingo. (Pl. CXXXVIII.) . . . . . .
. . . . . **Aristida Rosei Hitchc.**

Lower glume manifestly scabrous on the keel; upper glume bifid with an awn from the sinus; lemma scabrous on the keel, callus with long hairs.

Densely caespitose, elegant, erect perennial, with numerous intravaginal innovations, culms erect, very slender, glabrous or minutely scaberulous, terete, slightly striate, 2—3-noded or but 1-noded in small specimens, the nodes placed in lower part of the culms or sometimes nearly basal, 20—60 cm. high or only 10 cm. high in depauperate plants, nodes slightly swollen; sheaths terete or somewhat compressed, glabrous, striate, slightly shorter or somewhat longer than the internodes, ligule a ciliolate rim, auricles bearded, collar glabrous; leaves usually in a conspicuous basal tuft, blades very narrow, filiform-involute, glabrous beneath, scaberulous on the upper surface and on the margins, narrowed into a setaceous point, mostly less than 10 cm. long, the basal tufts 5—15 cm. long; panicle narrow, rather lax and more or less open and loose, interrupted, 5—15 cm. long, exserted, axis striate, glabrous below, angulous and scaberulous upwards, filiform, erect or slightly flexuous, branches slightly scaberulous, ascending or stiffly erect, binate, naked at the base, few-flowered or not rarely each branch bearing but one spikelet, or sometimes in robust panicles the longer basal branches many-flowered and up to 5 cm. long, the pedicels half as long as the glumes or equalling them or those of the uppermost flowers

of each branch sometimes much longer; spikelets yellowish green, tinged with purple, glumes slightly unequal, or about equal, 1-nerved, the lower scabrous on the keel, 4—5 mm. long, linear-lanceolate, narrowed into a very short scabrous awn, the upper one smooth on the keel, about 6 mm. long, linear, bifid or notched at the apex with a short awn from the sinus; lemma with the callus about $4^1/_2$ mm. long, the body punctulate, scarcely narrowed above into a minute scaberulous beak, the callus about $^1/_2$ mm. long, subacute, densely and long-bearded, the hairs much surpassing the true base of the lemma; awns scabrous, about equal, straight when young, about 12—15 mm. long, at maturity the base of each more or less contorted in a loose spiral. West Indian Islands: Cuba, Jamaica and Porto Rico. (Pl. CXXXIX.) . . . . . **Aristida refracta Griseb.**

180. (*174.*) Lemmas tuberculate mostly from below the middle to the summit, with antrorse more or less curved spiny hyaline hairs. . . . . 181.
Lemmas glabrous or more or less scabrous, sometimes slightly hairy or adpressedly strigose upwards but not tuberculate by spiny hyaline hairs. 182.

181. Panicle narrow, contracted, very dense, branches and branchlets strictly erect and adpressed, stiff, the pedicels of the spikelets very short.
Caespitose perennial with few innovations; culms erect, naked at the base, branched upwards, inclusive of the panicle up to 80 cm. high, terete, glabrous, slightly striate, few-noded, the lowermost internode about 15 cm. long, the uppermost one more than 25 cm. long, culm-nodes tumid, protruding above the annular constricted sheath-nodes; sheaths slipping from the stems, glabrous or scaberulous and striate upwards, 5–6 cm. long, ligule a short ciliolate rim, auricles and collar pubescent; blades 7–10 cm. long, flat only at the very base, convolute upwards, setaceously acuminate, scaberulous beneath, puberulous or hirtellous on the upper surface; panicle exserted, 10—15 cm. long, about 1 cm. broad, slightly interrupted at the base and the axis visible there, the latter terete, glabrous or subangulous and scaberulous upwards, branches solitary, divided nearly from the base, many-flowered, up to 5 cm. long, gradually becoming shorter upwards, scaberulous or pubescent; spikelets erect, yellowish-green or slightly coloured, glumes 1-nerved, scaberulous, the lower 7–9 mm. long, linear-lanceolate, very scabrous on the keel, subabruptly acuminate and shortly awned, the upper glume narrower, 8–10 mm. long, scabrous on the keel, distinctly bifid at the apex with subobtuse, subcrenulate, lateral lobes, awned from the sinus, the awn scabrous and scarcely 1 mm. long; lemma tubulous, with the subacute, densely hairy, scarcely 1 mm. long

callus, about 8 · 9 mm. long, subcompressed, glabrous and smooth below, aculeolate upwards, not beaked, awns flat at the base, very scabrous, erect or somewhat spreading, about equal, 20 mm. long. Australia: Queensland to New South Wales. (Pl. CXXXIX.) . . . . . **Aristida echinata Henr.**

Glumes not scabrous as in the type, nearly glabrous and smooth. . . . . **var. nitidula Henr.**

Panicle broader, not dense, rather loose, especially below, branches erectly spreading, capillary, with curved or flexuous branchlets and filiform pedicels.

Caespitose perennial with intravaginal innovations; culms erect, simple or branched only from the lower node, together with the panicle about 50 cm. high, terete, slightly scaberulous and striate, 2-noded, the lowermost internode about 6 cm. long, the uppermost one (peduncle) 12—15 cm. long, culm-nodes tumid, protruding; sheaths tight or some at the branches slipping from the main-stem, terete or keeled at the base, glabrous or minutely scaberulous, distinctly striate, about as long as the internodes or somewhat shorter, ligule shortly ciliate, auricles pubescent or mixed with a few long hairs, collar smooth; blades flat, 1 mm. broad at least in lower half part, inrolled upwards, ending in a long setaceous point, up to 20 cm. long or the lower ones commonly much shorter, scaberulous beneath, hirtellous on the upper surface; panicle about half the length of the whole plant, shortly exserted, very loose below, denser upwards, much interrupted, the axis nearly visible over its whole length, axis terete, striate and scaberulous, branches binate or tripartite from the base, the lower very distant, one naked at the base for 1—2 cm., up to 10 cm. long, the other nearly sessile and much shorter, both thin and capillary, more or less curved or flexuous but not spreading, more or less erect, loosely flowered, the spikelets not densely congested, the branches and branchlets subtriquetrous and scabrous, the uppermost branches not divided, gradually becoming shorter, nearly sessile, erect and more or less adpressed; spikelets erect, the pedicels filiform but rather short, the ultimate ones with a pedicel shorter than the glumes, the lateral ones shortly pedicelled, flowers brownish-purple, darker at the base, glumes 1-nerved, slightly unequal, the lower remotely scabrous on the keel, shortly awned, 10—11 mm. long, the upper one smooth on the keel, 11—12 mm. long, abruptly and obtusely pointed, distinctly awned, subbifid at the summit; lemma tubulous, slightly narrowed upwards, together with the 1 mm. long, subobtuse, densely and shortly hairy

callus, about 8–9 mm. long, tuberculate by short antrorsely curved, hyaline hairs in upper half part, glabrous and punctulate below, awns erect, thin and capillary, minutely flattened only at the base, very scabrous, somewhat unequal, the central up to 30 mm. long, the lateral ones up to 25 mm. long. Australia: New South Wales. (Pl. CLIV.) . . . . . **Aristida muricata Henr.**

182. Glumes acute, both or one of them manifestly awned, the awns at least $1^1/_2$ mm. long, mostly longer. . . . . 183.
Glumes obtuse or acutish, not awned or shortly awned, the awn scarcely 1 mm. long, not rarely from a bifid apex. . . . . 191.

183. Glumes very distinctly unequal. . . . . 184.
Glumes equal or nearly so.

Caespitose perennial; culms strictly erect, elegant, inclusive of the panicle more than 1 meter high, about $1^1/_2$ mm. thick, terete or slightly compressed, simple or branched from some of the nodes, many-noded, the internodes somewhat unequal, sheaths tight or some of them slipping from the stems, the lower ones subcompressed, striate, smooth and glabrous, shorter than the internodes or some of them nearly as long as the internodes, ligule truncate, a very short, ciliolate rim, auricles densely laterally bearded, the hairs often reflexed and more or less passing over the collar; blades linear, flat, gradually narrowed and acuminate, up to 25 cm. long and 3 mm. broad at the base, very glaucous, glabrous and smooth beneath, scabrous on the upper surface and with some long hairs near the base, strongly nerved, the margins very prominently thickened with stramineous bands of sclerenchyma, the innovations convolute and rather short; panicle oblong-lanceolate, about 20 cm. long, up to 6 cm. broad, somewhat lax but contracted, many-flowered, the axis striate and angulous, scabrous, the branches binate or tripartite, the longer ones up to 10 cm. long, erect, naked at the base, iterately branched, the branchlets erect and adpressed, subangulous and scaberulous, the spikelets more or less congested at the summit of the branchlets, shorter or longer pedicelled, the pedicels scaberulous and slightly thickened at the apex only, linear-lanceolate, rather small, yellowish, tinged with purple; glumes linear-lanceolate, equal, with the awns about 7 mm. long, the lower one without the awn $4^1/_2$—$5^1/_2$ mm. long, the scabrous awn at least $1^1/_2$ mm. long, the body membranaceous, slightly punctulate, 1-nerved, the keel scabrous, upper glume gradually narrowed into the about 1 mm. long awn, keel nearly smooth, slightly scaberulous only at the summit; lemma narrowly linear, tubulous, about 5 mm. long, pale or mottled, with a very short, obtuse, shortly hairy callus, gradually

passing upwards into a distinct straight beak which is up to 2 mm. long, the beak scabrous but not twisted; awns more or less spreading or suberect, scabrous, quite straight, the central one up to 15 mm. long, the lateral ones shorter, about 10 mm. long, sometimes all the awns slightly shorter. South America: Brazil, Prov. Matto Grosso. (Pl. CXL.) . . . . . **Aristida marginalis Ekman**

184. Culms terete, blades flat at the base or if more or less convolute or complicate all over than not subsetaceous but rather rigid. . . . . 185.

Culms compressed, especially below, blades narrow, subsetaceous.

Caespitose erect perennial, covered at the base with old dark sheaths; culms fascicled, erect, 30—50 cm. high, inclusive of the panicles, slender, glabrous, striate, strongly compressed, mostly simple, few-noded or rarely 3-noded, the culm-nodes but slightly swollen and protruding above the glabrous dark sheath-nodes; sheaths shorter than the internodes, tight, the lower keeled, striate, glabrous or scabrous, sometimes with a few long, flexuous hairs along the margins, ligule a short ciliolate rim, auricles pubescent, those of the lower sheaths not rarely with long flexuous hairs and more or less bearded, the collar glabrous; blades very narrow, subsetaceous, acute, somewhat rigid, convolute or folded below, mostly strictly erect, sometimes slightly curved, up to 30 cm. long, about $^1/_2$ mm. broad or 1 mm. when expanded, smooth beneath, scaberulous or hirtellous on the upper surface; panicle rather narrow and depauperate, 5—15 cm. long, mostly erect, 1—3 cm. broad, the axis angulous and scaberulous, branches subfascicled, mostly binate and divided from the base, erect, capillary, more or less flexuous, the longer ones in well-developed large panicles up to 5 cm. long, often naked at the base for 2—3 cm., branches and branchlets scaberulous, the pedicels rough and very short, almost sessile; spikelets greenish to yellowish, somewhat congested at the tips of the branchlets, glumes linear-lanceolate, very unequal, thin, acute or acuminate and awned, 1-nerved, plicate and apparently 3-nerved, the lower one lanceolate, 6—7 mm. long inclusive of the fine awn, slightly scabrous on the back and keel, the upper glume sublinear, 9—10 mm. long, slightly scaberulous or smooth, the keel nearly smooth, the awn very fine and scabrous; lemma linear, tubulous, glabrous and smooth below, scaberulous upwards, the subobtuse, shortly hairy callus about $^1/_2$ mm. long, the body of the lemma not beaked or scarcely so, about 6 mm. long; awns very fine, scabrous, somewhat unequal, suberect or more or less spreading, the central one 20—25 mm. long, the lateral ones 15—20 mm. long. South Africa: Natal and Orange Free State. (Pl. CXL.) . . . . . **Aristida junciformis Trin. et Rupr.**

185. Both glumes long-awned, always 1-nerved. . . . . 186.
Only the upper glume long-awned, the lower glume acute only or acuminate, sometimes with a lateral sidenerve or sub-3-nerved. . . . . 190.

186. Blades straight, or sometimes slightly curved but never strap-shaped; glumes gradually narrowed into the awns. . . . . 187.
Blades especially the lower ones curled, flexuous and strap-shaped; glumes rather abruptly narrowed into the awns.
Densely caespitose perennial, glaucous-green, with intravaginal innovations; culms strictly erect, inclusive of the panicle 4—6 dm. high, simple, 2—3-noded, terete, glabrous, slightly striate; sheaths tight, the lower ones slightly compressed or keeled, the upper ones terete, glabrous, striate, much shorter than the internodes, ligule a ciliolate rim, auricles pubescent or shortly hirtellous, the collar distinctly thickened but glabrous; blades linear, flat below, up to 3 mm. broad and about 20 cm. long, complicate or convolute upwards, gradually long-acuminate, basal blades curled and strap-shaped, scaberulous on the upper surface, nearly smooth beneath, many-nerved, with thickened margins and a band of sclerenchyma, those of the innovations much shorter and convolute throughout; panicle contracted and dense but not spike-like, strictly erect, 8—10 cm. long, 1—2 cm. broad, axis terete or subangulous, glabrous, branches binate or solitary, shortly pilose at the axils, the longer ones about 5 cm. long, inclusive of the awns, naked at the base, the other ones about 3 cm. long, few-flowered, somewhat naked at the base, strictly erect and adpressed, the branches scaberulous and angulous, the spikelets somewhat congested with hirtellous, subclavate pedicels; spikelets yellowish-purplish to brownish, shortly pedicelled, glumes glabrous, 1-nerved, the lower very scabrous on the keel, abruptly subtruncate at the summit, long-awned, the scabrous awn about $2^1/_2$ mm. long, the total length 7 mm., upper glume narrower, smooth on the keel, minutely truncate, inclusive of the 1 mm. long awn about 8—9 mm. long; lemma glabrous in lower $^1/_3$ part, very scabrous upwards, the keel subserrate, gradually slightly narrowed but not beaked, inclusive of the obtuse, about $^3/_4$ mm. long, densely bearded callus, about 9 mm. long; awns subequal, erect or slightly spreading, scabrous, about 10 mm. long. South West Africa: South Angola. (Pl. CXLI.) . . . . . **Aristida nemorivaga Henrard**

187. Culms many-noded, nodes 4 or more, equally distributed; sheaths short. Old World species. . . . . 188.
Culms few-noded, the nodes nearly basal or congested in the lower part of the culm; sheaths very long. New World species. . . . . 189.

188. Panicles rather dense, not or scarcely interrupted, the branches congested; glumes long, the lower 17 mm. long, the upper 20 mm. long inclusive of the long awns.

Caespitose robust perennial; culms 3 mm. thick at the base, stout, erect, simple or sparingly branched with open sheaths at the ramifications, up to more than 1 meter high, inclusive of the panicles not rarely over $1^1/_4$ meter long, terete, slightly striate only, smooth, many-noded, the culm-nodes swollen and protruding above the dark sheath-nodes; sheaths tight or somewhat open, terete, slightly striate, glabrous, much shorter than the internodes or sometimes as long as or slightly longer, ligule a short ciliolate rim, auricles thickened and with a few hairs, mostly slightly puberulous or ciliolate; blades flat below at the base, involute or convolute upwards, narrowed into a long setaceous point, up to 30 cm. long or longer, $2—2^1/_2$ mm. broad when flattened, many-nerved, glabrous beneath, scaberulous on the upper surface, the margins not conspicuously thickened; panicle exserted, 25—35 cm. long or longer, contracted, rather dense, not interrupted, the axis visible only at the base, subterete and glabrous, slightly scaberulous upwards, branches fascicled (solitary and much divided just above the base), up to 6 cm. long, erect and adpressed; reiterately branched, the branchlets scaberulous, erect and adpressed too, the spikelets more or less congested, the branchlets with compressed, subclavate, scaberulous pedicels, the latter shorter than the glumes; spikelets yellowish-brown, sometimes tinged with purple or quite purplish, erect, glumes linear-lanceolate, 1-nerved, the awns 3—5 mm. long, the lower glume with a scabrous keel, the upper glume quite smooth; lemma with a very acute, $1^1/_2$ mm. long, densely hairy callus, the hairs not surpassing the true base of the lemma, the latter constricted above the callus, tubulous, nearly smooth, punctulate, gradually narrowed but not beaked at all, shorter than the glumes, commonly 15 mm. long, inclusive of the callus; awns erect or somewhat spreading, scabrous, somewhat unequal, the central one about 30 mm. long, the lateral ones 25 mm. long, capiliary all over, minutely flattened only at the base. British India and Ceylon to the Mascarene Islands. (Pl. CXLI.) . . . . . **Aristida setacea Retz.**

Panicles not dense, much interrupted, the branches very distant; glumes shorter, the lower one 7—8 mm., the upper one 8—10 mm. long, inclusive of the shorter awns.

Caespitose perennial with few innovations; culms erect, erectly and fastigiately branched from nearly all the nodes, elegant, scarcely 1 mm. thick, terete, scaberulous, slightly striate, inclusive of the panicles

up to 1 meter or more high, many-noded, the nodes in the lower half part of the culms, the uppermost internode (peduncle) very long; sheaths shorter than the internodes, much compressed below, slipping from the stems, striate, scaberulous, with more or less hyaline margins, ligule a short ciliolate rim, auricles pubescent only or rarely with some long delapsing hairs: blades flat at the base, convolute upwards, setaceously pointed, about 10 cm. long or longer, 1—2 mm. broad at the base, many-nerved, the margins not thickened, glabrous beneath, scaberulous or hirtellous on the upper surface; panicle narrow, very long, more than 30 cm. long, not rarely longer, those of the lateral branches commonly shorter, much interrupted, the branches very distant and much shorter than the internodes of the panicle, axis of inflorescence subterete, scaberulous or smooth below, branches binate, capillary, mostly erect and adpressed or sometimes some of them more flexuous and ascending, the longer branches naked below, the shorter ones nearly sessile or but very shortly peduncled, all the branches rather few-flowered, the branchlets scaberulous, the spikelets erect with scaberulous, subclavate pedicels, the latter shorter or much shorter than the glumes; spikelets straw-coloured, glabrous, the glumes 1-nerved, the lower lanceolate-linear, acuminately awned, the keel very scabrous, the upper one quite smooth, linear-lanceolate, both manifestly awned, the scabrous awn at least 1 mm. long; lemma nearly quite smooth, tubulous or subcompressed, with the subobtuse or subacute, 1 mm. long, densely bearded callus, about 7—9 mm. long, the awns very scabrous, flattened at the base, erect, somewhat unequal, the central one 17—18 mm. long, the lateral ones 14—15 mm. long. Australia: Queensland. (Pl. CXLI.) . . . . . **Aristida personata Henr.**

189. Panicles mostly 10—20 cm. long, branches of the inflorescence rather short, somewhat distant, erect, as long as or somewhat longer than the internodes of the panicle, spikelets bearing from the base or very shortly peduncled; plants tall, mostly up to 60 cm. high.

Densely caespitose perennial with an oblique rhizome; culms rather robust, erect, simple, terete, or slightly compressed, striate, glabrous and smooth, up to 60 cm. long or sometimes longer, few-noded, the nodes densely congested and nearly basal, the lowermost internode distinctly compressed and only 2—3 cm. long, the node constricted; sheaths as broad as the culms, distinctly compressed below, terete upwards, tight, striate, glabrous and smooth with hyaline narrow margins, the lowermost sheaths rather short, more or iess flabellate, the upper ones longer and overlapping, ligule a scarcely developed

nearly glabrous rim, auricles minutely pubescent and sometimes with a few long delapsing hairs, collar of the sheaths very distinct, developed as a more or less thickened, puberulous rim; blades firm, those of the culms and the basal ones at the base of the culms flat, 2—2$^1/_2$ mm. broad, reaching half the length of the culms, many-nerved, the margins not conspicuously thickened without bands of sclerenchyma, glabrous beneath, scaberulous on the upper surface, narrowed upwards and ending in a convolute acute point, the blades of the innovations involute or subjunciform; panicle long-exserted, dense and subspiciform, slightly interrupted only at the base, axis subterete, glabrous or nearly so below, subangulous and scabrous upwards, branches binate or solitary, erect, densely flowered, spikelets bearing nearly to the base or naked below over a short distance, spikelets fasciculate, erect, linear-lanceolate, glabrous; glumes thin, lanceolate-subulate, 1-nerved, long-awned, the lower one 12—13 mm. long, scaberulous on the keel, the upper one 17—18 mm. long, nearly smooth, the awns 4—6 mm. long; lemma mostly 14 mm. long or sometimes shorter and 11—12 mm. long, nearly smooth, fusiform, the acute, densely hairy callus about $^3/_4$ mm. long; awns capillary, scabrous, erectly spreading, somewhat unequal, the central one 40—45 mm. long, the lateral ones 30—40 mm. long, sometimes all the awns nearly equal. South America: Brazil, Uruguay and Paraguay to Argentina. (Pl. CXLII.) . . . . . .
. . . . . **Aristida laevis Kunth**

Spikelets mostly shorter than in the type, the lower glume 11 mm. long, the upper one 14 mm. long, the lemma mostly 12 mm. long; awns nearly equal, about 30 mm. long. Argentina. . .
. . . . . **var. argentina Henr.**

Panicles longer, 30—40 cm. long, branches rather long, more distant, erect, longer than the internodes of the panicle, naked at their base over a rather long distance, sometimes more or less spreading, plants very tall, 80—120 cm. high.

Caespitose erect perennial with an oblique fastigiately branched rootstock; culms terete, striate, nearly smooth, few-noded, the 3—4 nodes nearly basal, the sheaths very long, 15 cm. long or even longer, nearly equal in length, gaping or the upper ones tight, the blades more or less crowded and congested, subterete or more or less compressed at the base with hyaline margins, striate and glabrous, ligule a very short, minutely ciliolate rim, auricles pubescent or with a few long hairs, collar a ciliolate, thickened rim; blades flat below, about 3 mm. broad, convolute in upper half part, gradually narrowed into

a setaceous point, very long, mostly more than 50 cm. long, many-nerved, glaucous-green, the margins not thickened, glabrous beneath, slightly scaberulous on the upper surface; panicle narrow, erect, not very dense but somewhat loose and open, the branches erectly spreading, the axis terete and glabrous below, scaberulous and subangulous upwards, visible, branches binate, subcompressed, scaberulous, naked at the base, the longer ones without the awns 6–8 cm. long, the shorter ones 3–4 cm. long or becoming gradually shorter upwards, the branchlets erect and adpressed with scaberulous rather short pedicels or the lateral pedicels nearly sessile and the other ones shorter than the glumes, the spikelets rather densely congested along the branches and branchlets; spikelets narrow, linear-lanceolate, glabrous, glumes lanceolate-subulate, 1-nerved, yellowish-brown at maturity, the lower glume 12 mm. long, scaberulous on the keel, the upper one 16 mm. long, nearly smooth, both long-awned; lemma about 12–13 mm. long, tubulous with a densely hairy, acute, about $^3/_4$ mm. long callus; awns erect or more or less spreading or somewhat divergent, scabrous, straight, nearly equal, about 30 mm. long or shorter, sometimes the central one slightly longer and about 34 mm. long. South America: Uruguay. (Pl. CXLIII.). . . . . .
. . . . . **Aristida altissima Arechav.**

190. (*185.*) Panicles about 8 cm. long, branches of inflorescence inclusive of the spikelets, erect, as long as the internodes of the panicle, auricles of the sheaths pubescent, blades not very rigid, flat below, the upper ones convolute, rather short, not reaching the panicles.

Caespitose erect perennial with an oblique rootstock; culms with numerous basal leaves, sheaths manifestly striate, tight or somewhat open upwards, ligule ciliolate, auricles pubescent or with a few long hairs only, blades flat at the base, narrowly convolute upwards, shorter than the culms, striate, more or less curved or strictly erect; panicle erect, the axis somewhat angulous, quite smooth or nearly so, branches short, erect, the lower ones as long as the internodes of the panicle; spikelets purplish, glumes glabrous, unequal, acuminate or the upper one awned, the lower one about 12–13 mm. long, acute, not or scarcely awned, sub-3-nerved or with only one nerve and an additional side-nerve, scabrous on the keel, upper glume narrower than the lower one, 1-nerved, glabrous and smooth on the keel, without the awn 14 mm. long, abruptly awned, more or less distinctly bifid at the apex with minute acutish lateral setulae, the well-developed awn from the sinus about 2 mm. long or at least $1^1/_2$ mm. long; lemma tubulous or fusiform, 12—13 mm. long, nearly quite smooth, slightly contracted

and narrowed at the base into a shortly hairy, subacute, about 1/2 mm. long callus, not or but slightly narrowed upwards but not beaked; awns erectly spreading, very scabrous, about equal, the central one 3 1/2 cm. long, the lateral ones 30–33 mm. long. South America: Uruguay. (Pl. CXLIV.) . . . . . .

. . . . . **Aristida Arechavaletae Henr.**

Panicle spike-like. about 10–15 cm. long, branches of inflorescence erect or ascending, longer than the internodes of the panicle, auricles bearded with a lateral tuft of hairs, blades rigid, flat only at the very base, nearly quite convolute, thick, reaching or overtopping the base of the panicle, the basal blades commonly shorter.

Densely caespitose perennial from an oblique rootstock; culms simple, erect or ascending, 1-noded, the node nearly basal, inclusive of the panicles about 30 cm. high, sheathed in lower half part, terete or subcompressed, slightly striate, glabrous and smooth; lower sheaths more or less overlapping, somewhat open at the summit, the upper ones tight, striate or slightly compressed above, glabrous with hyaline margins, ligule a short ciliolate rim, auricles bearded with a lateral tuft of long white hairs, collar glabrous; blades firm, flat only at the very base, convolute nearly all over, erect or more or less curved, especially the lower ones, about 10 cm. long or slightly longer, those of the innovations mostly slightly shorter, gradually narrowed, but not setaceously pointed, more or less obtuse at the summit, 1—1 1/2 mm. broad at the base, about 9-nerved, striate and glabrous beneath, slightly scaberulous on the upper surface; panicle erect, peduncle erect, exserted, axis subterete, glabrous or slightly scabrous upwards, branches binate, not very remote, scabrous, the longer ones inclusive of the spikelets and awns 7—8 cm. long, up to 10-flowered, the shorter ones about half as long, up to 5-flowered, gradually becoming shorter upwards, the branchlets scabrous, short, the scabrous, compressed, subclavate pedicels erect or somewhat divergent, mostly half as long as the glumes or the lateral ones much shorter; spikelets purplish, glumes linear-lanceolate, the lower one 1-nerved or sometimes with an additional side-nerve, glabrous, keel scaberulous only, acute, minutely awned, 10—12 mm. long, the upper glume narrower, 1-nerved, smooth on the keel, awned, the awn at least 1 1/2 mm. long, not bifid at the summit, gradually narrowed, about 16–17 mm. long; lemma nearly smooth or somewhat punctulate under a lens, gradually narrowed at the base into a densely shortly hairy, acute, about 1 mm. long callus, the body of the lemma not or scarcely narrowed above, slightly scaberulous on the keel upwards; awns about equal, scabrous,

erect or slightly spreading, the lateral ones about 30 mm. long, the central one mostly about 35 mm. long. South America: Uruguay. (Pl. CXLIII.) . . . . . **Aristida teretifolia Arechav.**

191. (*182.*) Lemmas at maturity deeply furrowed at the ventral side, the margins inrolled. . . . . 192.

Lemmas not furrowed, with overlapping margins, terete or fusiform, never grooved. . . . . 197.

192. Lemmas not narrowed above, equally broad and not beaked at all, not longer than the glumes. . . . . 193.

Lemmas gradually narrowed above, distinctly beaked, distinctly longer than the glumes.

Densely caespitose perennial with many innovations; culms strictly erect, simple, up to 50 cm. high inclusive of the panicles, 1—2-noded, the nodes subbasal, striate, terete, glabrous; sheaths compressed, glaucous, striate, scaberulous, longer than the internodes, the old ones broken, afterwards delapsing, ligule shortly ciliolate, auricles not bearded, pubescent; blades flat at the base and about $2^1/_2$ mm. broad, about 15 cm. long, convolute upwards, gradually long-acuminate, erect or somewhat curved or flexuous, scaberulous on both surfaces, the margins with a thick band of sclerenchyma, those of the innovations setaceous, convolute throughout, 10 cm. long and scarcely $^1/_2$ mm. broad or flattened 1 mm. broad, with scattered long hairs on the upper surface; panicle erect, subcontracted but somewhat lax and open, 10—15 cm. long, 2—3 cm. broad, exserted, axis terete below and glabrous, angulous and scaberulous upwards, branches filiform, binate or solitary and divided nearly from the base, erect or subflexuous, very scabrous, the longer ones 2—3 cm. long and 5—8-flowered, the shorter ones 1—2-flowered, all naked at the base, laxly flowered, the flowers somewhat remote and not densely congested; spikelets greenish-purple, erect with very scabrous, about 5 mm. long pedicels or the lateral spikelets subsessile, glumes glabrous, 1-nerved, the lower one with a scabrous keel, 8—9 mm. long, somewhat abruptly acuminate or slightly mucronate, the upper one up to 10 mm. long, smooth on the keel, abruptly acuminate, scarcely awned; lemma tubulous, narrowed upwards and beaked, smooth or slightly scaberulous only below the awns, 11—12 mm. long, the very short, subobtuse and shortly hairy callus, about $^1/_2$ mm. long, body deeply grooved from the base to the branching-point of the awns; awns slightly flattened at the base and slightly contorted, straight upwards, subequal, about 35 mm. long or the central one slightly longer. South America: Brazil. (Pl. CXLIV.) . . . . . **Aristida succedanea Henr.**

193. Plants not robust, not up to 1 meter high, the panicles much shorter than 5 dm., glumes and lemmas shorter than 10 mm. . . . . .194.
Plants very robust, $1^1/_2$—2 meter high, the panicles very long, up to 5 dm., glumes 12—13 mm. long, the lemmas about 9 mm. long.
Caespitose erect glaucous perennial; culms erect, branched from some of the middle and upper nodes, many-noded, culm-nodes swollen and protruding above the short, brownish sheaths-nodes, uppermost internode very long and exserted, glabrous and smooth, sometimes minutely scaberulous between the faint nerves, old sheaths at the base dark, delapsing, upper ones tight or more or less slipping from the stems, half as long as or shorter than the internodes, terete, prominently striate and slightly scaberulous, ligule a ciliate rim, auricles well-developed, pubescent and with a prominent lateral reflexed tuft of long hairs and a villous or puberulous line across the collar of the sheaths: blades elongate, flat in lower half part, up to 3 mm. broad, glaucous, up to 20 cm. long, many-nerved, the margins not thickened, scaberulous beneath, scabrous to hirtellous on the upper surface, more or less convolute upwards, ending in a setaceous subpungent tip; panicle very long, not dense, much interrupted at the base, very narrow, the lower branches very distant, much shorter than the internodes of the panicle, upper branches less remote as long as or longer than the internodes, axis terete and slightly scaberulous below, more scabrous upwards, branches erect and adpressed, binate or solitary and divided nearly from the base, scaberulous, the longer ones naked at the base, inclusive of the spikelets 6—8 cm. long, many-flowered, the shorter ones sessile rather few-flowered, branchlets short, scaberulous, pedicels shorter than the glumes or the lateral ones nearly sessile; spikelets yellowish, erect and adpressed, glabrous, glumes about equal, 1-nerved, very narrow, long-acuminate and shortly mucronate, the lower scabrous on the keel, especially upwards, the upper one with a smooth keel; lemma shorter than the glumes, about 9 mm. long, punctulate and more or less mottled, cylindrical, with a very acute, densely rather long-hairy, about 1 mm. long callus, not narrowed upwards, passing into the slightly unequal awns, the latter flat at the very base, very scabrous, the central one 20 mm. long, the lateral ones 15—17 mm. long, all the awns straight, strictly erect or slightly spreading. Australia: Queensland. (Pl. CXLV.) . . . . . **Aristida sciuroides Domin**

194. Lemmas 7—8 mm. long, as long as the glumes or nearly so. . . . . .195.
Lemmas rather short, only about 5—6 mm. long, always shorter than the glumes. . . . . .196.

195. Blades flat or afterwards becoming inrolled upwards, rather firm and stiff, not capillary, glaucous-green.

Caespitose, glaucous, erect or slightly ascending perennial, with few innovations; culms 50–60 cm. high, simple or branched from some of the nodes, the branches strictly erect and adpressed, 2—3-noded, the nodes placed in lower half part of the culms, culm-nodes often swollen and protruding above the dark, annular, contracted sheath-nodes, the uppermost internode long-exserted, terete, slightly striate, somewhat scaberulous; lower sheaths more or less compressed and gaping or slipping from the stems, rather short, striate and slightly scaberulous, the upper ones tight or slipping from the stems and inrolled upwards, about half as long as the internodes or much shorter, striate with narrow hyaline margins, ligule a short ciliolate rim, auricles pubescent with a more or less developed pubescent line across the collar; blades narrow, the upper ones up to 15 cm. long, those of the lower leaves mostly shorter, flat, afterwards becoming involute or nearly so in upper part, gradually narrowed and pointed, about 1–2 mm. broad at base, scabrous-hirtellous on the upper surface, striate and glabrous beneath; panicle long-exserted, up to 20 cm. long or longer, not rarely shorter, much interrupted, the branches rather distant, axis terete and glabrous below, angulous or triquetrous and scaberulous upwards, branches binate, bipartite from the base, naked below for about 1 cm., the upper ones nearly sessile, the branches slightly compressed and nearly glabrous, erect or ascending or not rarely afterwards somewhat spreading at least one of the two geminate branches, reiterately branched, the branchlets shortly peduncled, rather few-flowered, compressed, scabrous or puberulous, the axils not rarely slightly pilose, the pedicels scabrous, compressed, shorter than the glumes, the lateral pedicels much shorter or nearly sessile; spikelets erect, more or less placed in groups of 3 or 4 but not densely congested, dark-purplish or reddish, glumes lanceolate, the lower broader, about 7—8 mm. long, the keel nearly smooth or very slightly remotely scaberulous only, 1-nerved and not rarely with more or less distinct short lateral nerves, acuminate or very shortly awned, upper glume smooth on the keel, 1 mm. longer than the lower one, distinctly emarginate and subbifid at the apex with a mucro from the sinus; lemma with inrolled margins, deeply furrowed at the ventral side, glabrous, punctulate only under a lens and mottled with purple, inclusive of the subacute, 1 mm. long, densely hairy callus, up to 7 or 8 mm. long, not or scarcely narrowed upwards, the awns very scabrous, flattened at the base, erectly spreading or somewhat divergent, about equal, commonly 15 mm. long or sometimes slightly longer or shorter. Australia: Queensland to Victoria. (Pl. CXLV.)

. . . . . **Aristida calycina R. Br.**

Dimensions of the spikelets as in typical *A. calycina*, but the lemmas strigose upwards, the adpressed hairs more or less placed in longitudinal rows. . . . . **var. strigosa Henr.**

Blades inrolled throughout, filiform or capillary, flexuous and curved.

Grayish-green or glaucous-green, probably perennial plant, fasciculately branched from the lower nodes, culms simple upwards, very thin and elegant, erect or ascending from a decumbent base, about $^1/_2$ mm. thick, up to 5 dm. high, inclusive of the panicle, the internodes terete, not striate, quite smooth and shining, the culms covered at the base by the remnants of old sheaths, the latter slipping from the stems, shorter than the internodes, the latter thus quite naked, upper sheaths terete or subcompressed and tight below, striate, gaping upwards, as long as the internodes, uppermost sheaths tight and more deeply striate or grooved, scaberulous, the internodes obtected, all the branches of about equal length and bearing panicles, ligule a shortly ciliolate rim, auricles shortly puberulous, collar smooth, junction with the blade whitish and thickened; blades very narrow, quite inrolled, almost junciform but not very stiff, straight or more or less curved, gradually narrowed into a short, acute point, about 10—15 cm. long or sometimes shorter or longer, scarcely $^1/_2$ mm. thick or expanded scarcely 1 mm. wide, those of the lower sheaths mostly much shorter, sometimes only a few cm. long, strongly few-nerved, scaberulous beneath, scabrous or hirtellous on the upper surface, with a narrow, hyaline band of sclerenchyma, uppermost internode long-exserted, the naked peduncles up to 20 cm. long; panicle linear-lanceolate, contracted, interrupted, especially below, the axis nearly visible all over, the latter terete, deeply striate, smooth, branches binate or simple upwards, strictly erect and adpressed, rather distant, the lower longer ones with an up to 1 cm. long peduncle, up to 4 cm. long, the shorter ones nearly sessile, much reduced and consisting, of a few spikelets only, the branches and branchlets scaberulous; spikelets strictly erect and adpressed, not very congested, the pedicels slightly thickened upwards and scaberulous, the lateral spikelets very shortly pedicelled or nearly sessile, the ultimate ones of each branchlet distinctly pedicelled, with pedicels shorter or scarcely as long as the glumes; spikelets yellowish-green, glumes rather broad, distinctly unequal or subequal, glabrous, 1-nerved, the lower 6—7 mm. long, inclusive of the short, scabrous awn, the latter from a distinctly bifid apex, nearly smooth on the keel, the upper one $7^1/_2$—8 mm. long, quite smooth, rather abruptly narrowed into the scabrous, scarcely $^1/_2$ mm. long awn; lemma tubulous

or slightly compressed, scabrous on the keel above, punctulate nearly all over, not or slightly narrowed upwards, inclusive of the nearly 1 mm. long, obtuse, long-bearded callus, about as long as the glumes, mostly 7 mm. long, awns erect or slightly spreading, very scabrous, somewhat flattened at the base, subequal, the central about 14—15 mm. long, the lateral ones a few mm. shorter. Australia: South Australia; Victoria desert. Elder exploring expedition. Camp 5. Collected in the year 1891 by R. HELMS. (Pl. CLIV.) . . . . . **Aristida capillifolia Henrard**

196. Blades flat, about 2 - 2½ mm. broad, convolute only at the summit or sometimes some of them somewhat inrolled in drying. the old ones flexuous or curved, strap-shaped; auricles of the sheaths densely bearded with a conspicuous villous line across the collar.
Densely caespitose erect, more or less glaucous, firm perennial; culms erect, rather robust, somewhat branched from the nodes, 70 –80 cm. high or sometimes somewhat longer, inclusive of the panicles, 4—5-noded, the culm-nodes slightly swollen and protruding above the narrow, glabrous sheath-nodes, the internodes about equal, terete, slightly striate, nearly smooth; lower sheaths pale-yellowish, somewhat flabellate, compressed laterally, gaping above, slightly scaberulous and striate, upper sheaths scabrous, afterwards becoming glabrous, tight or slipping from the stems, terete, manifestly striate with hyaline margins, about half as long as the internodes, ligule a rather long-bearded or cilate rim, the villous line across the collar with rather long, erectly spreading, white hairs; blades thick and rigid, distant, strongly about 9-nerved, scabrous beneath, grayish pubescently villous on the upper surface, elongate, about 20 cm. long, 2 - 2½ mm. broad, quite flat, without thickened margins, subconvolute only at the very summit, acuminately pointed, blades of some of the lateral branches more inrolled upwards, those of the innovations much shorter and more or less folded or involute throughout, blades of the basal leaves persistant, lacerate, curved or flexuous; panicle exserted, very narrow, elongate, up to 30 cm. long or not rarely longer, scarcely 1 cm. broad, contracted but not very dense or spike-like, interrupted at the base, more congested above, axis subterete and nearly smooth, or scaberulous upwards, the axils, especially the lower ones, with a small tuft of short white hairs, branches solitary, much divided nearly to the base or those at the base of the panicle somewhat naked below, somewhat distant, the axis visible, densely flowered, the longer ones 8—9 cm. long, gradually becoming shorter upwards, strictly erect and adpressed, the lower branches as long as the internodes of the inflorescence or

the upper ones longer, branchlets and subcompressed pedicels strictly erect and adpressed, scaberulous, the spikelets densely congested or imbricate, the pedicels shorter than the yellowish or brownish glumes, the latter narrow, 1-nerved, about equal, 8—9 mm. long, the lower one scabrous on the keel, slightly scaberulous on the back, acuminately awned, the upper one somewhat narrower, erosely dentate or subbifid at the summit with a mucro or short awn from the sinus; lemma with a very acute, densely long-hairy, about 1 mm. long callus, slightly narrowed at the summit, nearly glabrous, punctulate under a lens, more or less mottled, about 5—6 mm. long, inclusive of the callus; awns very scabrous, flat at the base, capillary upwards, erectly spreading, the central one up to 20 mm. long, the lateral ones about 15 mm. long. Australia: Queensland. (Pl. CXLVI.) . . . . . .
. . . . . **Aristida ingrata Domin**

Blades flat only at the base, mostly convolute throughout, 1—1½ mm. broad when expanded, the old ones not persistant; auricles of the sheaths more or less bearded without a villous line across the collar. Densely caespitose, more elegant perennial; culms simple or nearly so, strictly erect, sometimes branched from some of the lower nodes, about 60 cm. high inclusive of the panicles, few-noded, terete, slightly striate, scaberulous, pruinose below the glabrous nodes; sheaths shorter than the internodes, striate and somewhat keeled, tight or sometimes gaping at the summit, glabrous, ligule a short ciliolate rim, auricles, especially those of the innovations, long-bearded, the collar glabrous; blades 10—15 cm. long, mostly convolute all over and gradually setaceously acuminate, flat sometimes only at the very base, nearly glabrous beneath, scaberulous on the upper surface, more or less glaucous-green; panicle exserted, about 20 cm. long, contracted but not spiciform, subinterrupted at the base, densely flowered, axis glabrous and subterete below, angulous and scaberulous upwards, branches binate or solitary above, the axils without a small tuft of hairs, strictly erect, adpressed, naked at the base, the longer ones sometimes up to 9 or 10 cm. long, the shorter and upper ones 4—5 cm. long, commonly 5—6 cm. long, the spikelets densely congested and adpressed or imbricate, rather shortly pedicelled, the subclavate pedicels scaberulous, spikelets yellowish or brownish, glumes slightly unequal, 1-nerved, acuminately awned, the lower one 6½ mm. long, scabrous on the keel, the upper one up to 8 mm. long with a smooth keel; lemma about 5 mm. long, inclusive of the callus, sub-3-nerved and somewhat keeled at the back, punctulate under a lens, more or less mottled with inrolled margins, the callus acute, densely long-

bearded, about 1 mm. long, the awns flat at the base, very scabrous, capillary upwards, erectly spreading, about equal in length, the central one up to 16 mm. long, the lateral ones a few mm. shorter. Australia: Queensland to New South Wales. (Pl. CXLVI.) . . . . . **Aristida jerichoensis Domin**

Lemmas with an indication of small tubercles on the inside of the ventral furrow. New South Wales. . . . . **var. subspinulifera Henr.**

197. (*191.*) Panicles linear-oblong, dense, spike-like, only slightly interrupted at the base, the branches and branchlets very short, with sessile or very shortly pedicelled spikelets nearly to the base, the spikelets always densely congested. . . . . 198.

Panicles in outline different in form, narrow and subcontracted or subinterrupted but always rather loose, never dense and spike-like, branches and branchlets naked at the base, the peduncles and pedicels always longer, the panicles thus never densely contracted. . . . . 203.

198. Glumes 10 mm. long or longer. . . . . 199.

Glumes shorter than 10 mm. . . . . 201.

199. Upper glume obtusely emarginate at the summit, with an awn from the sinus; lemma about as long as the glumes. Species of the New World. 200.

Upper glume acuminately awned, not bifid at all; lemma much shorter than the glumes. Species of the Old World.

Densely caespitose perennial with numerous short innovations; culms simple, erect or commonly ascending, inclusive of the panicles 10—25 cm. high, 1—2-noded, the nodes placed in the lower half part of the culm, the latter terete, smooth or striate upwards; sheaths of the culm-leaves as long as or longer than the internodes. glabrous, striate and grooved, tight, terete, with hyaline margins, those of the basal leaves rather short, with fibrous old brown sheaths at the base, ligule densely and shortly ciliate, auricles shortly and densely bearded, the collar more or less distinct as a pubescent line; blades of the culm-leaves sometimes 6—7 cm., rarely up to 10 cm. long, mostly shorter and commonly not longer than 3 cm., those of the basal leaves still shorter, those of the innovations very short, not rarely curved and scarcely 1 cm. long, all the blades plicate or somewhat convolute, very narrow, scarcely 1 mm. thick or expanded $1^1/_2$ mm. broad, acuminately pointed, the summit somewhat thick and subpungent, deeply grooved or striate and glabrous beneath, scabrous-hirtellous on

the upper surface; panicle erect, linear-obovate, cuneate at the base, 5—8 cm. long, the axis subterete and striate. scaberulous, the lower axils minutely ciliate, branches binate or tripartite nearly from the base, shortly peduncled or nearly sessile and spikelets bearing to the base. the branches and branchlets strictly erect and adpressed, the lower ones not rarely half as long as the whole panicle, gradually becoming shorter upwards, branchlets and pedicels slightly scabrous, the latter rather short and the spikelets nearly sessile, spikelets yellowish-brown, tinged with purple or purplish all over, the glumes linear-lanceolate, acute and shortly awned, 1-nerved, the lower scabrous on the keel, about 12 mm. long, the upper one glabrous and smooth on the keel, about 13 mm. long, distinctly shortly awned; lemma 8–9 mm. long inclusive of the acute, 1 mm. long, densely bearded callus, the body glabrous below, very scabrous in upper half part, tubulous, scarcely narrowed upwards; awns scabrous, flat at the very base and with hyaline margins, about equal, erectly spreading, about 20—25 mm. long. North East Africa: Eritrea. (Pl. CXLVI.) . . . . . **Aristida Pennei Chiov.**

200. Blades rather soft, setaceous, not rigid and stiff, plicate or convolute throughout, scarcely $^1/_2$ mm. thick.

Densely caespitose perennial with intravaginal innovations; culms simple, erect, apparently without nodes the node basal, terete, scabrous, up to 25 cm. long with numerous basal leaves; sheaths tight, terete, glabrous or scaberulous, the lower ones sometimes sparingly long-hairy, ligule a small ciliolate rim, auricles more or less long-bearded, the collar densely but shortly pubescent; blades narrowly linear, gradually narrowed into a somewhat obtuse tip, 12—20 cm. long, sometimes as long as the culms, scarcely $^1/_2$ mm. broad, erect, scabrous on the lower, minutely puberulous on the upper surface, rather strongly nerved; panicle linear-oblong, contracted, dense and spike-like, 8—10 cm. long, about 1 cm. broad at the summit, with scabrous axis and branches, the latter solitary, erect, the lower ones up to 3 cm. long, naked in lower $^1/_3$—$^1/_4$ part, reiterately branched with densely congested, few-flowered branchlets, the upper ones gradually becoming shorter; spikelets on short or very short pedicels, dark purple, glumes linear, the lower sub-3-nerved, the lateral nerves sometimes obsolete or with only 1 developed side-nerve, more or less scabrous on the back, scabrous on the keel, about 9 mm. long, the scabrous awn up to $1^1/_2$ mm. long. the upper glume 1-nerved with a smooth keel, narrower than the lower one, bifid at the apex with a 1 mm. long scabrous awn from the sinus, the lateral setulae rather obtuse; lemma

scaberulous under a lens, about 10 mm. long, the 1 mm. long, densely but shortly hairy callus rather obtuse or acutish, the body narrowed upwards into a scarcely twisted, scaberulous short beak; awns somewhat unequal, erect or slightly spreading, scabrous, the central one up to 20 mm. long, the lateral ones up to 16 mm. long. South America: Bolivia to Northern Argentina. (Pl. CXLVII.) . . . . . **Aristida enodis Hack.**

Blades not soft, rather rigid and very stiff, flat at the base, convolute upwards, about 1 mm. thick.

Densely caespitose erect perennial, covered at the base with old delapsing sheaths; culms 1-noded, the node basal, terete or slightly compressed, scaberulous, nearly smooth or minutely striate, inclusive of the panicles 20—30 cm. high; sheaths more or less compressed below or terete upwards, tight, striate or grooved, glabrous or minutely scabrous with more or less hyaline margins, lower sheaths gaping and more or less keeled, ligule a ciliolate rim, auricles of the upper leaves ciliate or somewhat bearded with a prominent scaberulous or villous line across the collar, auricles of the innovations more prominently bearded and the collars with longer, spreading white hairs; blades of the upper leaves 1 or 2 mm. broad at the flat base, strongly nerved, plicate and curved upwards, scabrous on the mid-nerve beneath, otherwise glabrous, scabrous-hirtellous on the upper surface, tapering to a subobtuse point, the blades 5—6 cm. long, those of the innovations plicate throughout, only a few cm. long, erect or somewhat curved; panicle long-exserted, linear to linear-lanceolate or obovate, the base cuneate, axis, branches and branchlets very scabrous, the lower axils minutely ciliate, 7–8 cm. long or much shorter, without the awns about 1 cm. broad, branches solitary or binate, one of them less developed or wanting, peduncled, rather few-flowered, the lower ones up to 3 cm. long, the upper ones becoming much shorter, the scabrous pedicels much shorter than the glumes; spikelets yellowish-brown tinged with purple, strictly erect, rather densely congested, the lateral ones nearly sessile, glumes linear-lanceolate, rather broad at the base, the lower $11^1/_2$ mm. long, scabrous on the keel and more or less so on the back with a strong mid-nerve and at the base 2 short lateral nerves, more or less anastomosing with the mid-nerve, the side-nerves scarcely $^1/_4$ the length of the glume, mostly still shorter, the mid-nerve passing into a scabrous, $1^1/_2$ mm. long awn, the upper glume 12 mm. long, 1-nerved, smooth on the keel, slightly narrower than the lower one, somewhat abruptly narrowed above, not acuminately awned, the tip erosely dentate or subbifid and rather abruptly awned, the lateral

setulae but slightly developed; lemma with the acute densely hairy, about 1 mm. long callus up to 12 mm. long, tubulous, glabrous and smooth beneath, scaberulous upwards, gradually narrowed and shortly beaked; awns somewhat spreading, scabrous, slightly unequal, the central one up to 20 mm. long, or slightly shorter, the lateral ones about 15 mm. long. South America: Peru. (Pl. CXLVII.) . . . . . **Aristida Antoniana Stend.**

201. Lemmas glabrous or slightly scaberulous only; awns about 15 mm. long or longer. . . . . 202.

Lemmas very scabrous nearly all over; awns shorter, only about 10 mm. long.

Densely caespitose erect perennial without or with few innovations, probably flowering the first year, glaucous; culms erect or geniculately ascending, simple or sometimes branched at the base, 10--20 cm. high, inclusive of the inflorescence, elegant, terete or compressed below, striate, scaberulous upwards; sheaths very broad at the base with hyaline margins, compressed and keeled, very striate, shorter than the internodes, those of the culms tight and scabrous above, ligule and auricles pilose; blades narrowly linear, gradually acuminate with a subobtuse tip, 3–5 cm. long, about 1 mm. broad, strictly erect and rather rigid, flat or more or less inrolled in drying, scaberulous beneath, hispidulous on the upper surface, prominently nerved with somewhat thickened margins; panicle linear-oblong, contracted, dense and somewhat spiciform, interrupted at the base, 4–5 cm. long or sometimes up to 8 cm. long, about 1 cm. broad, the axis scabrous, branches fasciculate, puberulous, somewhat naked at the base, the branchlets densely flowered nearly from the base, the spikelets congested, lanceolate to linear-lanceolate, pale greenish, tinged with purple, glumes somewhat unequal, 1-nerved, glabrous, the lower one acutish, scabrous on the keel, mostly $5^1/_2$ mm. long or sometimes only 4 mm. long, upper glume obtuse or somewhat truncate, erosely dentate or mucronate, subbifid, the keel smooth or scaberulous upwards, 7 mm. long or sometimes only $5^1/_2$—6 mm. long; lemma very scabrous, inclusive of the densely bearded, subobtuse or subacute, about 1 mm. long callus, up to $6^1/_2$ mm. long, tubulous, not or slightly narrowed upwards, but scarcely beaked; awns very scabrous, somewhat flat at the base, about equal, 10 mm. long. Australia: South Australia and New South Wales. (Pl. CXLVI.) . . . . . **Aristida anthoxanthoides Henr.**

202. Blades setaceously filiform or capillary, leaves almost basal; callus of the lemma equally broad, obtuse, truncate.

Densely caespitose compact perennial, inclusive of the panicles about

10 cm. high, with intravaginal innovations; culms apparently without nodes, the node hidden by the more or less flabellate sheaths, terete, glabrous and smooth, thin and elegant; lower sheaths much compressed, keeled, especially those of the innovations, conspicuously distichous, slightly striate and minutely rough with hyaline margins, the upper sheaths tight, subterete or compressed-keeled, more distinctly striate, ligule a ciliate rim, auricles not very prominent, shortly pubescent, collar glabrous; blades very narrow, thin and soft, strictly erect, straight, folded or somewhat convolute, scarcely $^1/_2$ mm. in diameter, those of the upper leaves overtopping the panicles, those of the innovations shorter, glaucous-green, distinctly about 5-nerved, minutely scabrous beneath, scabrous-hirtellous on the upper surface, ending in a long, fine, not pungent, scaberulous tip, the margins without a broad band of sclerenchyma; panicle shortly exserted or sheathed at the base by the uppermost leaf, short, about 4 cm. long, inclusive of the spikelets and awns, about 1 cm. broad at the summit, more or less cuneate at the base, congested and spike-like but somewhat loose and interrupted at the base, the axis subterete and scaberulous, branches mostly solitary or bipartite from the base, scaberulous, nearly sessile or somewhat naked at the base, erect and adpressed, the spikelets on short, scaberulous, about 2 mm. long pedicels, more or less congested, the branches rather few-flowered; spikelets yellowish, erect, glumes linear-lanceolate, 1-nerved, both scabrous on the keel, otherwise glabrous, the lower 6 mm. long, abruptly acuminate and somewhat subbifid, the upper one 7—7$^1/_2$ mm. long, bifid at the apex with a short awn from the sinus; lemma about 6—7 mm. long, compressed laterally, very scabrous on the keel and more or less so upwards, glabrous and punctulate below, slightly or scarcely narrowed, the obtuse, truncate, scarcely $^1/_2$ mm. long callus densely bearded, especially upwards, the hairs overtopping the true base of the lemma; awns erectly spreading, scabrous, nearly equal, about 15 mm. long. Madagascar. (Pl. CXLVIII.) . . . . . **Aristida chaetophylla Steud.**

Blades flat or convolute but not setaceously filiform, or if sometimes more or less so, the leaves not basal; callus more or less conical, subacute or subobtuse and rounded . . . . . See some forms of **Aristida coerulescens Desf.** with more contracted narrow panicles.

203. (*197.*) Culms more-noded, or in some badly developed lateral culms from the same bunch accidentally 1-noded, in that case the blades flat; panicles not short, mostly long or very long. . . . . 204.

Culms but 1-noded, blades very narrow, setaceous; panicles short, about $2-2^1/_2$ cm. long, rather lax.

Densely caespitose perennial with numerous innovations, culms fascicled, about 25 cm. high, very elegant, glabrous and nearly smooth, the node nearly basal, the uppermost internode long-exserted; sheaths tight, the lower ones pale coloured, somewhat compressed, persistant, the upper ones dark or purplish, glabrous, ligule a short ciliolate rim, auricles long-bearded, the hairs up to 4 mm. long, collar glabrous; blades very narrow, linear-lanceolate, acute, 10—15 cm. long, convolute, expanded about 1 mm. broad, somewhat rigid and flexuous, often plicate, glabrous beneath, scabrous-puberulous on the upper surface; panicle somewhat contracted, oblong, lax and flexuous, the penduncle and the axis subterete, striate, scabrous, filiform, the branches distant, very thin, solitary, naked at the base, the peduncle about 1 cm. long, bipartite upwards, the lower ones inclusive of the awns up to 4 cm. long and about 4-flowered or the lateral branchlets 1—2-flowered, pedicels scaberulous, unequal, the longer ones 6—10 mm. long, the lateral ones much shorter than 5 mm. long, subcompressed and subclavate at the tips; spikelets yellowish-brown to purplish or variegate, suberect, more or less adpressed to the branchlets, glumes 1-nerved, unequal, linear-lanceolate, more or less abruptly acuminate and mucronate, the lower one very scabrous on the keel and more or less so on the back, 6—8 mm. long, the upper one glabrous on the keel, about 9—10 mm. long; lemma tubulous or lanceolate, slightly narrowed upwards but not or scarcely beaked, the body purplish, glabrous, punctulate under a lens, the obtuse, densely shortly bearded callus, about $^3/_4$ mm. long, the body 7—9 mm. long; awns setaceous, scabrous, erectly spreading, unequal, the central one about 20 mm. long, the lateral ones about 15 mm. long. South Africa: Cape Colony. (Pl. CXLVIII.) . . . . . **Aristida Galpinii Stapf**

204. Collar of the sheaths without a villous line of long hairs, quite glabrous and smooth or when the sheaths and blades are scabrous the collars scabrous too. . . . . 205.

Collar of the sheaths (external ligule) with a very prominent, bearded line, or villous with long white hairs.

More or less glaucous caespitose perennial; culms strictly erect, inclusive of the panicles about 40—50 cm. high, simple, elegant, very scabrous, especially below the panicle, striate, few-noded; sheaths tight, terete, somewhat striate, very scabrous, much longer than the internodes, ligule a short ciliolate rim, auricles pubescent and long-bearded, the collar pilose; blades flat, about 3 mm. broad, convolute upwards and

gradually setaceously acuminate, about 20—30 cm. long, strictly erect, scabrous on both surfaces, the upper surface with long white hairs in lower part near the base, the margins scabrous; panicle strictly erect, contracted and more or less dense, but not spiciform, sometimes somewhat loose and open, about 15 cm. long and a few cm. broad or sometimes broader, the axis striate, angulous or subtriquetrous, very scabrous, the branches adpressed or somewhat ascending, solitary or 2—3-partite, thin, very scabrous, naked in lower half part, the spikelets erect, rather shortly pedicelled, the very scabrous pedicels triquetrous or angulous; glumes purple, linear-lanceolate, subequal, gradually acuminate, the lower glume 3-nerved, the nerves and the keel scabrous, about 7 mm. long, the summit rather abruptly awned, the awn very short, the upper glume 1-nerved, about 8 mm. long, smooth on the keel, distictly but shortly bifid at the apex with very short lateral setulae and a mucro from the sinus; lemma linear to tubulous, 7—8 mm. long, gradually narrowed and distinctly but shortly beaked, punctulate, the very short and very obtuse but rather long-bearded callus, about $^1/_4$ mm. long; awns subequal, erectly spreading, straight, scabrous, the central one 9—10 mm. long, the lateral ones about 8 mm. long. South America: Bolivia. (Pl. CXLIX.) . . . . . **Aristida Friesii Hack.**

205. Culm-blades convolute throughout or flat only at the very base, not flexuous and strap-shaped, about 1 mm. broad, margins without thick bands of sclerenchyma. . . . . 206.

Culm-blades flat, involute only upwards at the summit, flexuous and strap-shaped, about $2^1/_2$ mm. broad, margins with broad bands of sclerenchyma.

Densely caespitose erect perennial with few innovations; culms strictly erect, sheathed nearly all along, the nodes obtected or nearly so, simple, terete and slightly scabrous, not striate, rather thin, inclusive of the panicle up to 70 cm. high, purplish; sheaths tight, glabrous below, terete, slightly striate, distinctly scabrous-papillose upwards, ligule a shortly ciliate rim, auricles bearded with some long hairs, collar slightly indicated, not very distinct, smooth, with some delapsing laterally placed long hairs as a prolongation of the auricles, the sheaths mostly longer than the internodes or some of them a little shorter, auricles of the innovations longer and more distinctly bearded; blades 20 cm. or more long, flat below, gradually narrowed upwards and ending in a long, more or less setaceous point, flexuous or curved and strap-shaped, those of the innovations much shorter and convolute throughout, straight, all the blades glabrous beneath, scaberulous on

the upper surface and with some scattered long white hairs near the base, margins very scabrous with thickened bands of sclerenchyma; panicles erect, exserted, rather loose and open but the branches erect or ascending, axis subterete, angulous and scabrous, the branches solitary, distant, especially below, naked and undivided at the base for a few cm., than reiterately branched with rather long-peduncled very scabrous branchlets, the latter with subcongested spikelets forming more or less false spikes at the summit, the lateral spikelets with very short, scabrous, scarcely thickened pedicels or nearly sessile, the terminal pedicels longer, shorter than the glumes; spikelets erect or more or less adpressed, dark-purplish, glumes distinctly unequal, not awned, acuminate only, narrowly linear, the lower more or less scaberulous on the back and scabrous on the keel, 1-nerved with very short, not very distinct lateral side-nerves at the base, about 7 mm. long, the upper one 1-nerved, quite glabrous and smooth, about 8 mm. long; lemma $6^1/_2$—7 mm. long, narrowly linear, tubulous, slightly narrowed and beaked upwards, punctulate, scabrous only at the summit, the scarcely $^1/_2$ mm. long, obtuse callus densely bearded with more or less spreading hairs; awns slightly or more or less unequal, erectly spreading, scabrous, the central one 18–20 mm. long, the lateral awns about 12 mm. long. South America: Ecuador, Peru and Bolivia. (Pl. CXLIX.) . . . . . **Aristida ecuadoriensis Henr.**

206 Upper surface of the blades smooth or scabrous, sometimes hirtellous but never with long, spreading, scattered white hairs at the base, the blades flat only at the very base, complicate or involute upwards. . . . . 207.

Upper surface of the blades with spreading, scattered, long white hairs at the base, all the blades involute or nearly so. . . . . 210.

207. More or less robust, not very elegant species with rather dense panicles; awns of the lemmas scarcely up to $2^1/_2$ cm. long, blades rather firm, not setaceous, rather broad when expanded. . . . . 208.

More elegant, not very robust species with a less dense panicle; awns of the lemmas thinner, longer, $3^1/_2$—4 cm. long, blades setaceous, not very firm, scarcely 1 mm. broad when expanded.

Densely caespitose erect perennial with intravaginal innovations; culms simple or very rarely slightly branched, inclusive of the panicles up to 40 cm. high or sometimes longer, very elegant, terete, slightly striate, minutely scabrous, many-noded, the nodes equally distributed; sheaths much shorter than the internodes, terete, tight, striate, glabrous, only 2–$2^1/_2$ cm. long, ligule very short, densely ciliolate, auricles ciliate and long-bearded with erect hairs, the collar naked; blades

erect, the lower ones somewhat flat at the base, the upper ones setaceously convolute and gradually acuminate, subulate, subpungent, glaucous-green, $3^1/_2$ – 6 cm. long, striate, with somewhat thickened margins, glabrous beneath, scabrous-hirtellous on the upper surface; panicle 15 cm. long or longer, inclusive of the awns, strictly erect, narrow, subinterrupted at the base, more or less subspiciform but not very dense, branches binate or subsolitary, rather few-flowered, without the awns only up to 2 cm. long, the pedicels up to 7 mm. long or the lateral ones much shorter; spikelets yellowish-purple, glumes 1-nerved, the lower one linear to lanceolate, scabrous on the keel, acute or very shortly awned, 10–11 mm. long, the upper one smooth on the keel, 13–14 mm long, otherwise as the lower one but sometimes minutely emarginate at the summit; lemma inclusive of the callus about 10 mm. long, tubulous, scabrous on the keel and very distinctly so on the upper half part, not narrowed upwards, the subacute, densely bearded callus about 1 mm. long; awns capillary, purplish, scabrous, slightly curved or contorted at the very base, about subequal or mostly the central one longer and about 4 cm. long, the lateral ones mostly $3^1/_2$ cm. long. South America: Argentina. (Pl. CL.) . . . . . **Aristida subulata Henr.**

208. Glumes obtuse or truncate, the lower one sometimes acutish but the upper one always truncate, emarginate or bifid. Old World species. . . . 209.

Glumes very acute, prominently acuminately awned. Species of the New World.

Densely caespitose erect perennial; culms simple, 30 to 50 cm. or sometimes up to 70 cm. high, terete, slightly striate, distinctly scaberulous or hirtellous, sheathed nearly all along, rather few-noded, the nodes placed in lower half part of the culm; sheaths about as long as or longer than the internodes, tight, terete, slightly striate, hirtellous or more or less scabrous-pubescent, becoming glabrous only below, ligule a short ciliate rim, auricles pubescent and somewhat bearded with long white hairs, collar an indistinct pubescent line, becoming glabrous afterwards; blades erect or ascending, rather firm, flat only at the very base, soon becoming involute, scabrous-hirtellous on both surfaces or becoming more or less glabrous beneath, the long setaceous tip scabrous, up to 30 cm. long or sometimes only half as long, expanded 1–2 mm. broad, the margins scabrous, not conspicuously thickened, without bands of sclerenchyma; panicle narrow but rather lax, about 15 cm. long, exserted or at first sheathed by the uppermost leaf, the blades in that case overtopping the panicle, axis subterete or planconvex, sometimes more or less triquetrous, angulous and

scabrous, branches binate, rather stiff, ascending or adpressed, naked below, the lower ones 4—8 cm. long, the upper ones gradually becoming shorter, iterately branched, the branchlets short and adpressed, the flowers rather densely congested at the ends of the branches, pedicels scabrous, rather short, sometimes nearly sessile; spikelets purplish or brownish, erect and adpressed, glumes slightly unequal, acute, distinctly awned, 1-nerved, the lower about 12 mm. long, scabrous on the keel, the upper one smooth on the keel, a little longer; lemma about as long as the glumes or somewhat shorter and only 10 mm. long, tubulous, glabrous and smooth below, gradually narrowed above into a short, straight or scarcely twisted beak, distinctly scabrous from the middle to the summit; awns about equal or commonly the central one somewhat longer than the lateral ones, more or less divergent, slightly curved only at the base but not contorted, very scabrous, the central one 20—25 mm. long, the lateral ones 15—20 mm. long. North America: Arizona to California. (Pl. CL). **Aristida Parishii Hitchc.**

209. Both glumes rather broad, the lower broader than the upper one, not much narrowed upwards, both very obtuse and awned from the sinus; callus of the lemma at least 1 mm. long, densely long-bearded, the hairs much surpassing the true base of the lemma; awns of equal length, not over 15 mm. long.
Grayish-green perennial with an erect more or less contracted, stiff panicle and angulous or subtriquetrous rhachis. . . . . See pag. 210. Forms of **Aristida canescens Henr.** with shortly pedicelled or nearly sessile panicle-branches, consisting of congested spikelets.

Both glumes rather narrow, gradually narrowed upwards, the lower one acutish and not bifid at the summit; callus of the lemma only $^1/_2$ mm. long, shortly hairy, the hairs not or scarcely surpassing the true base of the lemma; lateral awns about 20 mm. long, the central one longer. Densely caespitose perennial with intravaginal innovations; culms erect or somewhat geniculate at the base, up to 40 cm. high, or sometimes shorter, very rarely longer, mostly simple, or sometimes very sparingly branched from one of the lowermost nodes, few-noded, the nodes placed in lower $^1/_4$ part of the culm, terete, slightly striate only, distinctly scabrous; sheaths terete or somewhat keeled, slightly striate, scabrous, especially between the nerves or glabrous afterwards, with hyaline margins, shorter than the internodes, ligule a short ciliate rim, auricles even those of the innovations pubescent only, not bearded.

collar glabrous; blades flat only at the very base, folded or involute, up to 10 cm. long, gradually narrowed upwards into a setaceous point, many-nerved, glabrous or nearly smooth beneath, scabrous-hirtellous on the upper surface, expanded up to 2 mm. broad, those of the innovations convolute throughout; panicle mostly exserted or at first more or less sheathed by the uppermost leaf, about half as long as the whole plant or the lateral and less-developed panicles somewhat shorter, strictly erect or more or less secund or sometimes somewhat drooping at the summit, narrowly contracted but more or less lax, sometimes somewhat effuse and 3—6 cm. broad at the base, axis terete, striate and scabrous, angulous upwards, branches mostly solitary, but divided nearly to the base and bipartite or divided only upwards, the lower ones naked at the base, the upper ones with shorter peduncles and more or less tripartite from the base, becoming nearly sessile, branches terete, capillary, very scabrous, reiterately branched, the branchlets short and the spikelets more or less congested, forming false spikes at the summit of the branches, pedicels scabrous, slightly compressed and subclavate, shorter than the glumes or those of the lateral spikelets much shorter and the spikelets nearly sessile, the latter commonly purplish or not rarely yellowish, erect and adpressed or more or less spreading and sometimes somewhat drooping; glumes unequal, 1-nerved, linear to lanceolate, the lower 7—8 mm. long, subacute or subobtuse, scabrous on the keel, the upper one smooth on the keel, 9—10 mm. long, very obtuse, distinctly bifid at the apex with a mucro from the sinus; lemma 8—9 mm. long, tubulous, glabrous and punctulate or glabrous only below and very scabrous from the middle to the summit, slightly or scarcely narrowed above; awns scabrous, capillary and subulate, triquetrous at the base, unequal, erect or somewhat divergent, the central one up to 25 mm. long, the lateral ones 18—20 mm. long. Southern Europe: southern Italy and south east Spain; North Africa: from Tunis and Algeria to Morocco, west to Madera and the Canarian Islands; Orient: Syria, Palestine and Arabia to Abyssinia, east to Persia. (Pl. CLI.) . . . . . **Aristida coerulescens Desf.**

Plant more elegant, with quite simple culms, the panicles more contracted, strictly erect and very narrow, all the branches nearly sessile, spikelets bearing to the base, lemmas more prominently scabrous, otherwise as the type. Orient: Sinai and Arabia to Abyssinia. . . . . **var. arabica Henr.**

210. Culms 1 mm. or more thick, blades rather firm, longer than 10 cm., glumes equal or somewhat unequal but rather long, always more than 7 mm. long, lemmas longer, 8—11 mm. long, only the upper glume sometimes bifid with a mucro from the sinus. Plants not very elegant, more than 20 cm. high. . . . . .211.

Culms only $^1/_2$ mm. thick, blades capillary, 6—7 cm. long or shorter, glumes somewat unequal, the lower 5 mm. only, the upper one $6^1/_2$ mm. long, both bifid at the apex with a mucro from the sinus, lemma about 7 mm. long. Plants elegant, up to 20 cm. long or shorter.
Rather densely caespitose with intravaginal innovations; culms strictly erect, together with the panicles up to 20 cm. high, elegant and simple or slightly branched below, glaucous, slightly striate, glabrous; sheaths shorter than the internodes, compressed, slightly striate, glabrous, ligule minutely ciliate, very short, auricles rather long-bearded; blades very narrow, capillary, convolute throughout, 6-7 cm. long or shorter, glabrous beneath, hirtellous on the upper surface, scabrous upwards, the base and especially the margins with scattered long white hairs, gradually long-acuminate; panicle strictly erect, contracted but not spiciform, axis subterete, glabrous and smooth or slightly scabrous above, the filiform, mostly strictly erect branches binate or subsolitary, the longer one elongated, naked at the base, the shorter one less peduncled or nearly sessile, all the branches rather few-flowered, the pedicels scabrous; spikelets yellowish-green, erect, sometimes tinged a little with purple, glumes distinctly unequal, 1-nerved, the lower somewhat scabrous on the keel, only 5 mm. long, the upper one about $1^1/_2$ mm. longer, smooth on the keel, both somewhat bifid, shortly but distinctly awned from the sinus; lemma about as long as the upper glume or but very slightly longer, the densely and long-bearded callus subacute or subobtuse and about $^1/_2$ mm. long, the body glabrous below, scaberulous upwards and slightly narrowed but not beaked; awns scabrous, suberect or slightly spreading, about equal, the central one up to 20 mm. long, the lateral ones a few mm. shorter, up to 18 mm. long. South America: Venezuela. (Pl. CLI.) . . . . . .
. . . . . **Aristida Pittieri Henr.**

211. Glumes and lemmas more than 1 cm. long. . . . . .212.
Glumes and lemmas less than 1 cm. long. . . . . .213.

212. Lower and upper glume acute or acuminate, more or less scabrous; lemma smooth, scabrous only just below the branching point of the awns; callus of the lemma about 1 mm. long, awns $3—3^1/_2$ cm. long
Caespitose perennial with few innovations; culms erect, 30—50 cm.

high, terete, striate, slightly scaberulous or smooth, dichotomously branched from the base and the lower nodes; sheaths shorter than the internodes, somewhat compressed, striate, somewhat scaberulous or smooth, the lower ones slipping from the stems, the upper ones tight, ligule a densely ciliolate rim, auricles distinctly bearded; blades narrow, complicate or convolute, glaucous-green, expanded 1–2 mm. broad, 15–20 cm. long, long-acuminate with somewhat thickened margins, hirtellous on the upper surface, nearly or quite smooth beneath, with scattered long white hairs near the base; panicle strictly erect, narrow but rather lax, interrupted at the base, up to 20 cm. long, $^1/_2$—1 cm. broad, axis angulous, scaberulous, branches solitary or subbinate, short, erect, scabrous, naked at the base, the branchlets rather few-flowered, short or nearly sessile; spikelets yellowish-green or more or less purplish with scaberulous pedicels, the latter as long as the glumes or the lateral ones much shorter, glumes somewhat unequal, 1-nerved, acuminate and shortly awned, the lower 10—11 mm. long, scaberulous nearly all over, the keel scabrous, the upper one 11—12 mm. long, nearly smooth, the keel smooth; lemma inclusive of the 1 mm. long callus, 9—10 mm. long, tubulous, very slightly narrowed upwards, smooth and minutely punctulate below, scabrous only upwards below the awns and there with a faint nodule, scarcely beaked or not, the subacute callus densely bearded; awns about equal, erect or slightly spreading, very scabrous, the central about 35 mm. the lateral ones about 30 mm. long. South America: Columbia to Venezuela. (Pl. CLII.) . . . . . **Aristida Moritzii Henr.**

Lower glume acuminately awned, upper one subobtuse, erosely bifid with a mucro from the sinus, both smooth on the back; lemma scabrous from below the middle to the summit; callus about 2 mm. long, awns about 2 cm. long.

Densely caespitose perennial; culms erect, few in a tuft, 50—60 cm. high inclusive of the panicle, simple, 3—4-noded, the nodes equally distributed, terete or subcompressed, manifestly striate, glabrous; sheaths about half as long as the internodes, terete or subcompressed, keeled upwards, striate-grooved, nearly glabrous or minutely scaberulous with hyaline purplish margins, ligule a short ciliate membrane, auricles pubescent, those of the innovations long-bearded; blades folded or more or less involute, flat only at the very base, 10—15 cm. long, expanded up to 2 mm. broad, those of the innovations shorter and convolute throughout, glabrous beneath, scabrous on the upper surface and also villous with scattered long hairs near the base, with slightly thickened scabrous margins, gradually narrowed and pointed; panicle

narrow, contracted but somewhat lax, 10—15 cm. long, subinterrupted especially at the base, axis subterete, very slightly scabrous, branches strictly erect and adpressed, more or less distant, solitary or bi-tripartite from the base, scaberulous, the longer ones up to 5 cm. long, somewhat naked at the base, the other ones nearly sessile, more or less densely flowered, the pedicels scaberulous, slightly compressed, somewhat or much shorter than the glumes; spikelets yellowish-purple, glumes somewhat unequal or about equal, 10—12 mm. long, 1-nerved, the lower one acuminate, awnpointed, sometimes with an additional side-nerve, scabrous on the keel, upper one smooth on the keel, erosely dentate at the summit with a short awn from the sinus; lemma 11—12 mm. long, inclusive of the 2 mm. long, subacute, densely bearded callus, the body mottled with purple, glabrous below, scaberulous upwards, narrowed but scarcely beaked, with an indication of a faint nodule below the branching-point of the awns, the latter somewhat unequal, slightly divergent, capillary, not contorted at the base, very scabrous, the central one up to 30 mm. long, the lateral ones up to 25 mm. long. West Indian Islands: Porto Rico. (Pl. CLII.) . . . . . **Aristida Chaseae Hitchc.**

213. Culms spreading, much branched, with few innovations; panicles rather long, blades rather short, the lemmas with short, about 14—15 mm. long awns.

Laxly caespitose perennial; culms erect or ascending, inclusive of the panicles 50—70 cm. high, terete or slightly compressed, striate, glabrous or minutely scabrous, 3—4-noded, the internodes long, 10—15 cm. or the lowermost one shorter, not obtected; sheaths slipping from the stems, compressed-keeled below, striate and slightly scabrous, shorter than the internodes, with hyaline margins, ligule a ciliolate short rim, auricles even those of the sterile shoots pubescent only, never bearded; blades narrowly convolute or flat at the base only, up to 15 cm. long or longer, expanded 1—1½ mm. wide, glabrous beneath, scabrous on the upper surface and villous with scattered long white hairs on the lower part, especially near the base, the blades gradually narrowed upwards into a long, setaceous point; panicle up to 20 cm. long, narrow but loose, very interrupted especially below, with distant, erect or ascending branches, axis terete, striate and smooth below, angulous and scaberulous upwards, branches binate, erect and adpressed or ascending, the longer ones up to 7 cm. long, naked at the base for about 1—1½ cm., many-flowered, reiterately branched, the branchlets short and adpressed, the secondary branches short, only a few cm. long, shortly peduncled or sessile, few-flowered, branchlets and pedicels

scaberulous, the latter more or less compressed, shorter than the glumes or the lateral spikelets nearly sessile; spikelets yellowish-green, erect, glumes linear-lanceolate, 1-nerved, glabrous, the lower scabrous on the keel, acuminately awned, about $7^1/_2$ mm. long, the upper one smooth on the keel, $8-8^1/_2$ mm. long, distinctly bifid at the summit, the lateral setulae very prominent, awned from the sinus; lemma mottled, glabrous and punctulate below, scaberulous upwards, especially below the awns and with a distinct nodule at the summit, the acute, densely rather long-bearded callus about 1 mm. long, the tubulous lemma inclusive of the callus about $8^1/_2$ mm. long, slightly narrowed above but scarcely beaked; awns erect or somewhat spreading, scabrous, not contorted at the base, capillary, about equal, up to 15 mm. long or slightly shorter, the central one slightly longer. West Indian Islands: Virgin and Windward Islands. (Pl. CLIII.). . . . . **Aristida cognata Trin. et Rupr.**

Culms erect, simple or more or less branched, with numerous, erect innovations; panicles rather short, blades very long as much as 30 cm., the lemmas with longer, up to 25 mm. long awns.

Densely caespitose perennial; culms 40—50 cm. high inclusive of the panicles, 2—3-noded, the internodes long, erect or somewhat geniculate at the nodes, terete or slightly compressed, striate, glabrous or slightly scaberulous; sheaths tight or more or less slipping from the stems, compressed-keeled below, shorter than the internodes, striate or grooved upwards with hyaline margins, ligule a short ciliate rim, auricles, also those of the innovations pubescent and bearded with long hairs, the hairs afterwards becoming deciduous and wanting in old leaves; blades very narrow, convolute or involute nearly throughout, subsetaceous, 15—30 cm. long, the lowermost commonly shorter than 15 cm., setaceously acuminate, long-pointed, expanded scarcely 1 mm. broad, glabrous beneath, scabrous to hirtellous on the upper surface, more or less villous near the base with long deciduous hairs; panicle narrow, loose and interrupted, up to 15 cm. long or much shorter, axis angulous or triquetrous, slightly scaberulous, branches erect or ascending, binate, the shorter ones 1—3 cm. long, shortly peduncled or nearly sessile, the longer and lower branches 5 cm. or as much as 7 cm. long, usually rather lax and several-flowered, the secondary branches few-flowered, the lower primary branches naked at the base, the branchlets and pedicels scabrous, the latter compressed and subclavate, shorter or as long as the glumes, or the lateral flowers subsessile; spikelets erect, yellowish-green, somewhat tinged with purple, glumes somewhat unequal, 1-nerved, linear-lanceolate, lower

one scabrous on the keel, acuminate and shortly awned, 7–8 mm. long, the upper one smooth on the keel, about 1 mm. longer, bifid at the apex with a short awn from the sinus; lemma tubulous, with an acute, densely hairy, $^1/_2$—$^3/_4$ mm. long callus, the body of the lemma about as long as the upper glume, glabrous below, scabrous above, especially at the summit, slightly narrowed into a very short, minutely twisted beak, commonly with a distinct but faint nodule just below the branching-point of the awns; awns slightly unequal, capillary, scabrous, not contorted at the base, the central one about 25 mm. long, the lateral ones about 20 mm. long. West Indian Islands: Jamaica, also on Curaçao. (Pl. CLIII.) . . . . . .
. . . . . **Aristida Swartziana Steud.**

214. (*148.*) Glumes unequal, the lower or both shorter than 1 cm., mostly one of them or both bifid at the summit or rarely both acutish and rather abruptly awned; lemma shorter than 8 mm. or much longer with a subobtuse or very obtuse callus. . . . . 215.

Glumes equal or nearly so, about 1 cm. long, both acute and shortly awned; lemma about 8 mm. long with an acute callus.

Elegant, much branched or sometimes simple plant; culms very slender, erect or somewhat geniculate at the nodes, very thin, inclusive of the panicles 20—40 cm. high. terete, minutely striate, glabrous or scaberulous below the panicle, 5–6-noded, the nodes in lowermost part of the culm; sheaths glabrous, prominently striate, compressed-keeled, tight or gaping above, longer than the internodes, ligule a short, ciliolate rim, auricles slightly pubescent only, collar glabrous; blades mostly involute and setaceous, or flat below, mostly less than 10 cm. long and scarcely 2 mm. broad when expanded, ending in a setaceous point, glabrous or slightly scabrous beneath, scabrous and strongly nerved on the upper surface; panicle long-exserted, narrow and slender, rather depauperate, very loosely flowered, 10–20 cm. long or the panicles of the lateral branches much shorter, interrupted nearly all over, axis scabrous, subterete or angulous, branches very short, binate or not rarely solitary, each branch bearing but one spikelet, branches very distant, strictly erect, if binate, one branch peduncled and the other subsessile, the pedicels subcompressed and subclavate, scaberulous, shorter than the glumes; spikelets purplish, glumes about equal or slightly unequal, 1-nerved, both manifestly awned, the lower scabrous on the keel, about 8—9 mm. long, gradually narrowed into the scabrous, 1—$1^1/_2$ mm. long awn, the upper glume smooth on the keel, about as long as the lower one or slightly longer, more abruptly narrowed into the scabrous, $1^1/_2$ mm. long awn; lemma

6—8 mm. long, 3-nerved, scabrous on the keel and on the back upwards, not or scarcely beaked, the acute, densely hairy callus about $^3/_4$ mm. long; awns scabrous, capillary, about equal or the lateral ones slightly shorter, erectly spreading or somewhat divergent, the central one mostly 20 mm. long, the lateral ones 15–18 mm. long. North America: Indiana and Iowa to Mississippi and Texas. (Pl. CLV.) . . . . . **Aristida intermedia Scribn. et Ball**

215. Glumes very obtuse and rather broad, both erose, bifid, with a mucro from the sinus. . . . . 216.
Glumes acute or subacute and minutely awned, at least the lower one, the upper one commonly obtuse and bifid, with a mucro from the sinus. 217.

216. Glumes quite glabrous and smooth, only the lower one slightly scaberulous on the keel; spikelets very small, the lower glume 3 mm. long, the upper one 4—4$^1/_2$ mm. long and as long as the lemma; awns short, 5—7 mm. long, panicle few-flowered, very narrow and much interrupted; leaves very narrow, setaceous.
Very elegant, slender plant; culms erect or somewhat ascending, mostly up to 25 cm. high inclusive of the panicle or sometimes longer and as much as 40 cm. high, simple or commonly branched from the lower and most of the upper nodes, terete, filiform, only $^1/_3$ mm. thick, the nodes thicker and up to $^3/_4$ mm. in diam., striate or sulcate, glabrous, 3-more-noded; sheaths striate or grooved, greenish-purple, glabrous, compressed or slightly keeled above, tight or at the base more or less slipping from the stems, shorter than the internodes, ligule short, a ciliolate membrane, auricles scarcely pubescent with a glabrous collar; blades convolute-filiform, or folded at the base, very narrow, sulcate, many-nerved with scaberulous margins, glabrous beneath, slightly scaberulous on the upper surface, more or less curved or flexuous, the upper ones 10—20 cm. long or sometimes shorter than 10 cm., the lower blades commonly shorter, scarcely $^1/_2$ mm. broad, gradually narrowed into a long setaceous point; panicle simple, very narrow, much interrupted, rather depauperate, scarcely 10 cm. long or in robust specimens up to 15 cm. long, axis subterete, slightly angulous, nearly quite glabrous and smooth, nearly visible all over, branches distant, erect and adpressed, scaberulous, binate or tripartite from the base, the longer ones up to 2 cm. long, naked at the base for about $^1/_2$ cm., few-flowered not rarely only 2-flowered, the other branches nearly sessile and not rarely 1-flowered, the spikelets pedicelled, the pedicels scabrous, sometimes as long as the lower glume or mostly much shorter and the spikelets subsessile; glumes

yellowish-purple, 1-nerved, unequal, the lower oblong-lanceolate, scaberulous on the keel, mucronate at the summit from between two rounded very obtuse lobes, the mucro not surpassing the lobes, upper glume narrower, smooth on the keel, lanceolate, rounded at the distinctly bifid summit with a mucro from the sinus, the mucro slightly exserted above the lobes; lemma slightly keeled or tubulous, 3-nerved, glabrous, punctulate, slightly scabrous upwards on the keel, not narrowed above, the callus about $^3/_4$ mm. long and densely hairy, especially below; awns scabrous, erectly spreading, slightly unequal, the central one about 7 mm. long, the lateral ons 1—2 mm. shorter. Mauritius and Reunion. (Pl. CLV.) . . . . . .
. . . . . **Aristida mauritiana Kunth**

Glumes more or less scabrous, especially the lower one; spikelets longer, the lower glume mostly 6—6$^1/_2$ mm. long, the upper glume about 8 mm. long, the lemma longer than the upper glume and up to 10 mm. long, rarely the spikelets smaller but never so small as in *A. mauritiana* and the lemma always longer than the upper glume; awns longer about 15 mm. long or in dwarf varieties only half as long; panicle many-flowered, somewhat lax, blades broader and firmer, dwarf plants have short and very narrow blades and a much reduced, very short panicle.

More or less elegant or somewhat robust plant, commonly about 20 cm. high or sometimes much longer and up to 50 cm. high, sometimes very dwarf; culms erect or somewhat ascending, $^1/_2$ mm., or in robust specimens more than 1 mm. thick, more or less branched from the base and most of the lower nodes, terete, striate, very distinctly scabrous between the nerves; sheaths shorter than the internodes, tight or mostly slipping from the stems, more or less compressed-keeled and more or less scabrous, striate or sulcate, with hyaline margins, ligule a minute ciliolate rim, auricles pubescent, collar glabrous; blades more or less white-keeled beneath, flat at the base and about 1—1$^1/_2$ mm. broad there, convolute upwards or not rarely convolute throughout and folded at the base, gradually narrowed but without a long-setaceous tip, the summit rather obtuse or acutish only, scarcely 10 cm. long, mostly shorter or the lower ones only 5 cm. long, in dwarf specimens much reduced, many-nerved, glabrous beneath, scabrous-hirtellous on the upper surface, the margins conspicuously thickened; panicle exserted, narrow but rather dense and up to 15 cm. long and 1—2 cm. broad, or shorter and narrower, mostly linear and less than 1 cm. broad, or very short in dwarf specimens, more or less interrupted at the base, the branches adpressed and erect,

axis scabrous, terete below, substriate and angulous upwards, branches scabrous, binate or commonly bipartite nearly from the base, the longer branches more or less peduncled and sometimes 4—5 cm. long inclusive of the spikelets, commonly much shorter, the shorter branches subsessile, mostly rather few-flowered or sometimes densely flowered and the branches forming false spikes about as long as the internodes of the axis, with congested spikelets, the branchlets scabrous, the rough pedicels rather short or nearly sessile; spikelets yellowish or greenish, tinged with purple, pale at maturity, glumes of the typical forms, (with exception of the dwarf varieties), rather long, linear-lanceolate to lanceolate-oblong, unequal, 1-nerved, the lower up to 7 mm. long, very scabrous on the keel and more or less so on the back, distinctly emarginate at the summit with subobtuse lobes and an exserted mucro, the upper glume about 8 mm. long, smooth on the keel below, scabrous upwards, especially the whole upper half part of the glume, with a very distinct bifid summit and a mucro or short awn from between the subobtuse lobes; lemma tubulous or somewhat compressed, scabrous on the keel, punctulate all over, longer than the upper glume, up to 10 mm. long, not narrowed upwards, the acute, densely hairy callus about $^1/_2$ to $^3/_4$ mm. long; awns erect or more or less spreading especially the central one, very scabrous, slightly unequal, the central one about 20 mm. long or somewhat longer, the lateral ones about 15 mm. long. South Africa: From the coast and central region to Griqualand and Orange Free State, west to Little and Great Namaqualand. (Pl. CLVI.) . . . . . .
. . . . . **Aristida curvata Trin. et Rupr.**

Dwarf, inclusive of the panicles up to 5 cm. high, blades very short, complicate throughout, panicle half as long as the whole plant, very depauperate, nearly simple, linear, scarcely exserted, the branches very short, 1-flowered, binate or solitary, erect and adpressed, glumes shorter than in the type, 5 and $6^1/_2$ mm. long, the lemma up to 8 mm. long, awns shorter than in the type, about equal, 8 mm. long or the lateral ones slightly shorter. Little Namaqualand . . . . . .
. . . . . **var. nana Henr.**

217. Glumes not very unequal, the lower one more than $^2/_3$ as long as the upper one, the upper glume distinctly bifid with a mucro from the sinus or sometimes abruptly awned and acuminate without lateral setae. 218. Glumes very unequal, the lower not over $^2/_3$ as long as the upper one, generally shorter, up to 6 mm. long, the lemma mostly shorter than

the upper glume and about $8^1/_2$ mm. long, the awns about 20 mm. long, blades thin and setaceously convolute, panicles very loose and open, the branches thin and capillary, curved and flexuous, naked at the base. Indian species.

Annual or sometimes, if well-developed, with a few sterile innovations and probably in that case a subperennial plant, but the root-system rather faint. Culms elegant, filiform, erect or often decumbent at the base, much branched from the lower nodes, dwarf or up to 1 meter high, inclusive of the panicles, terete, slightly scaberulous and substriate, sheaths gaping, more or less compressed below, slipping from the stems or the upper ones and those of the sterile shoots tight, slightly scaberulous and striolate, a little shorter or as long as the internodes, especially the lower ones, ligule a minute ciliate rim, auricles and collar naked, blades thin, very narrow, more or less setaceously convolute, shorter or longer and sometimes up to 20 cm. long, acute, setaceously pointed; panicle subsecund, very loose and open, interrupted, the axis visible nearly throughout, the latter subterete or striately grooved, scaberulous, panicles sometimes depauperate, in well-developed specimens the branches semiwhorled or tripartite from the base, filiform, erectly ascending or more or less flexuous, peduncled, but with one or more subsessile branchlets at the base, the panicles sometimes up to 20 cm. long, rather narrow and rarely more than 3 cm. broad, the branches becoming shorter upwards, binate or subsimple and less-flowered than the lower ones, spikelets with scaberulous or hirtellous, triquetrous pedicels, slightly thickened below the glumes, mostly greenish or yellowish to straw-coloured, erect and adpressed to the branchlets, not rarely forming short false spikes at the end of them, in depauperate panicles erectly adpressed and the whole panicle more dense and less interrupted; glumes very unequal, not rarely the lower nearly half as long as the upper one, commonly not longer than $^2/_3$ the length of the upper one, the lower one scabrous on the keel and not rarely scaberulous to slightly hirtellous on the back, equally broad, not much narrowed above, pointed or subacute, commonly 6 mm. long, the upper one $8^1/_2$–9 mm. long or rarely longer, scabrous on the keel only, otherwise glabrous, agreeing in form with the lower one, linear, obtuse at the tip, slightly bifid with a mucro; lemma slightly longer or mostly shorter than the upper glume, commonly 8 mm. long, more or less flattened or compressed, scabrous on the keel, not much narrowed upwards, nearly equally broad towards the branching-point of the awns, the about $^3/_4$ mm. long, long bearded callus with an obtuse point, the hairs gradually becoming longer upwards, awns scabrous, subtriquetrous,

slightly flattened at the base, strictly erect or slightly spreading, up to 20 mm. long or the lateral ones a little shorter. British India, from the Nilghiri Hills throughout India to Bengal, east to Burma and Tonkin, north to Tibet. (Pl. CLVI.) . . . . . **Aristida depressa Retz.**

Note: Although in many characters approaching or agreeing with those of the, in many tropical regions widely distributed, *A. adscensionis* L., and identified by authors with that species or taken up as a variety, the species treated here, is characterized by the constant combination of different morphological characters and has such a limited geographical distribution, that it is worthy of specific rank, only there where the two species are linked together, we may expect forms of hybrid origin, which are not easy to determine, although in the genuine region of the species the aspect is striking enough.

218. Awns of the lemma terete or mostly subtriquetrous, sometimes narrowly winged only at the very base, without broad hyaline margins. . . . 219.

Awns of the lemma triquetrous above, very flat over a long distance with a thick green midnerve and hyaline rather broadly winged margins. Glumes slightly unequal, but 1 mm. differing in length. the lower distinctly awned, the upper truncate at the apex and the nerve excurrent as a short awn. Plants dichotomously branched with rather thick culms, the panicles rather compact and spiciform, somewhat interrupted. Rather robust African species.

Annual, without innovations, culms strictly erect, sometimes ascending at the base, dichotomously branched from most of the lower nodes, rather thick, ($\pm$ 2 mm.), together with the panicle 50—70 cm. high, many-noded, the culm-nodes swollen and protruding above the dark annular sheath-nodes, terete, distinctly scabrous, striate, the internodes rather equally distributed; sheaths not much compressed, subterete, striate, scabrous, with hyaline margins, slightly shorter than the internodes, slipping from the stems or at least gaping upwards, ligule a short ciliolate rim, auricles distinctly ciliate, collar a thickened crenulate, glabrous, or sometimes slightly puberulous margin; blades flat or not rarely becoming involute afterwards, $1^1/_2$ or nearly 2 mm. broad, 15—20 cm. long, or those of the lower parts much longer and not rarely 30—40 cm. long, very scabrous on both surfaces, with some narrow bands of sclerenchyma, especially along the very scabrous margins; panicle contracted, often secund by the lax and laterally curved branches, the axis thick, terete, scaberulous, visible in lower

part, the branches very thin, peduncled, scabrous, semiwhorled, (bi-multipartite from the base), the lower somewhat spreading or flexuous, longer than the internodes of the panicle, the upper ones dense and strictly erect, shorter peduncled, pedicels short, subterete, scabrous; spikelets greenish-purple, yellowish at maturity, erect, densely congested, glumes 1-nerved, linear-lanceolate, the lower scabrous on the keel and often more or less so on the back, about 6 mm. long, equally broad below over a long distance, gradually narrowed only below the tip, prominently awned, the upper one smooth on the keel and on the back, linear, distinctly awned from between two acutish or mostly subobtuse lobes, about 7 mm. long, lemma mostly slightly longer than the glumes, 8—9 mm. long, much compressed, 1—3-nerved, the keel very scabrous upwards, otherwise glabrous, punctulate, not narrowed upwards, the about $^1/_2$ mm. long, obtuse callus, densely bearded, awns subequal or slightly unequal, very scabrous, flat and distinctly winged, about 15 mm. long. Tropical Africa: From Southern Somaliland and Uganda, south to Nyasaland, Rhodesia and Mozambique, west to Angola. (Pl. CLVII.). . . . . .
. . . . . **Aristida submucronata Schumacher**

Glumes slightly longer, 7 and 8 mm. long, the upper one often scabrous on the keel upwards; lemma 9—11 mm. long, scabrous in upper half, especially below the awns, mostly 3-nerved, slightly narrowed upwards but not beaked, awns longer, 18—22 mm. long, the lateral ones 14—18 mm. long. Tropical Africa: Same range as the species, but also from South Angola to southern Damaraland. . . . . .
. . . . . **var. scabra Henrard**

219. Upper glume never emarginate or bifid, gradually, or sometimes more or less abruptly narrowed into the very distinct scabrous awn, or sometimes awnless but in that case always very acute without any trace of lateral setulae.

Very variable as to the vegetative parts and the shape of the inflorescence, more or less branched from the base and some of the lower nodes, rarely subsimple, not rarely dwarf in very high regions, much elongated and up to 50 cm. long in well-developed robust specimens and than with a dense, oblong not rarely spiciform panicle, culms terete and substriate, few- or many-noded, the sheaths quite tight or in branched specimens slipping from the stems, shorter than the internodes, often subcompressed, scaberulous or smooth, never with long hairs, ligule a short ciliolate rim, auricles smooth or minutely

ciliolate, collar always glabrous, blades linear, flat or not rarely becoming inrolled afterwards, long-pointed, commonly scabrous on both surfaces or at least on the upper one, very different in length, very small in dwarf specimens, elongated in robust forms; panicle very variable in form and outline, mostly subcontracted, commonly short, often depauperate, sometimes with longer, more or less spreading branches and laxly flowered, or very dense and oblong with congested spikelets on shorter pedicels; spikelets pale, tinged with red, or purplish; glumes linear-lanceolate, the lower one broadest, narrowed only in upper part and acuminately awned, scabrous on the keel, 7 mm. long, the upper one about 10 mm. long, nearly smooth, or the midnerve scabrous only at the tip, distinctly acuminate and awned, rarely the awns less developed and the glumes acute only; lemma about as long as the upper glume, slightly narrowed upwards but not beaked, smooth or slightly scaberulous in upper half or below the awns, awns scabrous, slightly spreading, about 15 mm. long or the central one somewhat longer. In the vegetative parts and shape of the panicle agreeing with typical *A. adscensionis*, but very distinct in the spikelet-characters. South America: High Andes. Ecuador, Peru, Bolivia and Chili. (Pl. CLIX.)
. . . . . **Aristida adscensionis L. subsp. bromoides Henr.**

Upper glume always distinctly emarginate or bifid at the summit and with a very distinct mucro or short awn from between the acutish or obtuse lobes.

In the vegetative characters and in form and outline of the inflorescence very variable, agreeing as to the former ones, with the subspecies mentioned above, the panicle-characters still more variable, in some varieties very narrow and elongate, in others very interrupted or not rarely divaricately spreading with branches naked at the base and drooping spikelets at the end of them; spikelet-characters extraordinarily variable in the different forms and even in the same specimen. Widely distributed species in the New and Old World. North America from the southern United States (Texas, New Mexico and Arizona) to southern California, common in Mexico; West Indian Islands, south to Columbia and the lower regions of the Andes, but rare in Brazil, to Argentina. Africa, from the northern parts to the tropical regions, west to the Senegal and the Canarian Islands, east to Egypt and Abyssinia, Arabia and Persia to China. Not observed in the malayan regions and in Australia. (Pl. CLVII.) . . . . . .
. . . . . **Aristida adscensionis L.**

Lemmas very long, much exceeding the glumes not rarely twice as long as the lower one, nearly equally broad from the base to the branching-point of the awns.

Lemmas tuberculate, very scabrous by thick, hyaline, hooked or curved, white, fragile hairs, placed in longitudinal rows, the background dark purplish at maturity, lower glume mostly pubescent, 7—8 mm. long, upper one 9—12 mm. long, obtusely bifid, lemma 14—15 mm. long, panicles if dense and contracted, 10—15 cm. long. sometimes very narrow, linear and depauperate, not rarely very lax, with distant, flexuous, spreading branches. Abyssinia and Eritrea to Arabia and Persia. (Pl. CLVIII.) . . . . . **var. Ehrenbergii Henr.**

Lemmas not tuberculate, smooth or scabrous only, no hyaline, fragile hairs, lower glume pubescent or not.

Lemmas quite smooth, with exception of the keel, which is scabrous upwards, lower glume 7—8 mm. long, upper one 9 mm. long, lemma mostly 12—13 mm. long, awns about 2 cm. long, the lateral ones distinctly shorter; panicle dense and contracted or loose and open as in the preceding variety. From the Senegal to Algeria, Eritrea to North Somaliland and Abyssinia, Arabia to Syria. (Pl. CLVIII.) . . . . . **var. festucoides Henr.**

Lemmas distinctly rough all over, or at least scaberulous upwards and on the keel.

Lemma very long, up to 17 mm., very flat, slightly narrowed at both ends, twice as long as the about 8 mm. long upper glume, which is bifid with only a mucro from the sinus, lower glume glabrous, $4^1/_2$ mm. long, lemma slightly scaberulous only, especially upwards, awns about $2^1/_2$ cm. long, slightly unequal; plants mostly very dwarf, with more or less compact panicles. Algeria, Egypt and Sinai to Palestine and Arabia. (Pl. CLVIII.) . . . . . **var. pumila Coss. et Durieu**

Lemma not so very long, only about 10 mm. long or but slightly longer, not so very flat, equally broad or only slightly narrowed to the summit, the upper glume mostly 8 mm. long, the lower one 6 mm. long, not rarely distinctly pubescent on the back, both glumes more distictly awned, the upper one not truncate only but with a prominent

awn from the sinus, awns of the lemma erect, the lateral ones 15 mm. long, the central one somewhat longer; plants more robust, mostly more than 50 cm. high, never dwarf, with very open and lax, straw-coloured panicles, the branches rather long, erectly or divaricately spreading, more ore less flexuous or drooping at the summit. Southern Egypt and Eritrea to Arabia, south to Abyssinia, Uganda and Zansibar, west to Belgian Congo in forms approaching to the *var. guineensis.* . . . . . **var. aethiopica Durand en Schinz**

Lemmas not very long, not longer than the glumes, only about as long as the upper one or if sometimes a little longer, distinctly gradually narrowed to the summit.

Blades very narrowly linear, setaceously filiform or capillary, rather short, sometimes only 3—5 cm. long, often divaricately spreading or even reflexed, very acute, panicle very narrow, rather long and subinterrupted, meagre but not few-flowered, with adpressed short branches, culms very elegant, up to 3 dm. high, the branches adpressed; glumes pale greenish, the lower acute, $3^1/_2$—4 mm., the upper one $5^1/_2$—6 mm. long, lemma $6^1/_2$—8 mm. long, asperulous throughout, awns 10—12 mm. long. Island Sokotra. . . . . **var. angustifolia Pilger**

Blades mostly longer, not narrowly filiform and capillary, often flat, or if inrolled, always firmer not spreading or reflexed, mostly suberect, lemmas smooth or scaberulous, always scabrous on the keel.

Panicles long, very dense, with numerous congested spikelets, or rather dense, more than 20 cm. long, distinctly spiciform, not interrupted or at the base only.

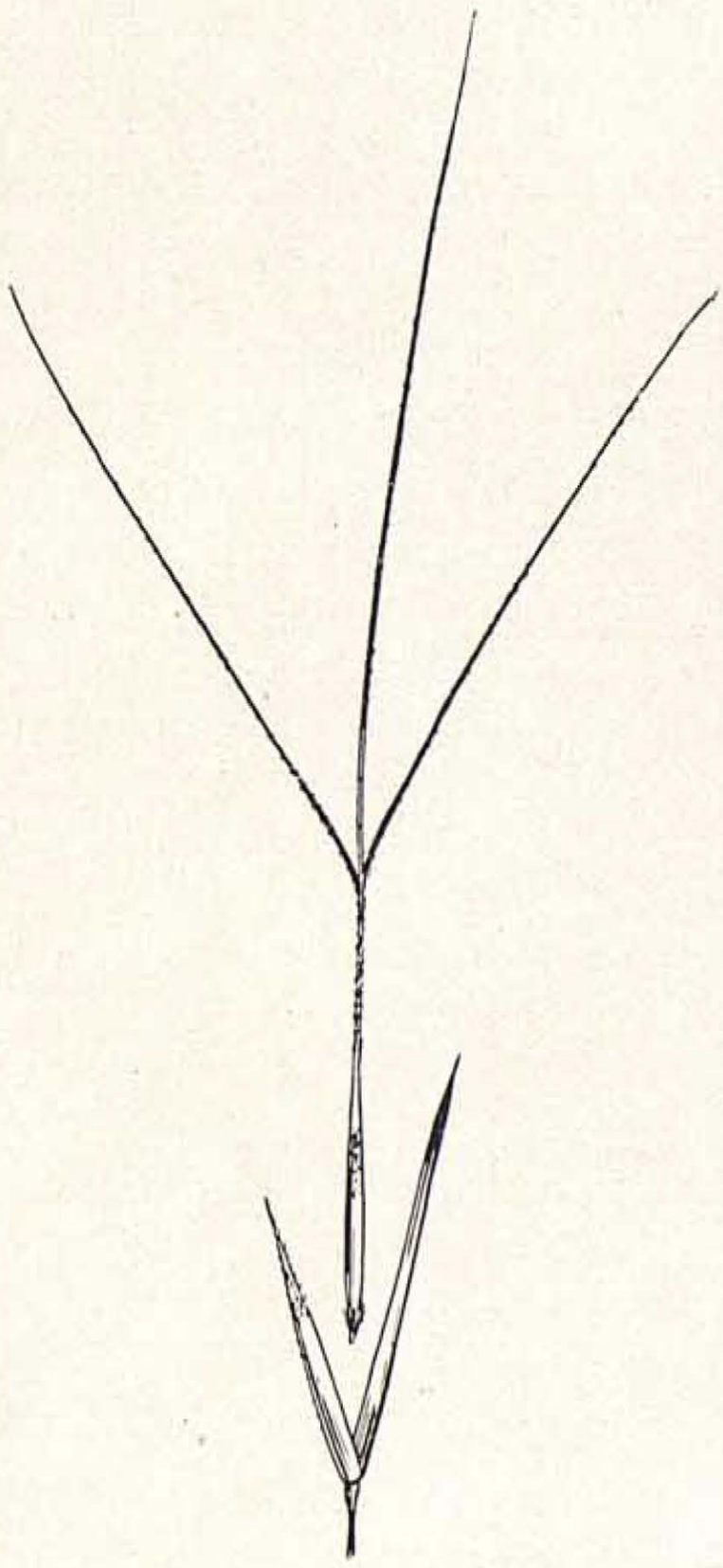
Plants robust, with thick, firm culms and erect panicles with adpressed branchlets, spikelets bearing to the base, panicles not or scarcely interrupted, glaucous-green, spikelets as in typical *A. adscensionis*, but glumes and awns longer. There occur intermediate forms between this variety and the var. *typica.* Argentina. . . . . **var. condensata Henr.**

Plant high, but not so robust, not glaucous-green or but slightly so, panicles long and many-flowered but the branches thinner and more erectly spreading, somewhat

naked at the base below, hence slightly interrupted there, spikelets as in typical *A. adscensionis*, but all parts smaller and the whole panicle very elegant. Lower glume about 5 mm. long, acute or shortly awned, upper one 6 mm. long, very obtuse, slightly awned from the sinus, lemma as long as or a little longer than the upper glume, awns mostly unequal, the lateral ones scarcely 10 mm. long, the central one distinctly longer. West Africa, from Upper Guinea (Southern Nigeria) to Lower Guinea (Portuguese and Belgian Congo). Uganda and British East Africa to southern Rhodesia. (Pl. CLIX.) . . . . **var. guineënsis Henr.**

Panicles short, always less than 20 cm. long, commonly much shorter, if sometimes long, than never spike-like but rather loose and lax and than always much interrupted, in depauperate or dwarf forms the panicle often rather dense and very compact but never over 10 cm. long and not interrupted in that case. Very variable as to the shape of the inflorescence, the latter often dense and spiciform, more or less interrupted with adpressed branchlets (*svar. spicigera*) or very elegant and up to 60 cm. high plants with very meagre, long and narrow interrupted panicles and branches naked at the base (*svar. vulpioides*) or in fertile soil very robust plants, the panicles very loose and open and very interrupted (*svar. interrupta*) with many intergrading forms between them; spikelets less variable, commonly the glumes glabrous, the lower scabrous only on the keel, 5–8 mm., the upper one 6—9 mm. long, the lemma commonly up to 10 mm. long, mostly quite smooth or the keel scabrous, or in *svar. abyssinica* with scabrous lemmas and the glumes, at least the lower one often puberulous or scabrous. Distribution given under *A. adscensionis* on pag. 322. . . . . **var. typica Stapf.**

(Published 1 Juli 1932).



× 10

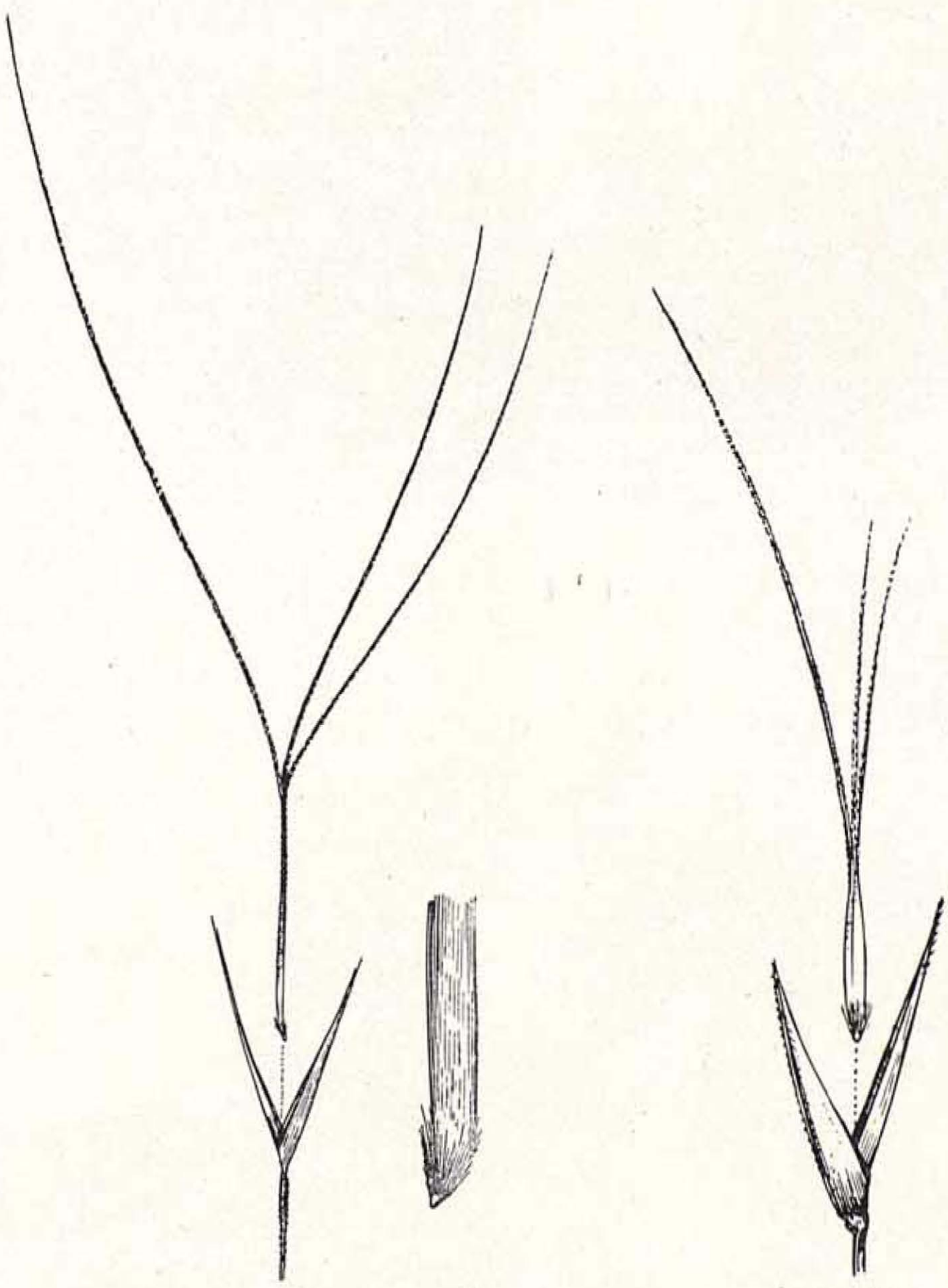
ARISTIDA CAPILLACEA Lamark.



× 4

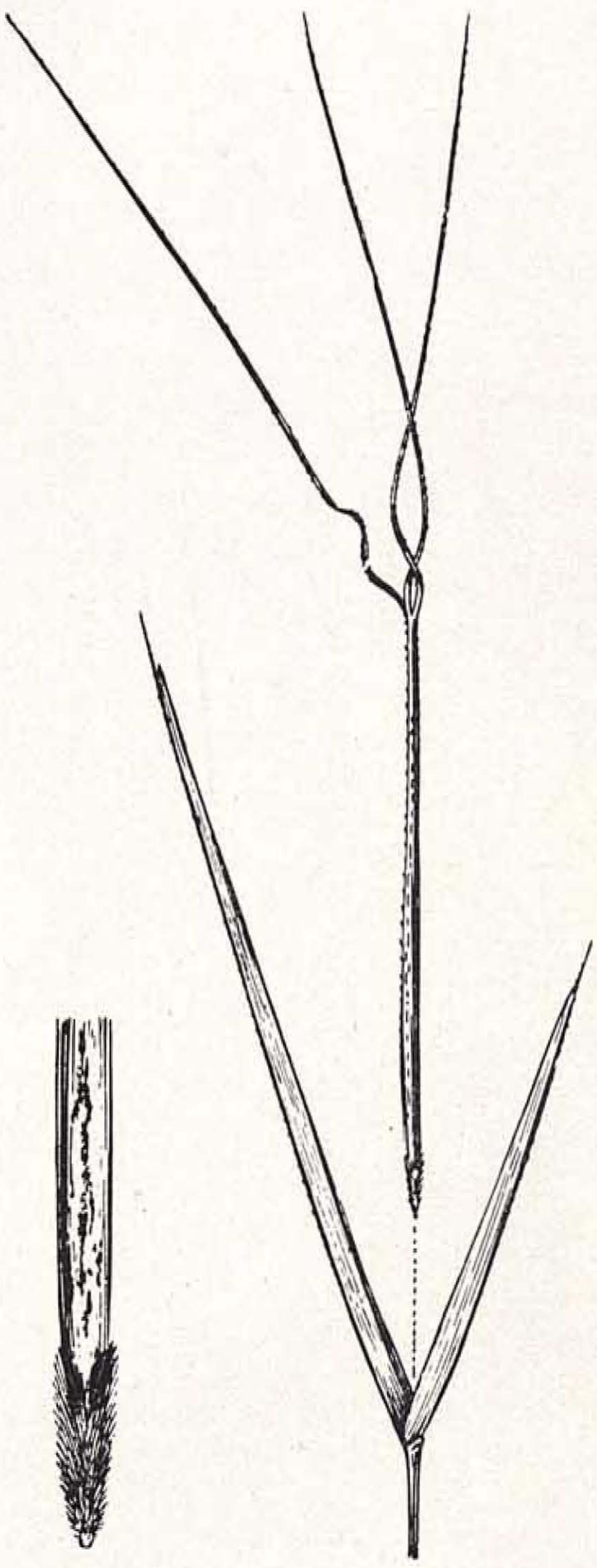
× 10

ARISTIDA SERICANS Hackel.



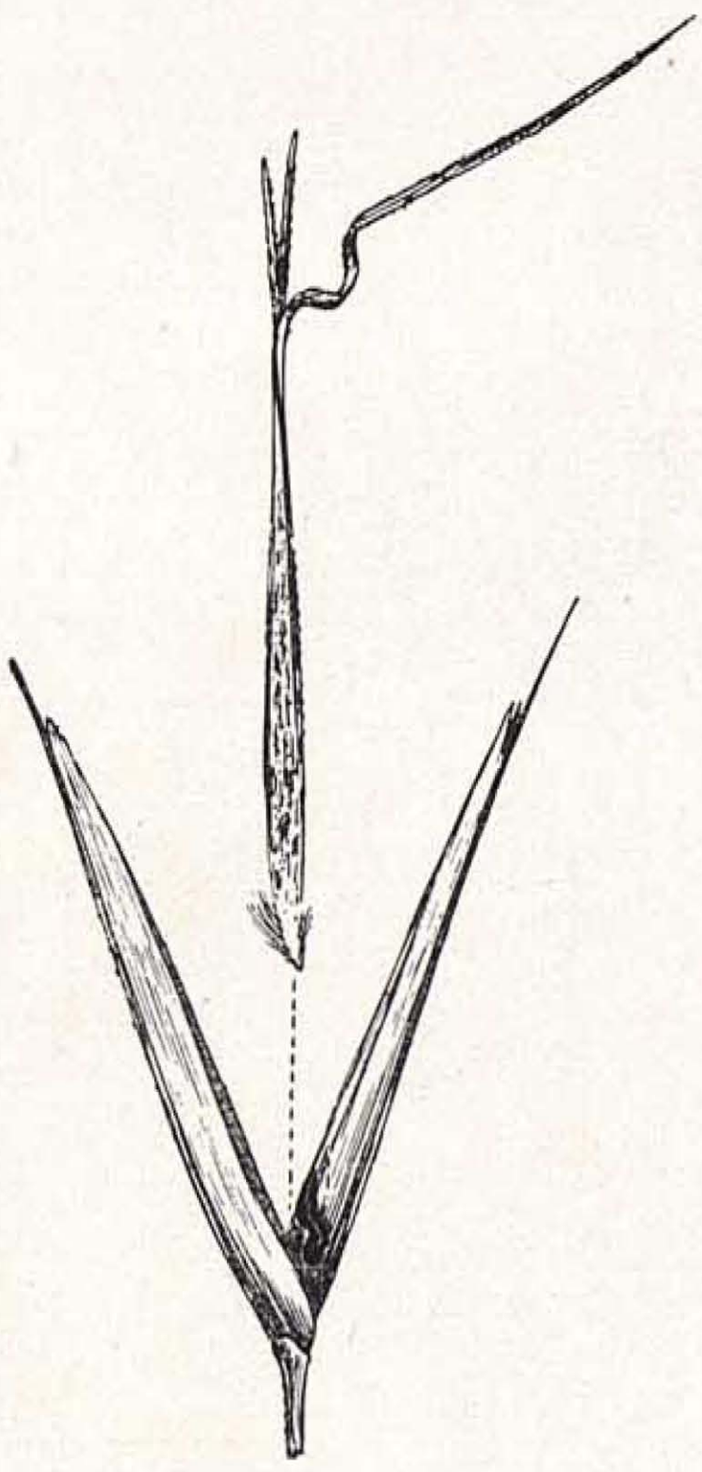
× 6 × 30
ARISTIDA SANCTAE LUCIAE Trinius.

× 10
ARISTIDA CUMINGIANA Trin. et Rupr.



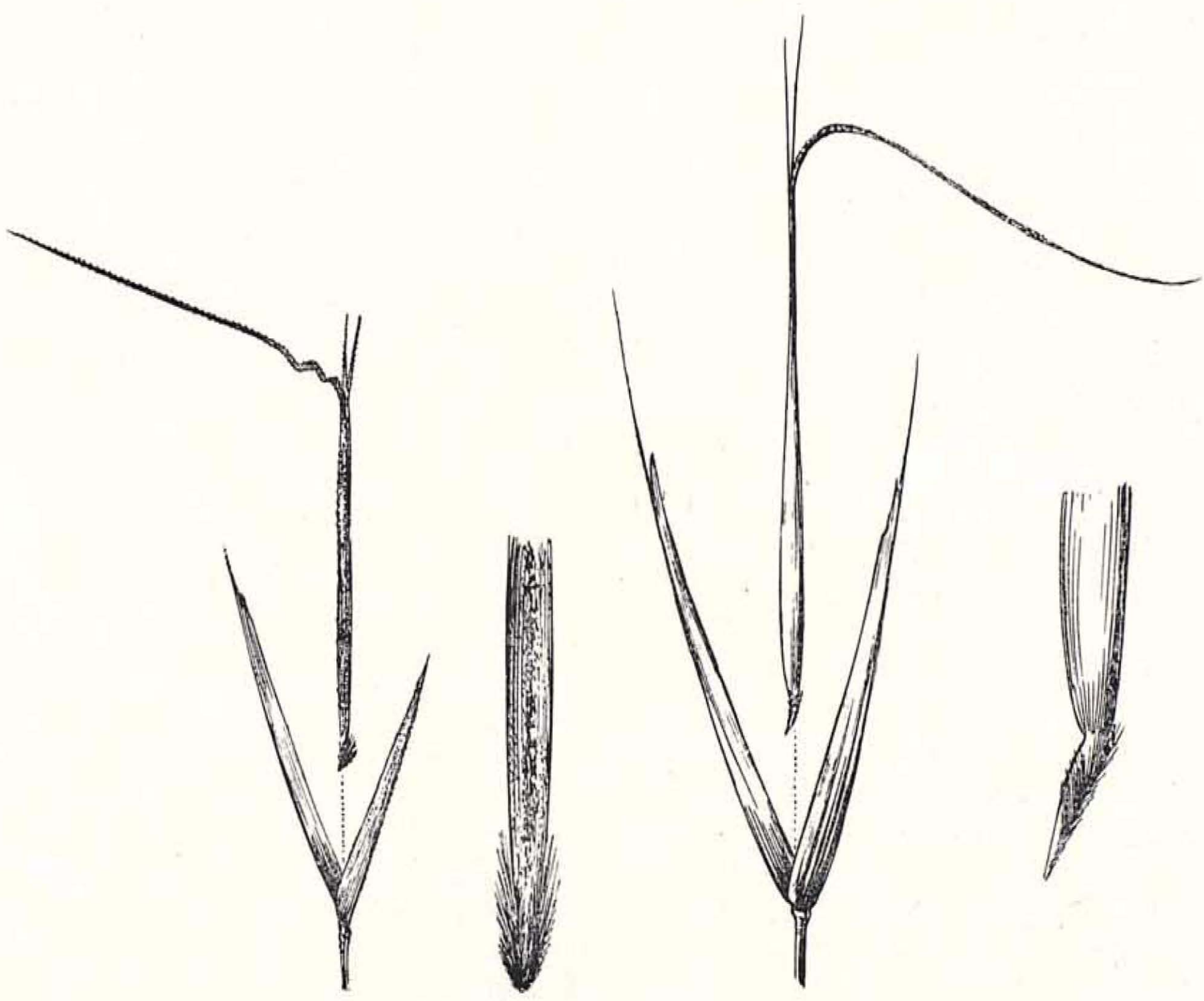
×15 ×5

ARISTIDA BASIRAMEA Engelmann.



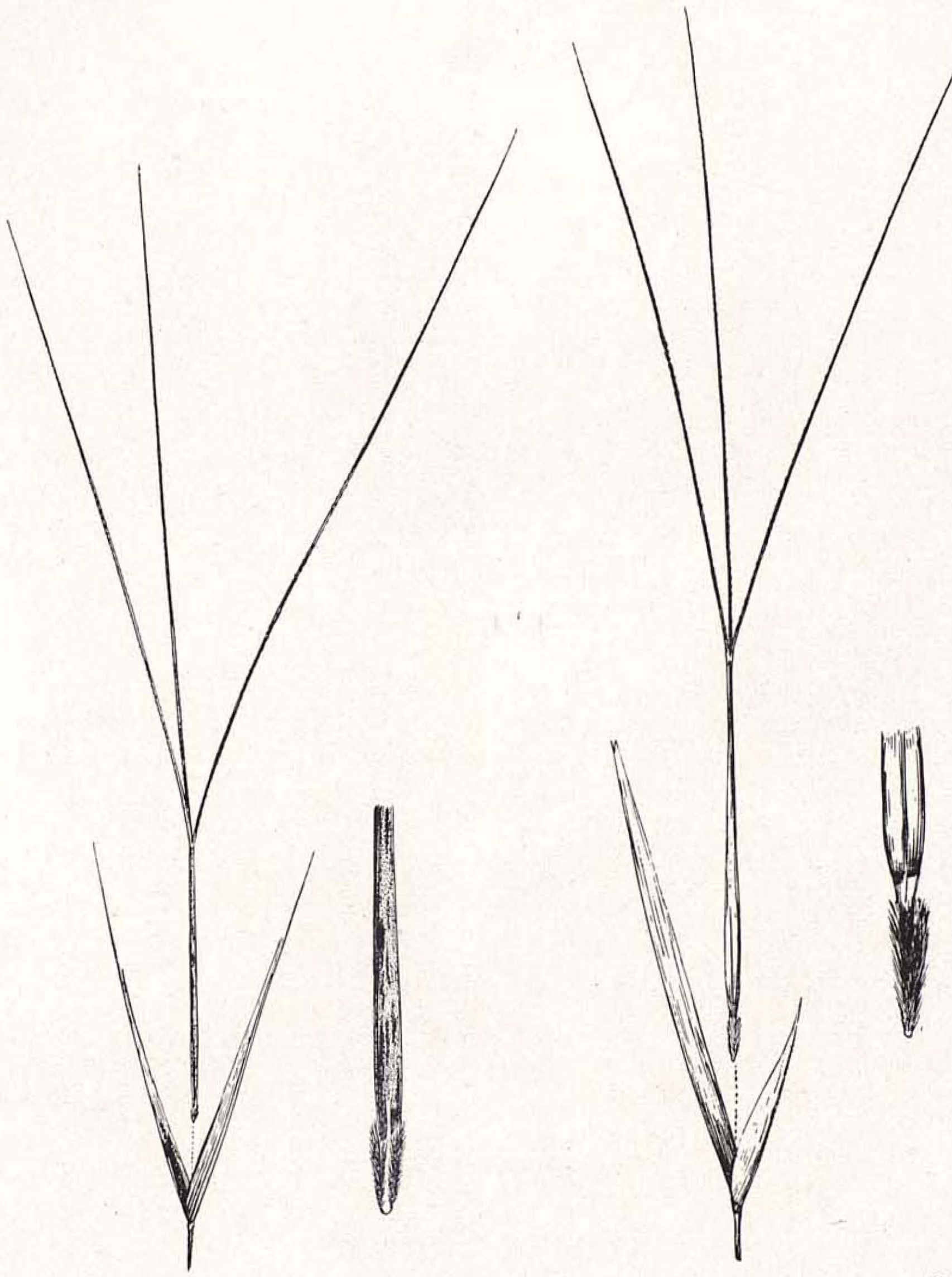
×8

ARISTIDA DICHOTOMA Michaux.



×4 ×14 ×3 ×15

ARISTIDA CURTISSII (A. Gray) Nash. ARISTIDA RAMOSISSIMA Engelmann.

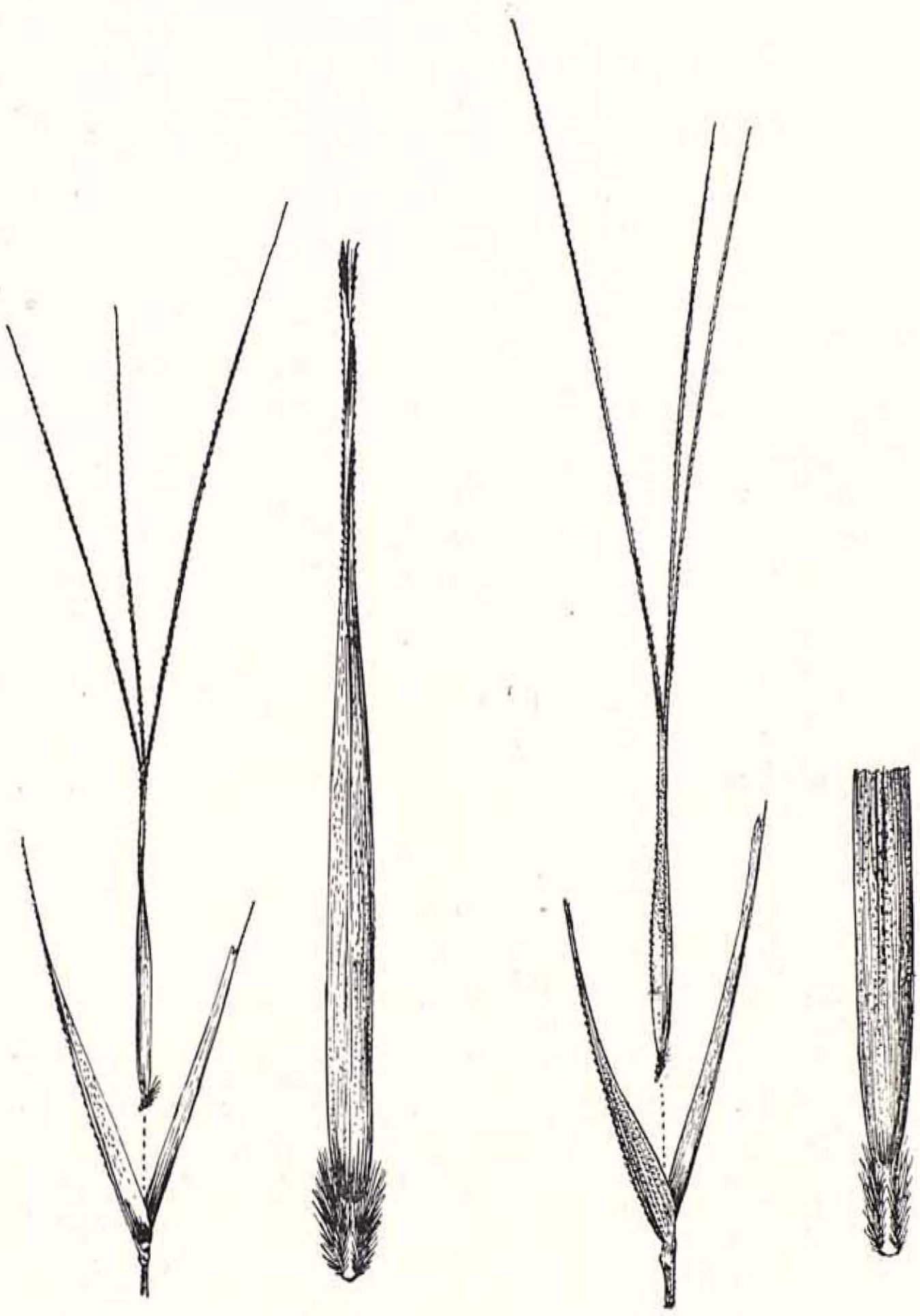


×2 ×10

ARISTIDA OLIGANTHA Michaux.

×5 ×10

ARISTIDA SCIURUS Stapf.



× 4 × 12

ARISTIDA LEUCOPHAEA
Henrard.

× 4 × 12

ARISTIDA ERIOPHORA
Henrard.

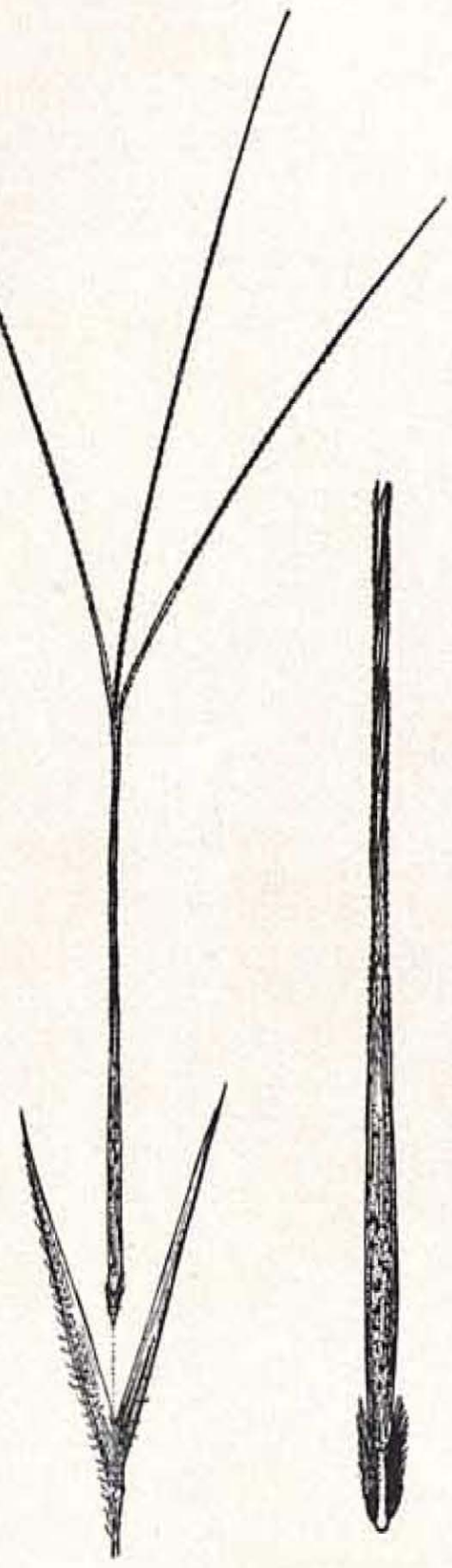


× 6

ARISTIDA PILOSA
Labillardière.

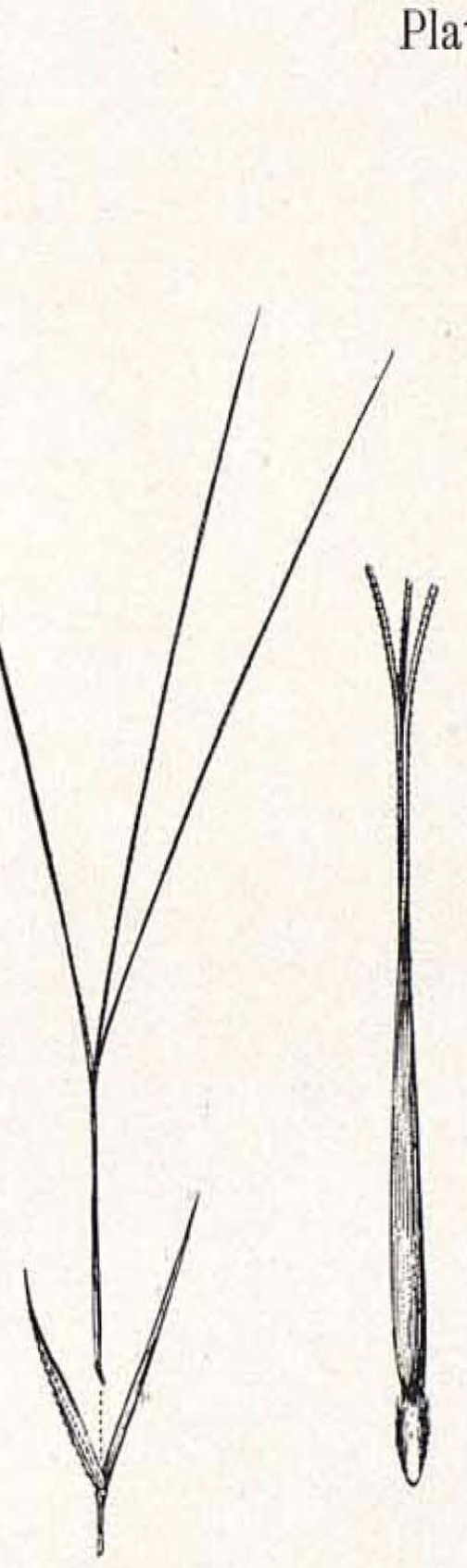
× 6 × 10

ARISTIDA QUEENSLANDICA
Henrard.



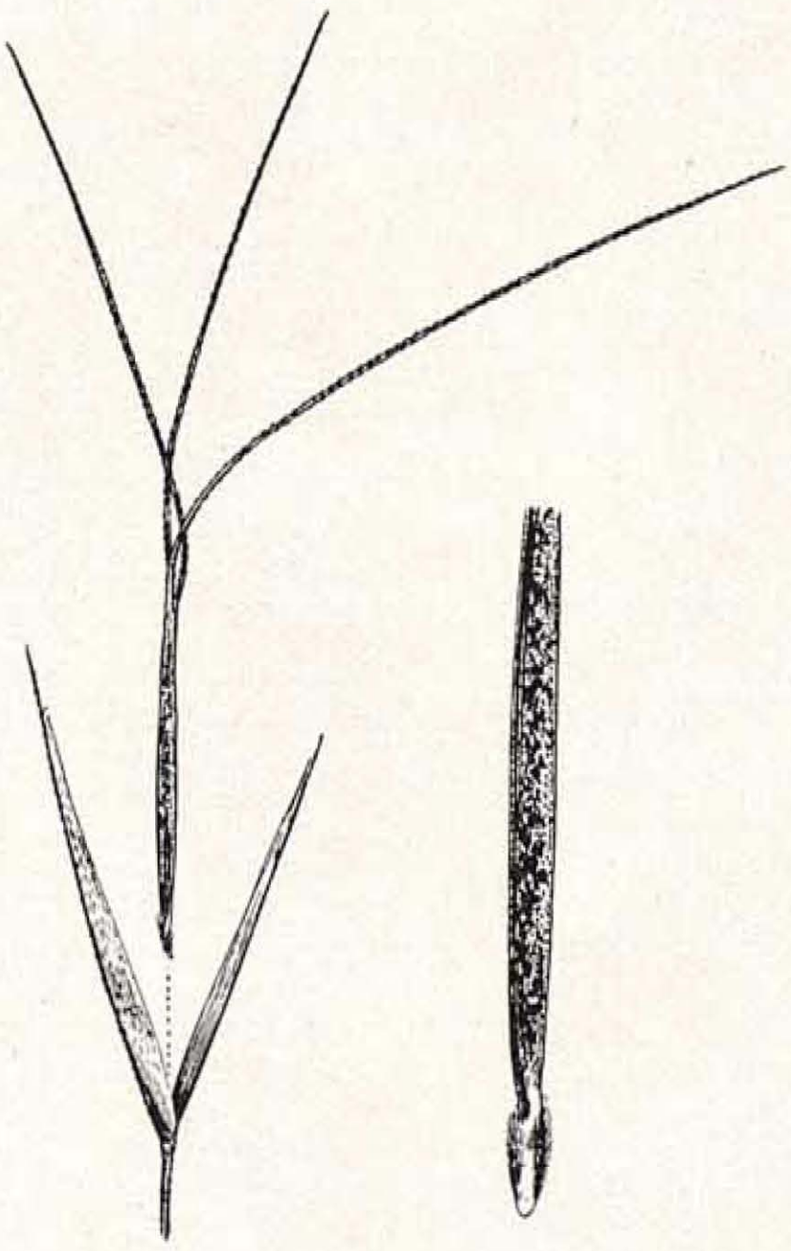
× 3 1/3 × 6 2/3

ARISTIDA SCRIBNERIANA Hitchcock.



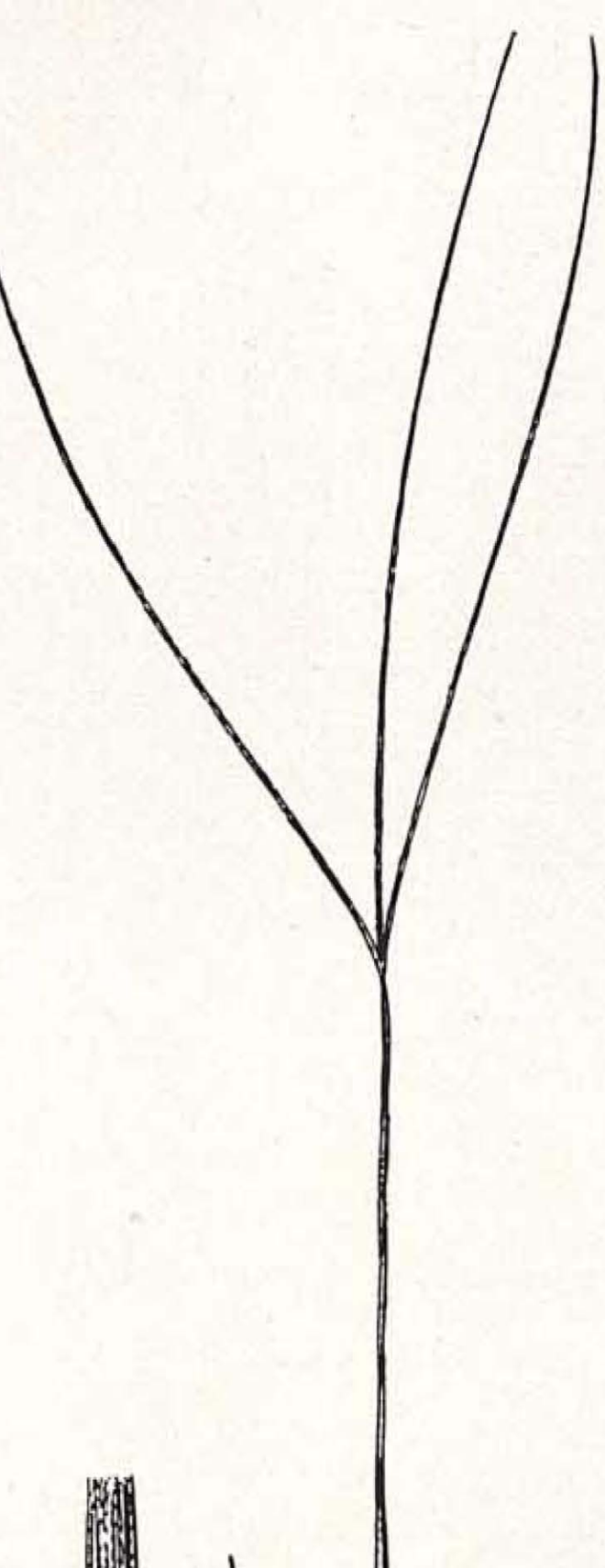
× 2 2/3 × 6 2/3

ARISTIDA MULTICAULIS Baker.



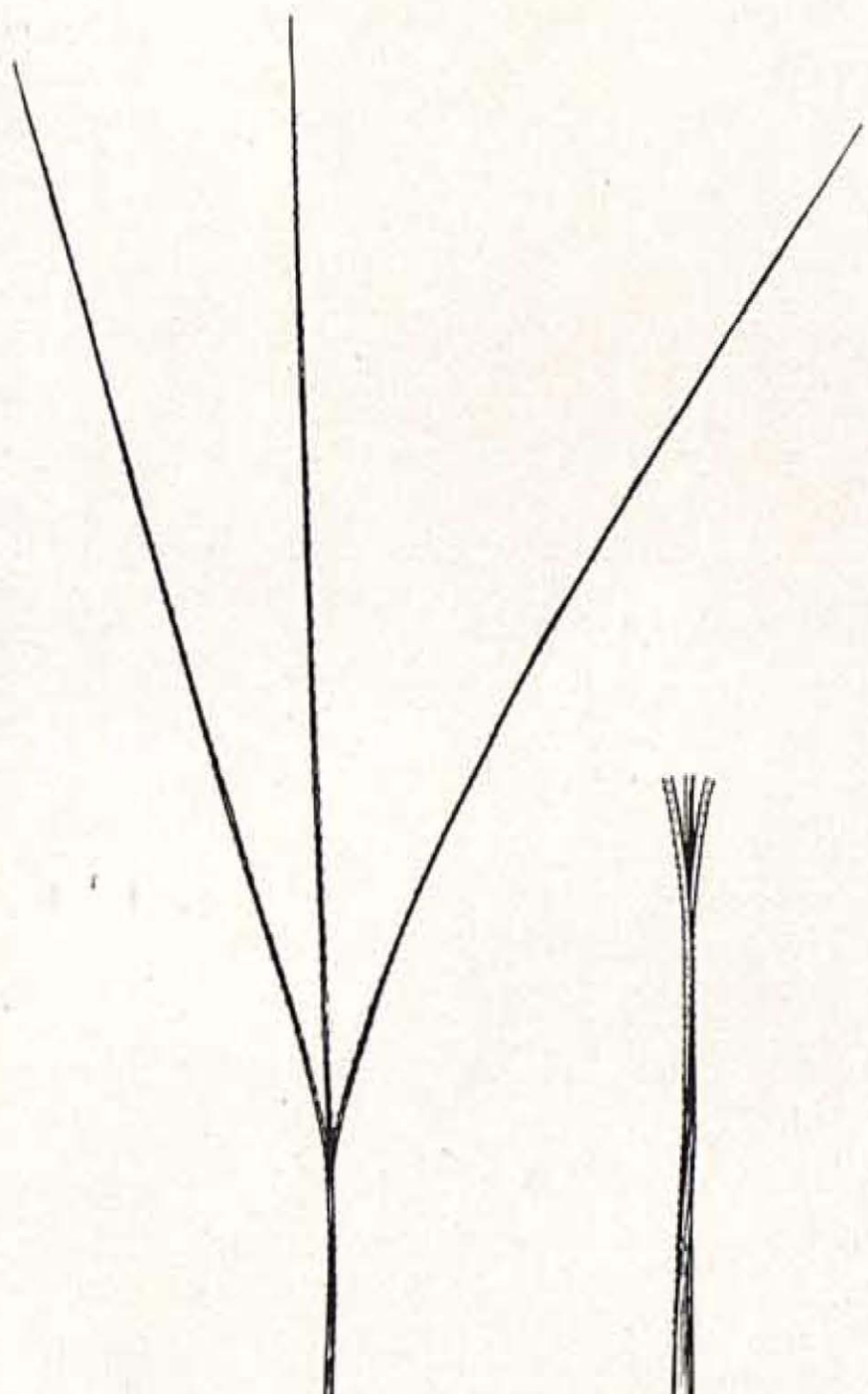
× 2 2/3 × 6

ARISTIDA LANOSA Muhl.



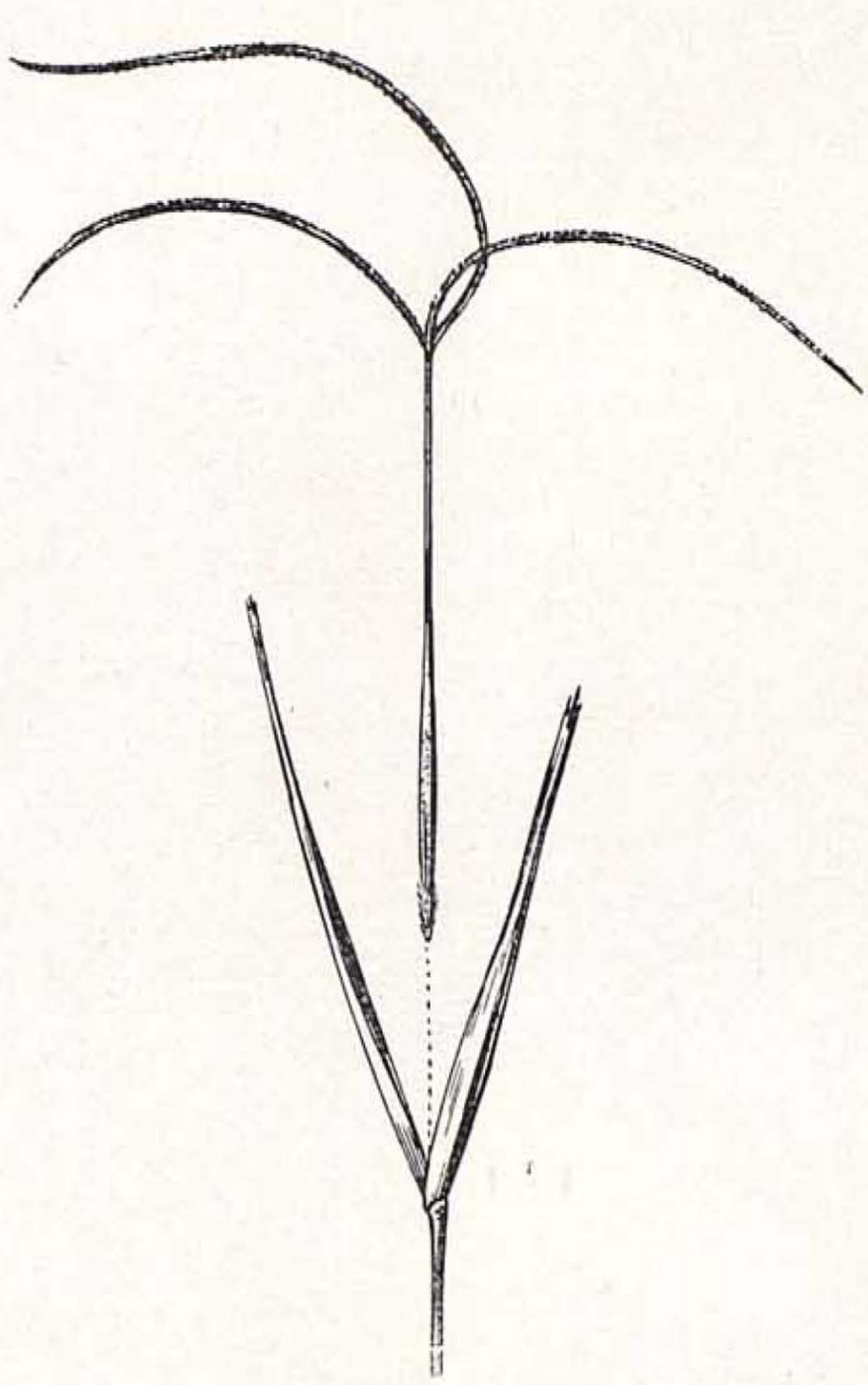
× 15 × 5

ARISTIDA TEXTILIS Mez.



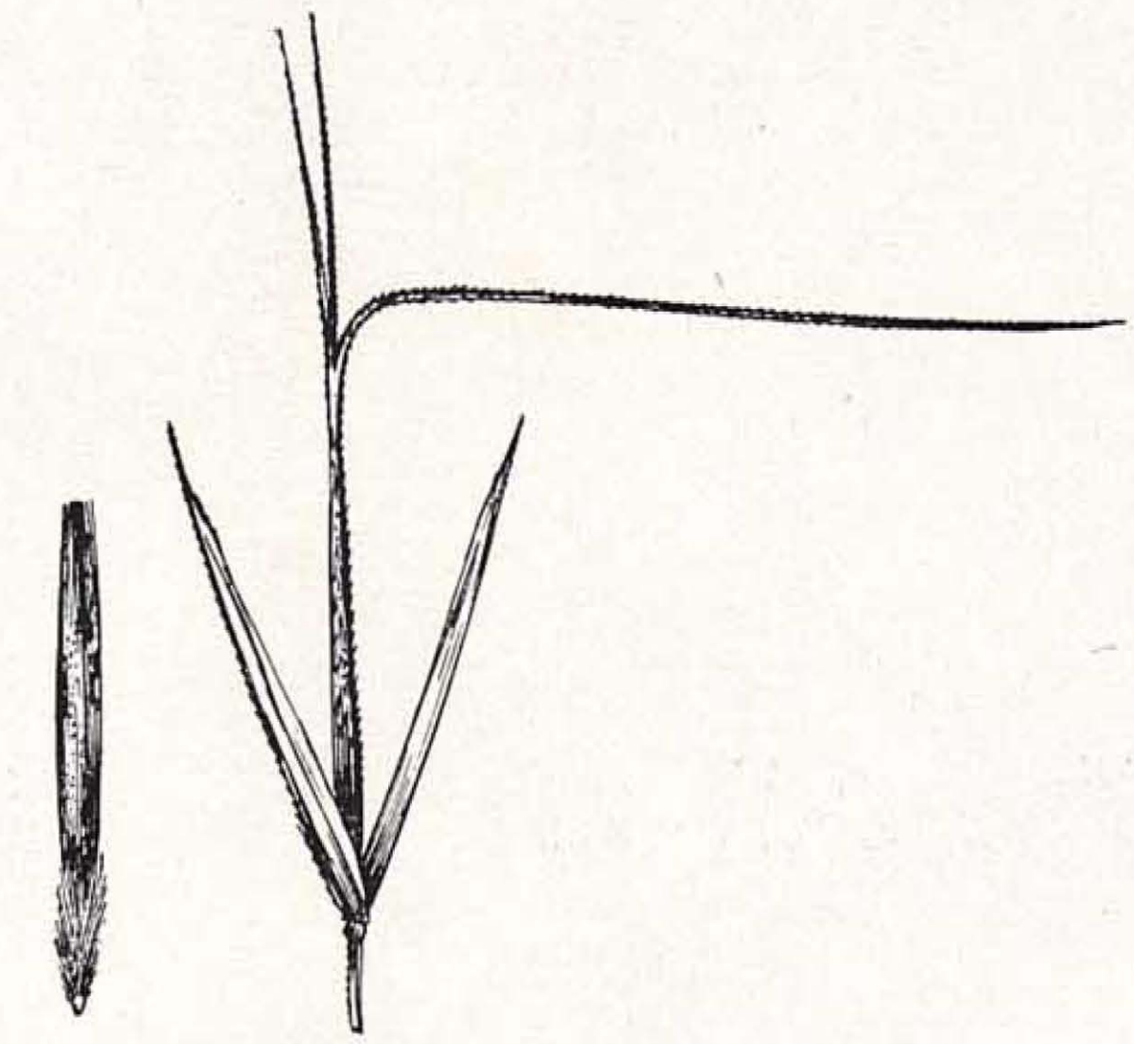
× 4 × 8

ARISTIDA DEWILDEMANI Henrard.



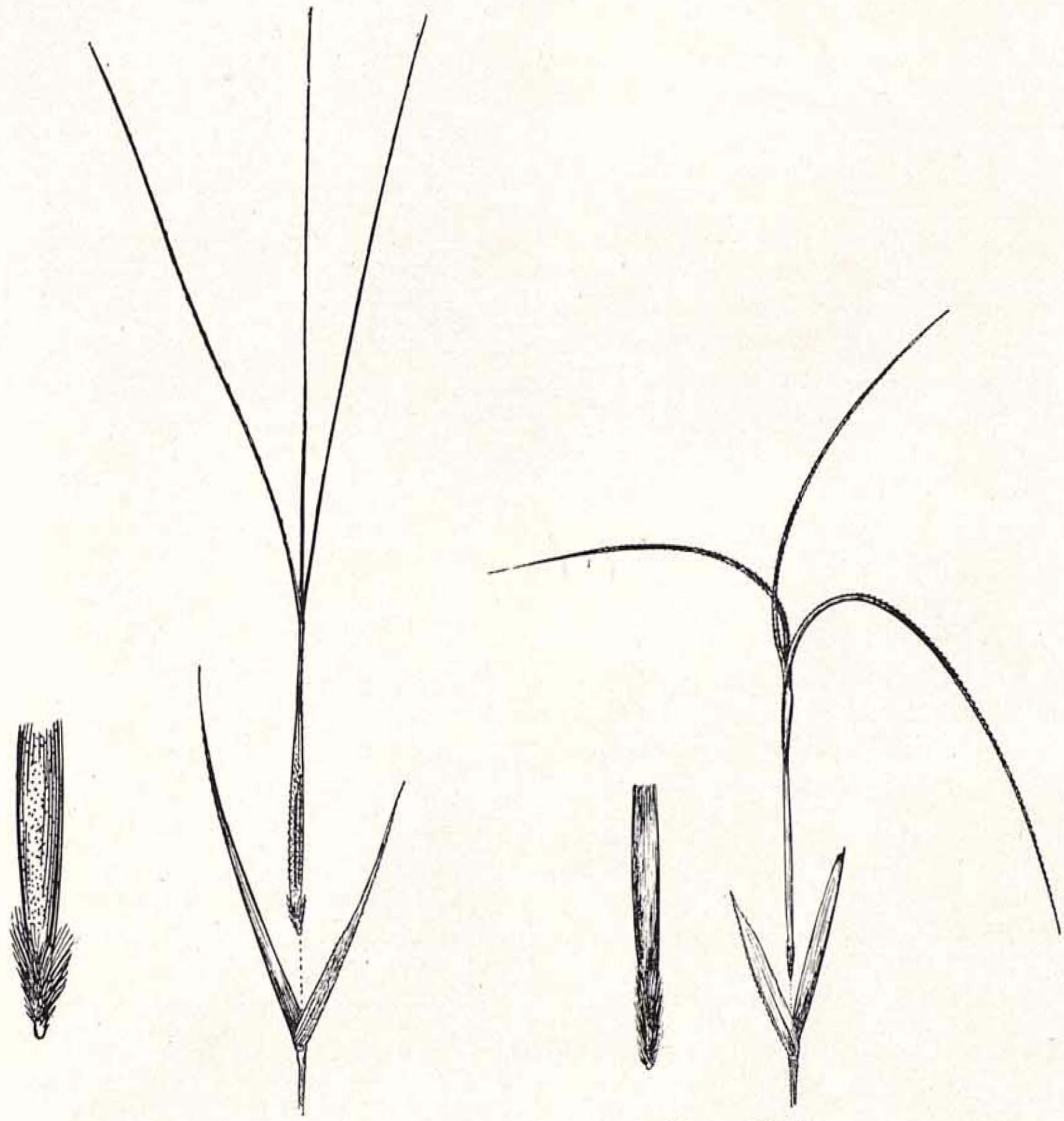
× 4

ARISTIDA MULTIRAMEA Hackel.



× 10 × 7

ARISTIDA LONGESPICA Poiret.

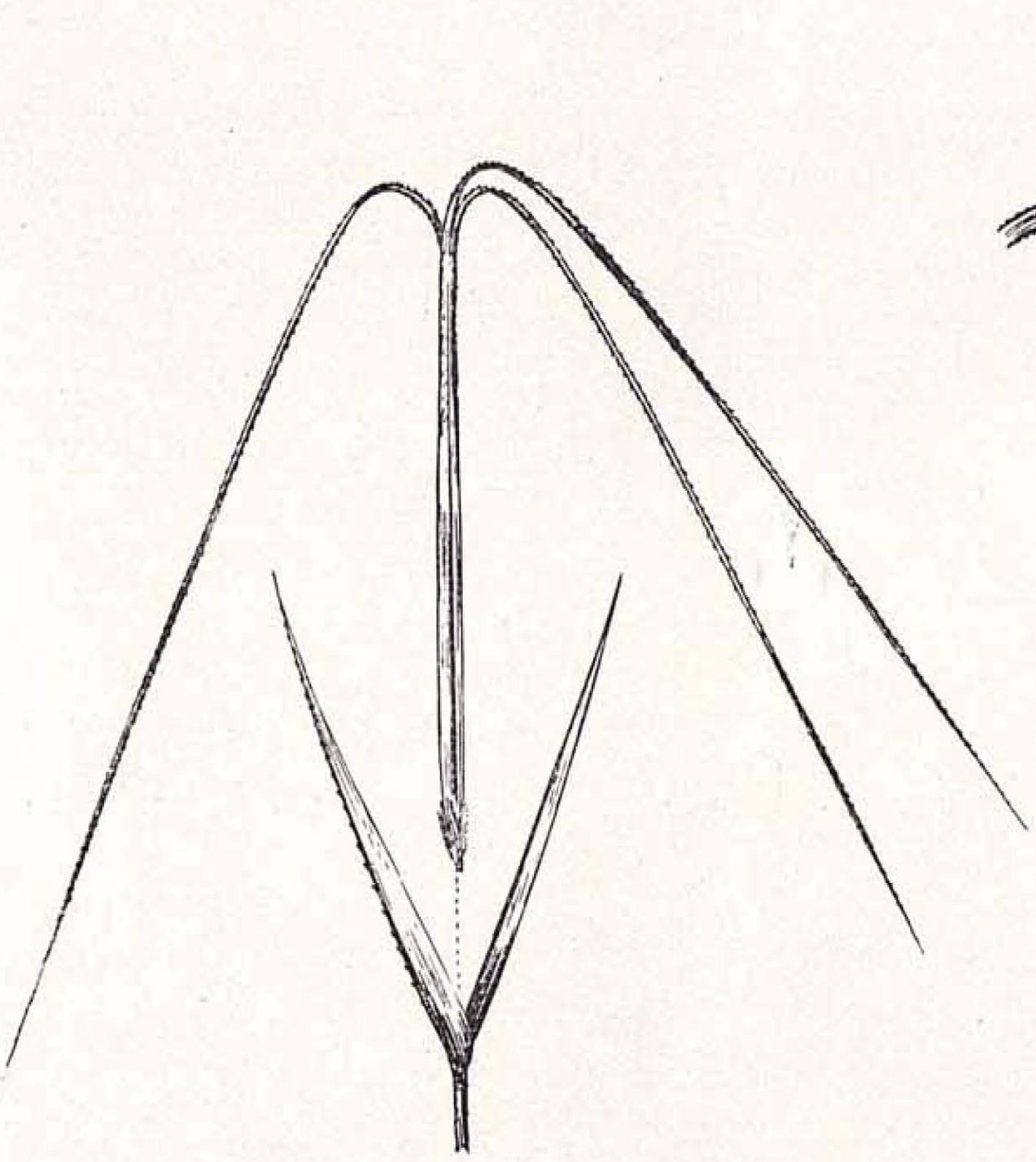


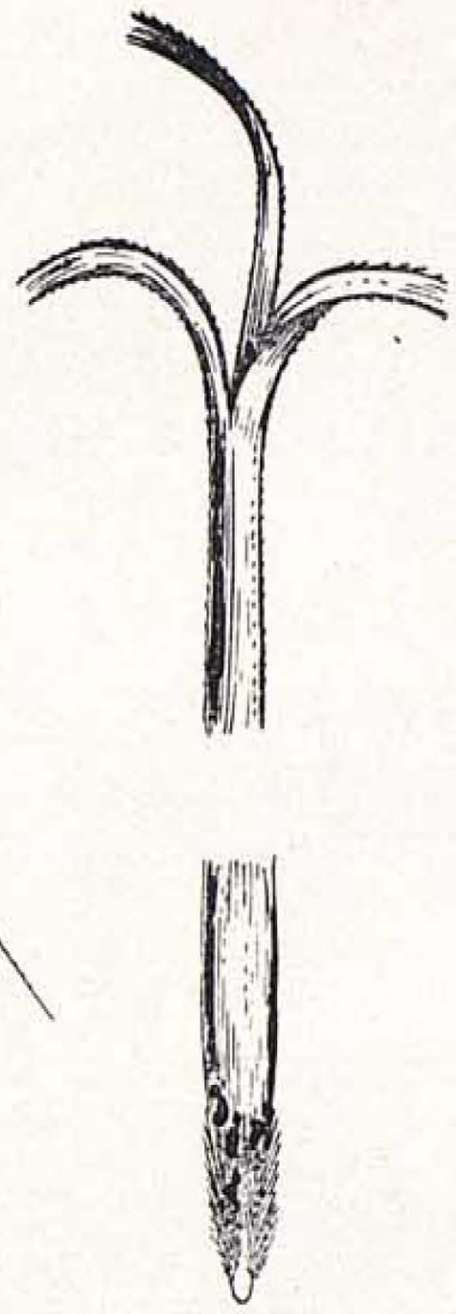
× 12 × 5

ARISTIDA RUFESCENS Steudel.

× 6⅔ × 2⅔

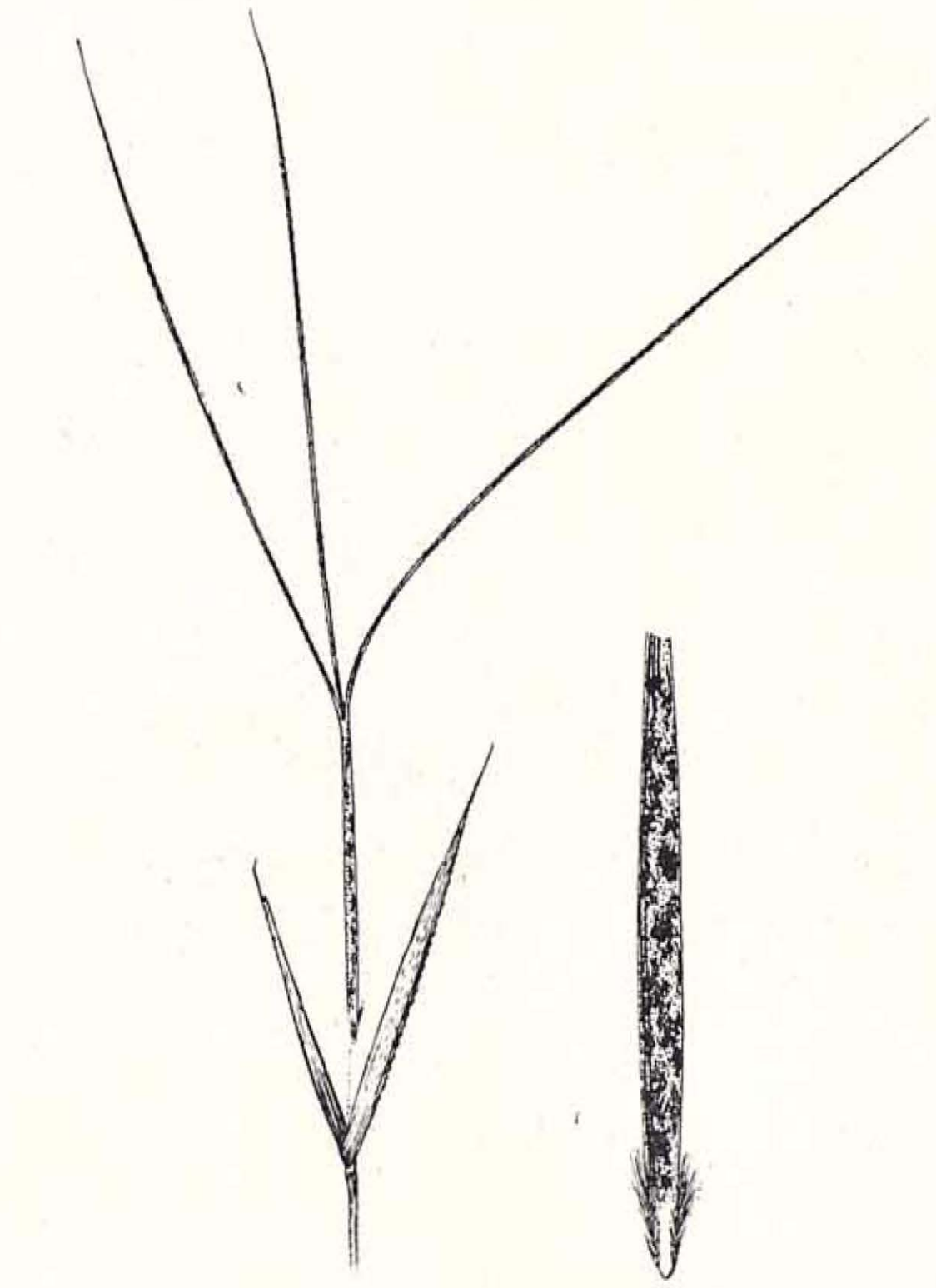
ARISTIDA NOVAE CALEDONIAE Henrard.





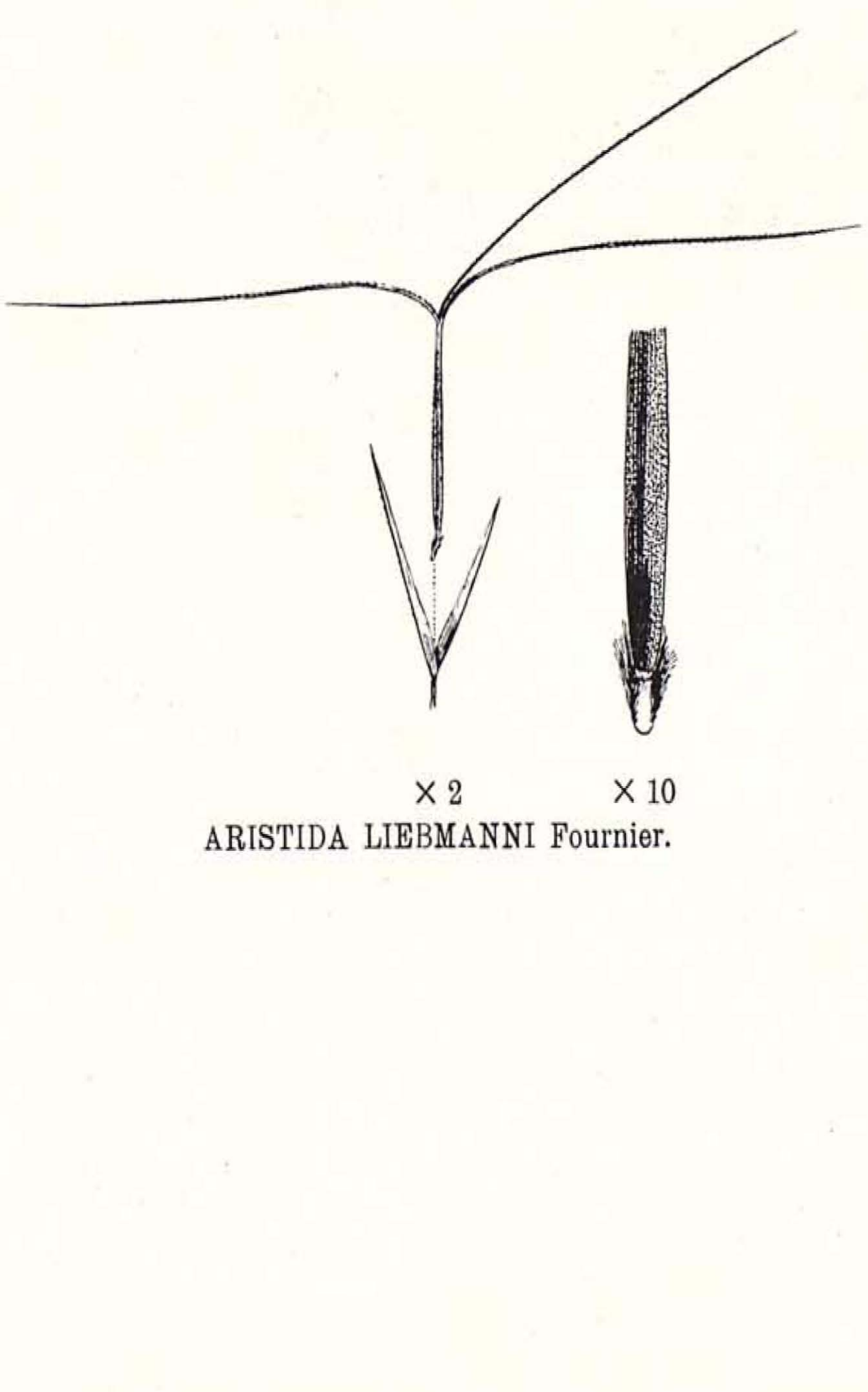
× 4 × 10

ARISTIDA SUBAEQUANS Doell.



× 3⅓ × 8

ARISTIDA PURPURASCENS Poiret.



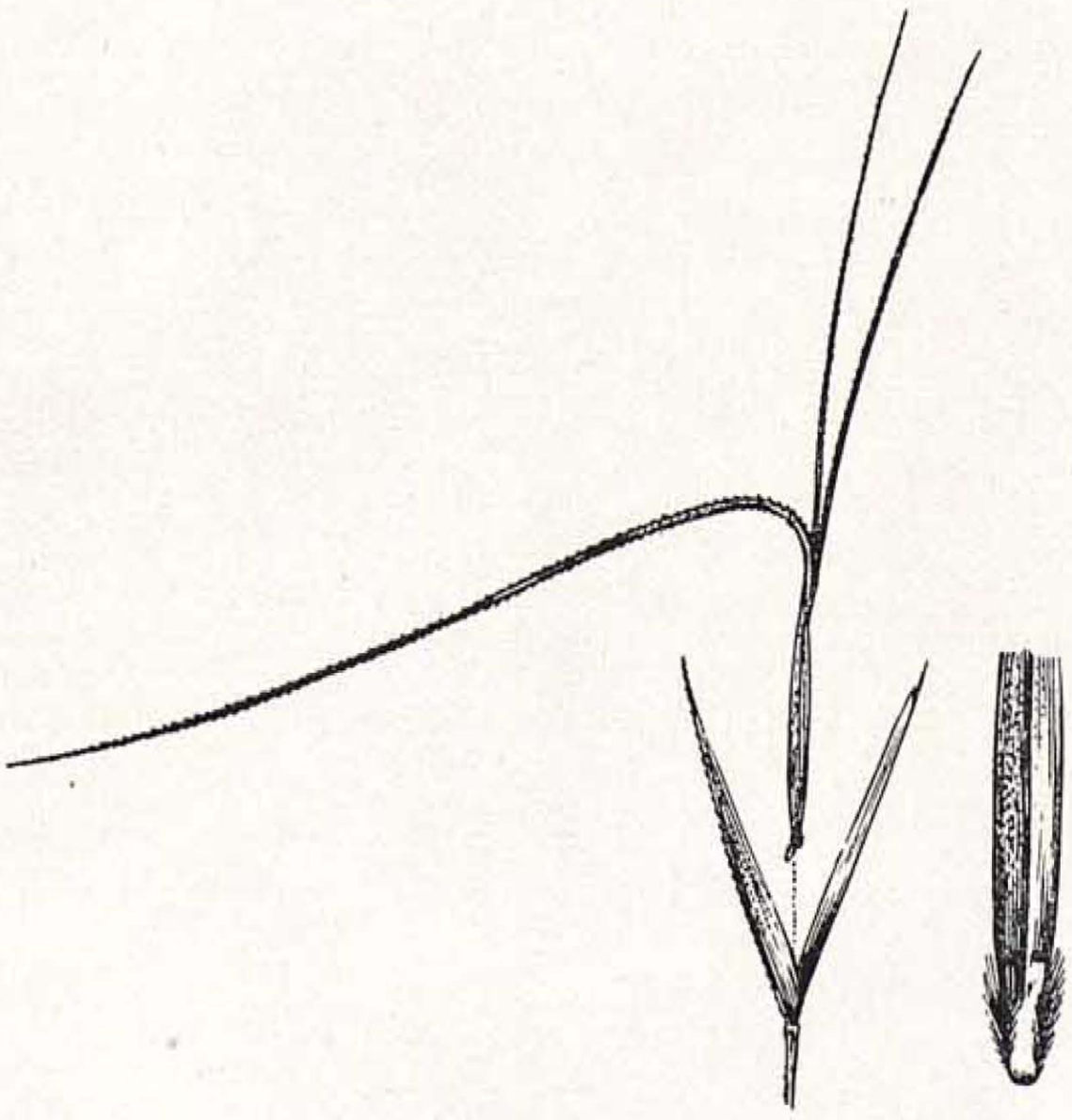
× 2 × 10

ARISTIDA LIEBMANNI Fournier.



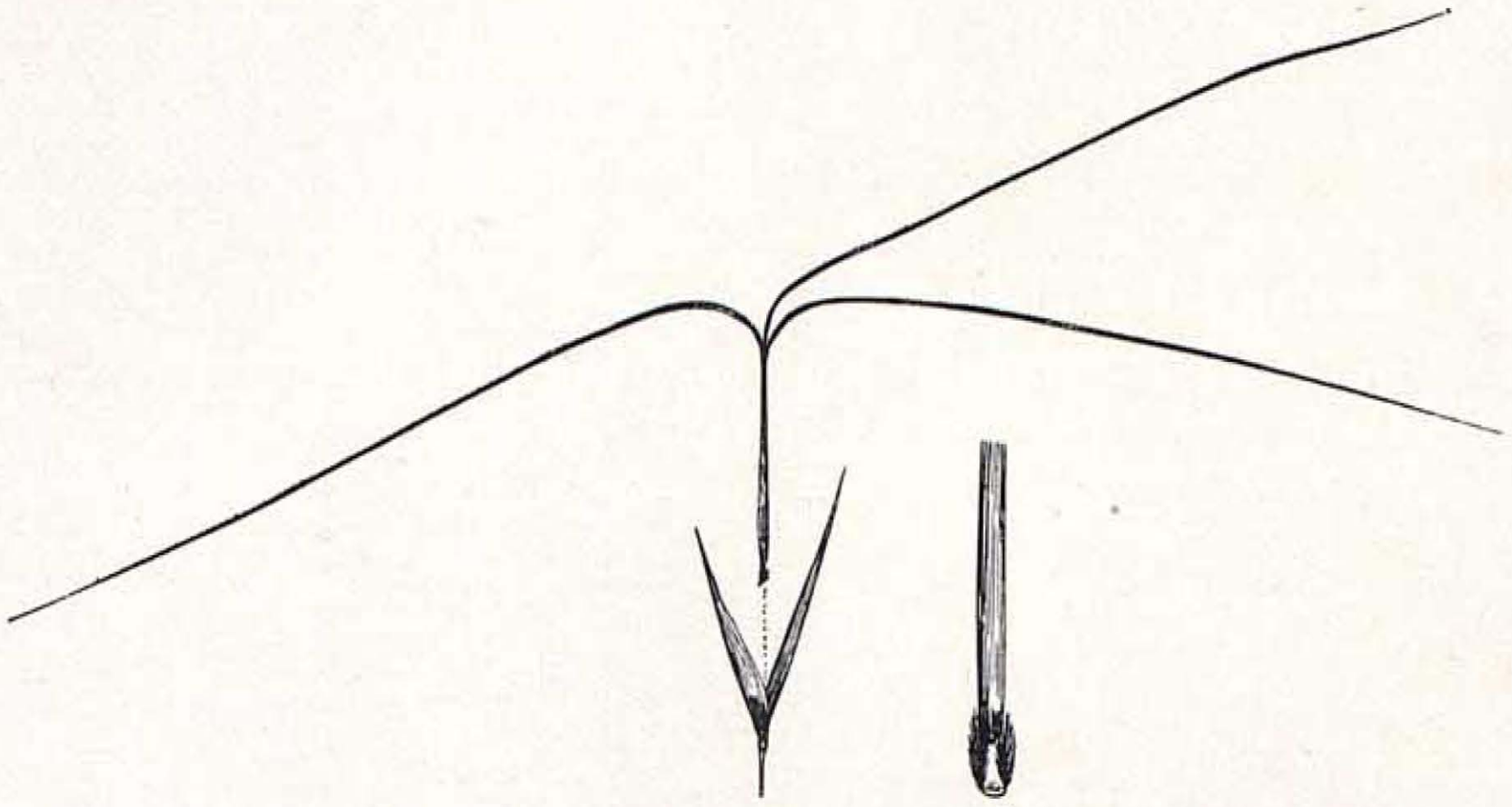
× 6⅔ × 2⅔ × 2⅔

ARISTIDA PALUSTRIS Vasey.



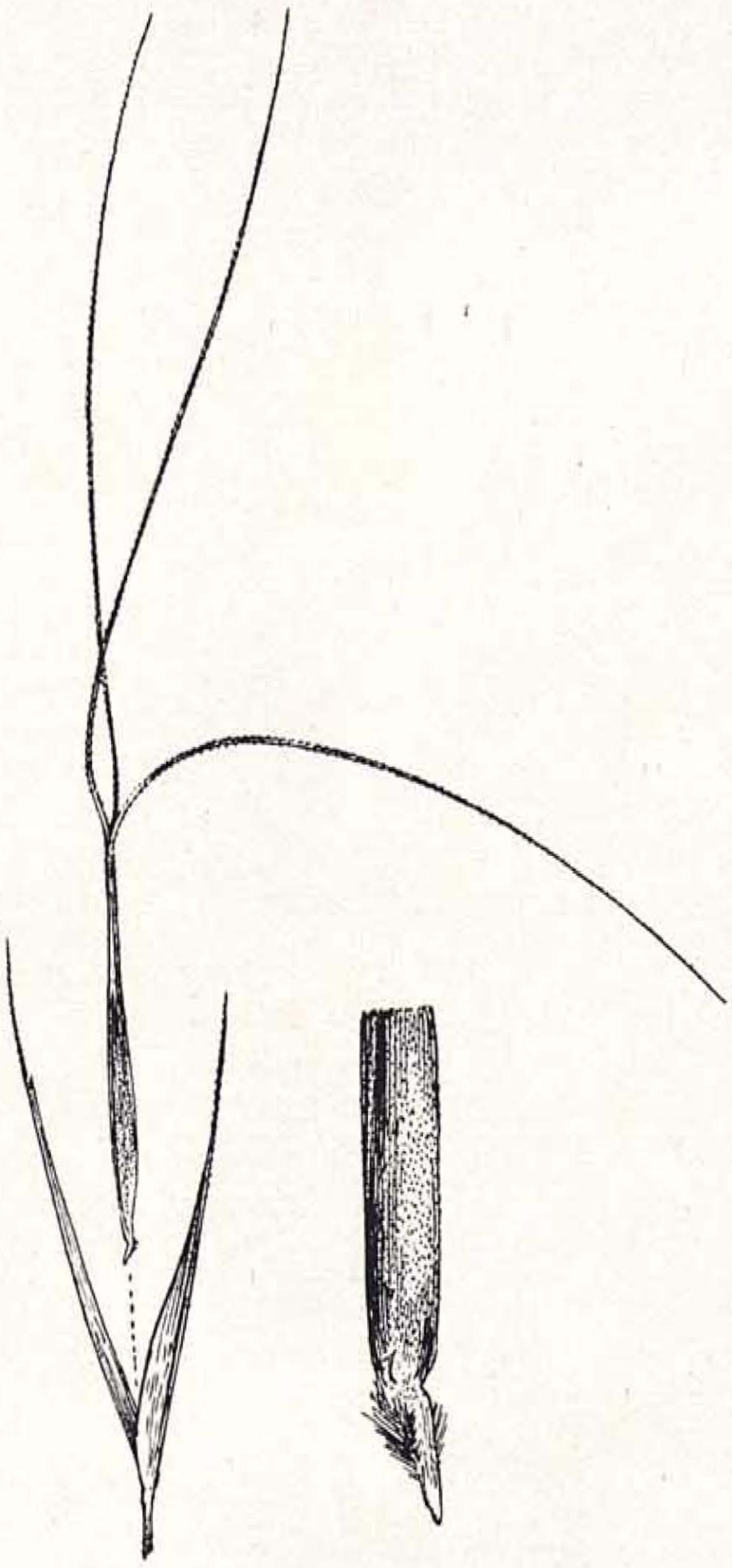
× 4 × 10

ARISTIDA VIRGATA Trinius.



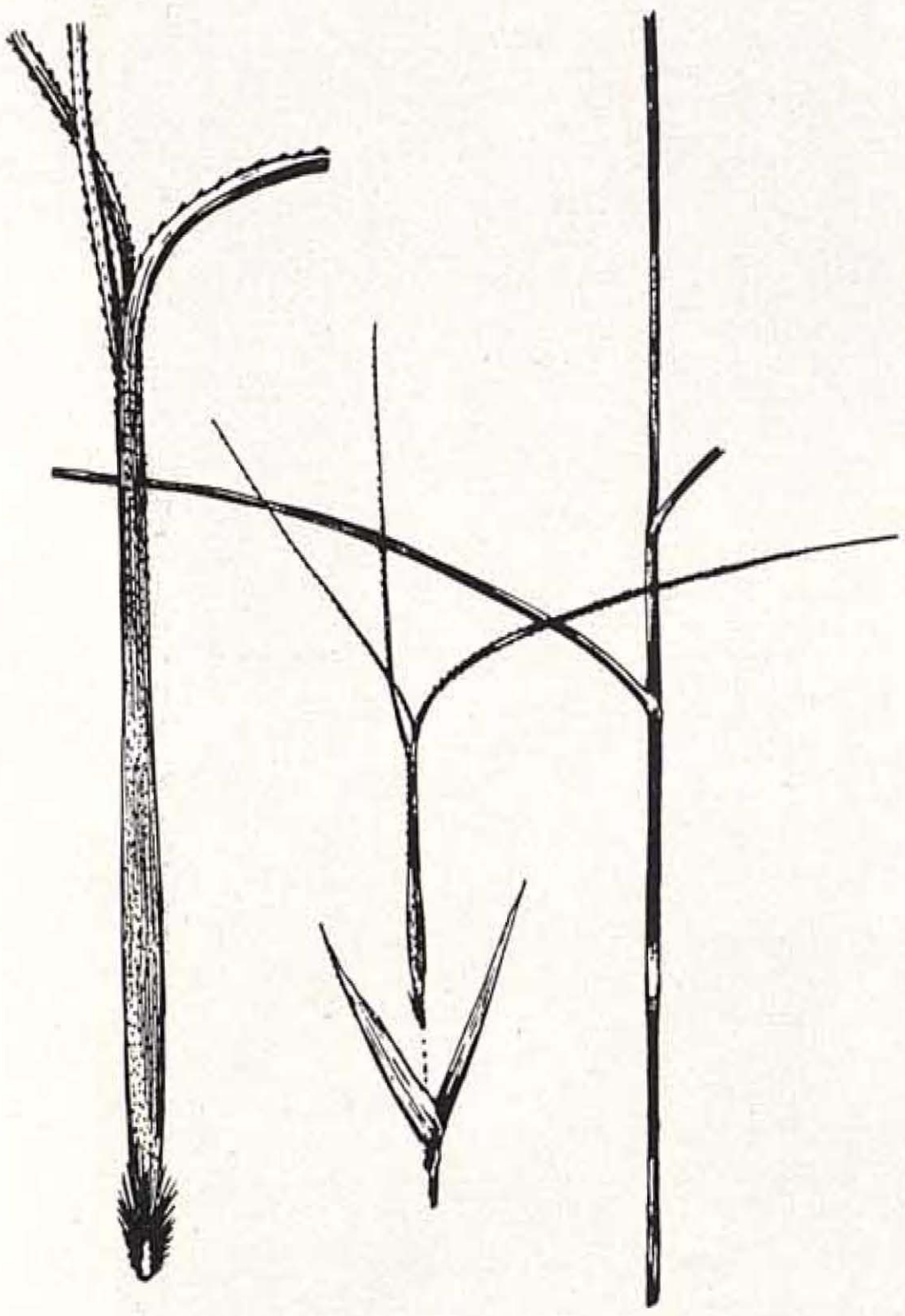
× 2 × 7.

ARISTIDA DENUDATA Pilger.



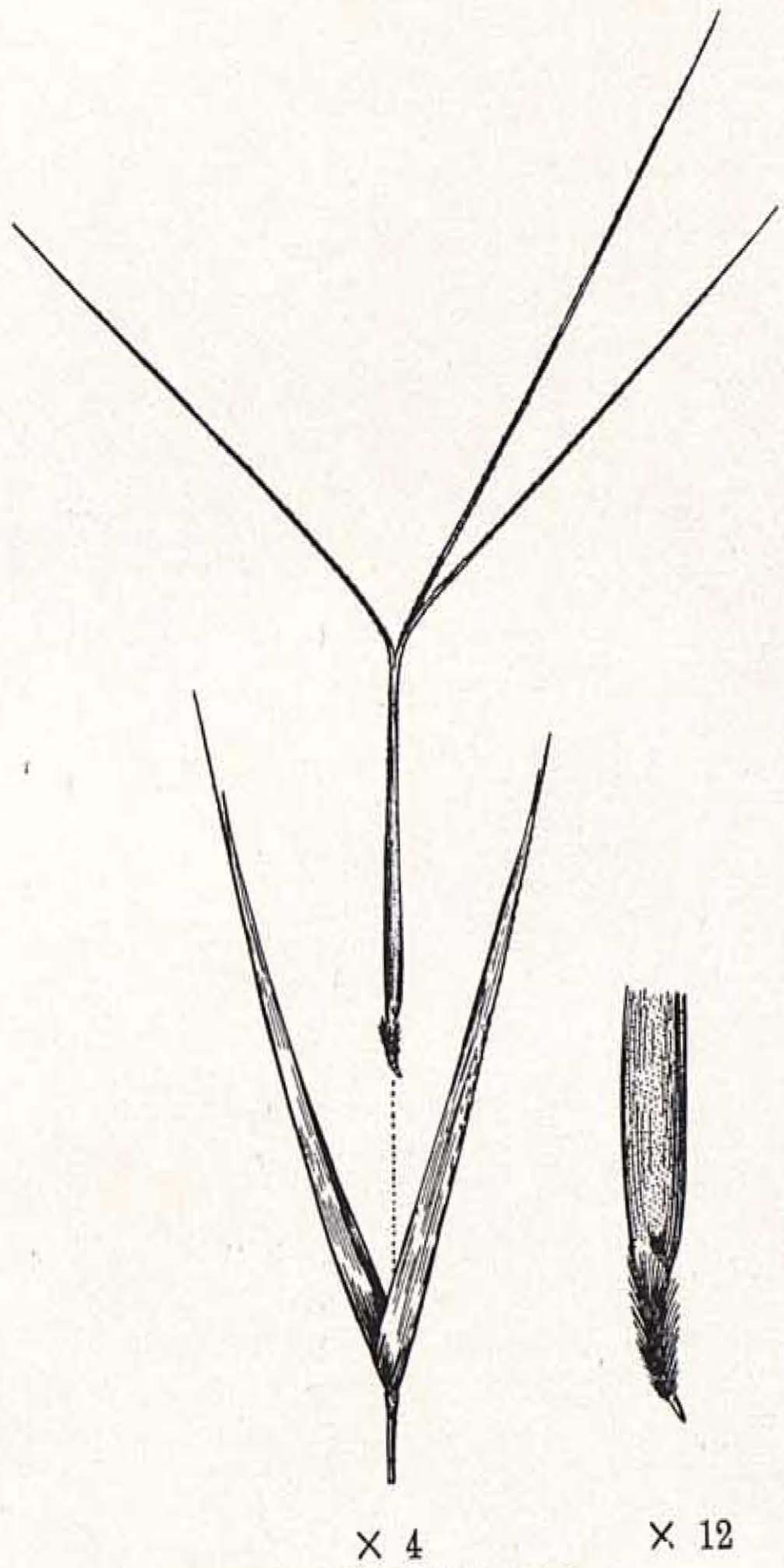
× 3 × 10

ARISTIDA RHIZOMOPHORA Swallen.



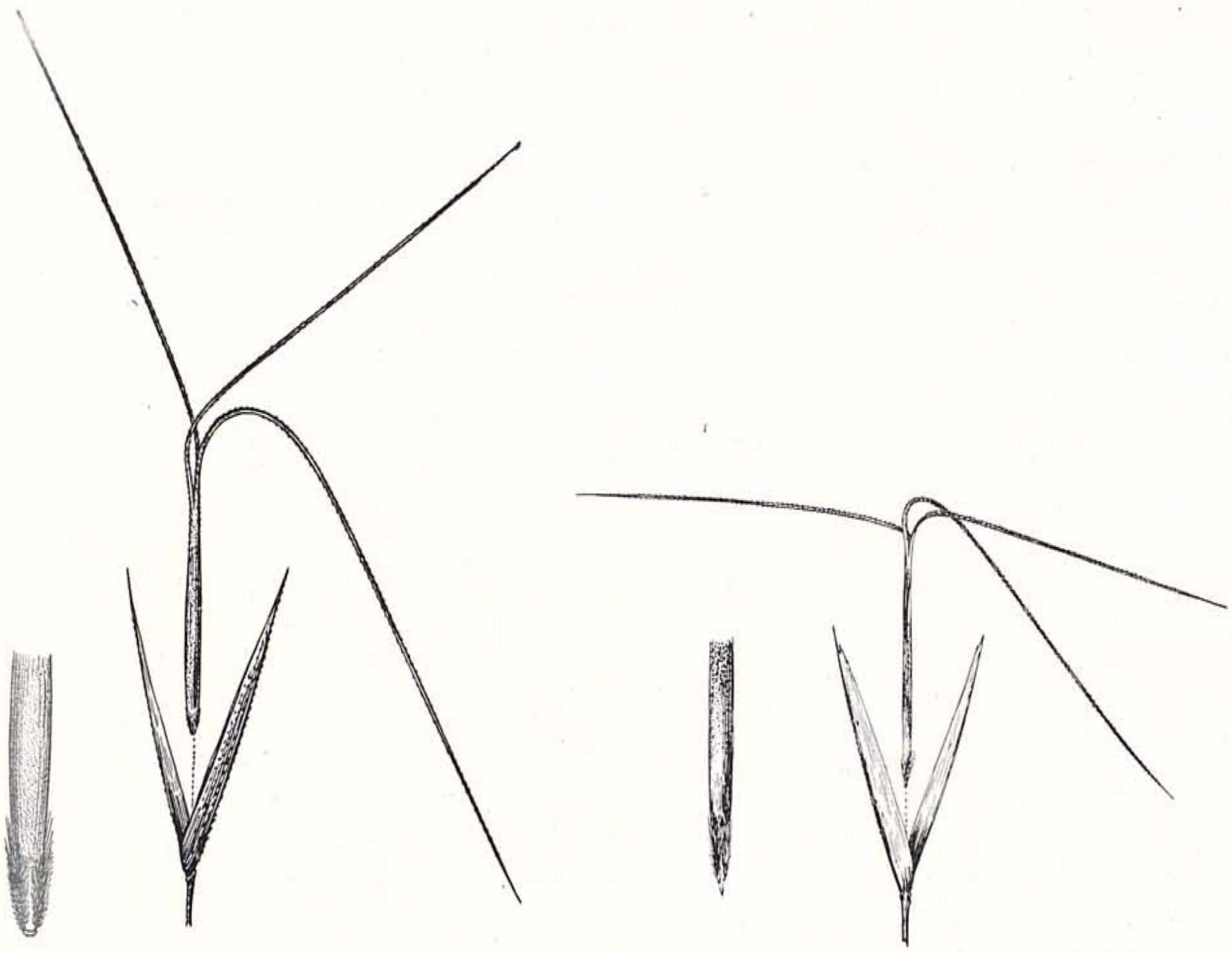
× 10 × 3 × 1

ARISTIDA MACILENTA Henrard.



× 4 × 12

ARISTIDA STRICTA Michaux.

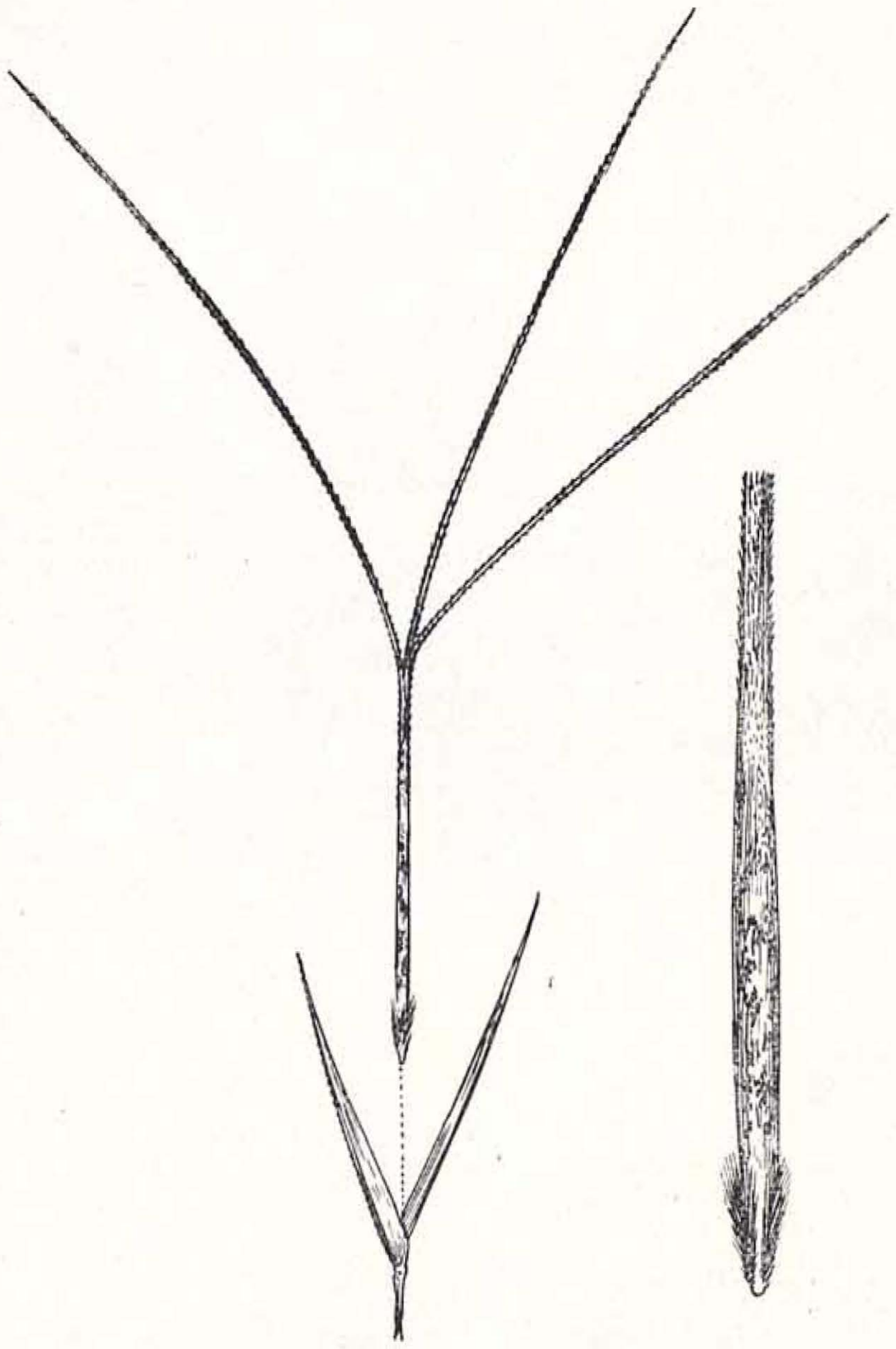


× 13 × 4

ARISTIDA SIMPLICIFLORA Chapman.

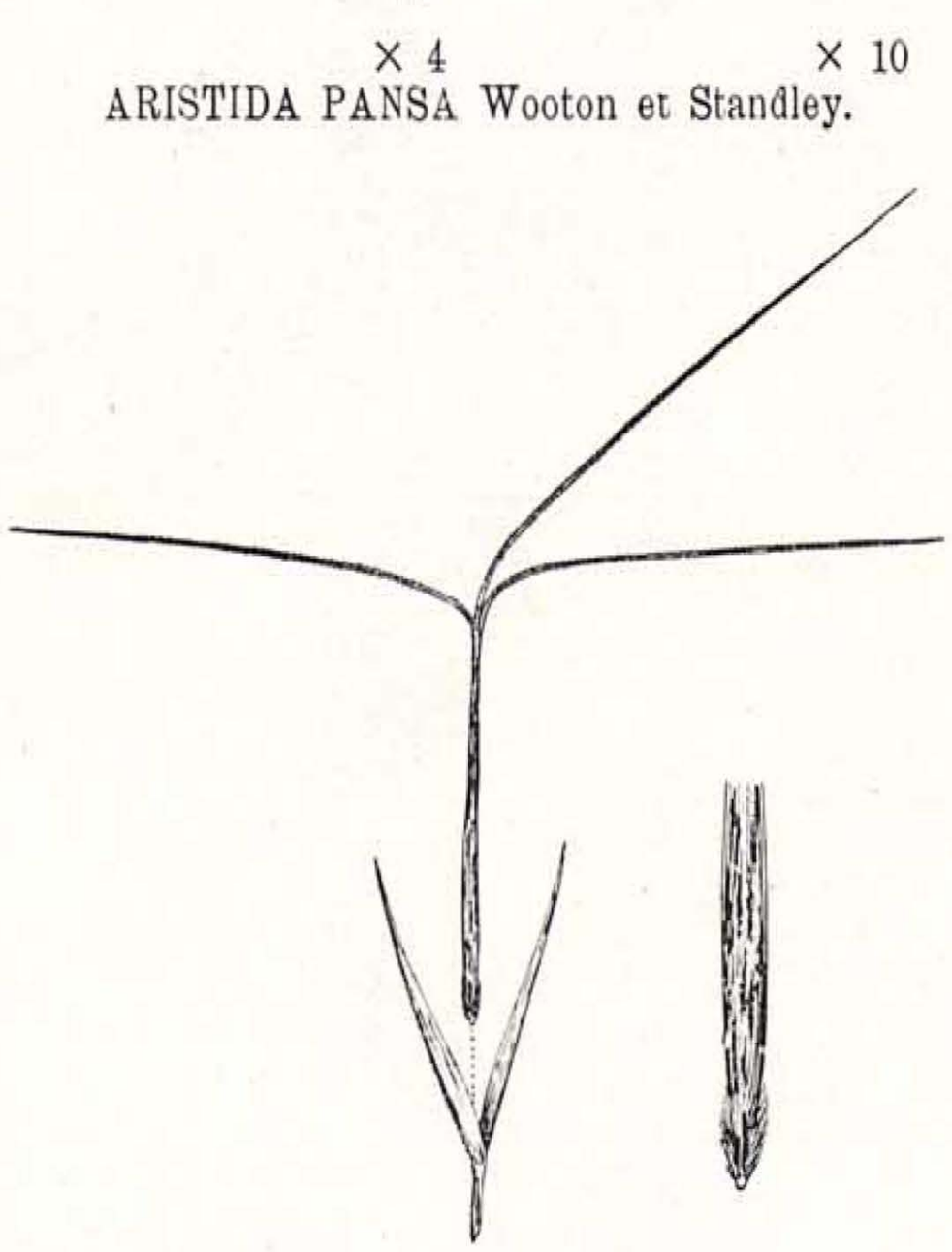
× $6^2/_3$ × $2^2/_3$

ARISTIDA MOHRII Nash.



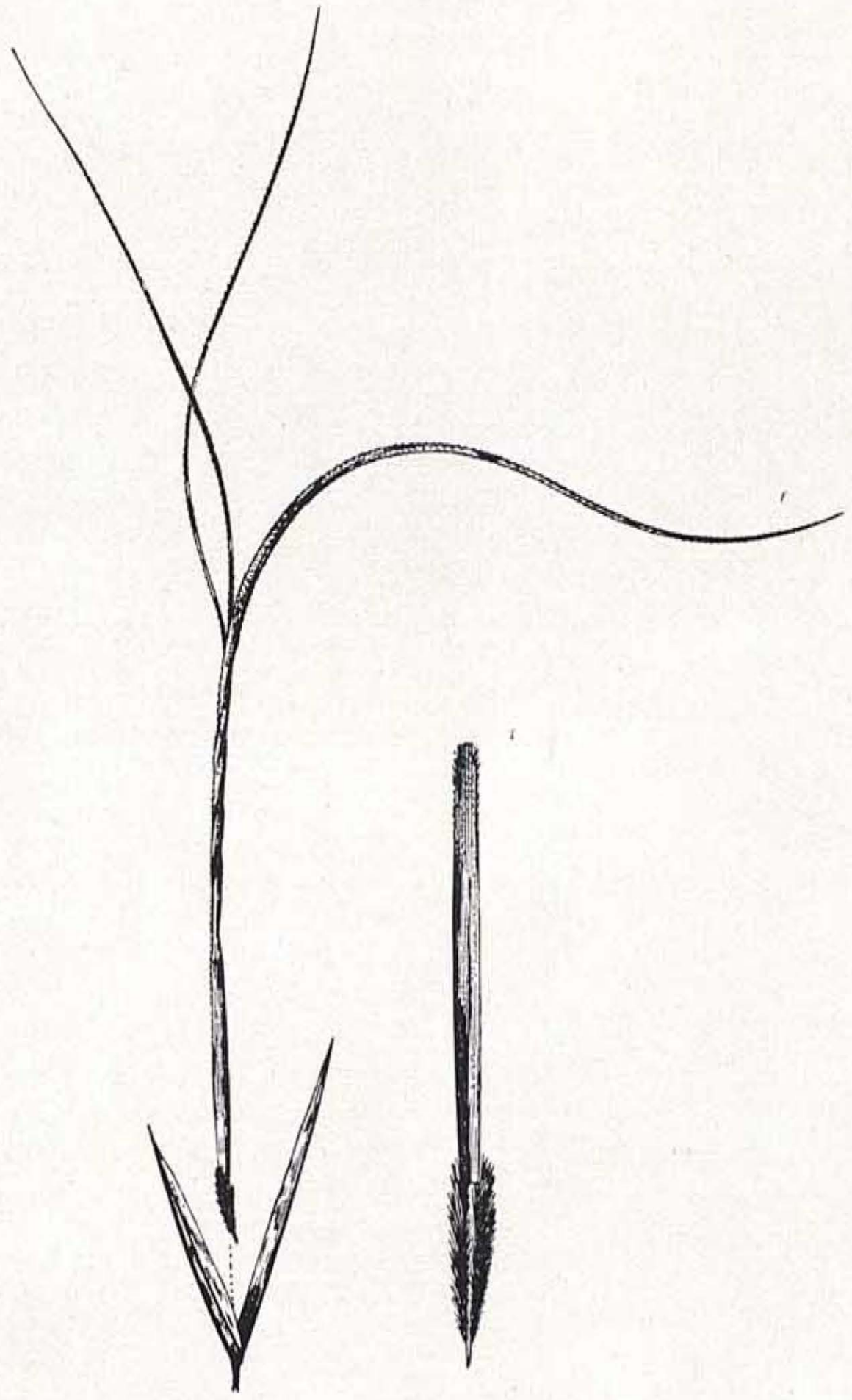
× 4 × 10

ARISTIDA PANSA Wooton et Standley.



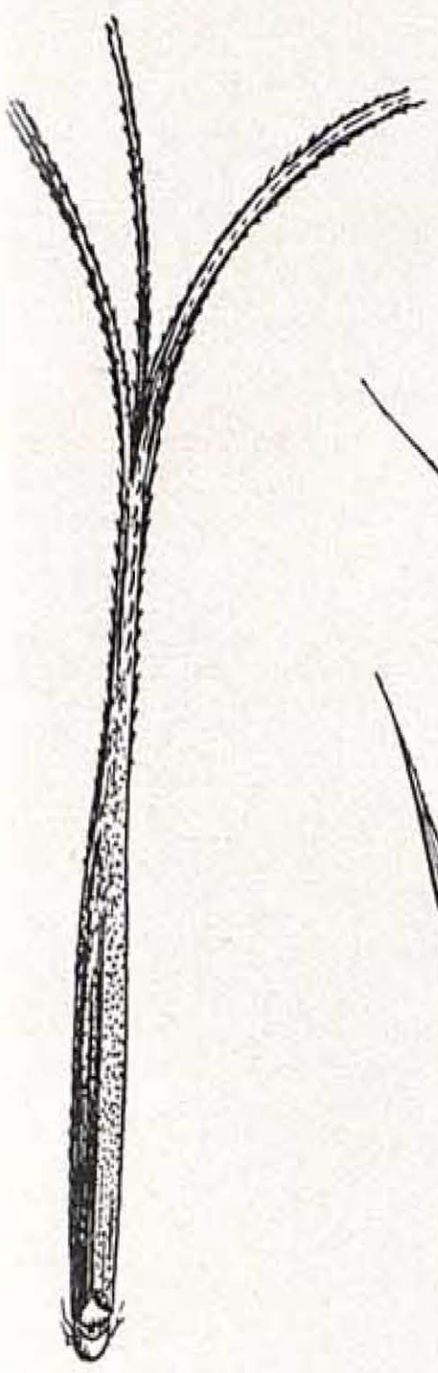
× 4 × 10

ARISTIDA NEGLECTA Leon.



× 2 × 6

ARISTIDA HETEROCHAETA Henrard.



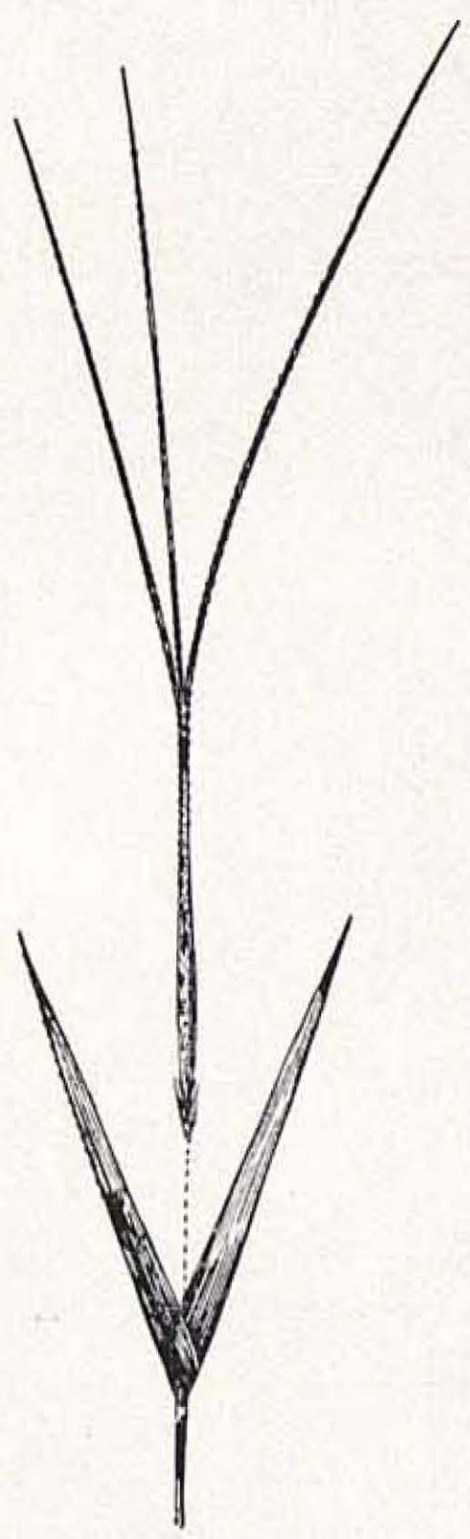
× 15



× 5

ARISTIDA TORTA (Nees) Kunth.

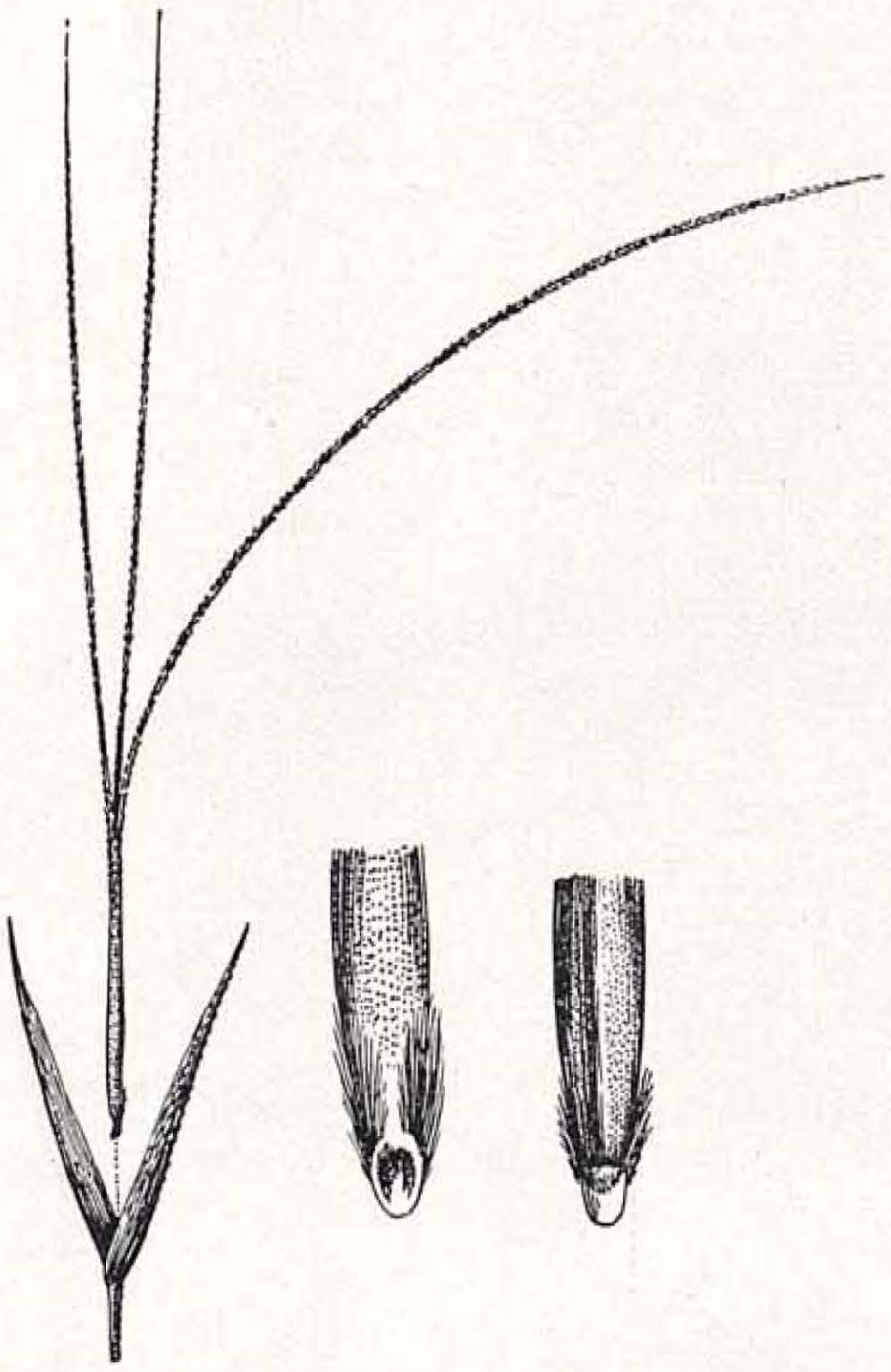






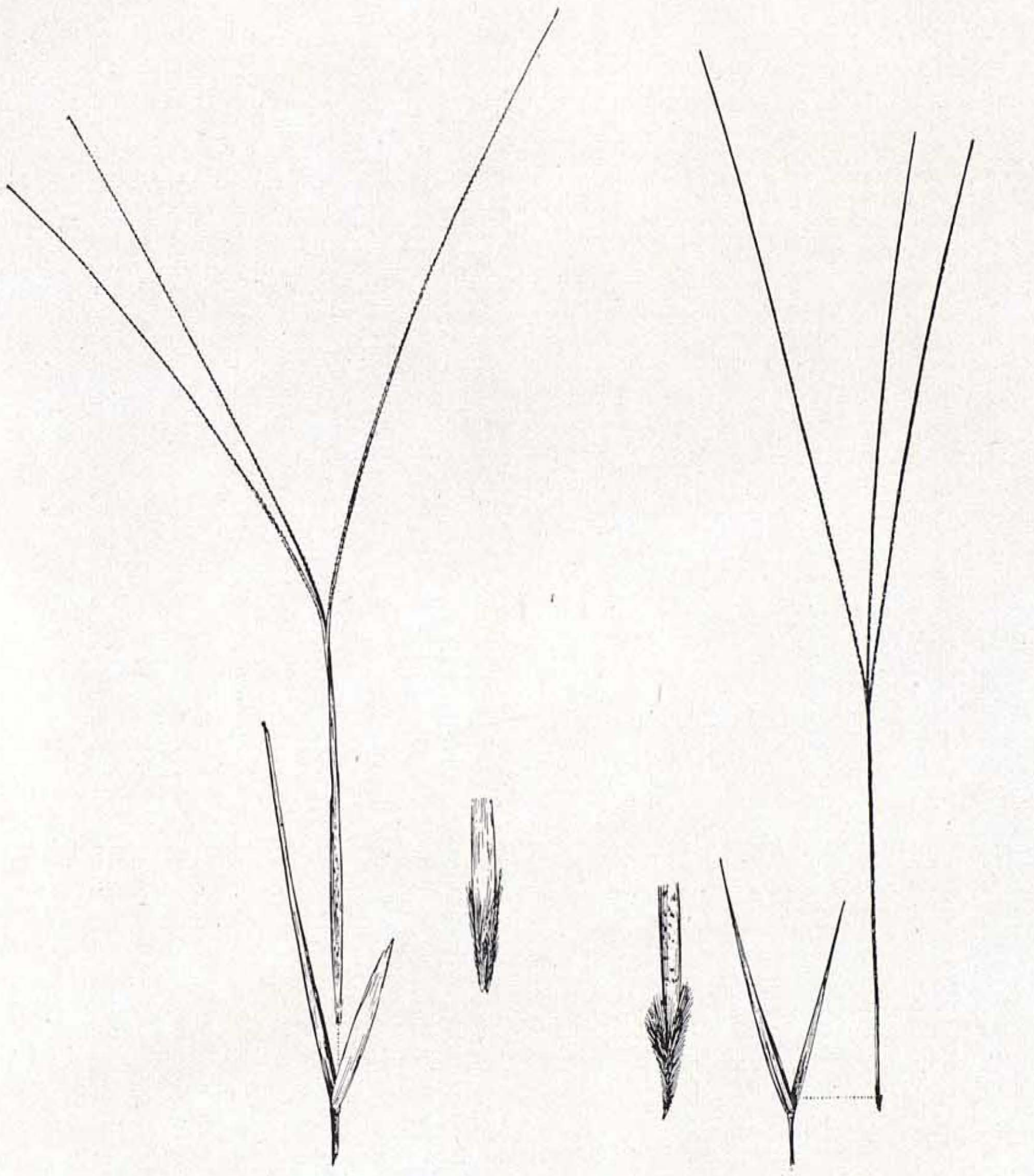
× 10 × 4 × 2

ARISTIDA CURTIFOLIA Hitchcock.



× 3⅓ × 16

ARISTIDA TINCTA Trinius et Ruprecht.

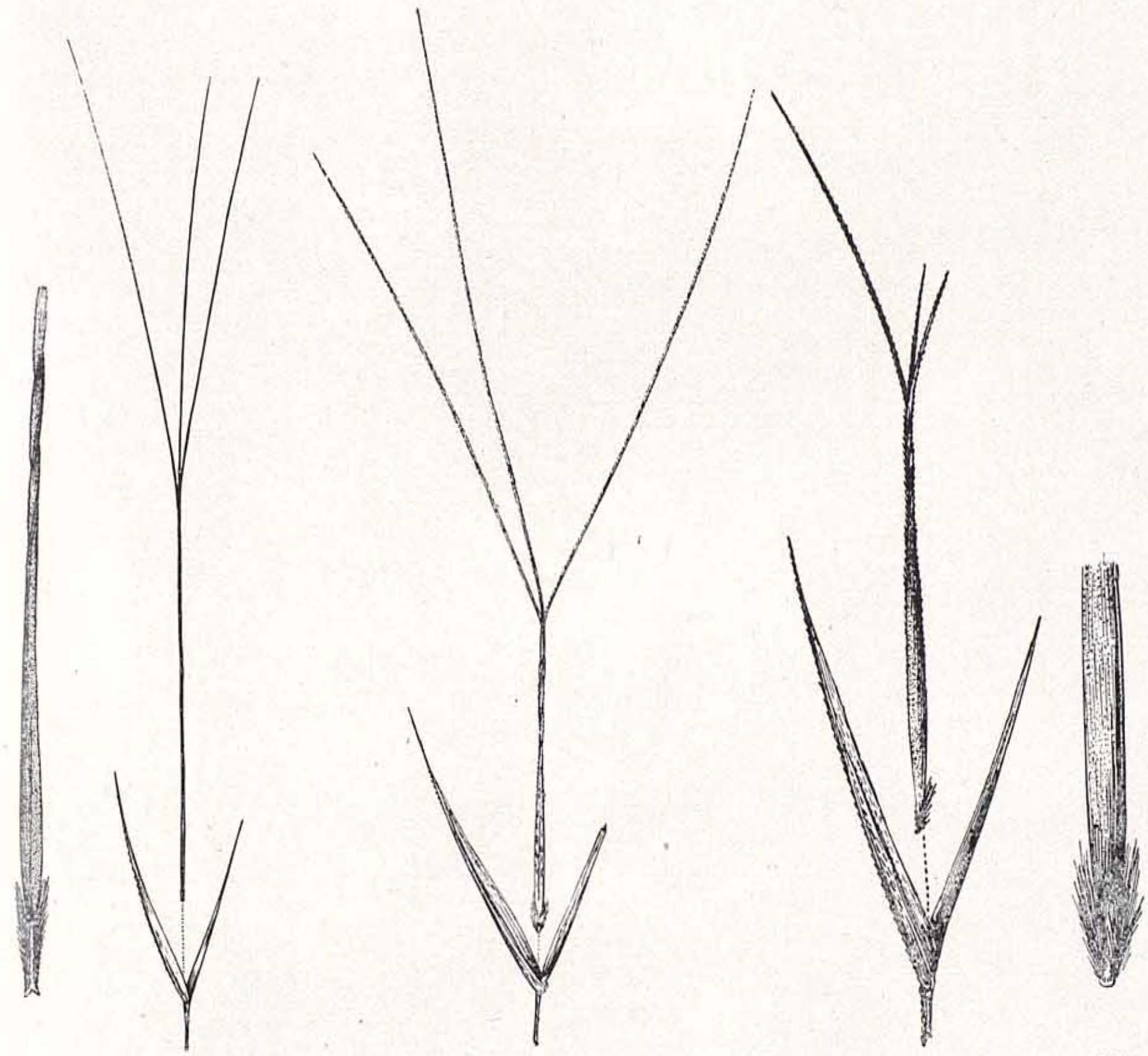


× 3 1/3 × 6 2/3

ARISTIDA BURKEI Stapf.

× 6 2/3 × 1 1/3

ARISTIDA CHAPADENSIS Trinius.



× 6⅔ × 2

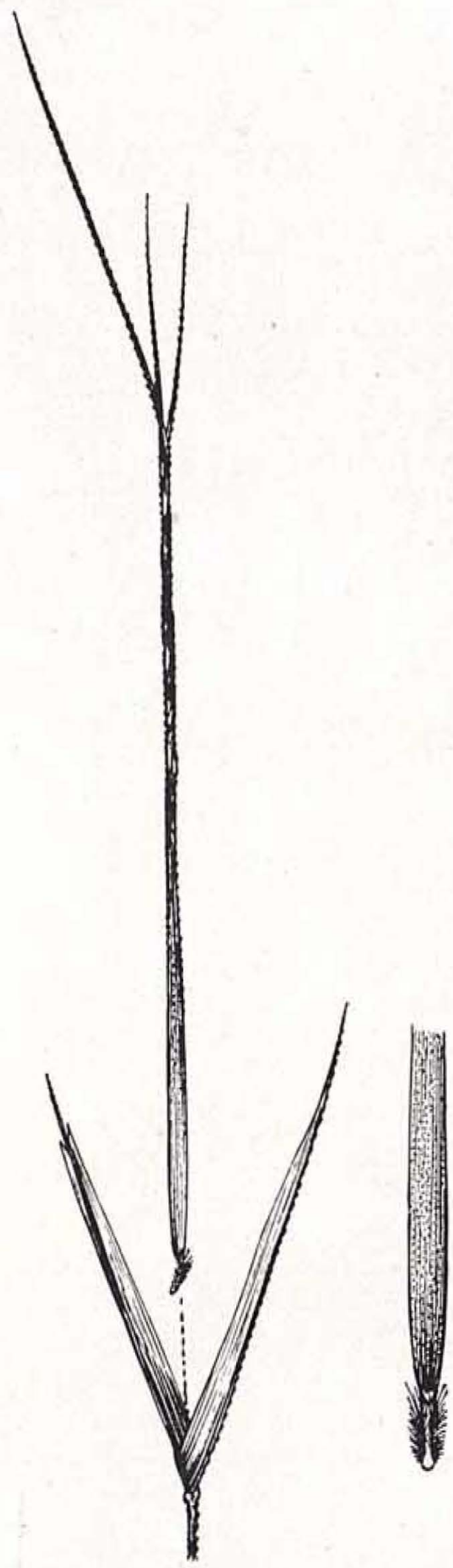
ARISTIDA RIPARIA
Trinius.

× 2⅔

ARISTIDA HASSLERI Hackel.

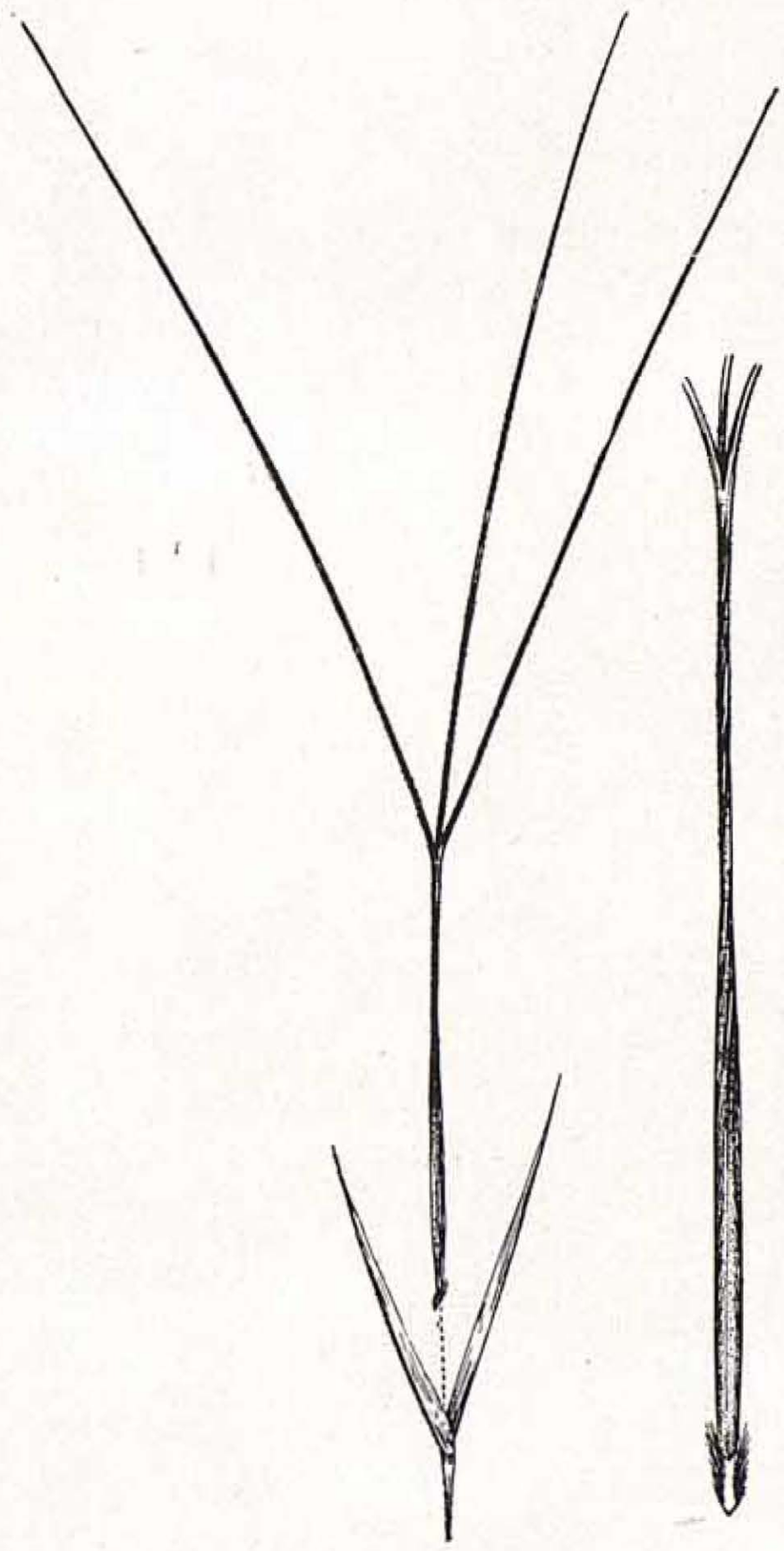
× 4 × 10

ARISTIDA LAGASCAE Henrard.



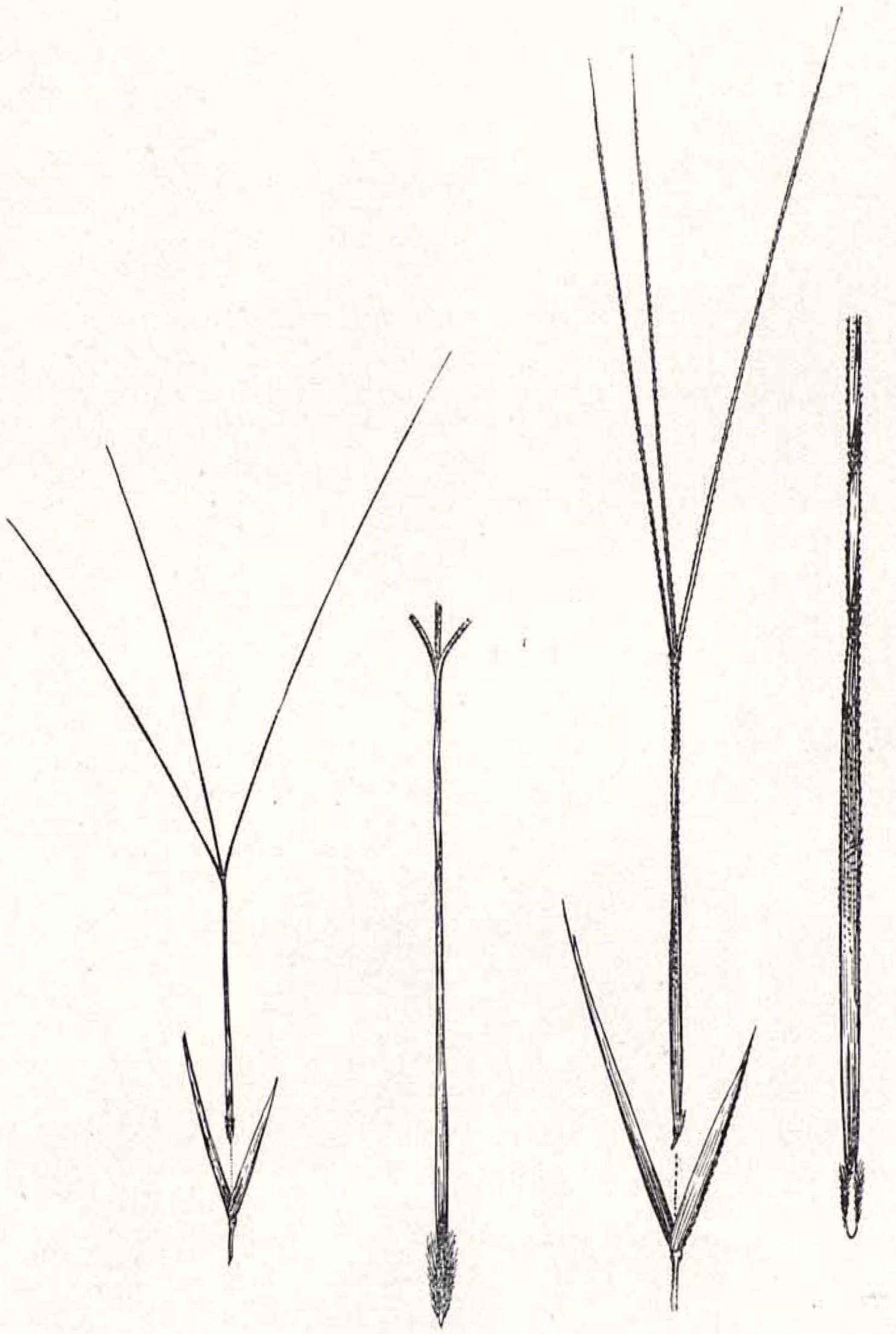
× 4 × 10

ARISTIDA JACQUINIANA Tausch.



× 2⅔ × 5⅓

ARISTIDA CULIONENSIS Pilger.

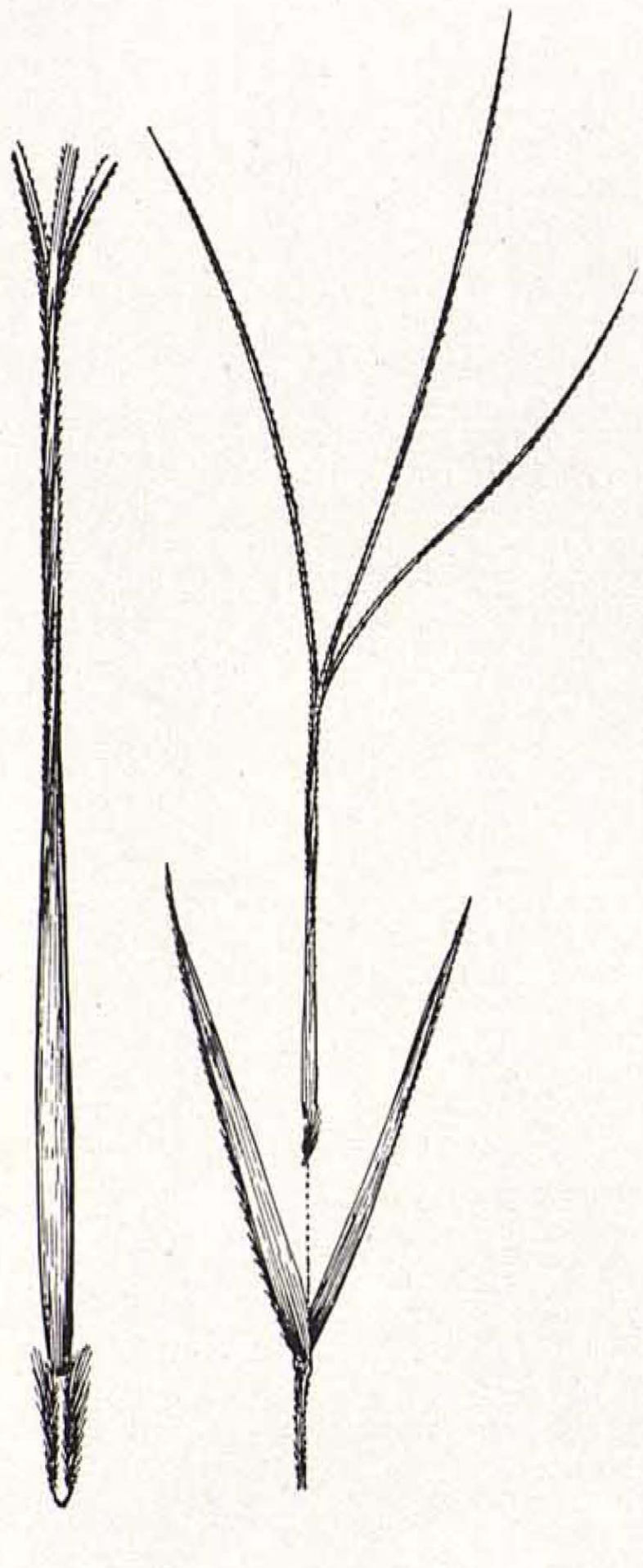


× 1²/₃ × 4

ARISTIDA SOMALENSIS Stapf.

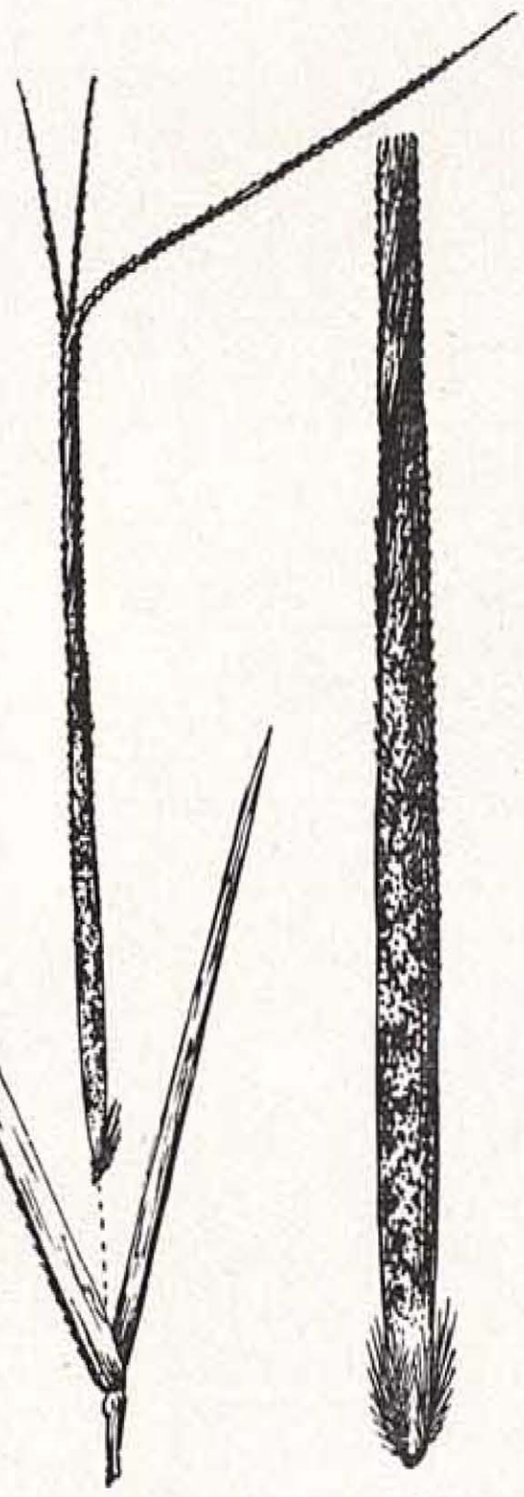
× 4 × 10

ARISTIDA MACROCLADA Henrard.



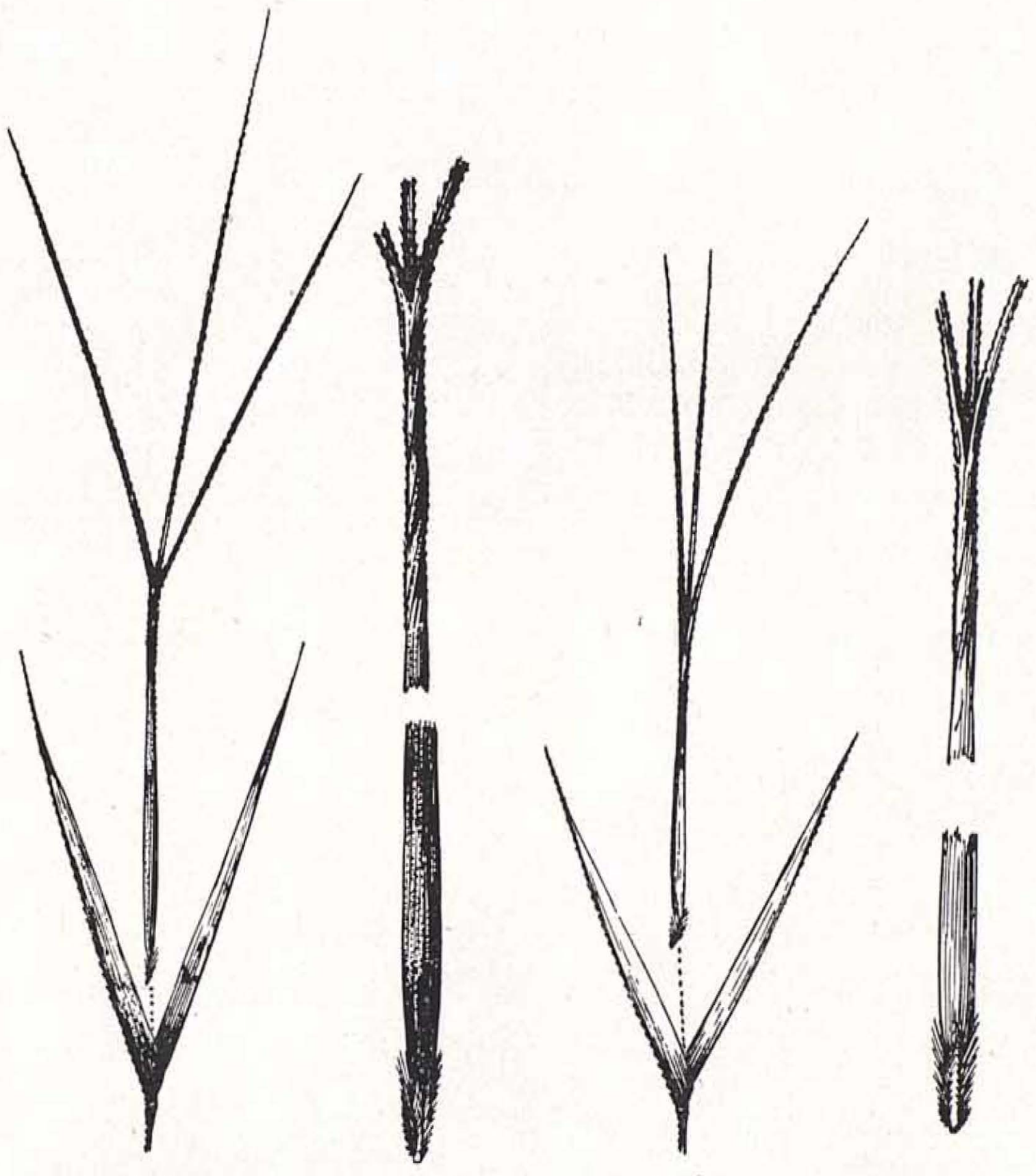
× 10 × 4

ARISTIDA ASPUNDII Henrard.



× 4 × 8

ARISTIDA LAXA Cav.

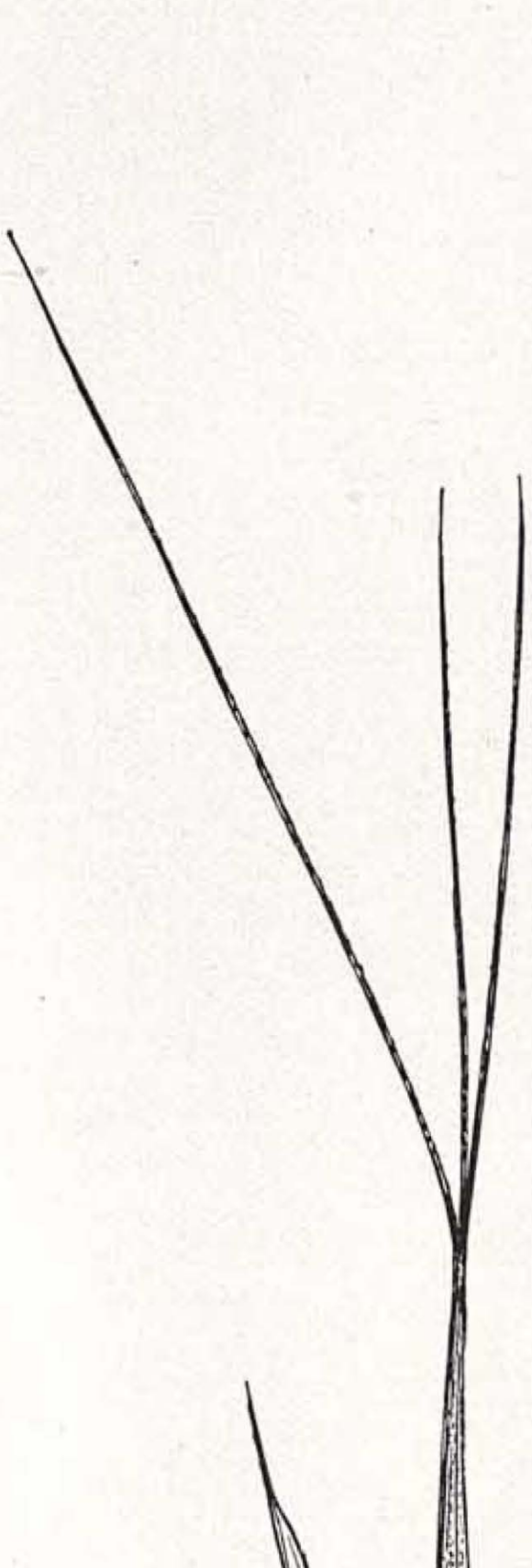


× 3 × 10

ARISTIDA DIVARICATA
Humboldt et Bonpland.

× 3 × 10

ARISTIDA BARBATA
Fournier.

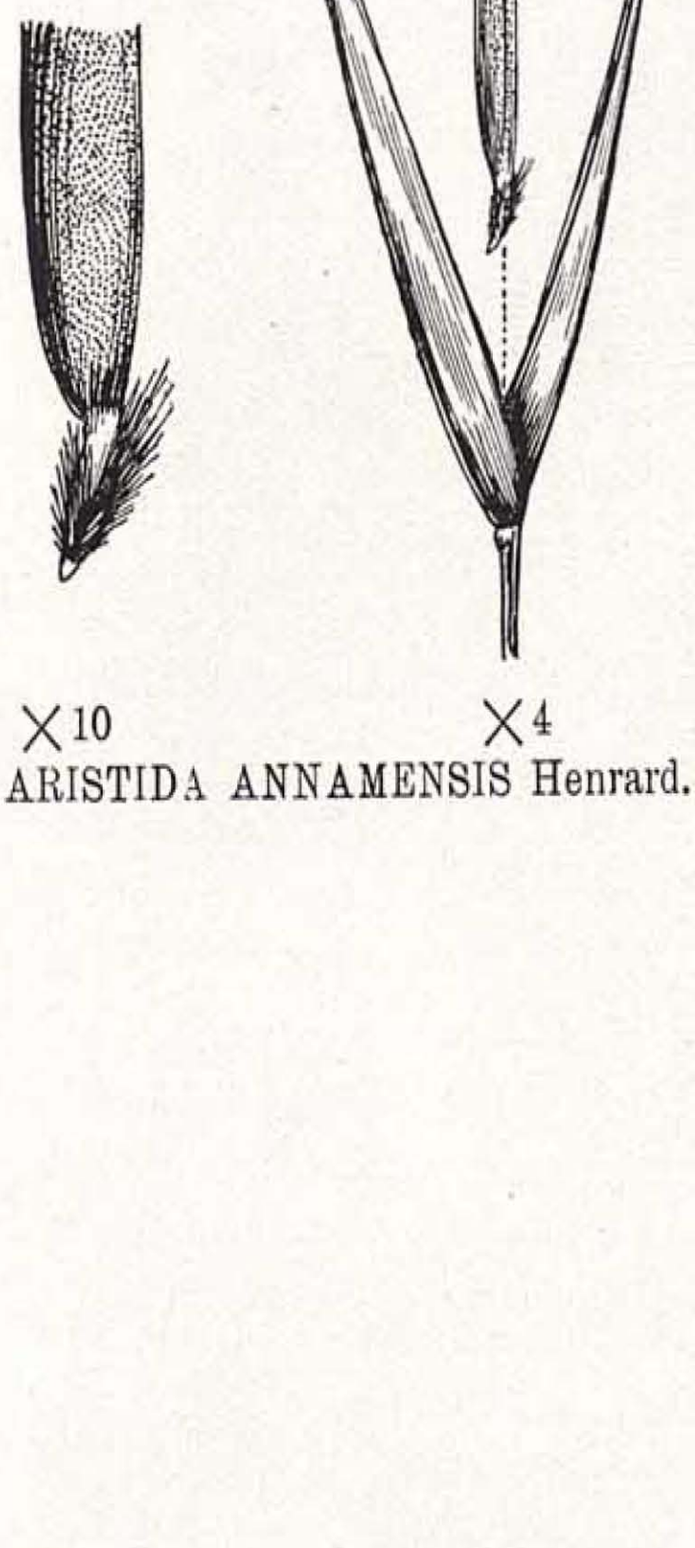


× 2⅔



× 5⅓

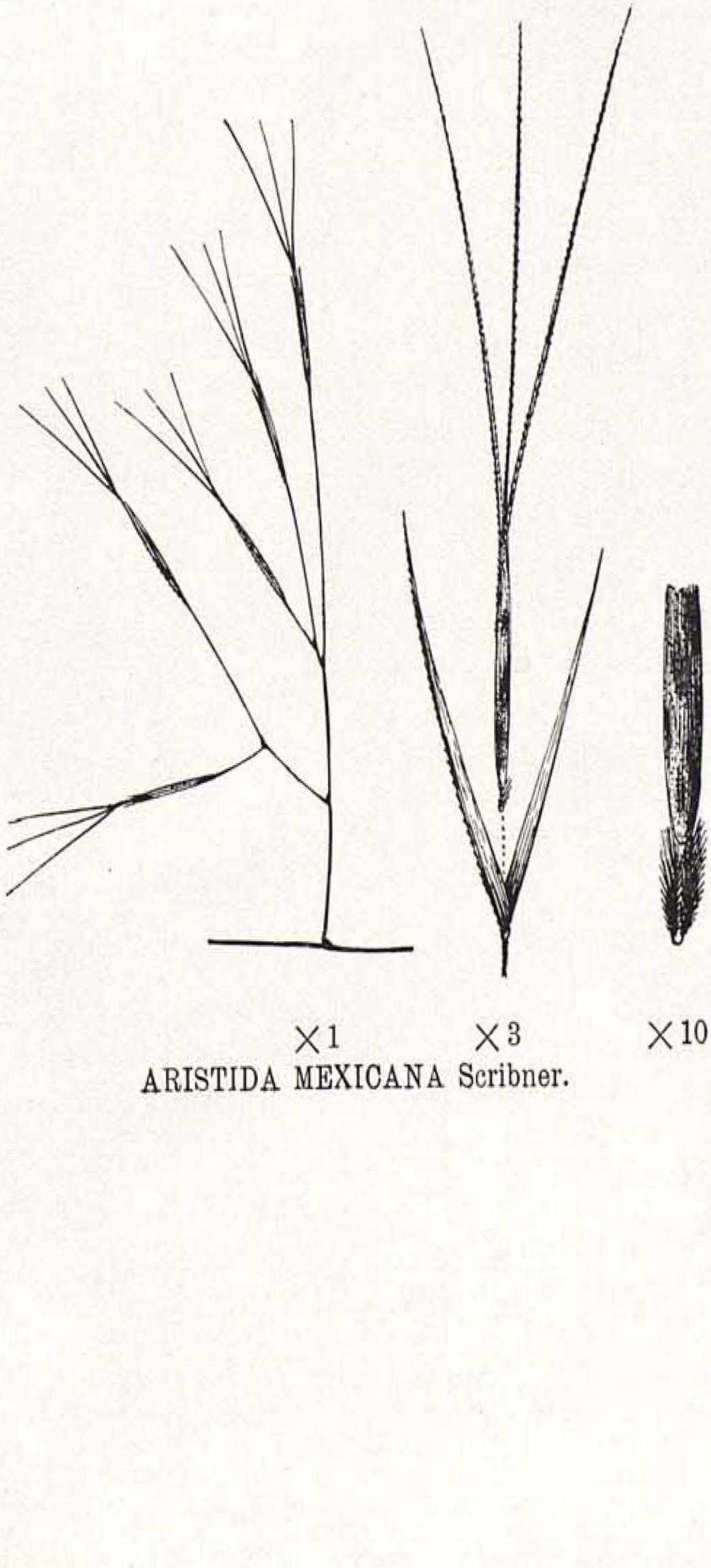
ARISTIDA ARMATA Henrard.



×10

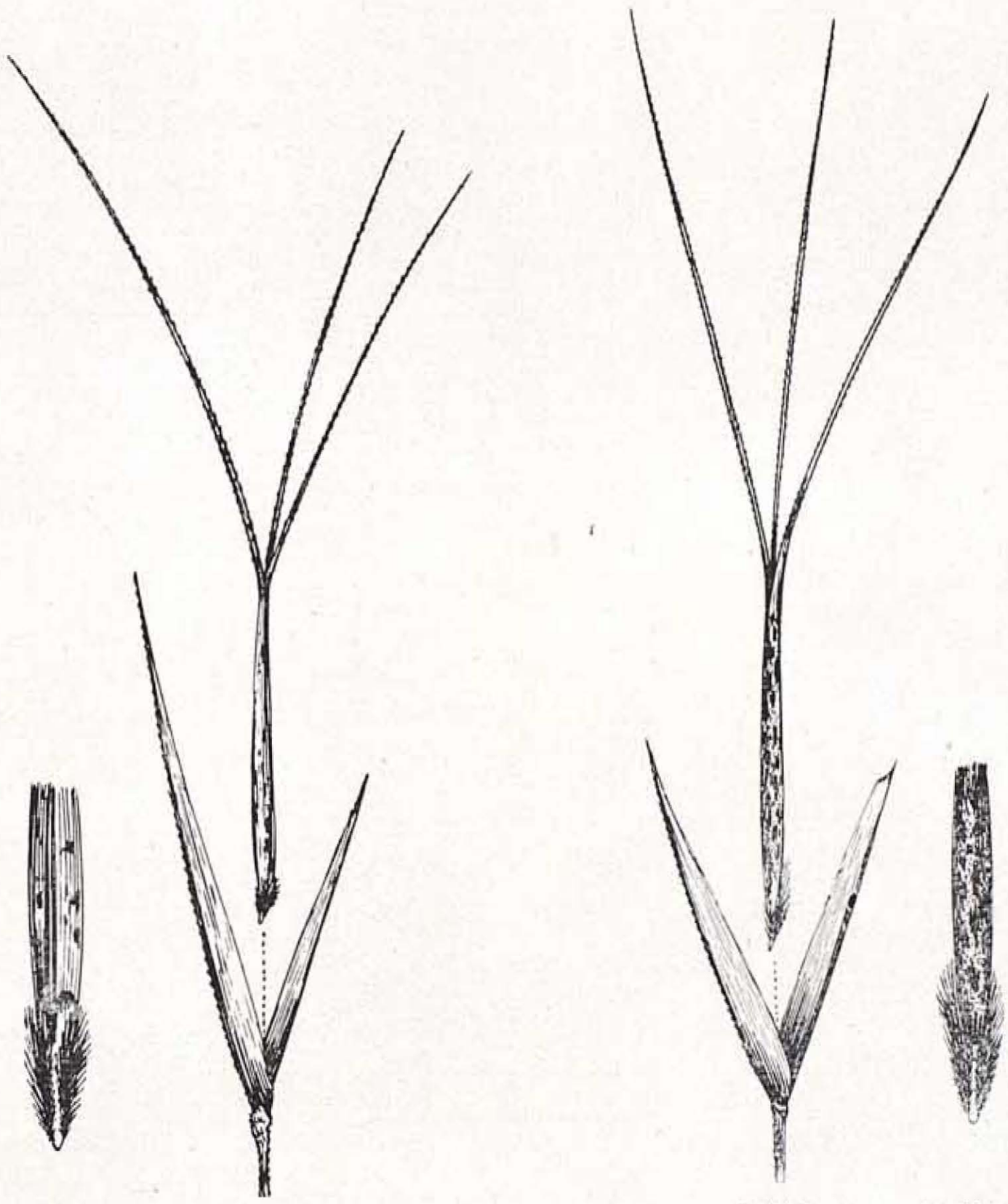
×4

ARISTIDA ANNAMENSIS Henrard.



×1 ×3 ×10

ARISTIDA MEXICANA Scribner.



× 10 × 4

ARISTIDA CHINENSIS Munro.

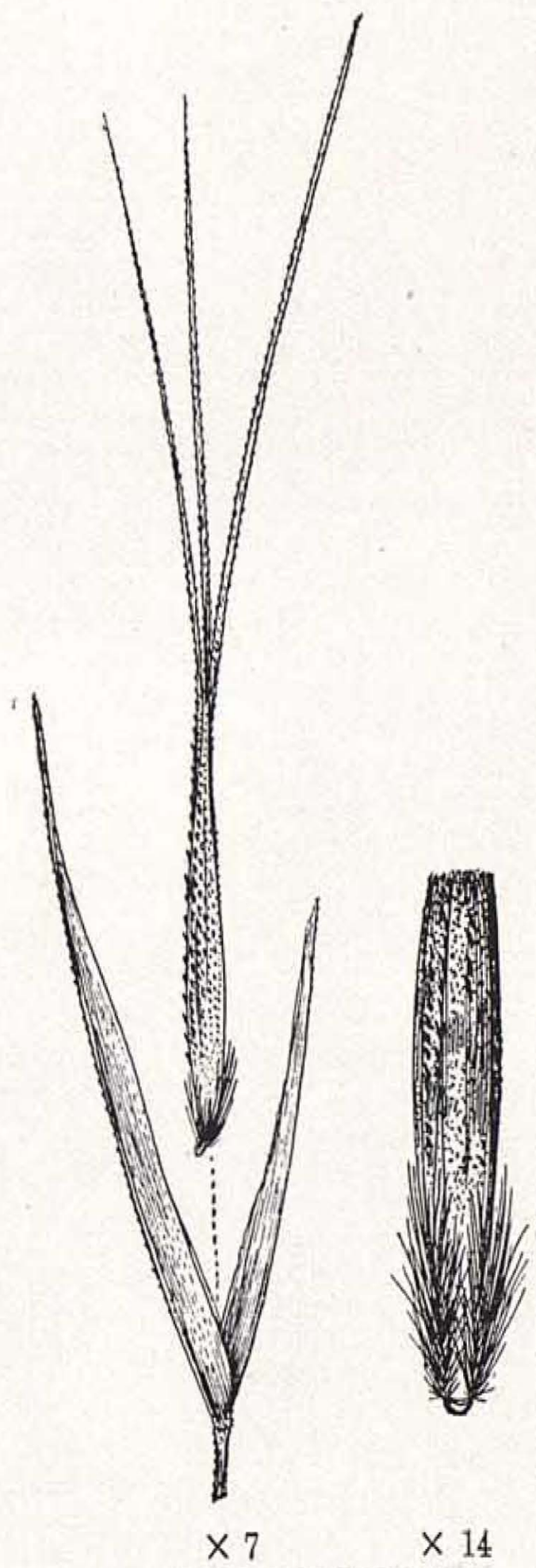
× 2⅔ × 6⅔

ARISTIDA PRAEALTA Henrard.



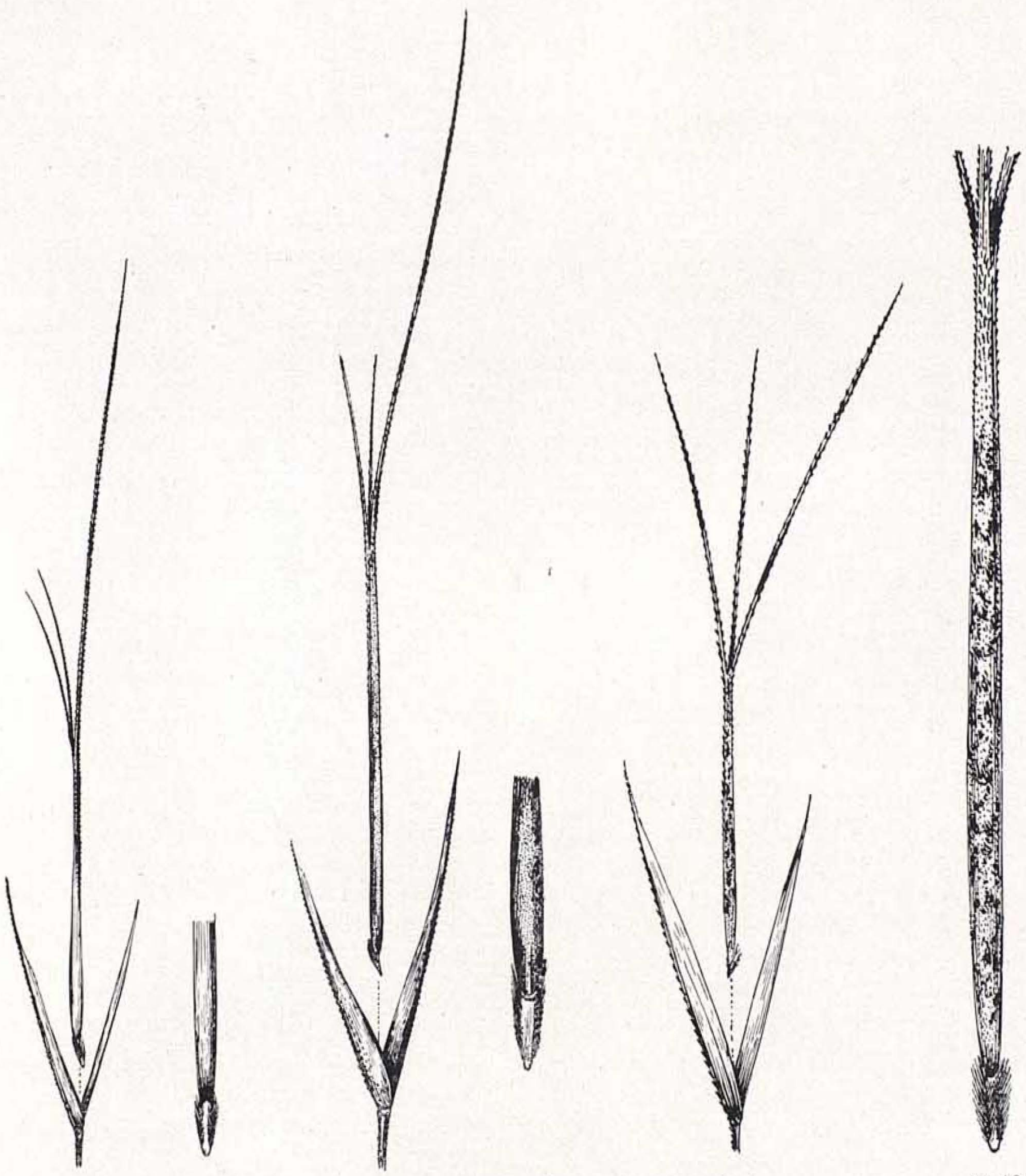
× 7

ARISTIDA BIPARTITA
Trin. et Rupr..



× 7 × 14

ARISTIDA HISPIDULA
Henrard.

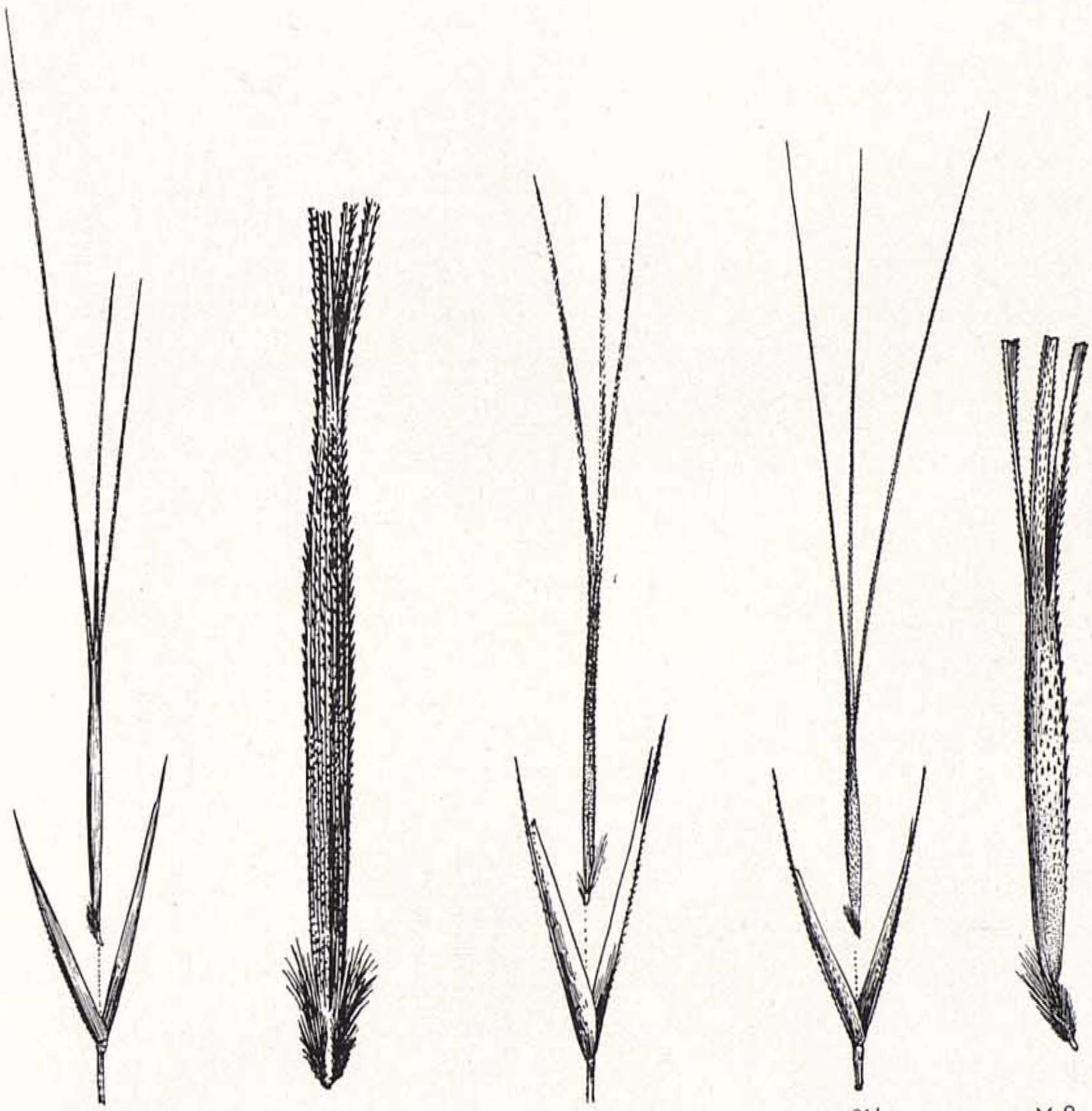


× 2⅔ × 6⅔ × 4 × 10 × 3 × 10

ARISTIDA PATULA Chapman.

ARISTIDA FLACCIDA Trinius et Ruprecht.

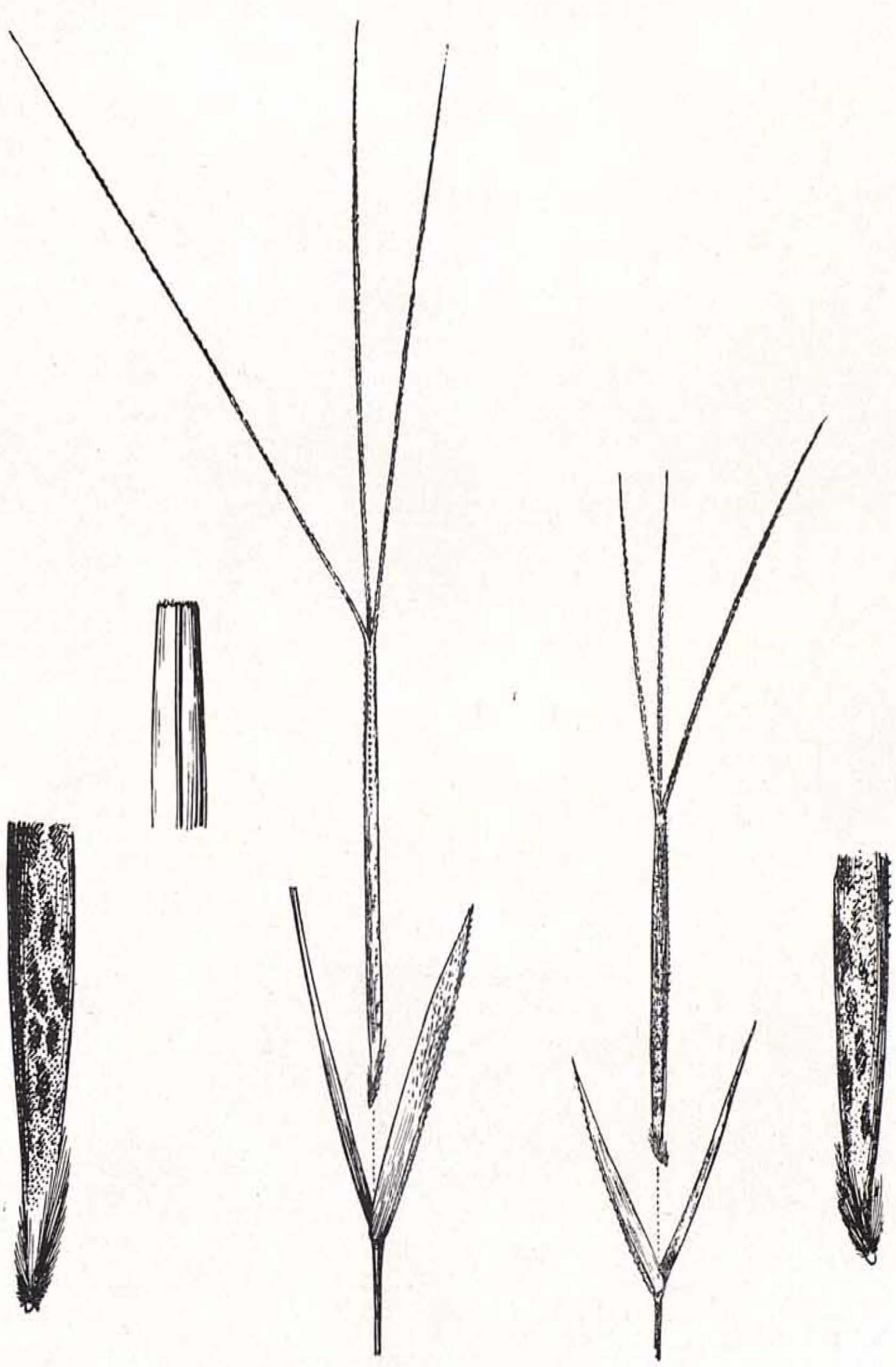
ARISTIDA GENTILIS Henrard.



× 2⅔
ARISTIDA
LONGIFOLIA
Trinius.

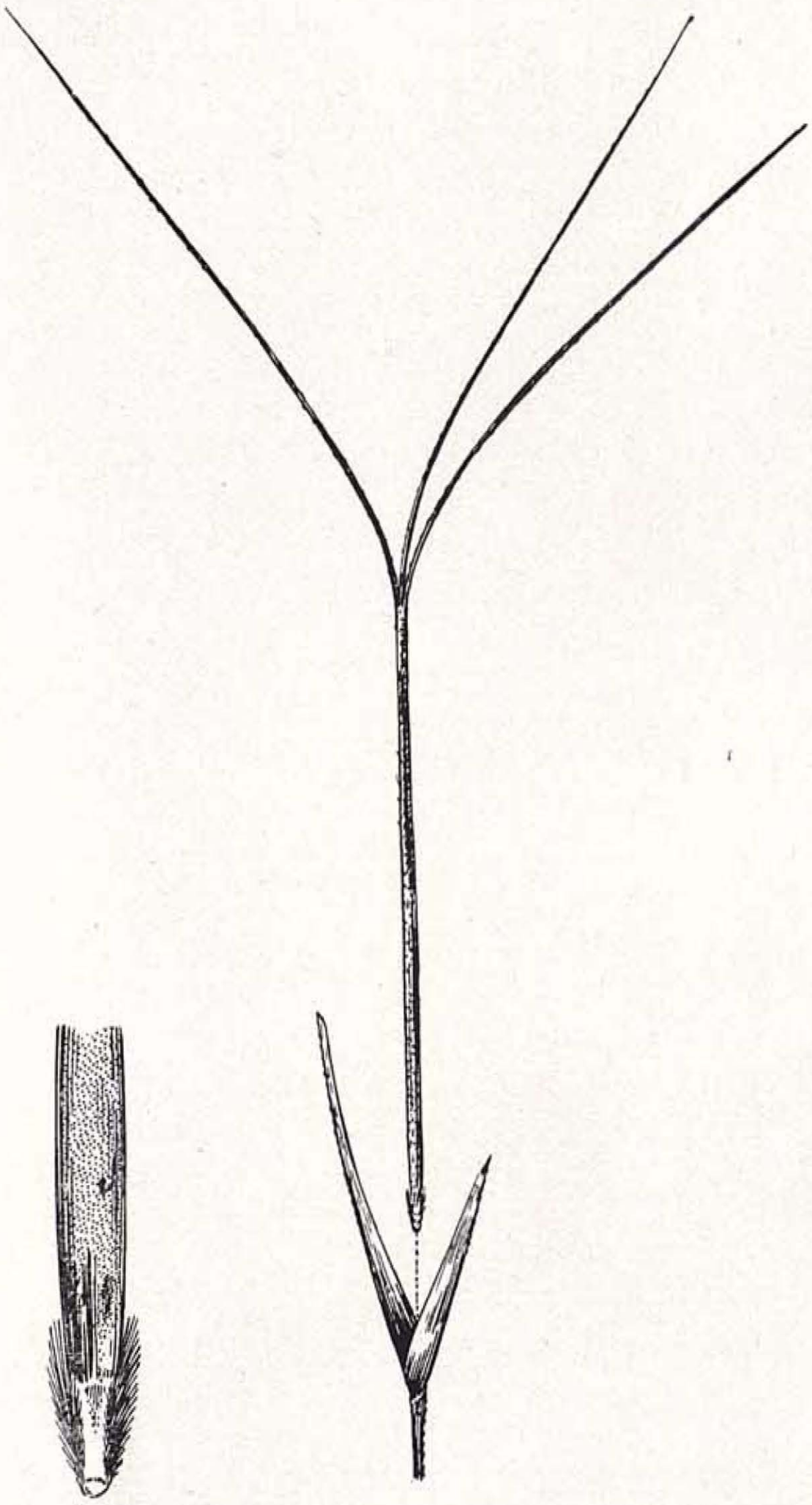
× 10 × 5
ARISTIDA SCABRIVALVIS
Hackel.

× 3⅓ × 8
ARISTIDA BORUMENSIS
Henrard.



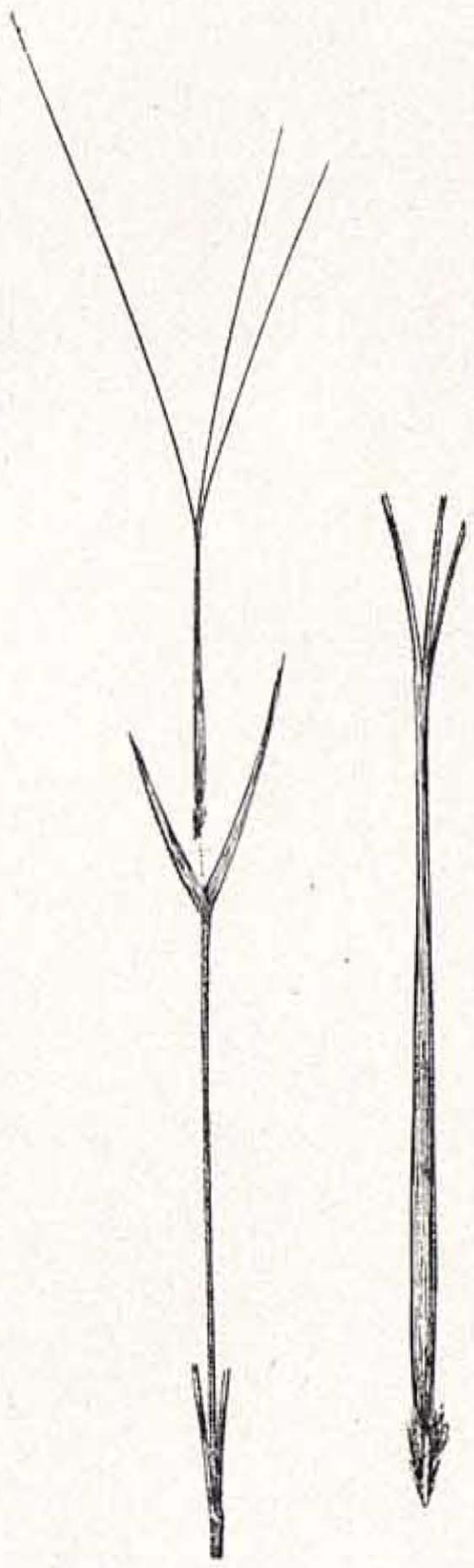
×12 ×15 ×5 ×4 ×10

ARISTIDA WAIBELIANA Henrard. ARISTIDA EFFUSA Henrard.



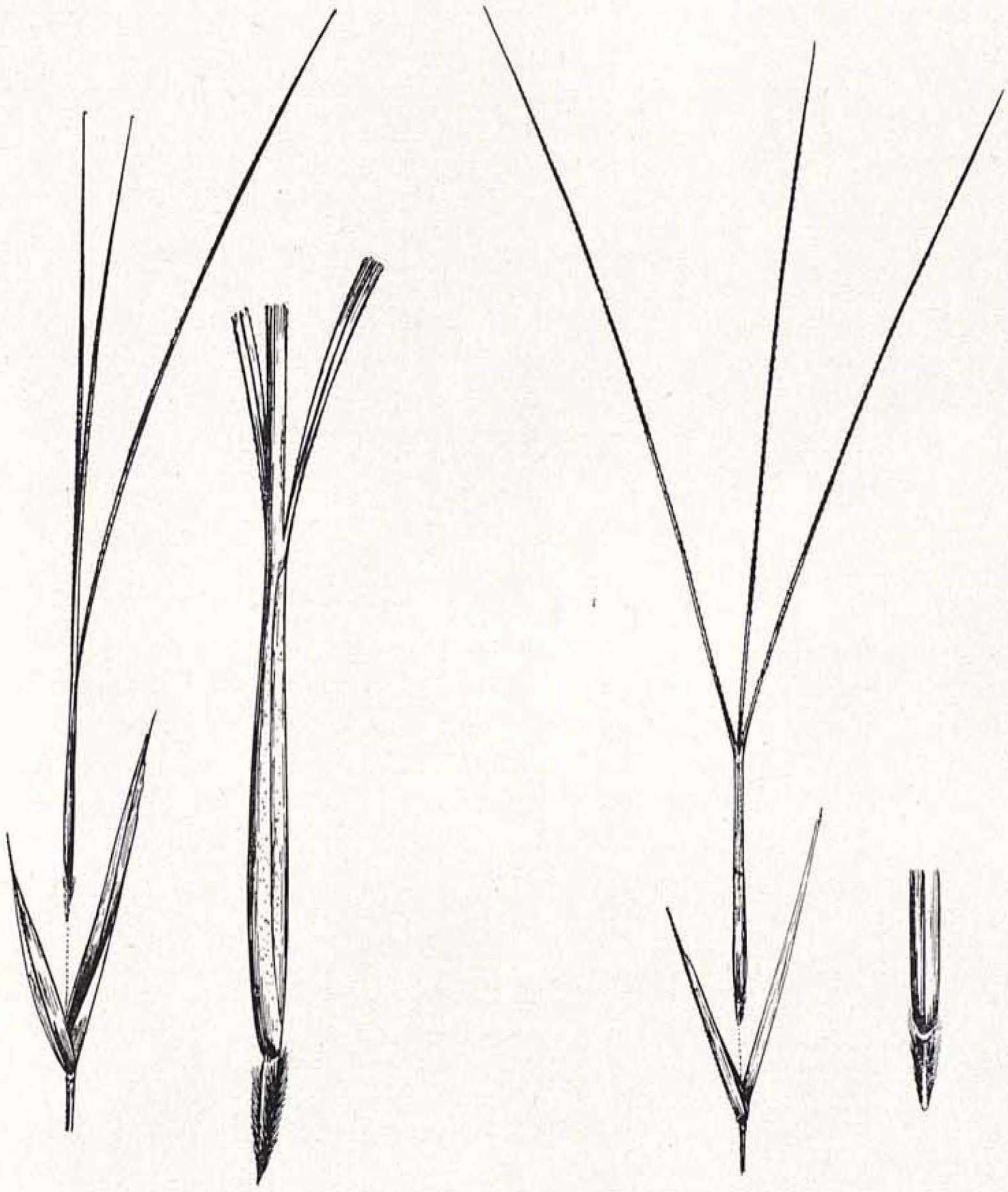
× 15 × 6

ARISTIDA VAGANS Cavanilles.



× 2⅔ × 6⅔

ARISTIDA GRACILIPES Henrard.



× 2 × 5⅓

ARISTIDA HYSTRIX L. f.

× 2⅔ × 7

ARISTIDA LEICHHARDTIANA Domin.

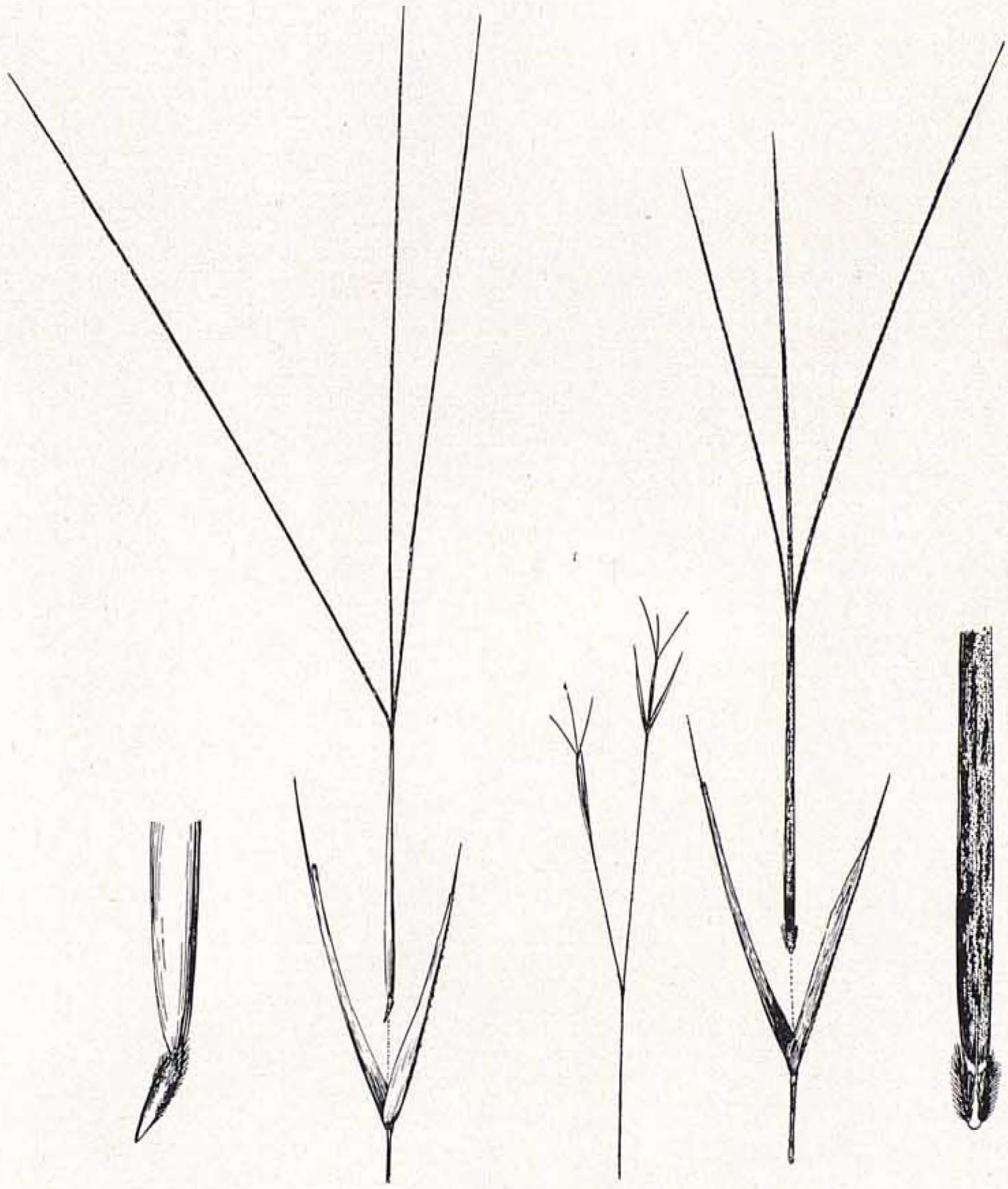


× 2²/₃ × 8

ARISTIDA PORTORICENSIS Pilger.

× 3 × 10

ARISTIDA CANESCENS Henrard.

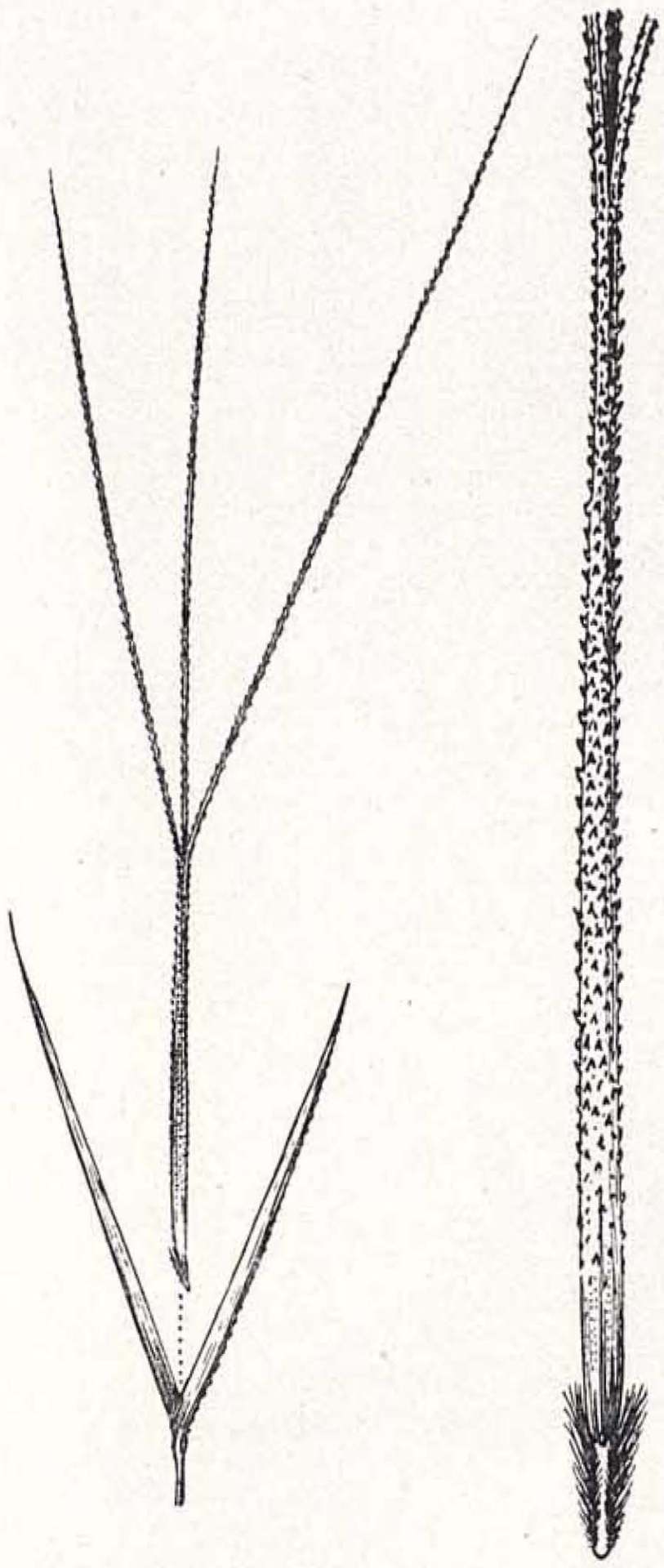


× 10 × 2

ARISTIDA CYANANTHA (Nees) Steudel.

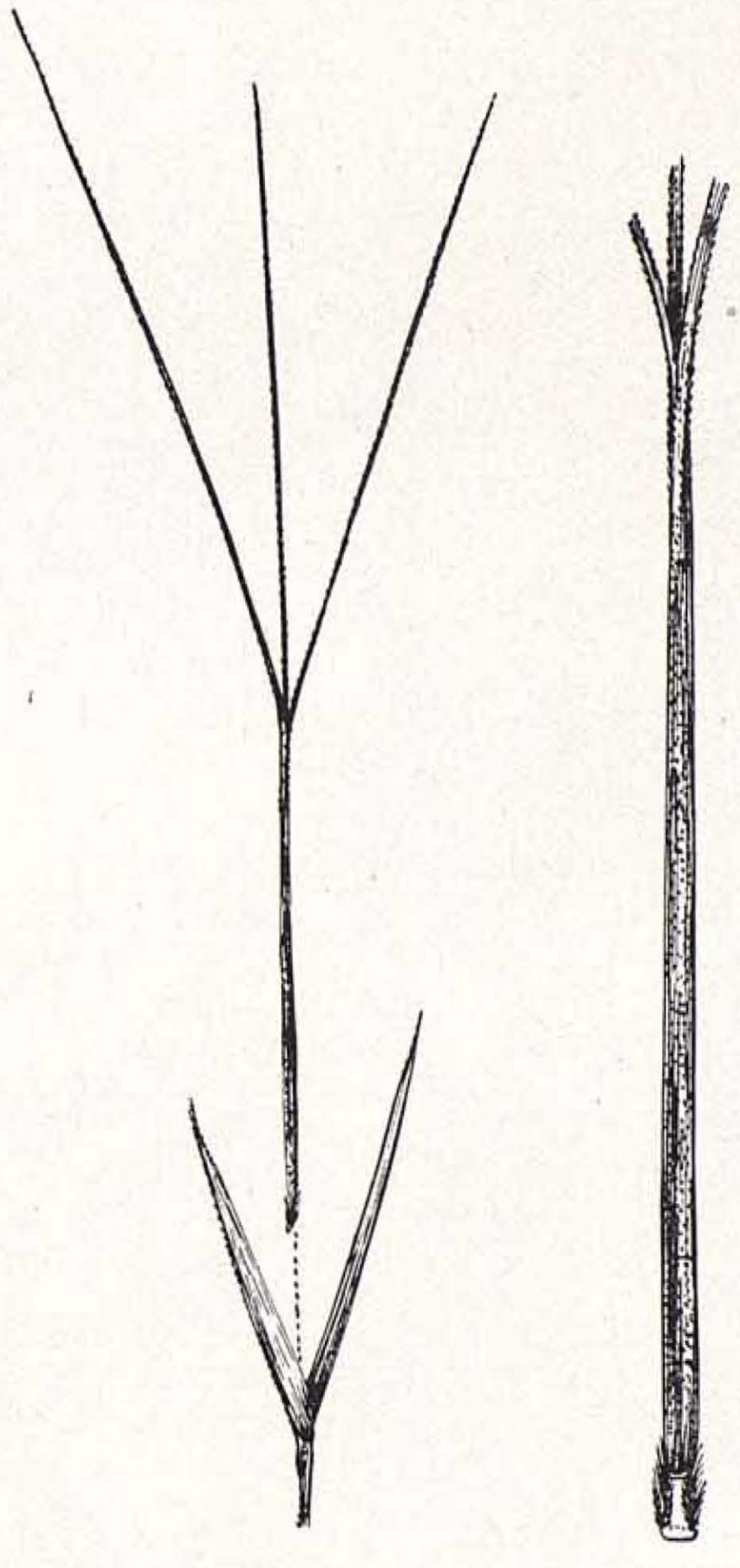
× ⅔ × 2⅔ × 8

ARISTIDA LEPTOPODA Bentham.



× 3 × 10

ARISTIDA HAMULOSA Henrard.



× 4 × 10

ARISTIDA PARODII Henrard.



×3 ×10
ARISTIDA IMBRICATA Henrard.

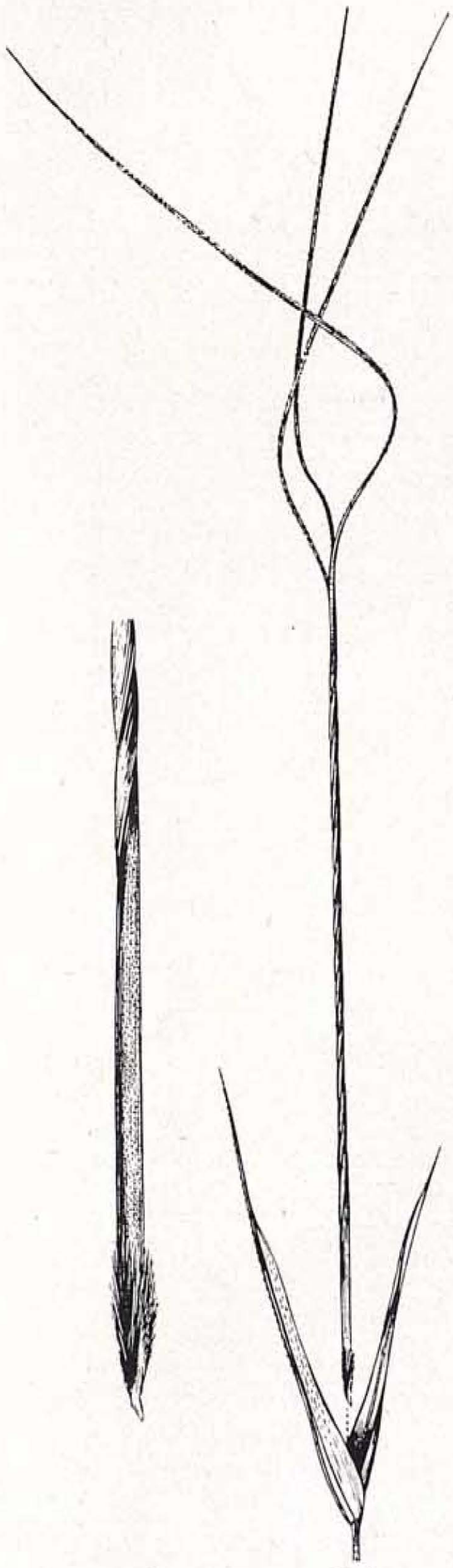
×2⅔ ×5⅓
ARISTIDA OLIGOSPIRA (Hack.) Henrard.

×2⅔ ×5⅓
ARISTIDA PERNICIOSA Domin.



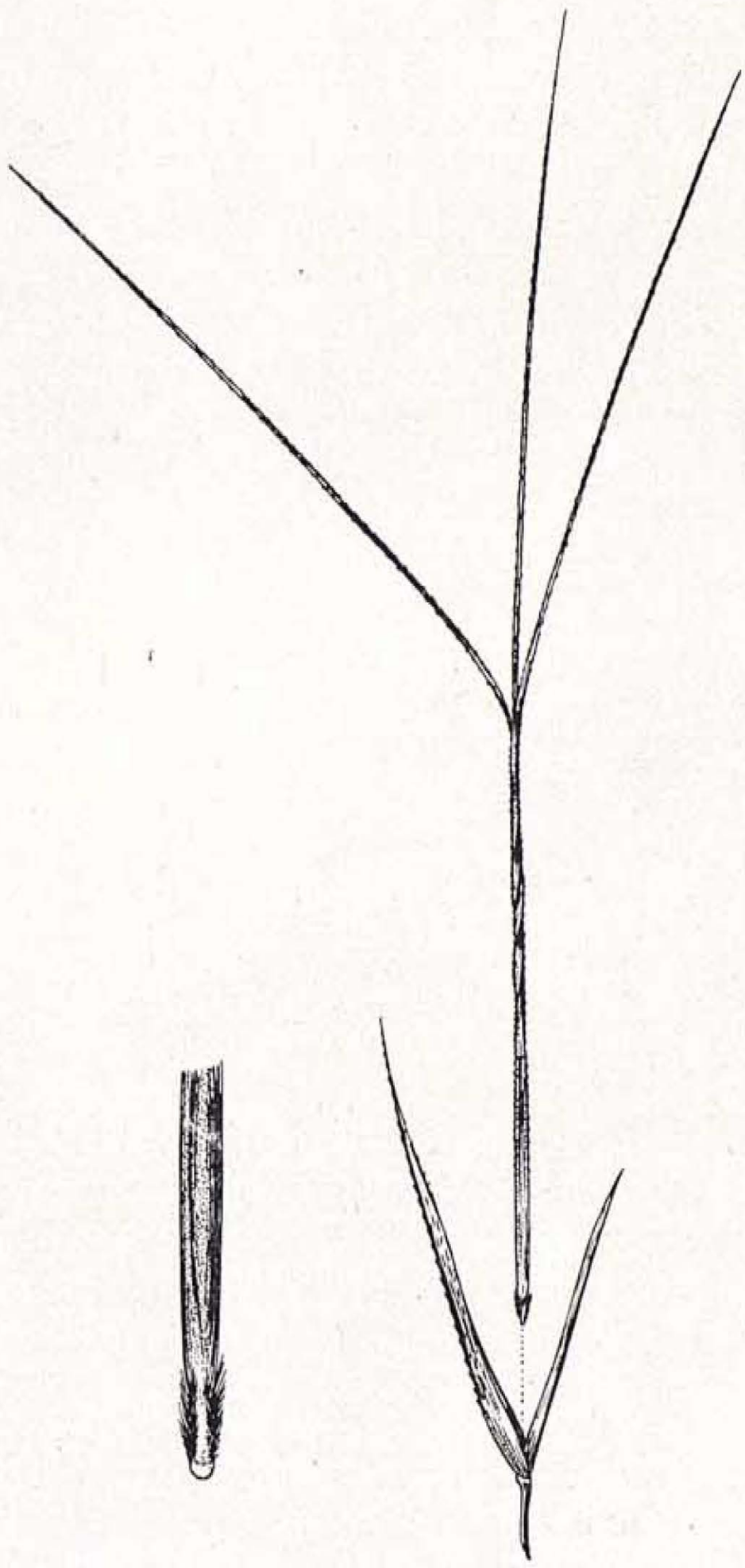
× 3 × 10 × 5 1/3 × 2/3

ARISTIDA TRINII Henrard. ARISTIDA VANDERYSTI De Wildeman.



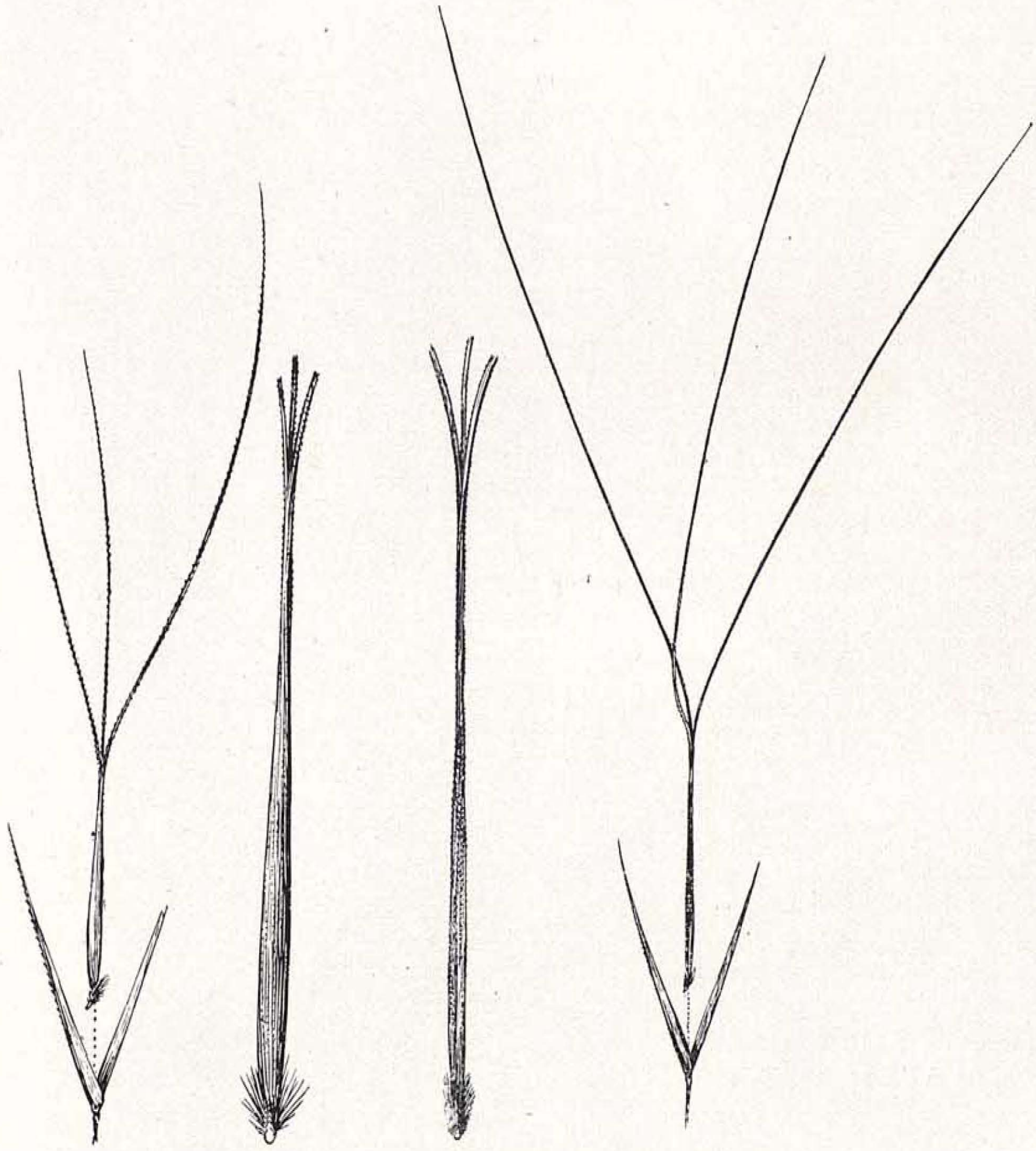
× 6 × 2

ARISTIDA MEGAPOTAMICA Sprengel.



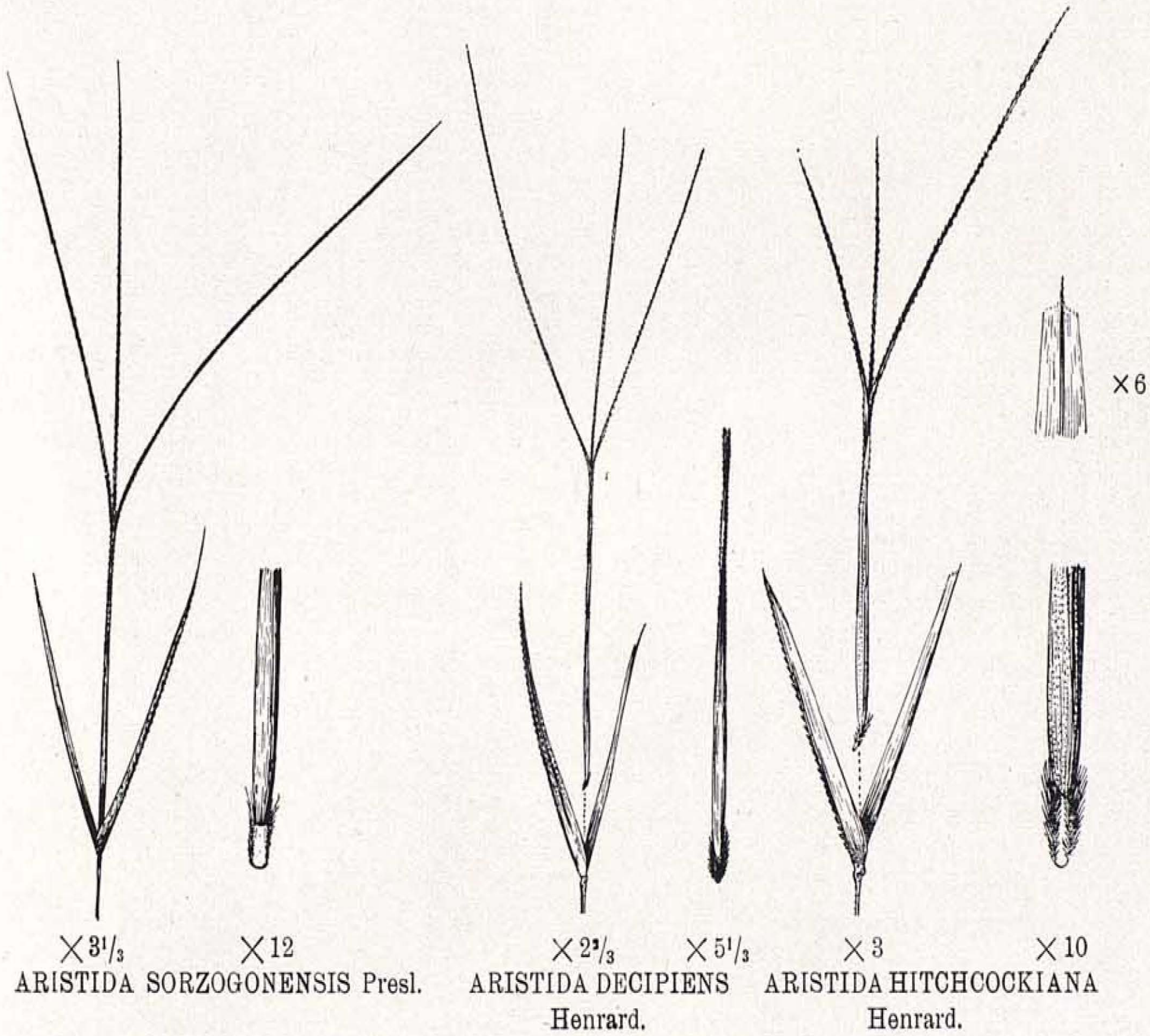
× 10 × 3⅓

ARISTIDA MACROPHYLLA Hackel.



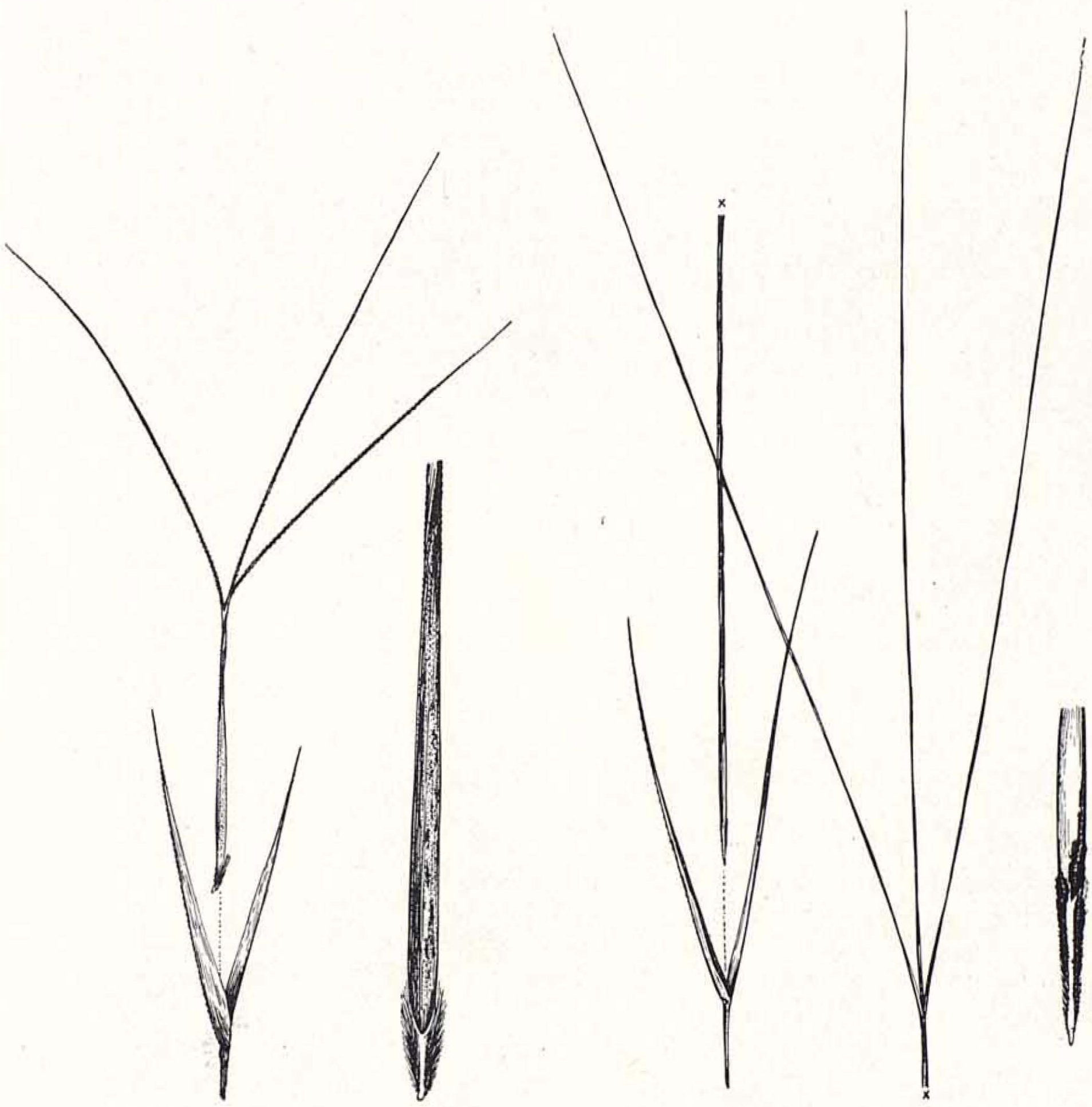
× 4 × 10 × 5⅓ × 2

ARISTIDA MONTICOLA Henrard. ARISTIDA HACKELI Arechavaleta.



×3½ ×12 ×2⅔ ×5⅓ ×3 ×10

ARISTIDA SORZOGONENSIS Presl. ARISTIDA DECIPIENS Henrard. ARISTIDA HITCHCOCKIANA Henrard.

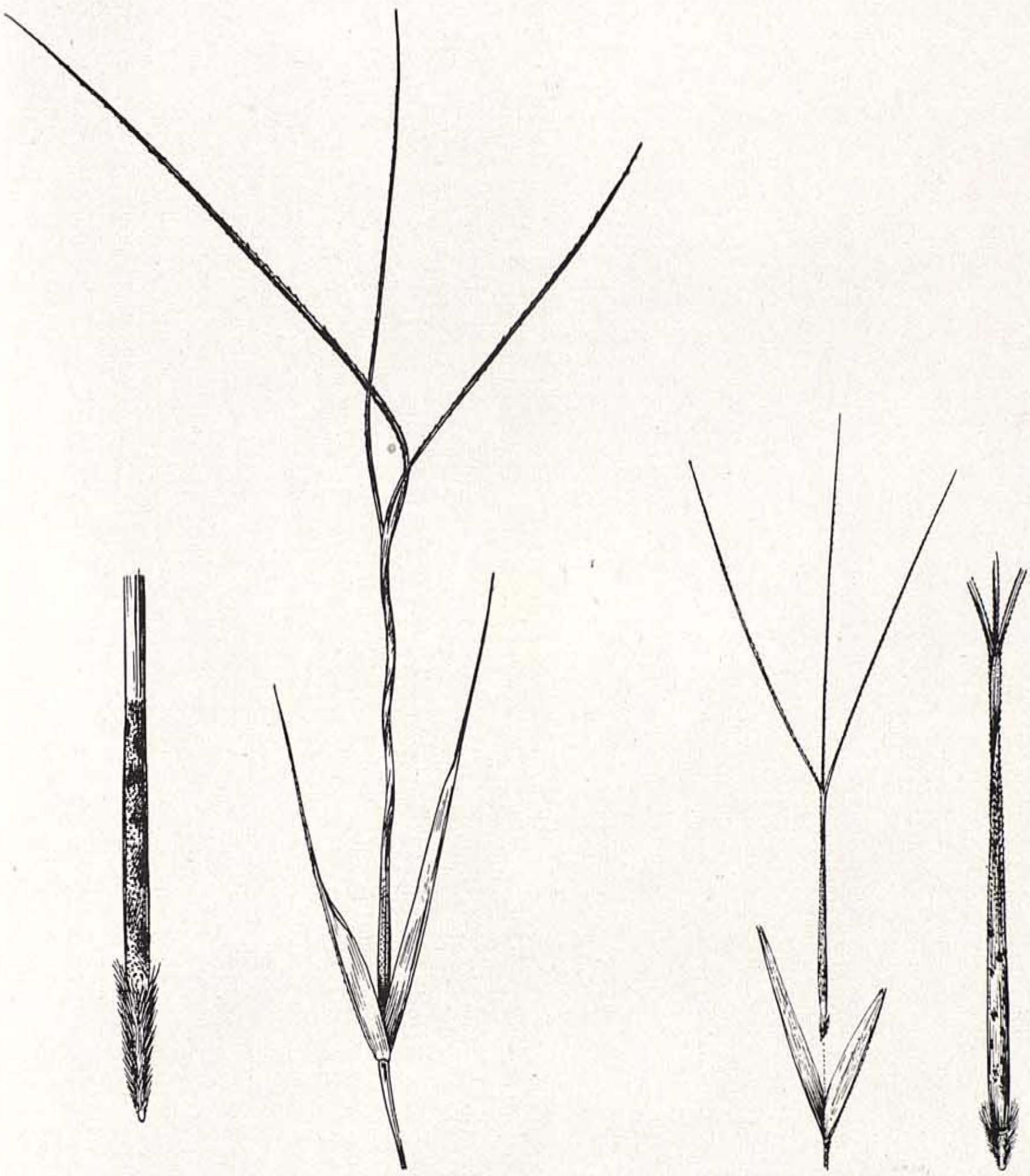


× 2 × 5⅓

ARISTIDA ARIZONICA Vasey.

×1 ×1 ×4

ARISTIDA MACRANTHA Hackel.

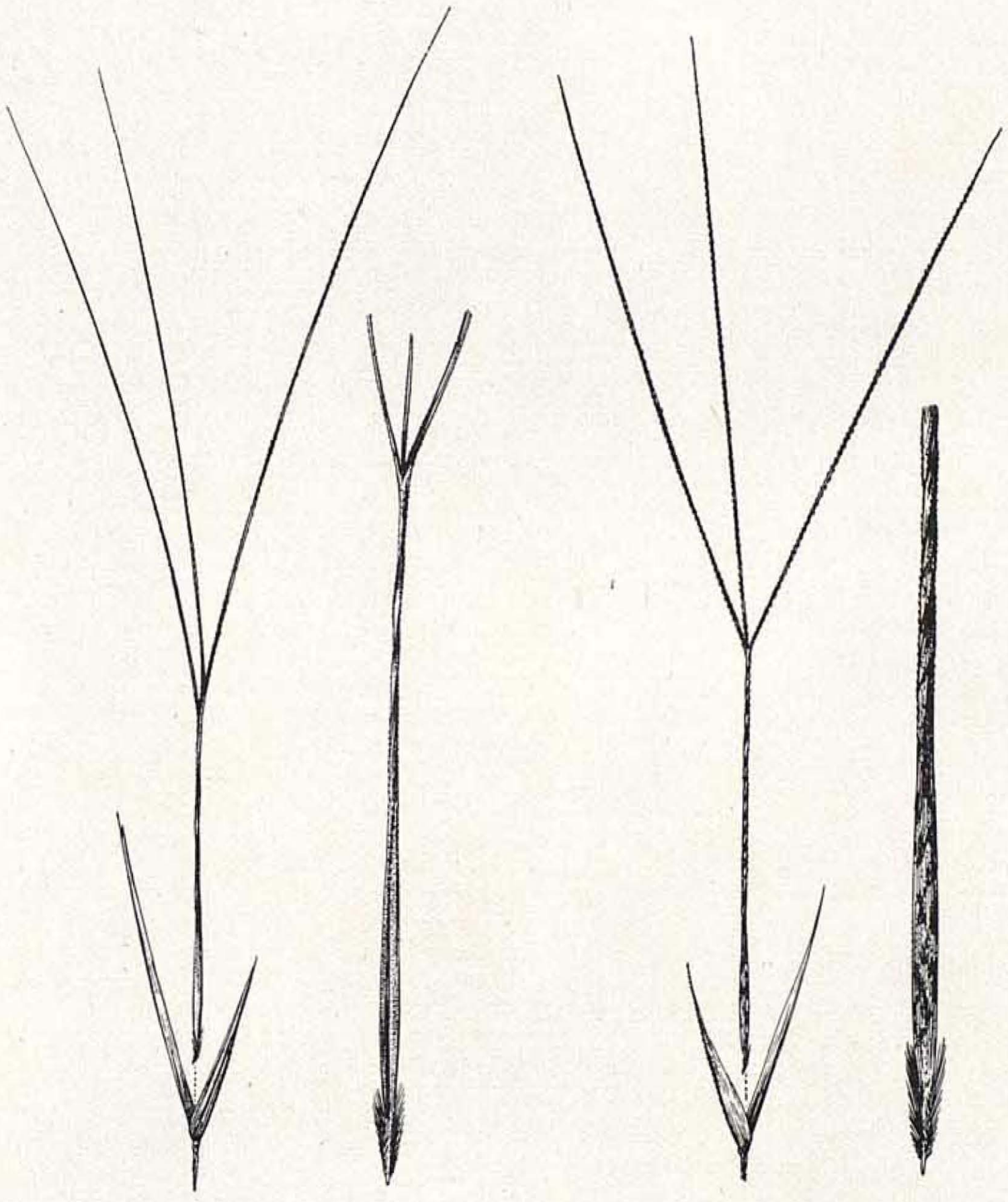


× 10 × 5

ARISTIDA SPICIFORMIS Elliott.

× 2⅔ × 5⅓

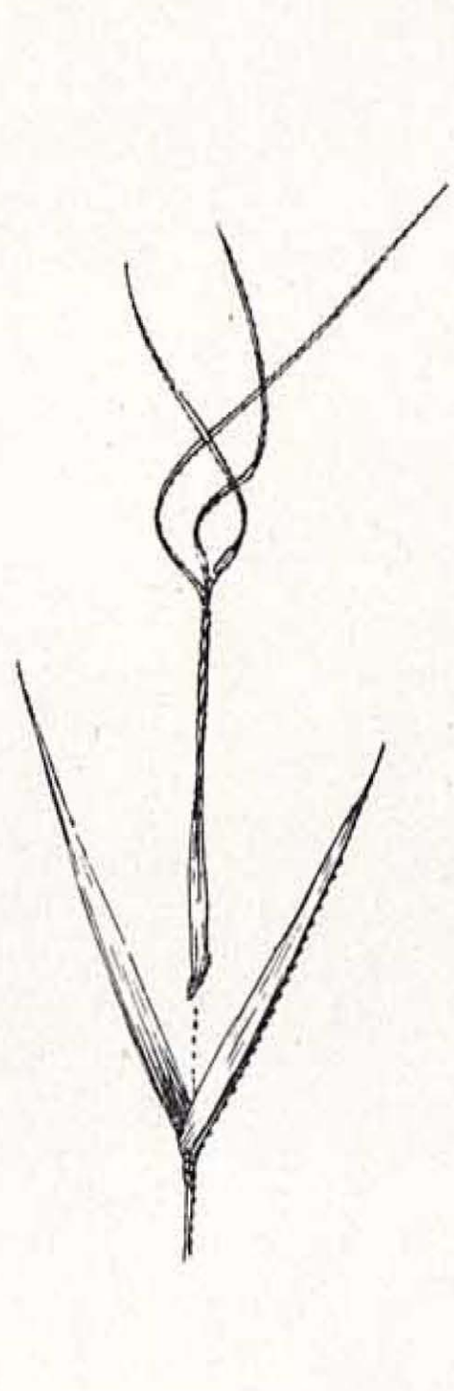
ARISTIDA CURVIFOLIA Fournier.



× 2²/₃ × 5¹/₃
ARISTIDA SCHULTZII Mez.

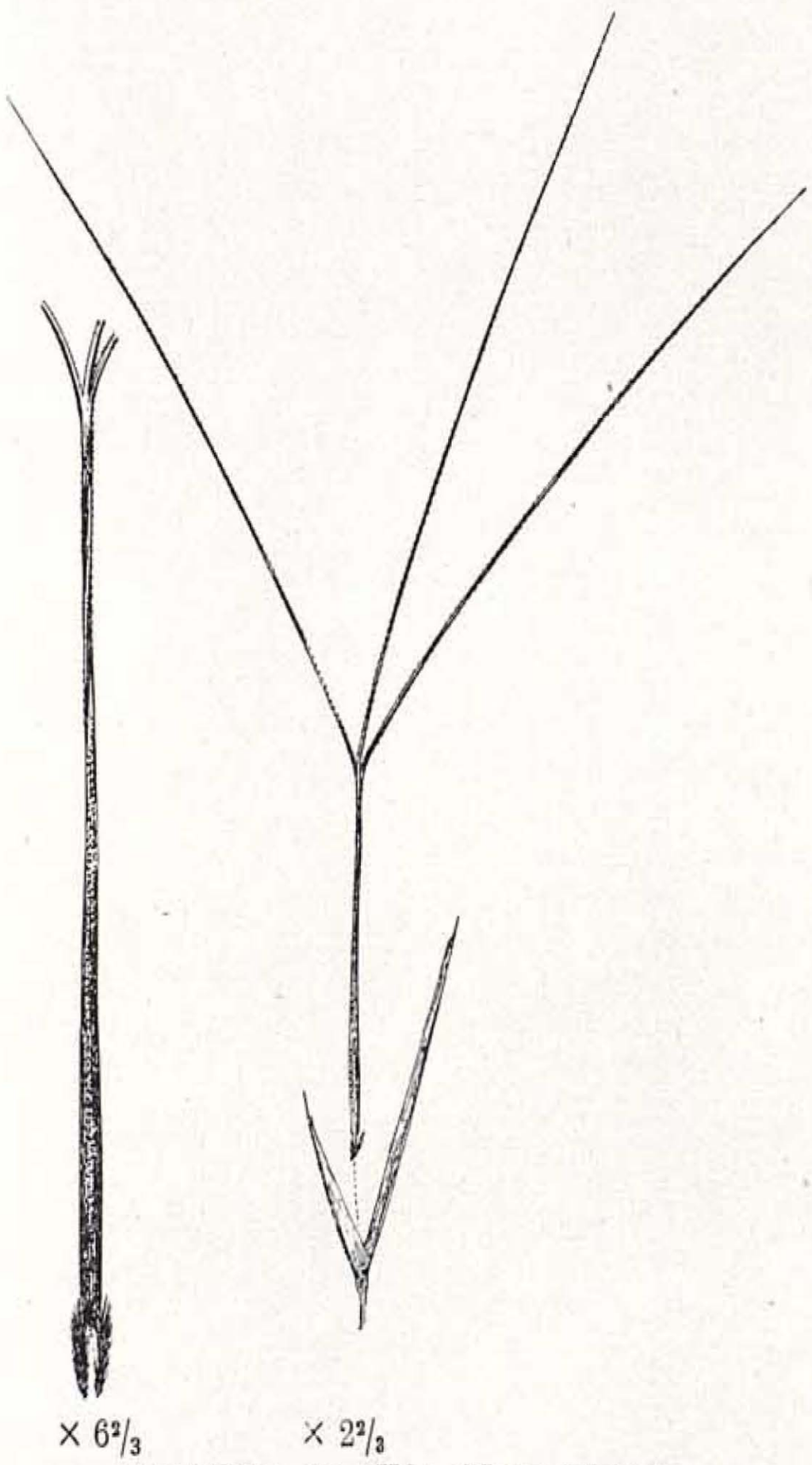
× 1¹/₃ × 5¹/₃
ARISTIDA HOLATHERA Domin.

Plate CVI.



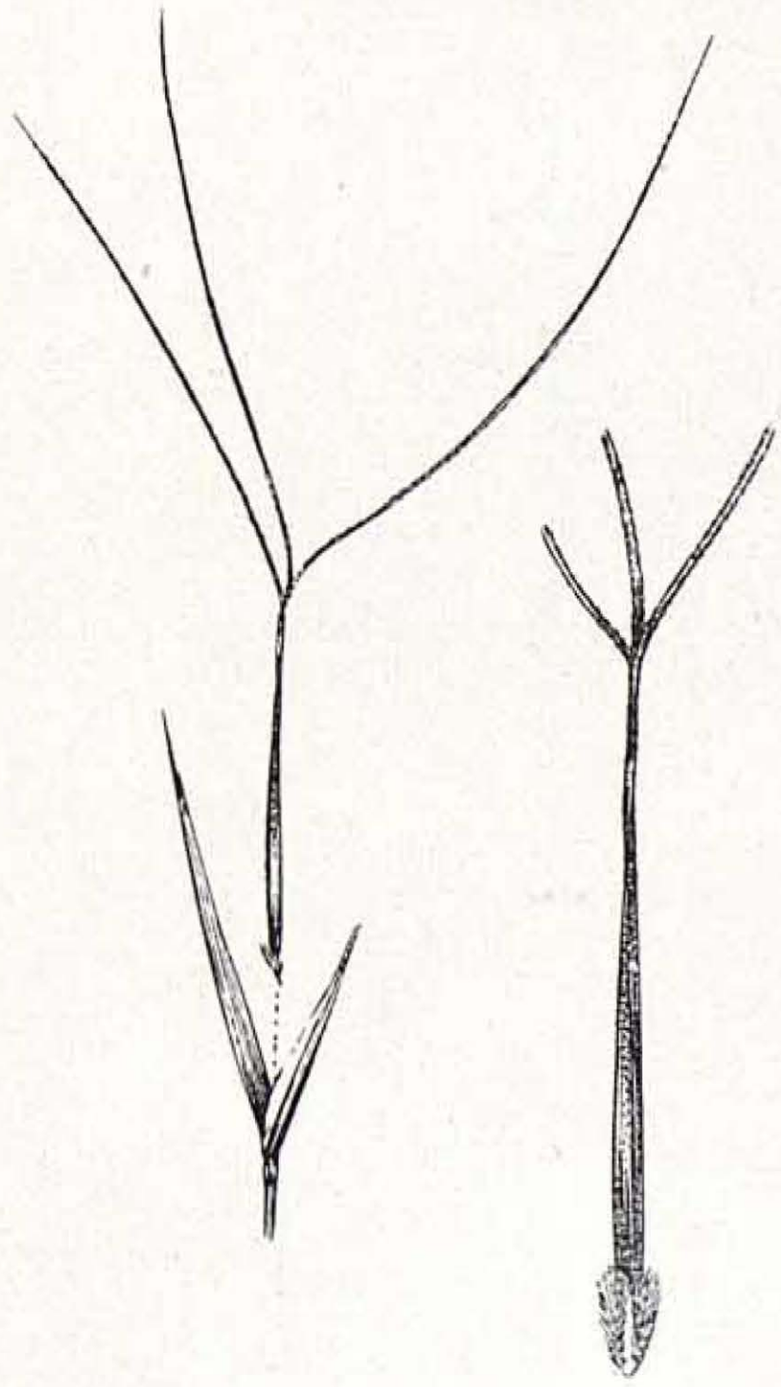
× 4 × 10

ARISTIDA RECURVATA H. B. K.



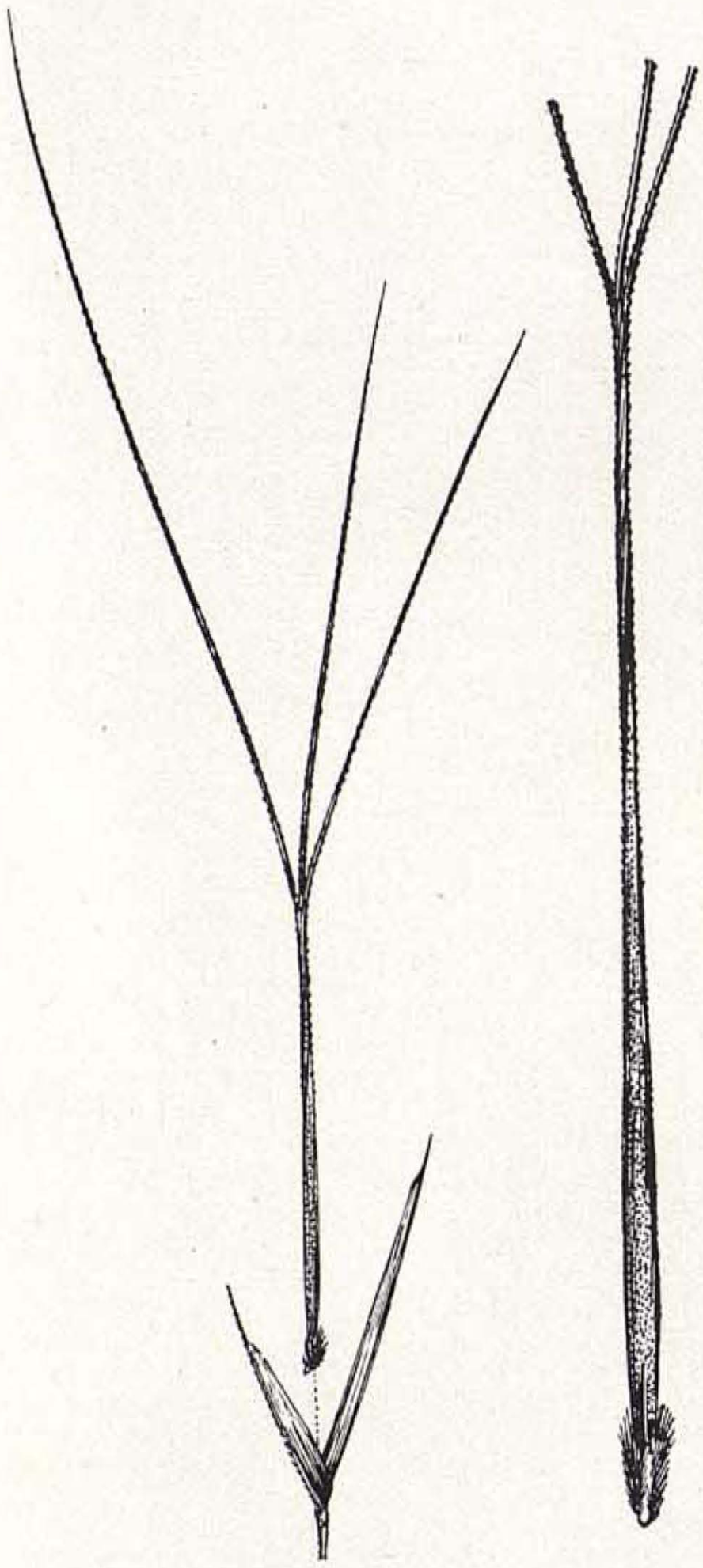
× 6⅔ × 2⅔

ARISTIDA GLAUCA (Nees) Walpers.



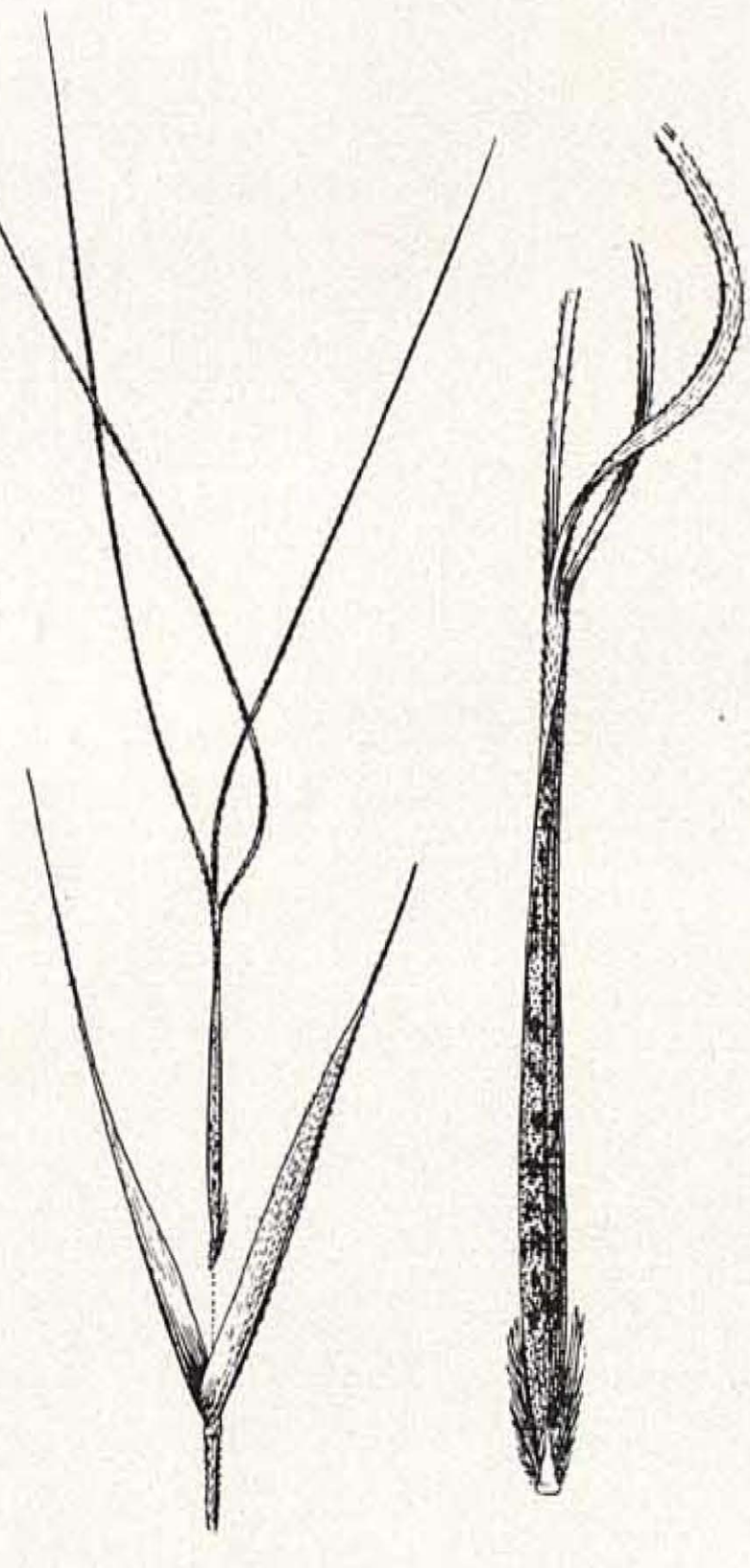
× 4 × 8

ARISTIDA SIMILIS Steudel.



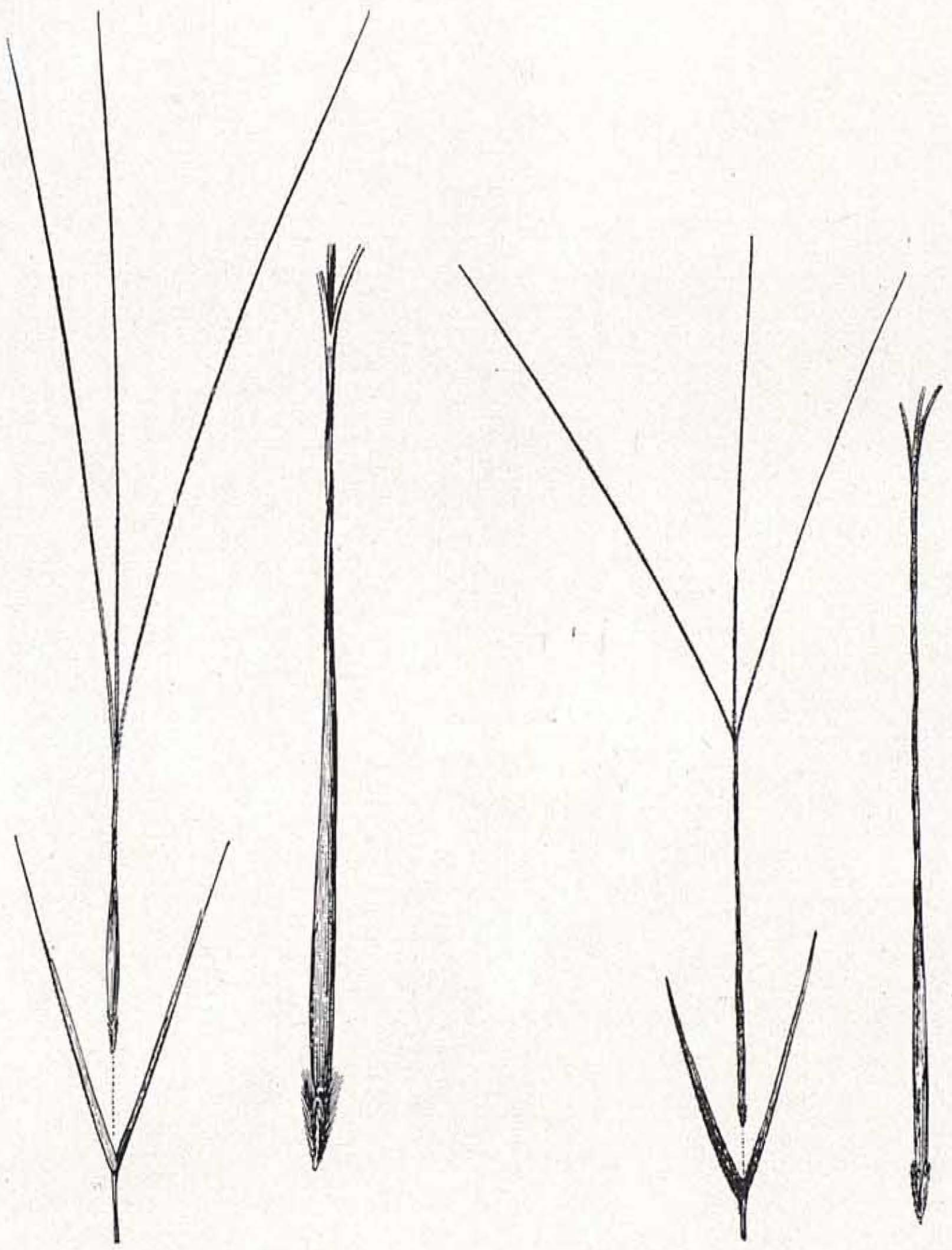
× 4 × 10

ARISTIDA WELWITSCHII Rendle.



× 4 × 10

ARISTIDA NEESIANA Trin. et Ruprecht.

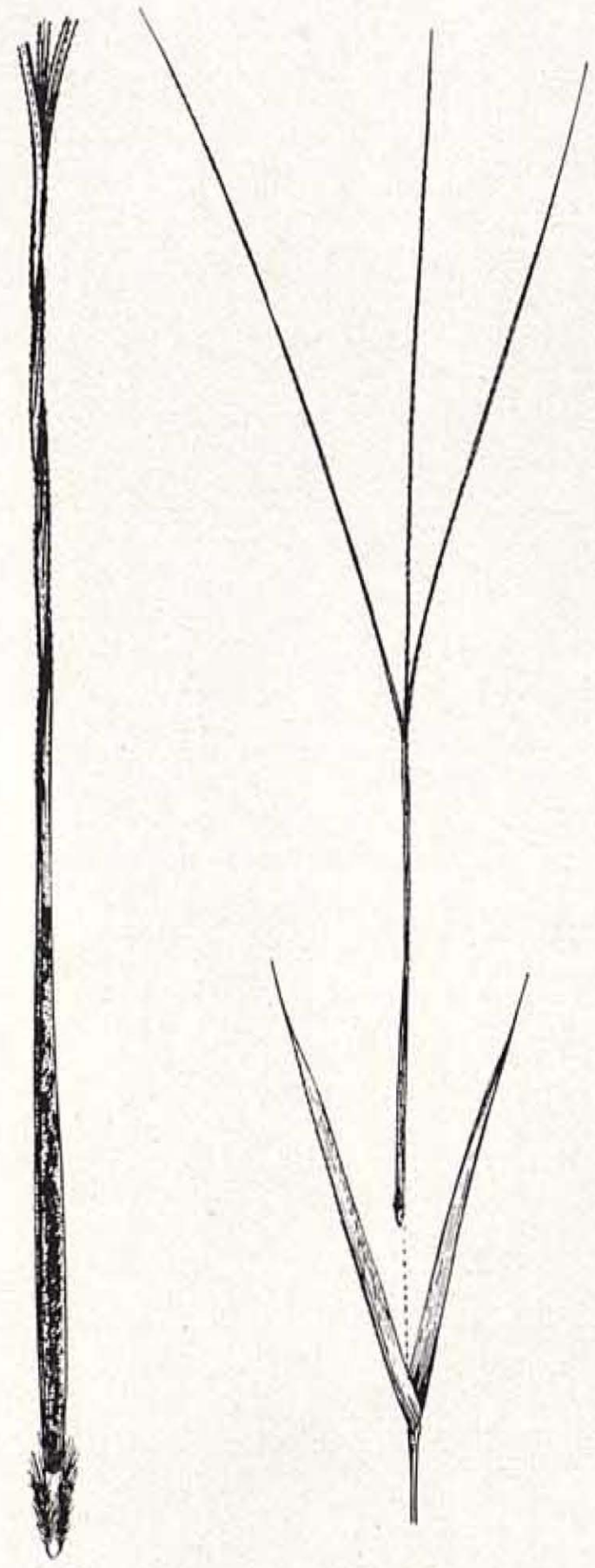


× 2⅔ × 8

ARISTIDA
BALANSAE Henrard.

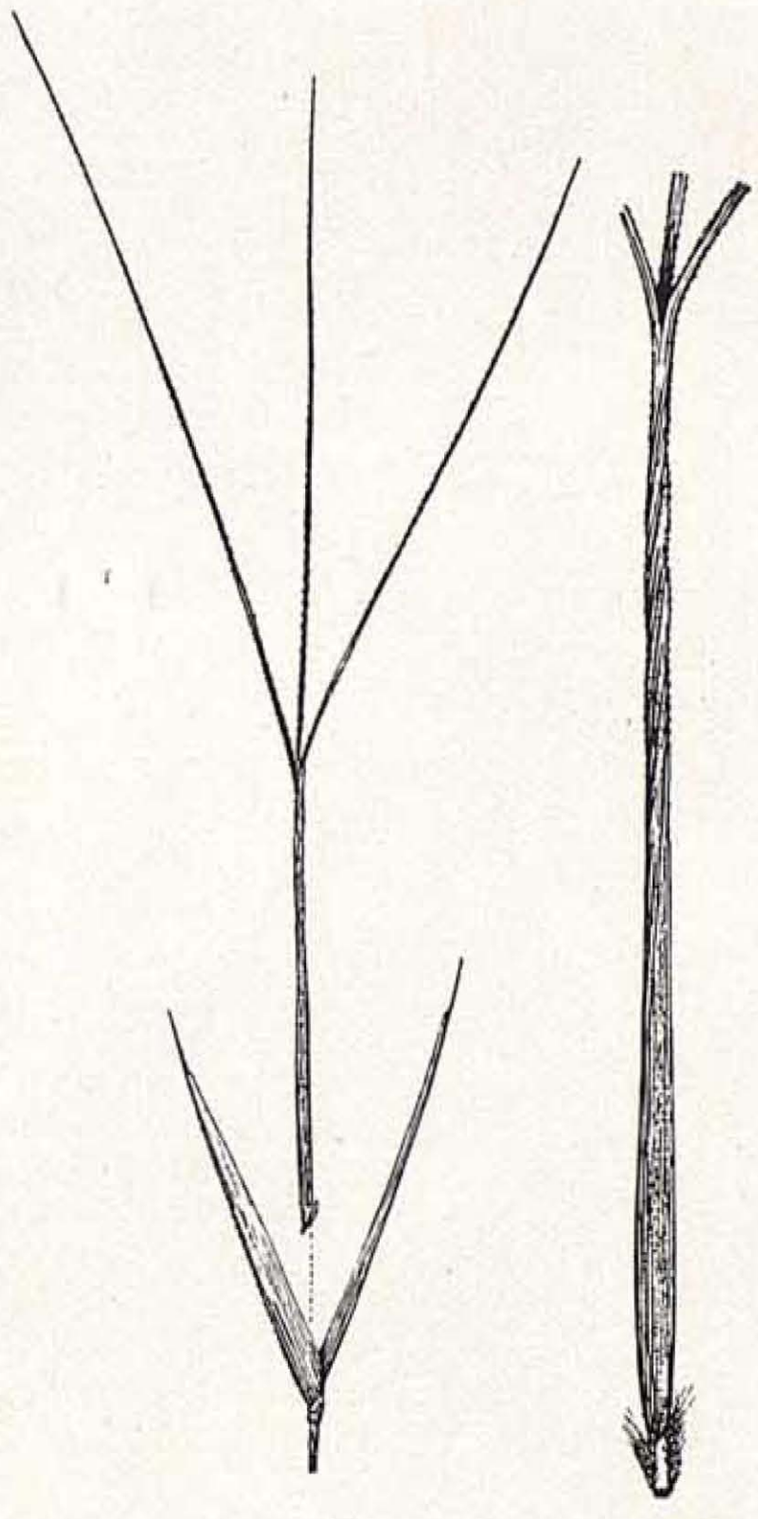
× 2 × 4

ARISTIDA EKMANIANA Henrard.



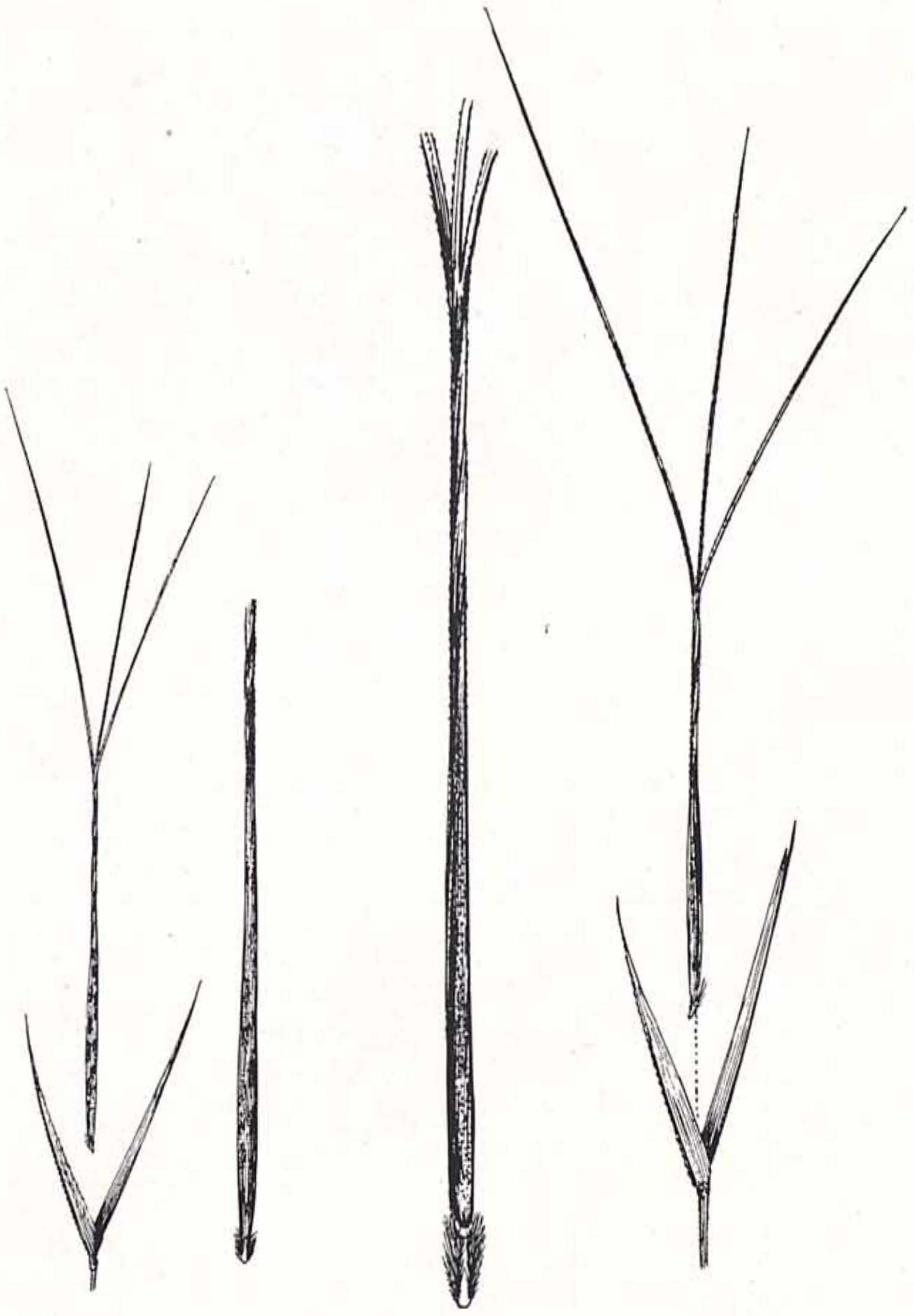
× 8 × 2⅔

ARISTIDA MANDONIANA Henrard.



× 2⅔ × 6⅔

ARISTIDA ACHALENSIS Mez.

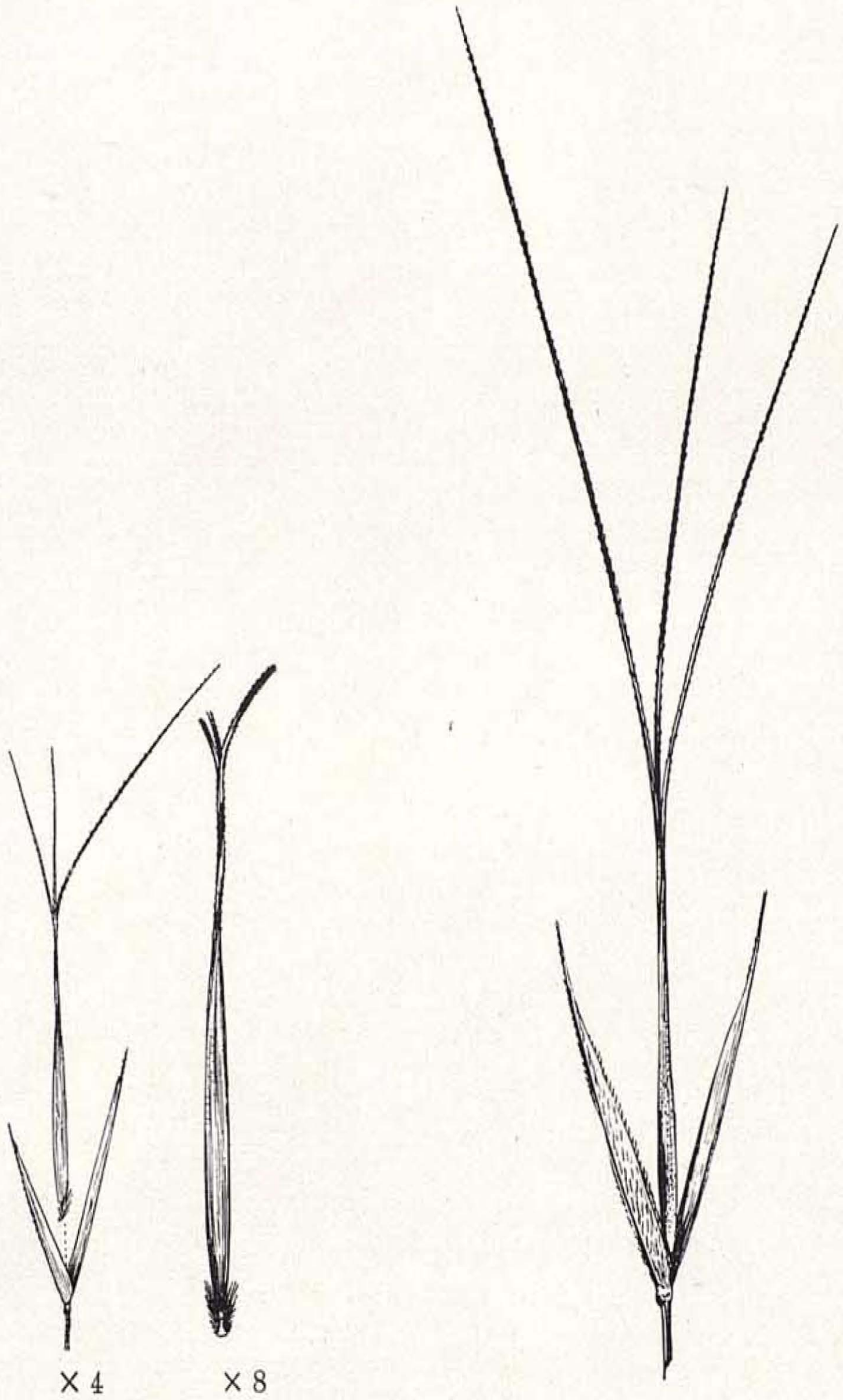


× 2⅔ × 5⅓

ARISTIDA ACHALENSIS Mez.
var. ELONGATA Henrard.

× 10 × 7

ARISTIDA ACHALENSIS Mez.
var. TUCUMANA Henrard.



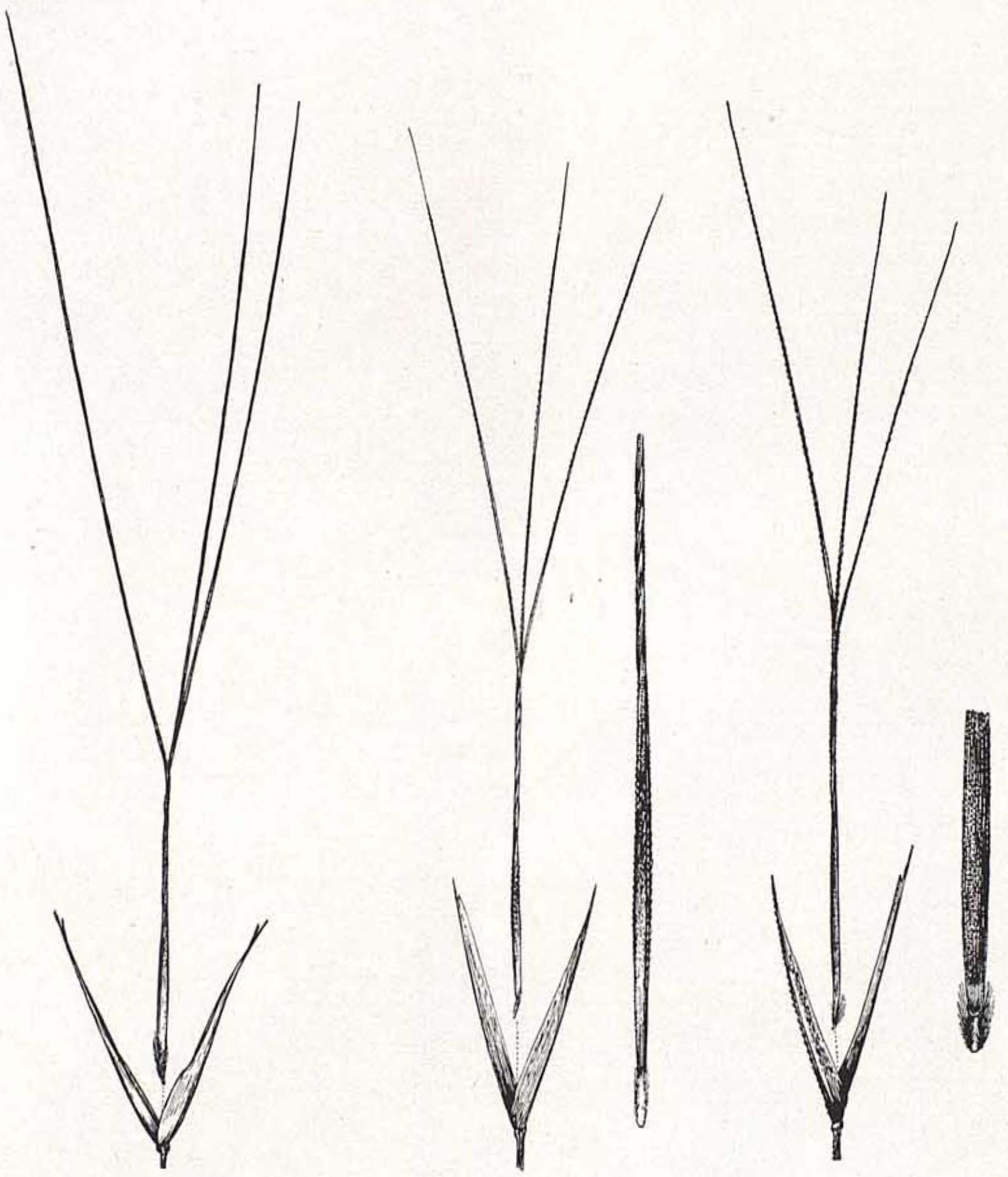
× 4 × 8

ARISTIDA
TRANSVAALENSIS Henrard.

× 4

ARISTIDA HUILLENSIS
Rendle.

Plate CXII.



× 2²/₃
ARISTIDA
AEQUIGLUMIS Hackel.

× 2²/₃ × 6²/₃
ARISTIDA LATIFOLIA
Domin.

× 2²/₃ × 6²/₃
ATISTIDA
APPRESSA Vasey.

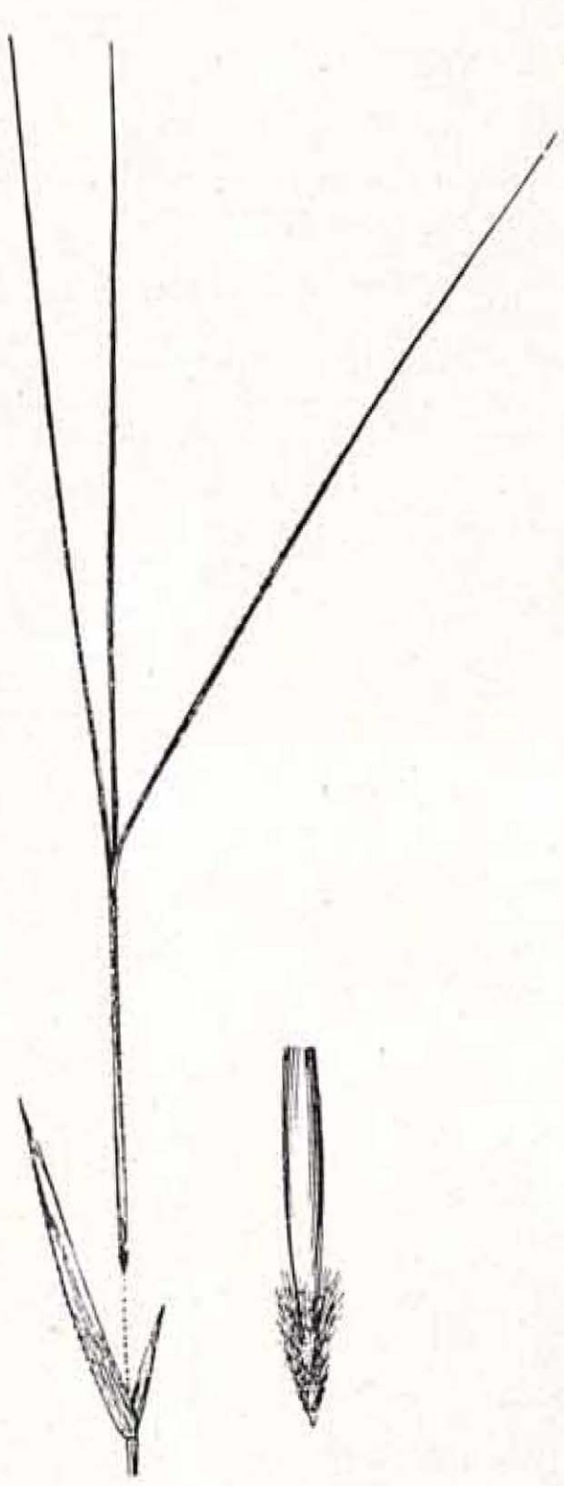


× 4 × 8

ARISTIDA ORIZABENSIS Fournier.

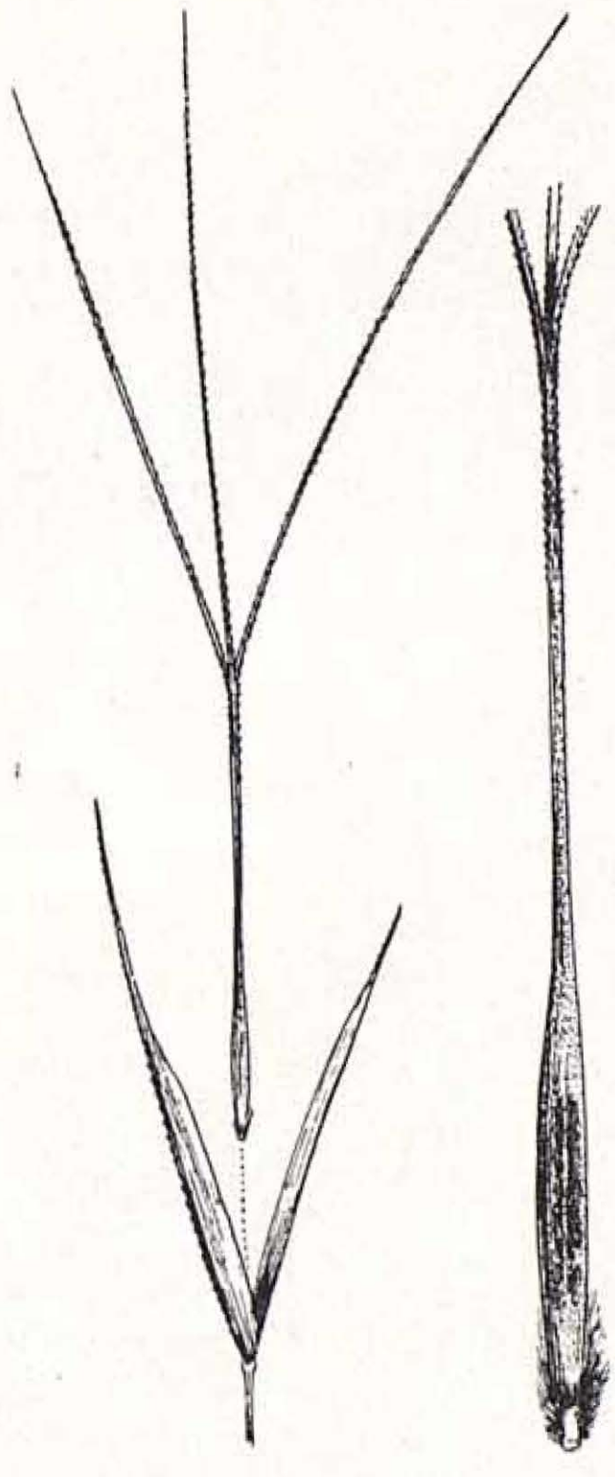
× 3 × 15

ARISTIDA INVERSA Hackel.



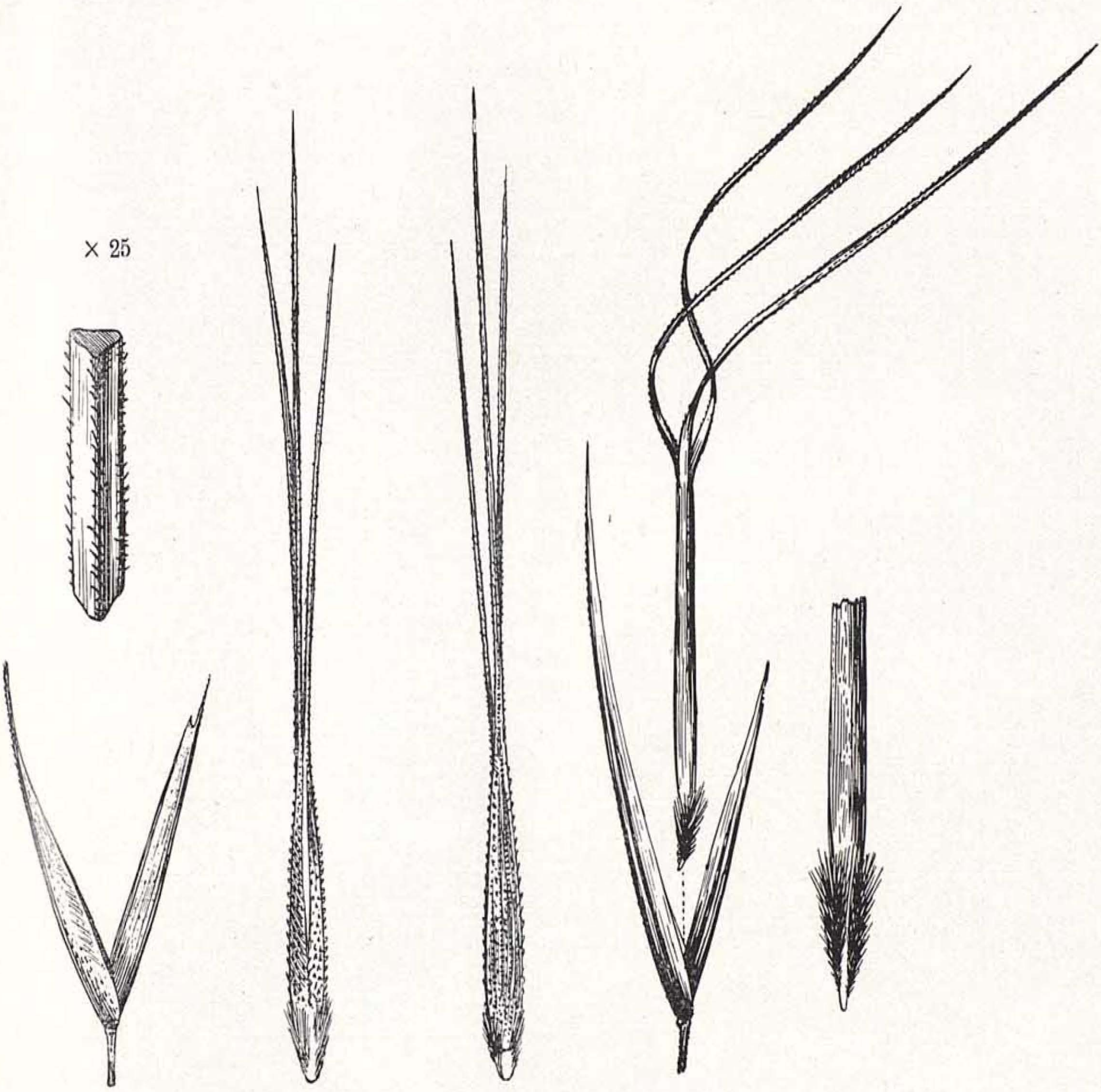
× 2²/₃ × 10

ARISTIDA MENDOCINA Philippi.



× 4 × 10

ARISTIDA GIBBOSA (Nees) Kunth.



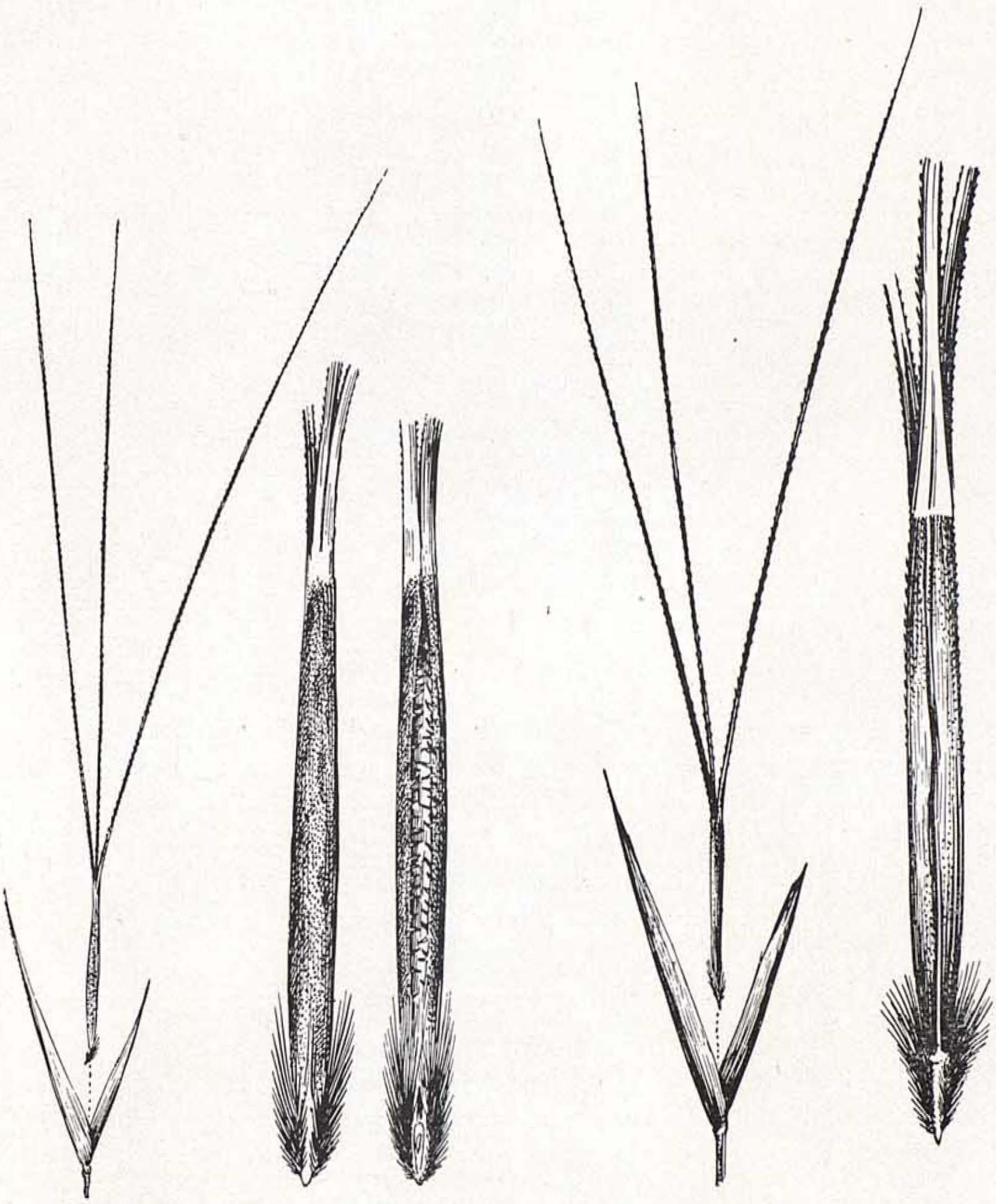
× 25

× 4 × 4

ARISTIDA RHINIOCHLOA Hochstetter.

× 3 × 6

ARISTIDA PERRIERI A. Camus.

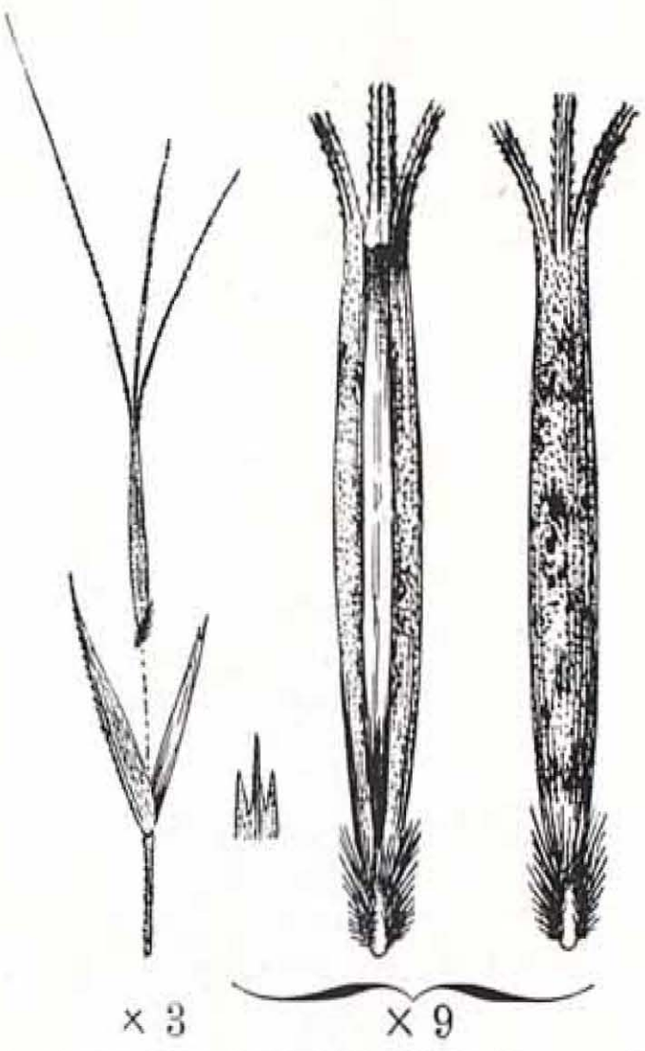


× 2 × 8

ARISTIDA INAEQUIGLUMIS Domin.

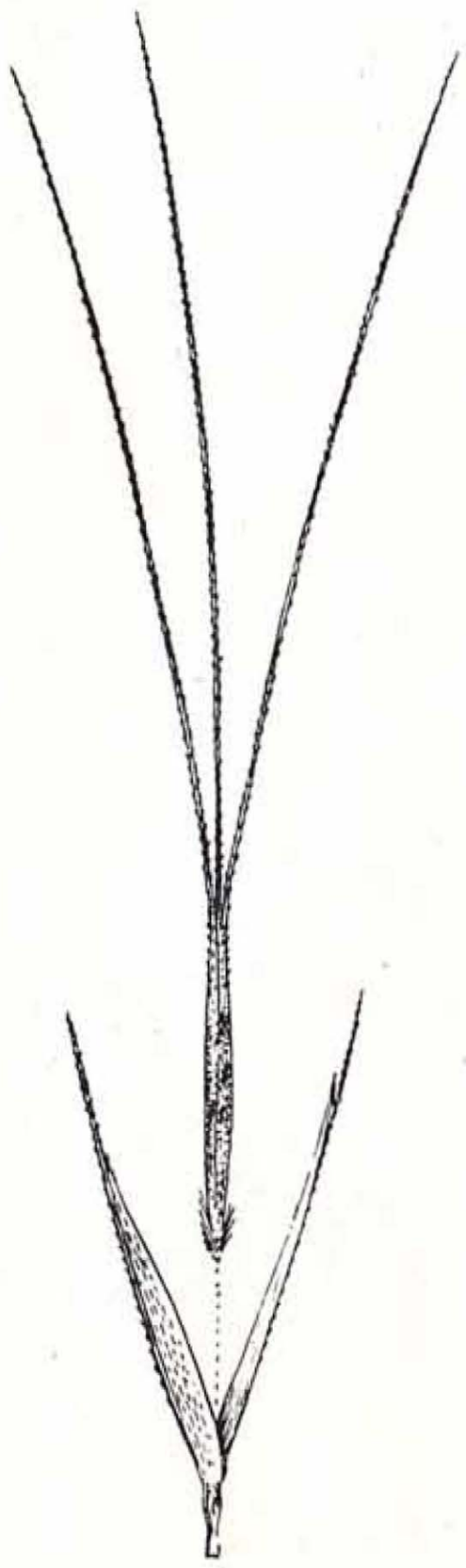
× 3 × 10

ARISTIDA PRUINOSA Domin.



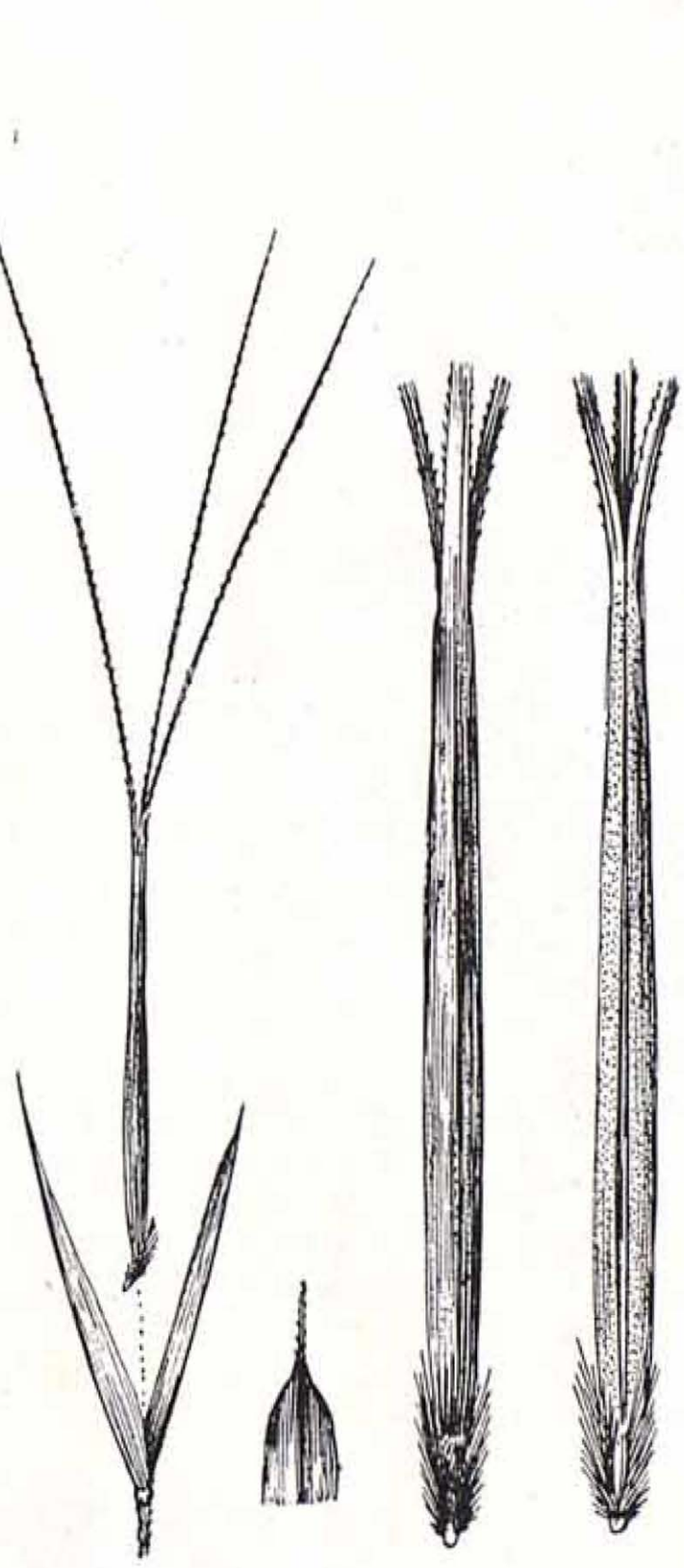
× 3 × 9

ARISTIDA BENTHAMI Henrard.



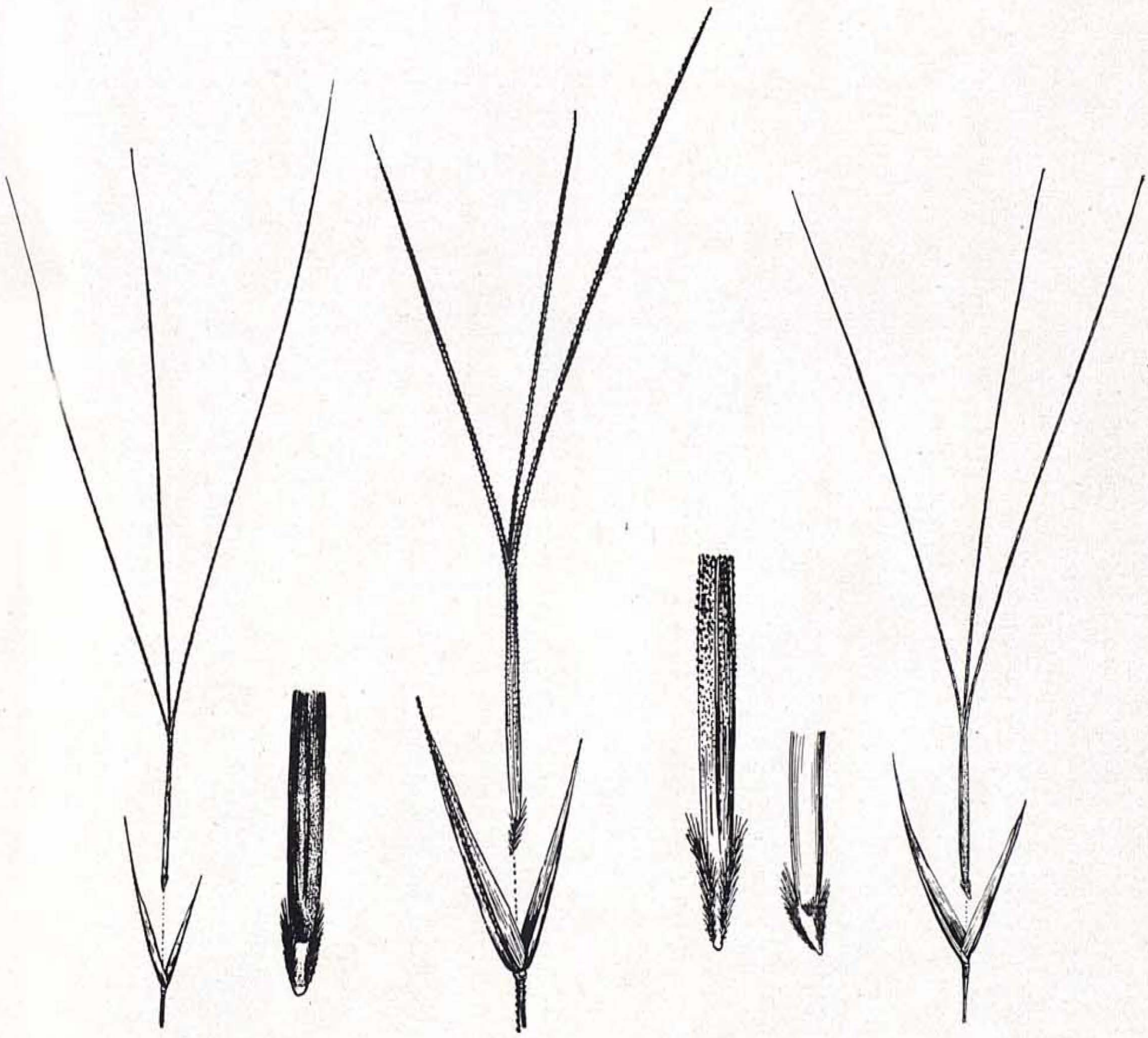
× 4 × 10

ARISTIDA FILIFORMIS Henrard.



× 3 × 7

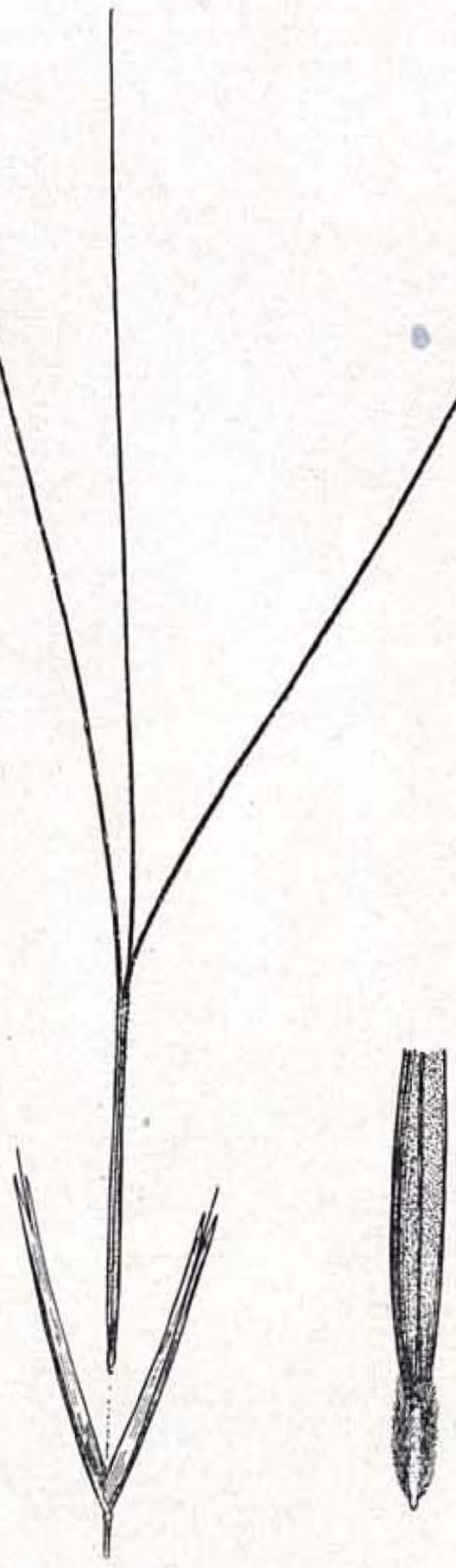
ARISTIDA GLUMARIS Henrard.



× 1⅓ × 10
ARISTIDA SPEGAZZINII
Arechavaleta.

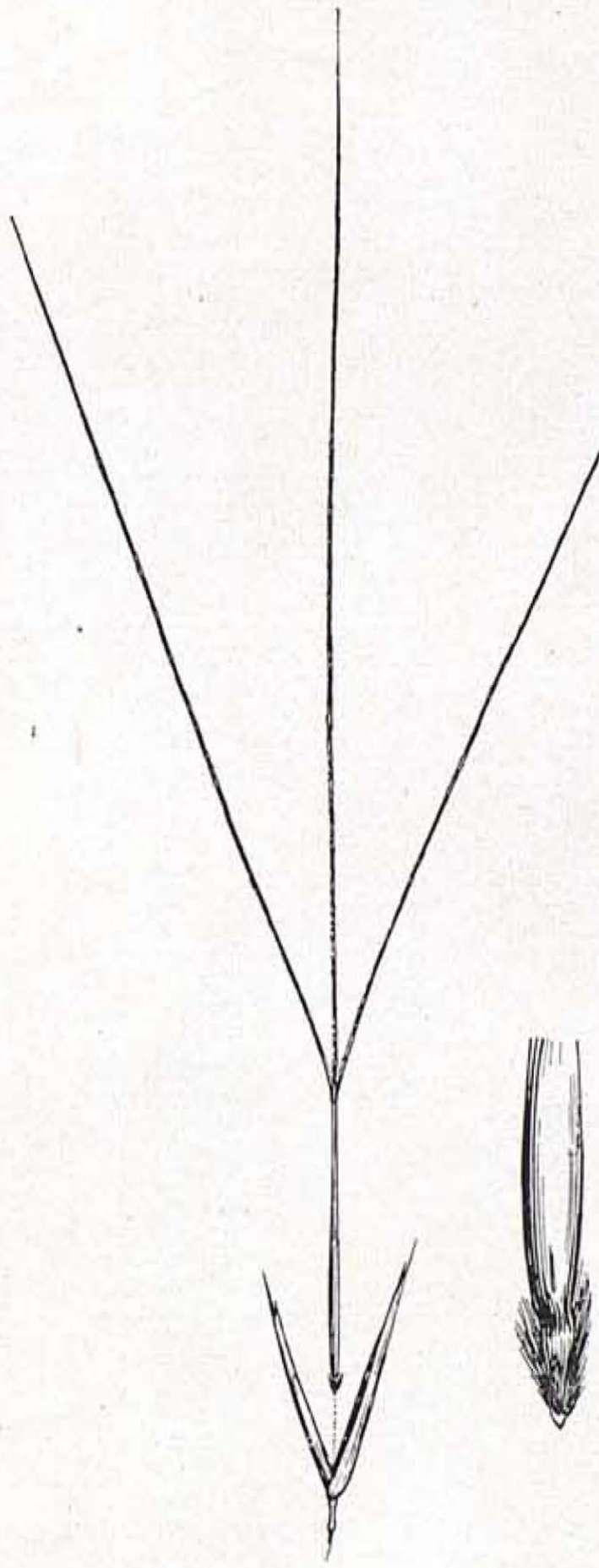
× 4 × 10
ARISTIDA VENESUELAE
Henrard.

× 6 × 2
ARISTIDA ACUMINATA Hackel.



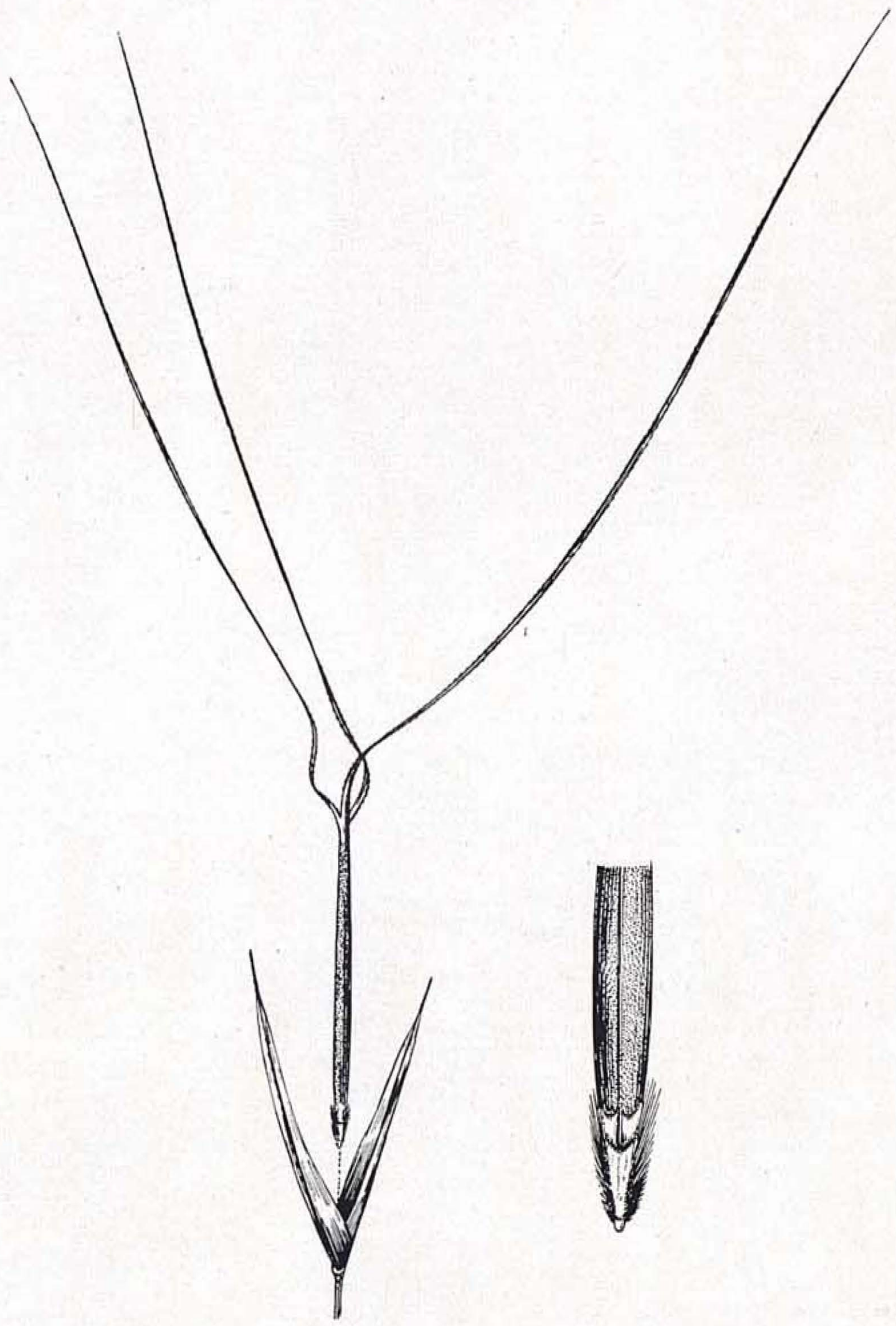
× $2^2/_3$ × 13

ARISTIDA TARAPOTANA Mez.



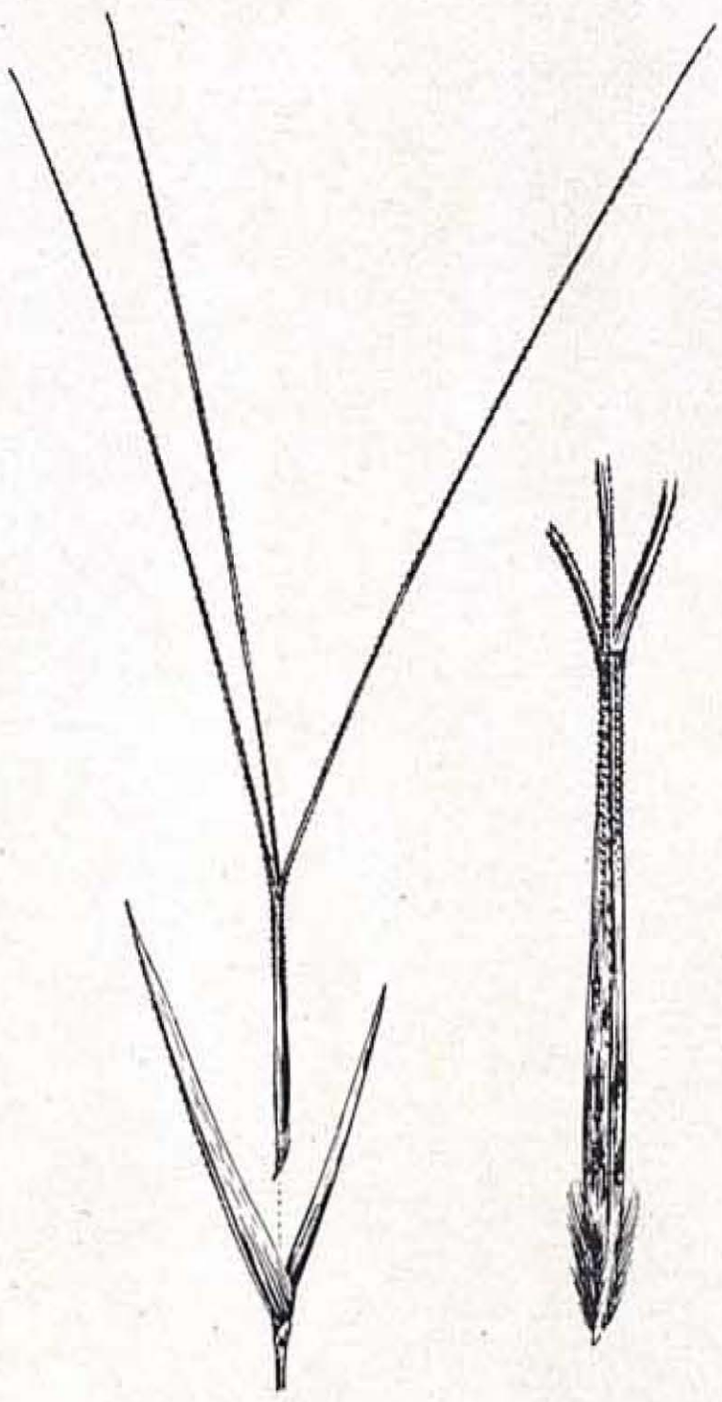
× 2 × 8

ARISTIDA LEPTOCHAETA Hackel.



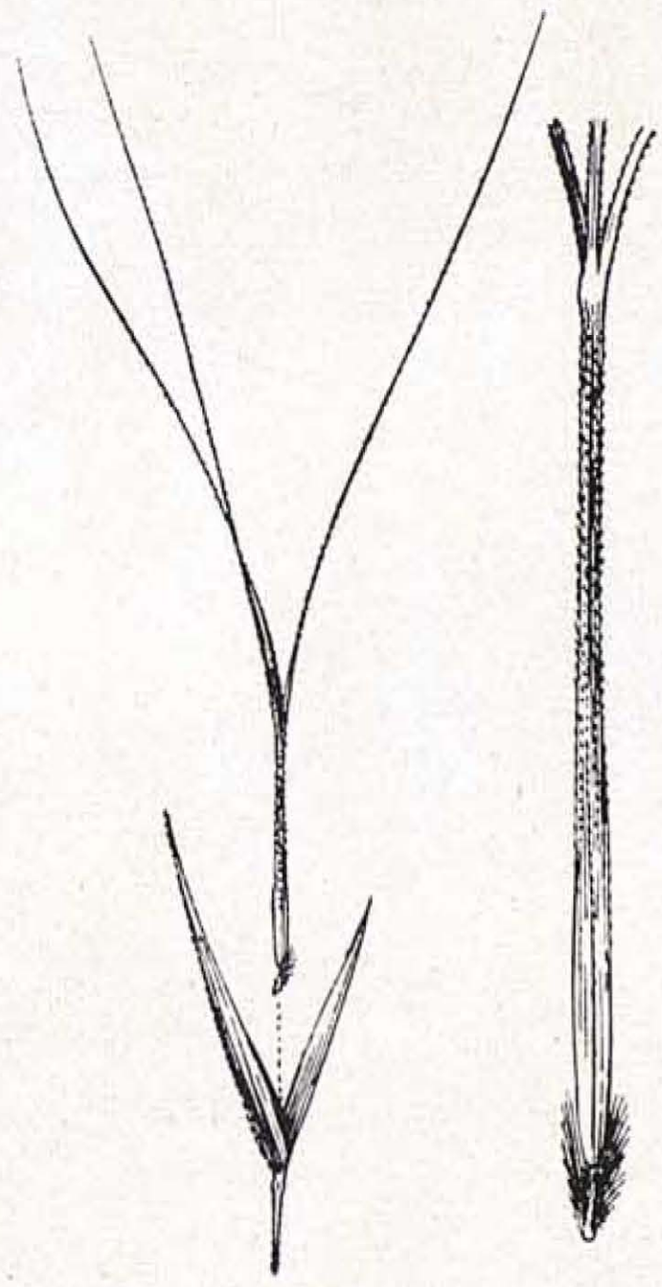
×3 1/3 ×13

ARISTIDA CIRCINALIS Lindman.



× $2^2/_3$ × $6^2/_3$

ARISTIDA ARUBENSIS Henrard.



× 3 × 10

ARISTIDA SURINGARI Henrard.

Plate CXXII.



× $2^2/_3$ × 7

ARISTIDA ERECTA Hitchcock.

× 3 × 10

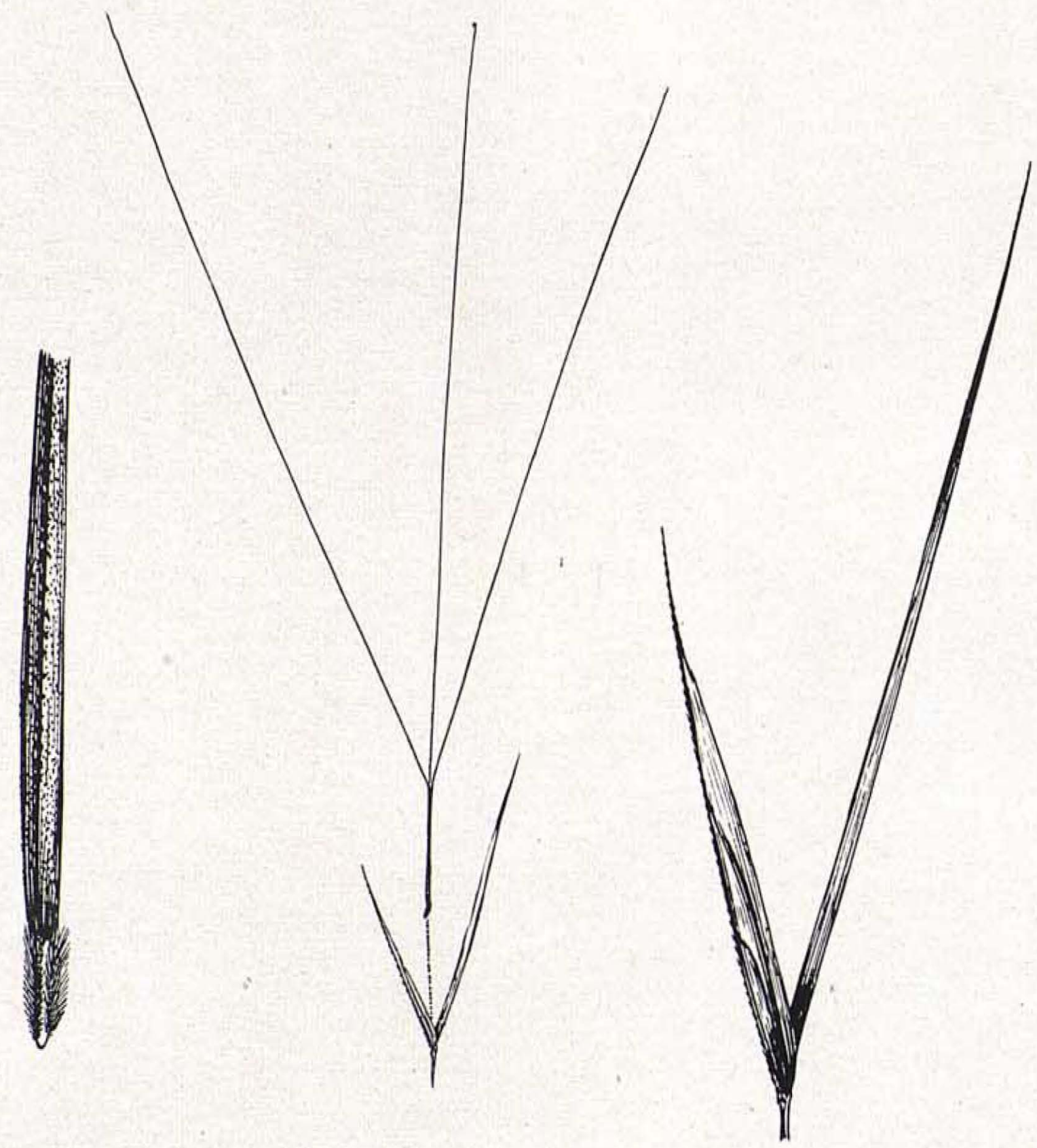
ARISTIDA CHRYSOCHLAENA Henrard.

× 7 × $3^1/_3$

ARISTIDA ELLIPTICA (Nees) Kunth.

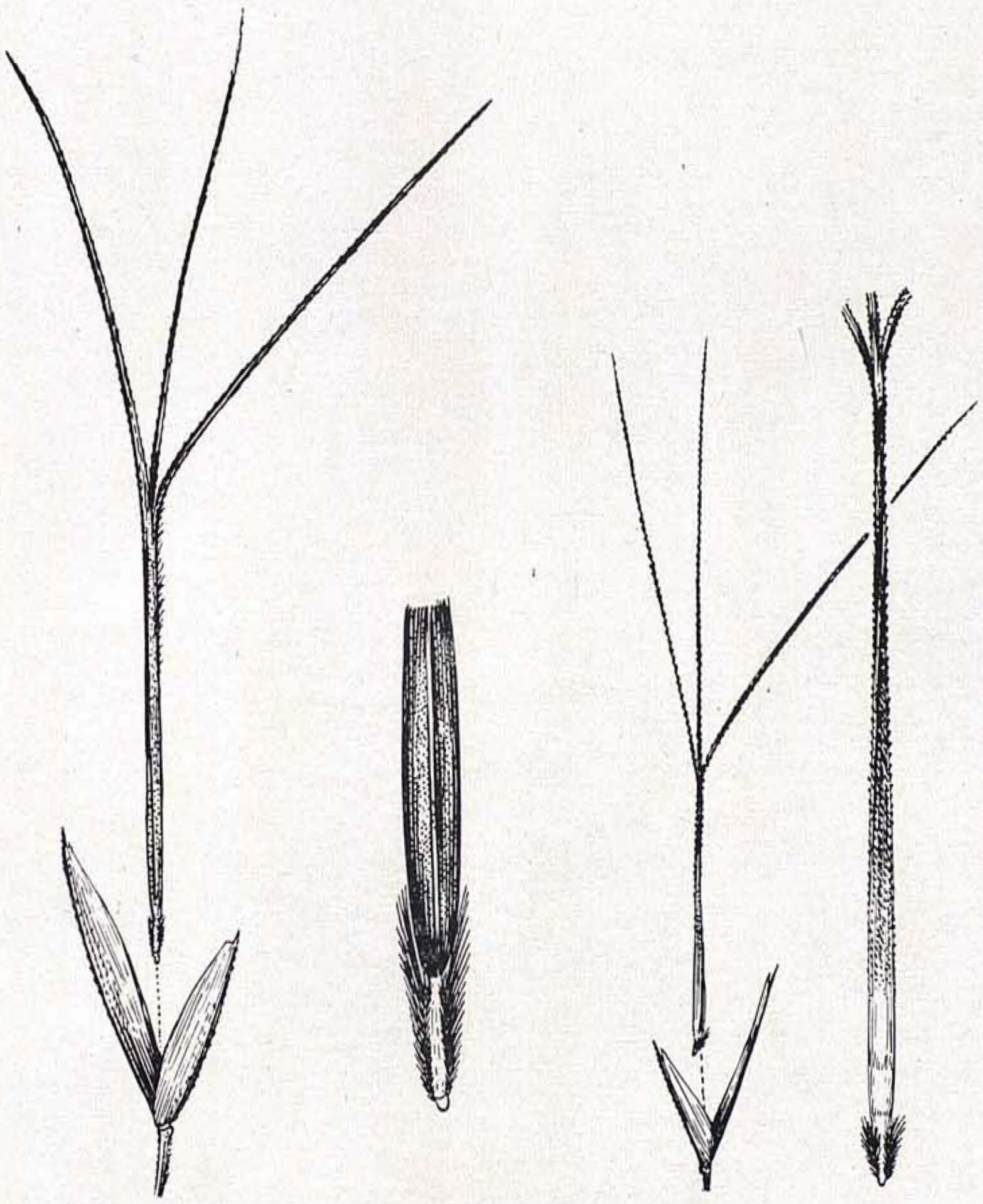
× $2^2/_3$ × $6^2/_3$

ARISTIDA GLAZIOVII Hackel.



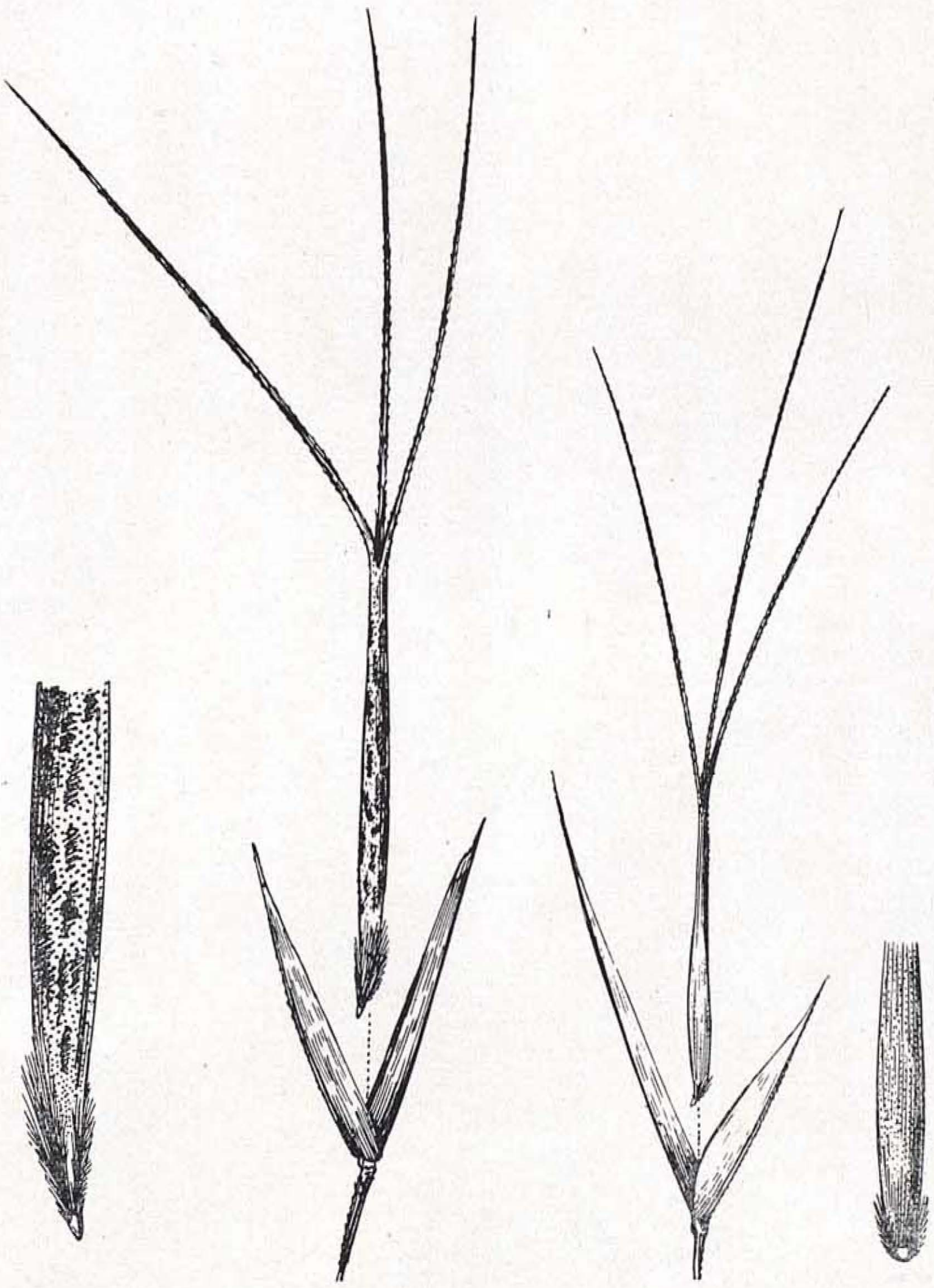
×10 ×1 ×3

ARISTIDA VENUSTULA Arechavaleta.



×6 ×20 × 3 × 8

ARISTIDA CAPUT-MEDUSAE Domin. ARISTIDA LONGICOLLIS Henrard.

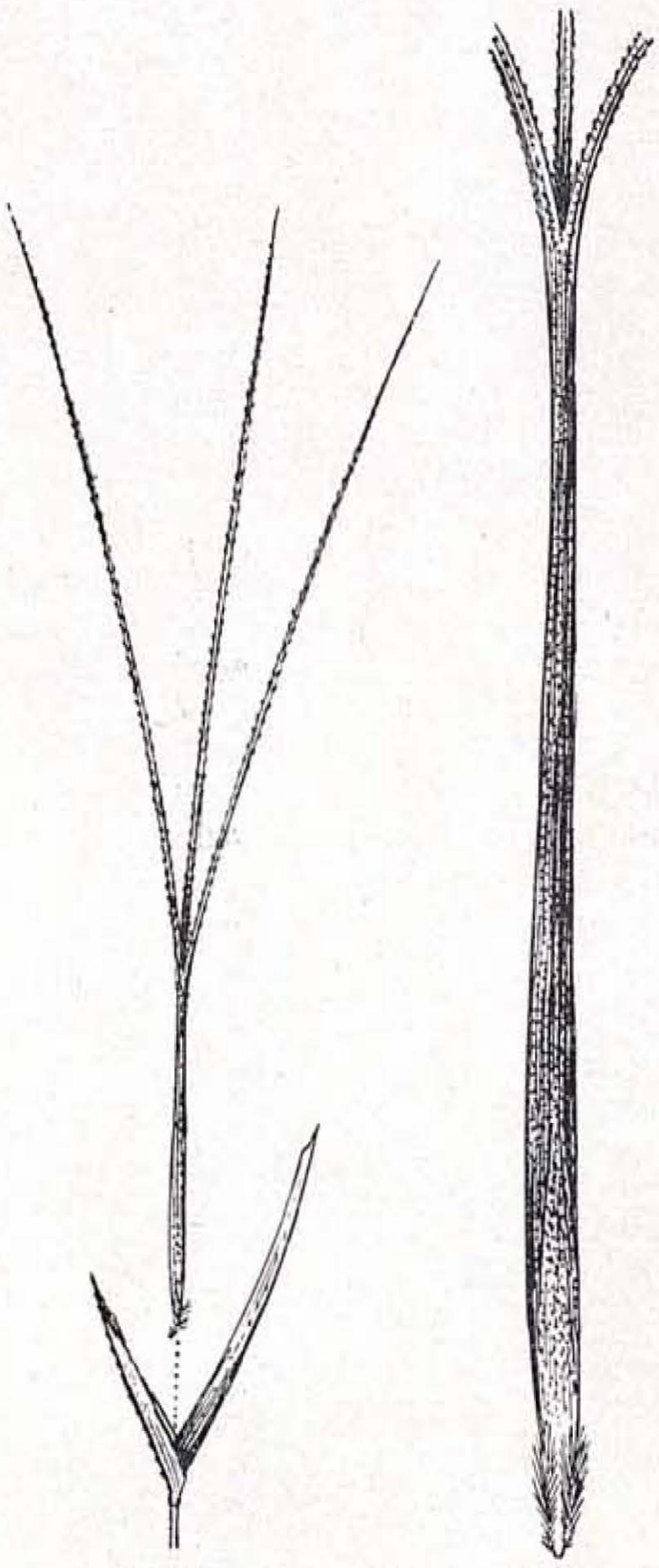


× 10 × 5

ARISTIDA RAMOSA Rob. Brown.

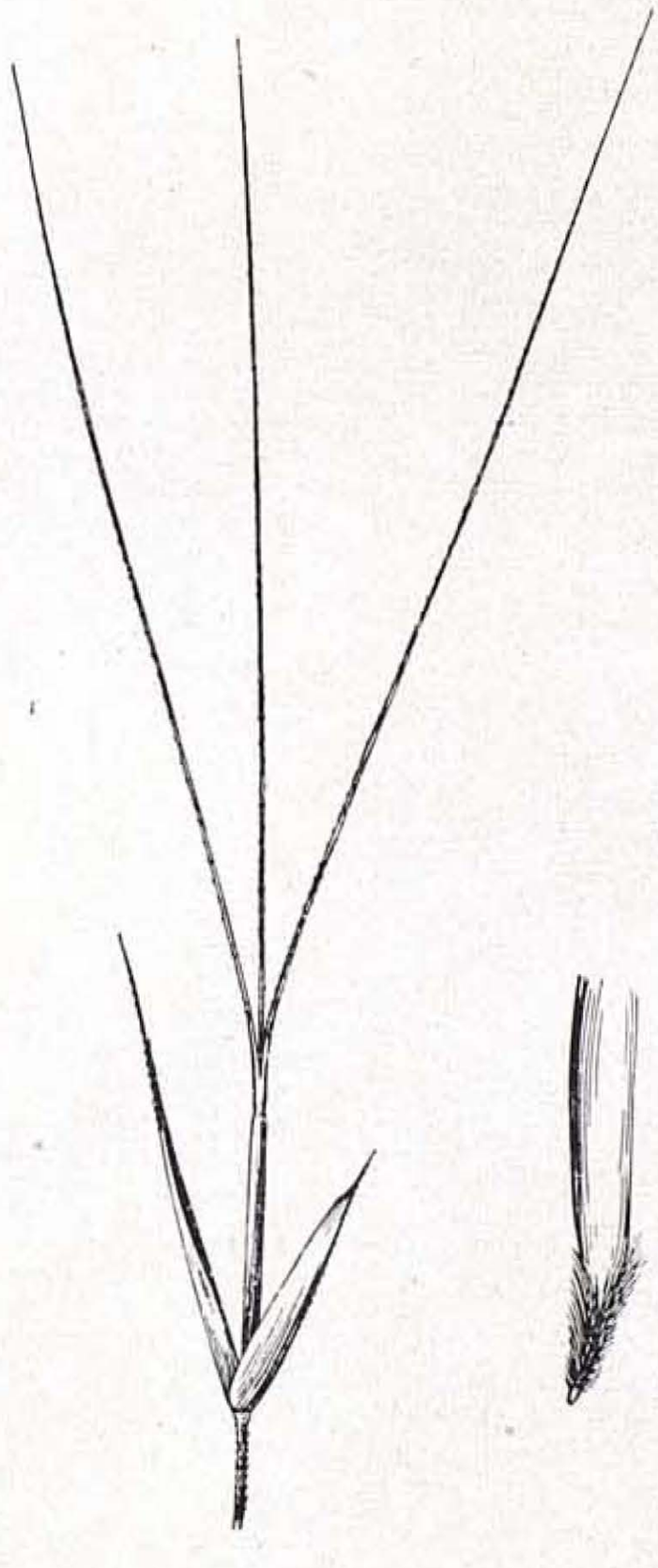
× 10 × 20

ARISTIDA RECTA Franchet.



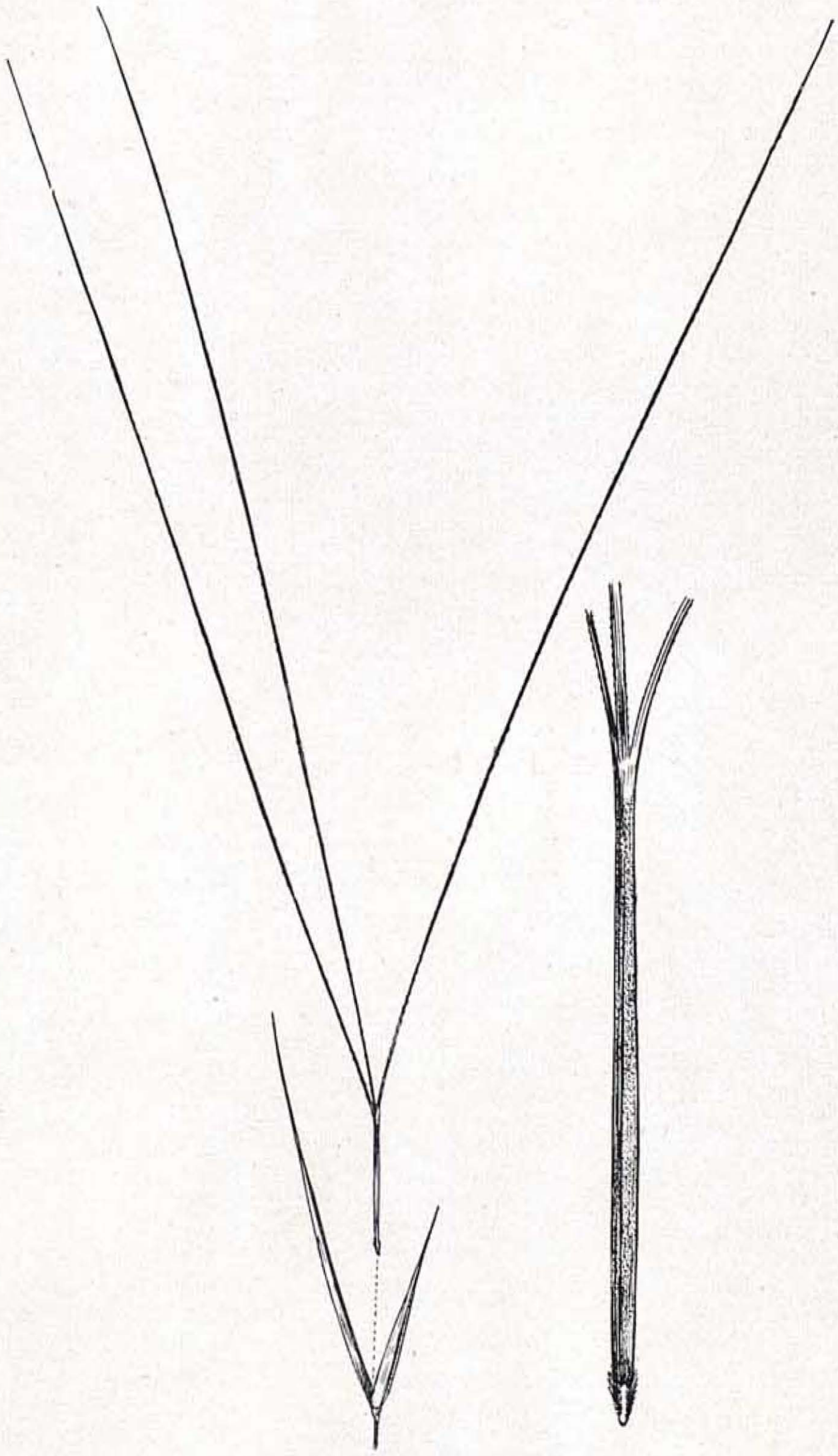
× 2 × 8

ARISTIDA OBSCURA Henrard.



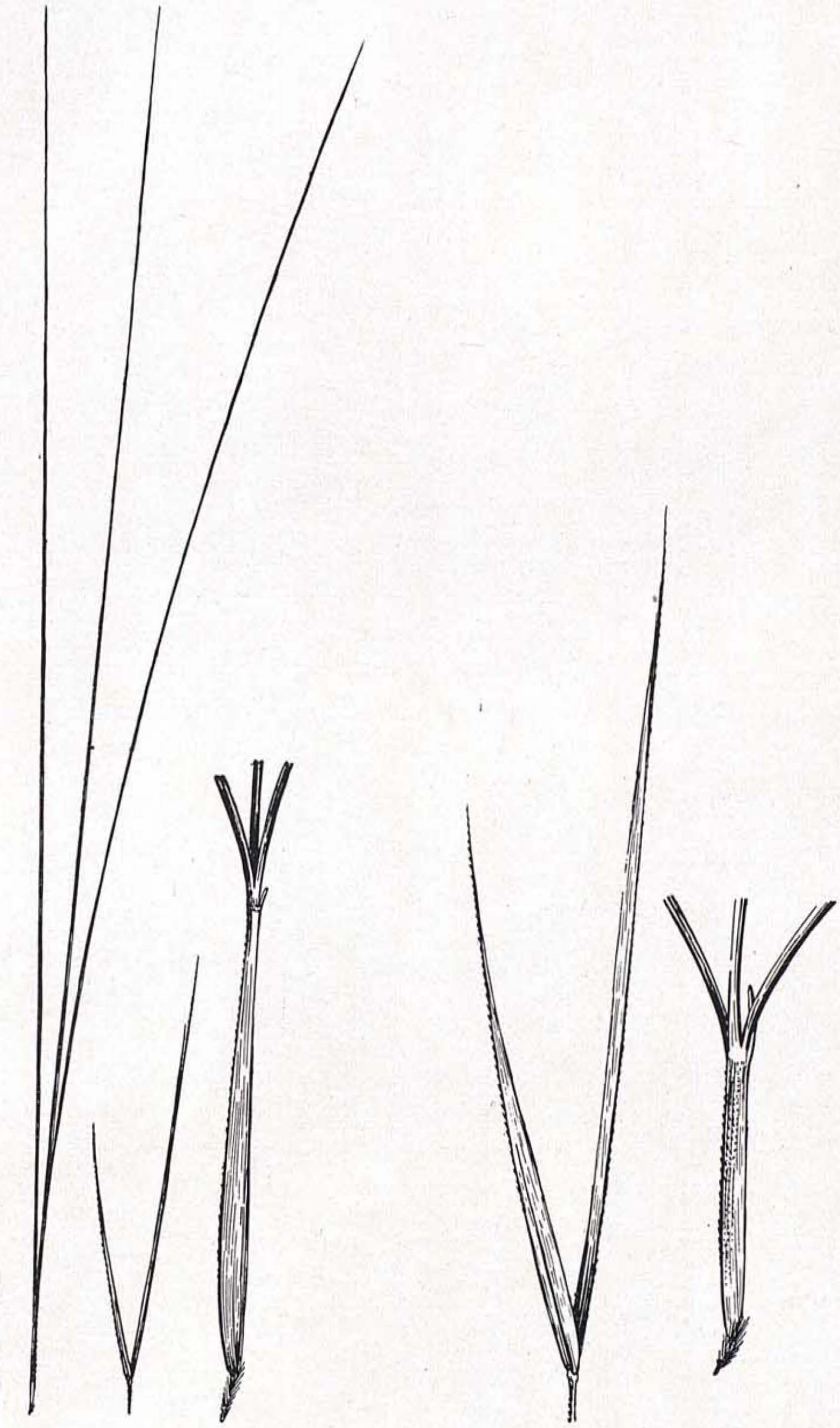
× 2 × 8

ARISTIDA BEHRIANA F. v. Mueller.



×1 ×5

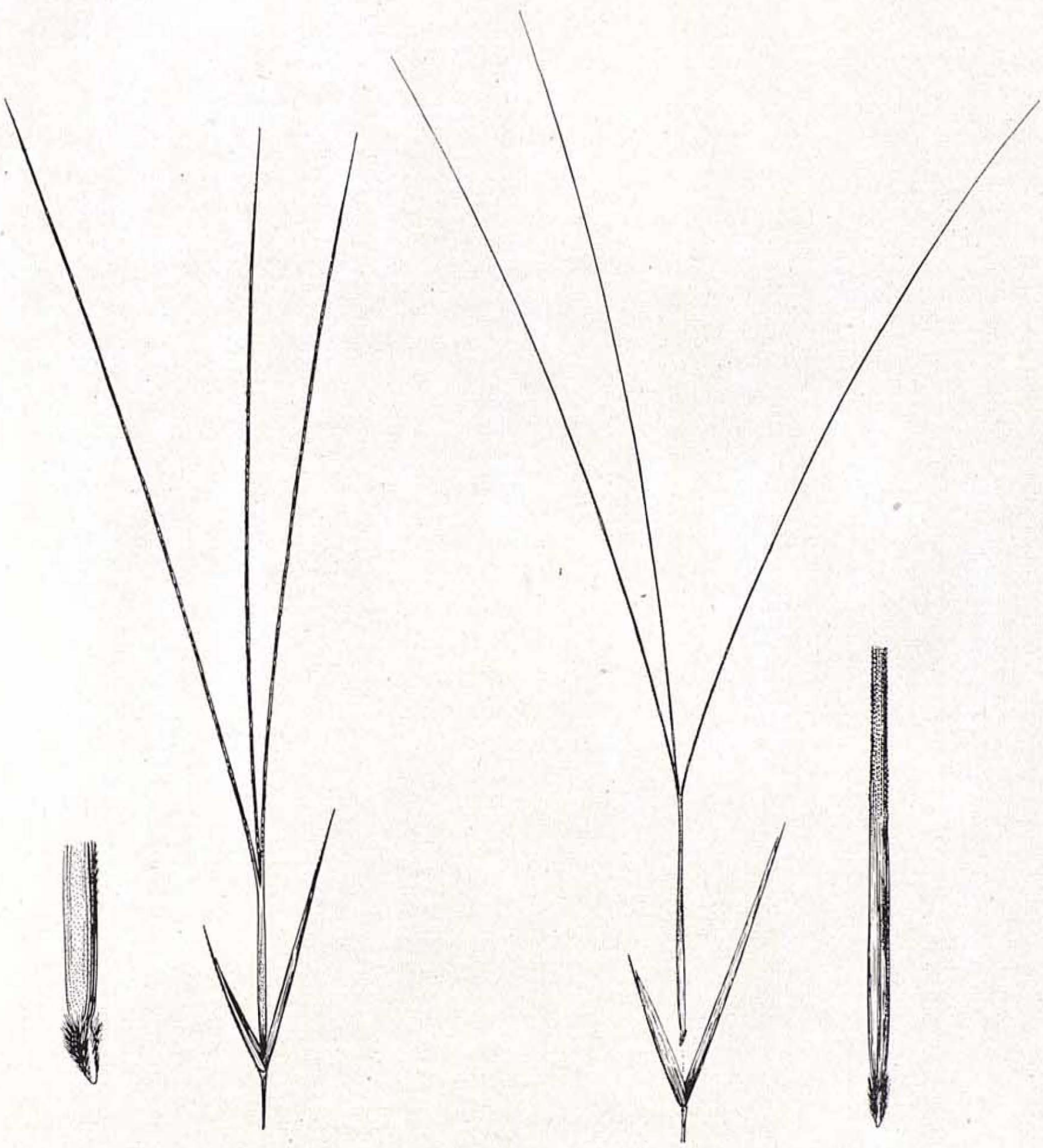
ARISTIDA PALLENS Cavanilles.



×1 ×1 ×6 ×2 ×2

ARISTIDA PALLENS Cav.
var. TRAGOPOGON Tr. et Rupr.

ARISTIDA PALLENS Cav.
var. JUBATA Arechav.

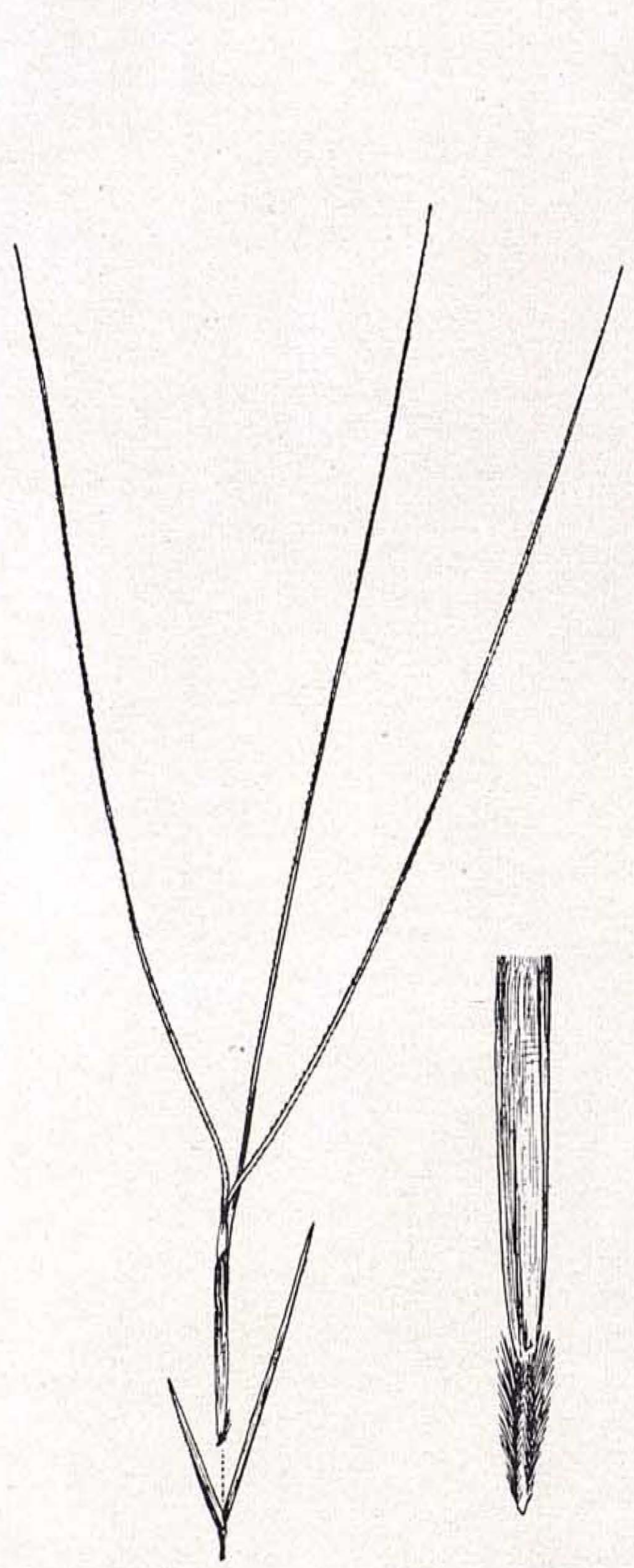


× 4 × 1½

ARISTIDA MURINA Cavanilles.

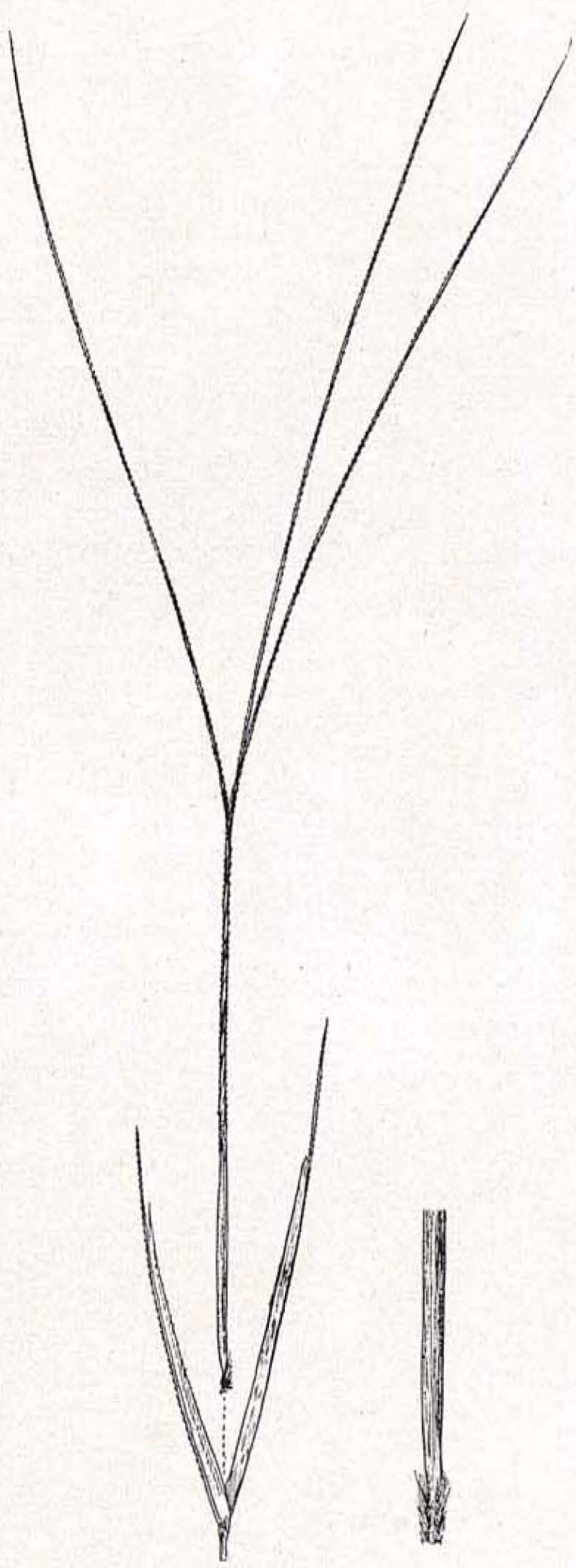
× 2⅔ ×8

ARISTIDA PURPUREA Nuttall.



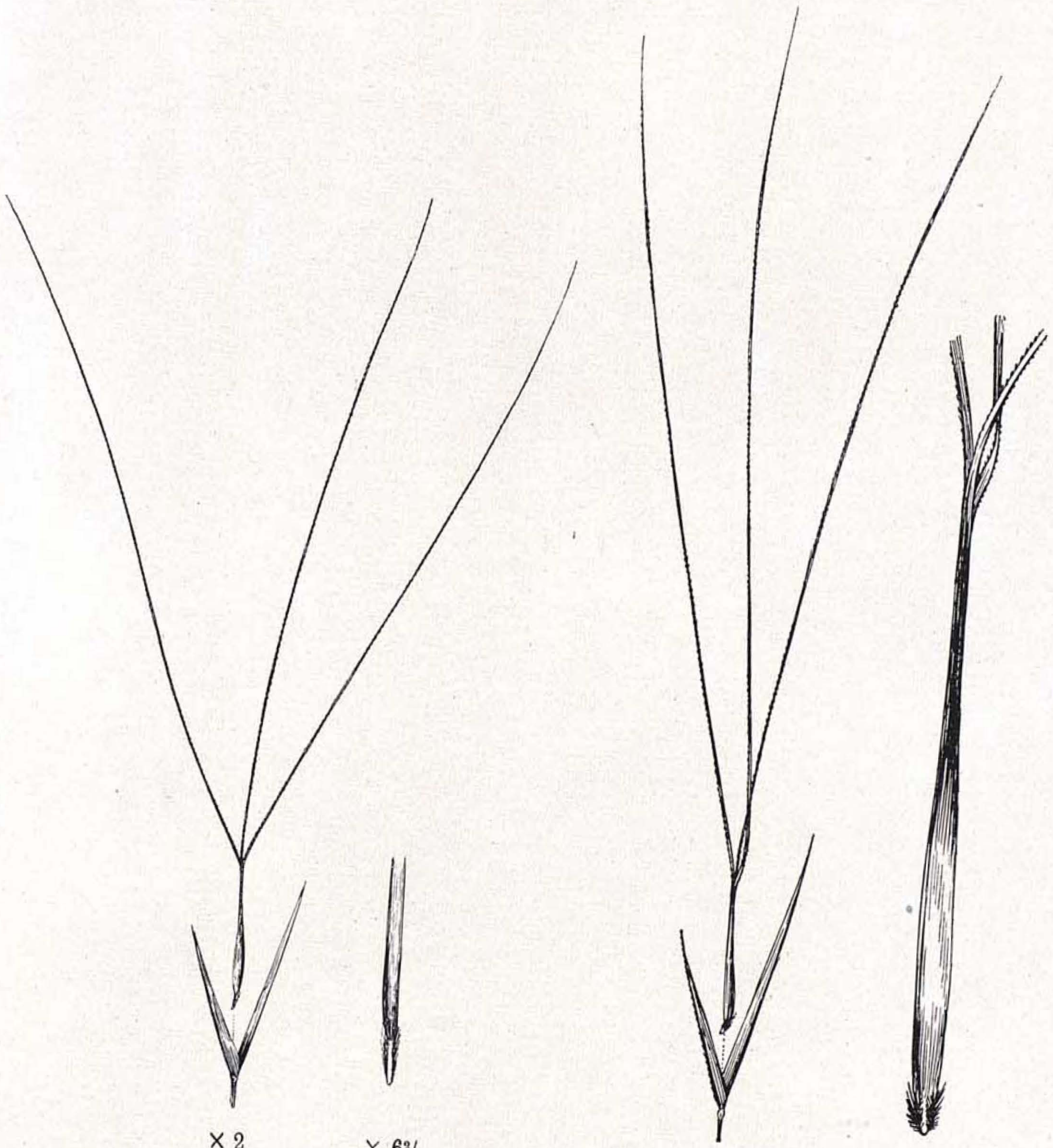
× 1½ × 10

ARISTIDA RARIFLORA Henrard.



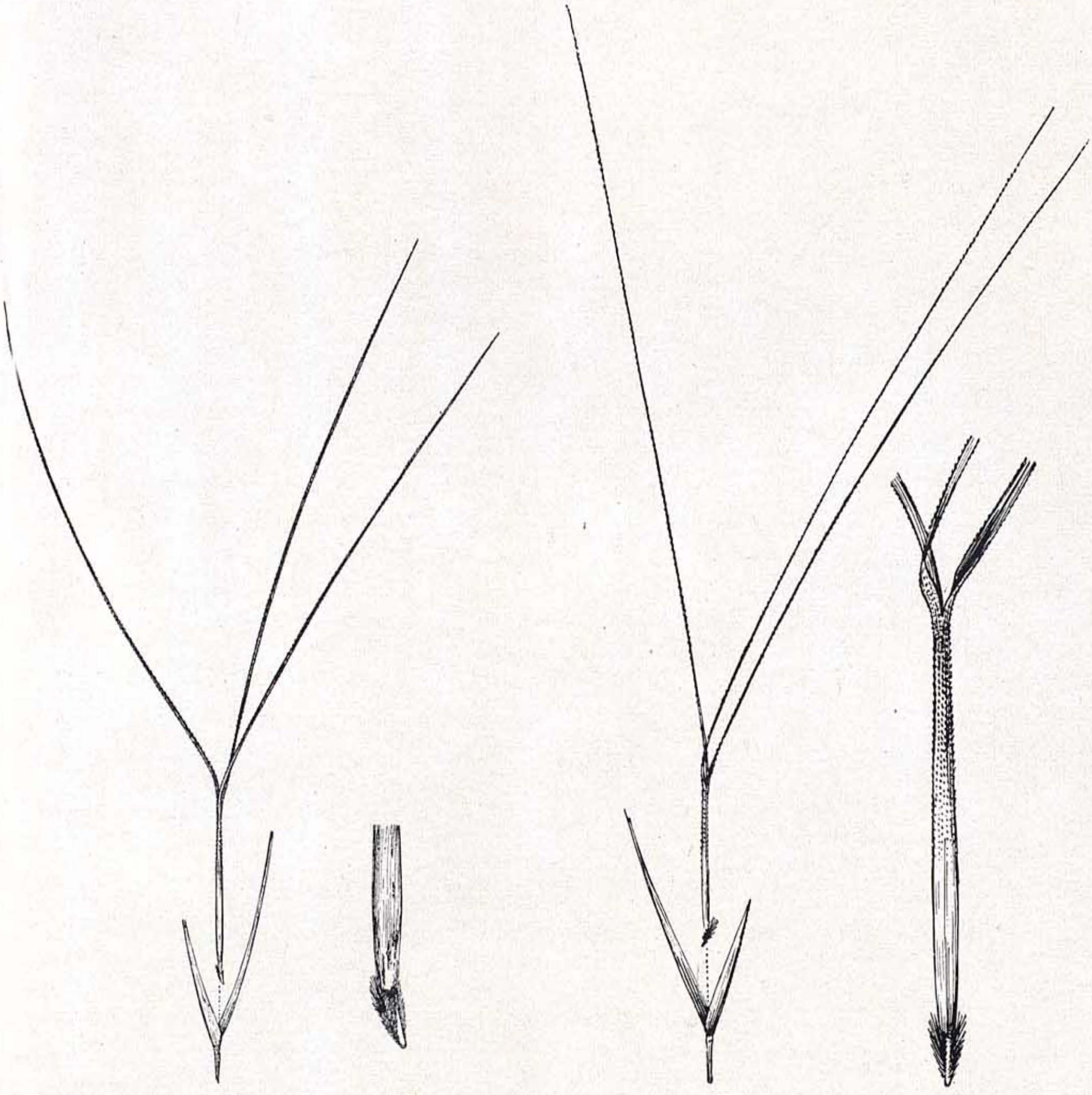
× 2⅔ × 6⅔

ARISTIDA PEDROENSIS Henrard.



× 2 × 6⅔
ARISTIDA ROEMERIANA Scheele.

× 1½ × 5
ARISTIDA VALIDA Henrard.

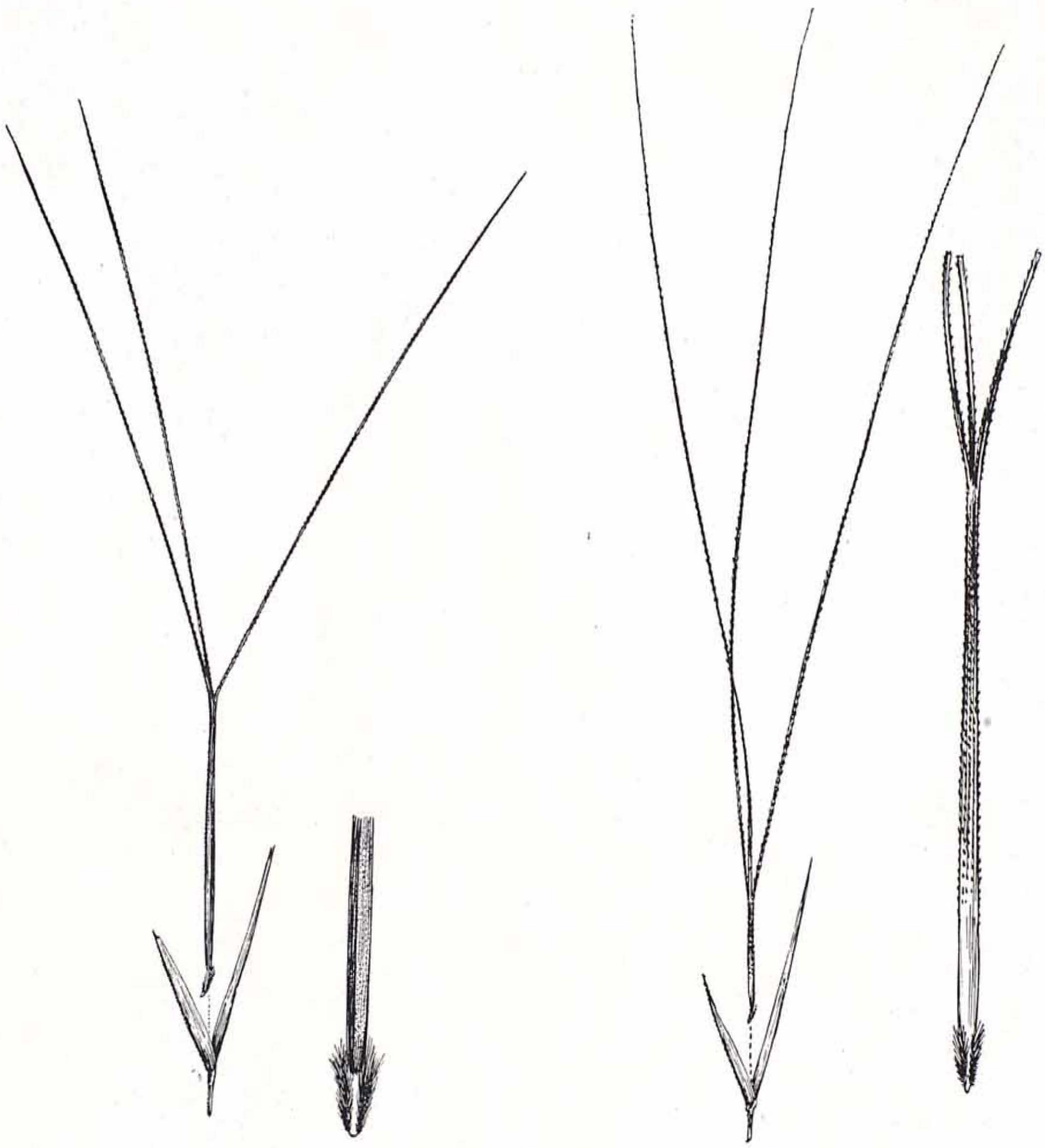


× 2⅔ × 5⅓

ARISTIDA EGGERSII Hitchcock.

× 2 × 6

ARISTIDA TRACHYANTHA Henrard.

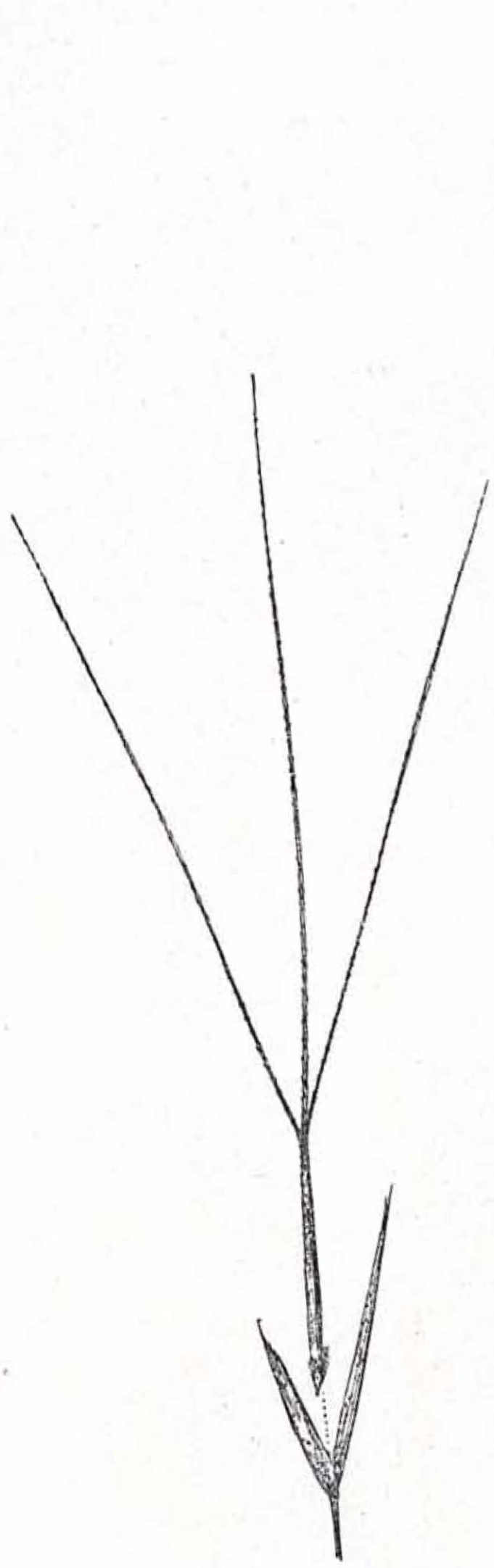


× 2⅔ × 6⅔

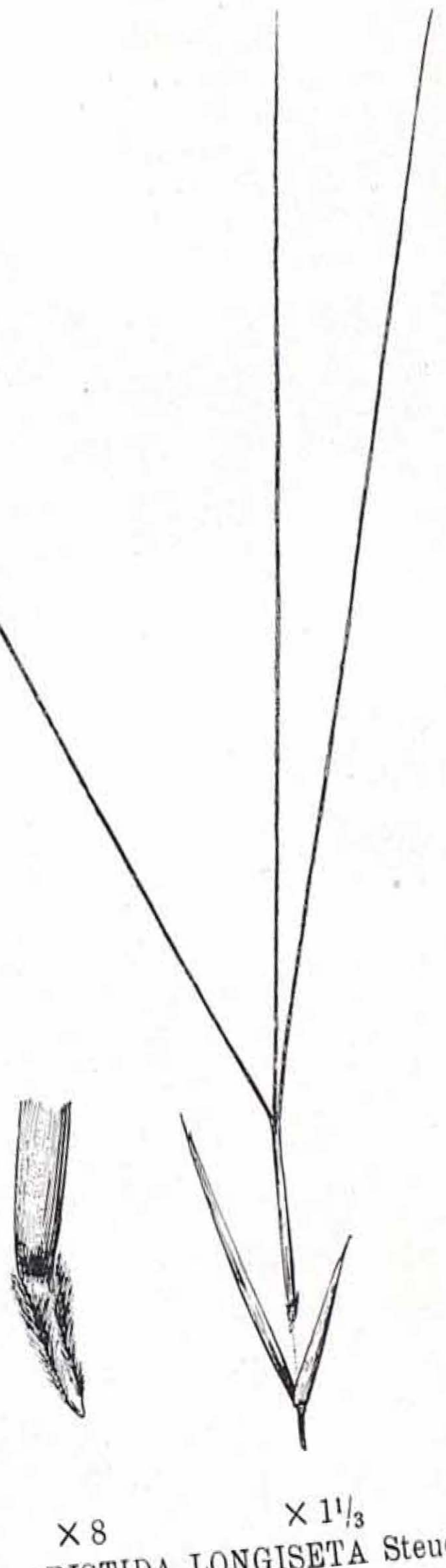
ARISTIDA WRIGHTII Nash.

× 1½ × 7

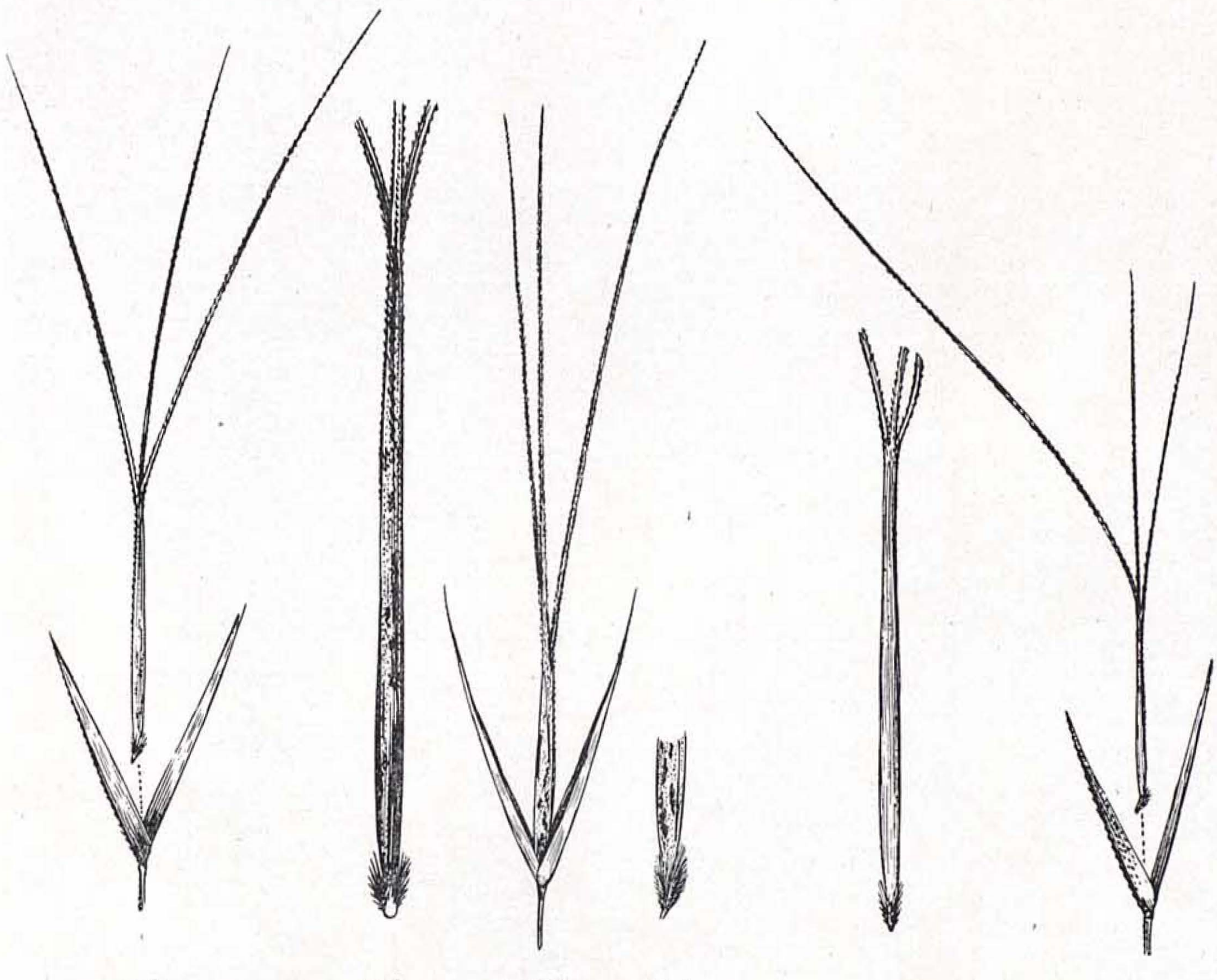
ARISTIDA VEXATIVA Henrard.



× 2²/₃
ARISTIDA FENDLERIANA Steudel.

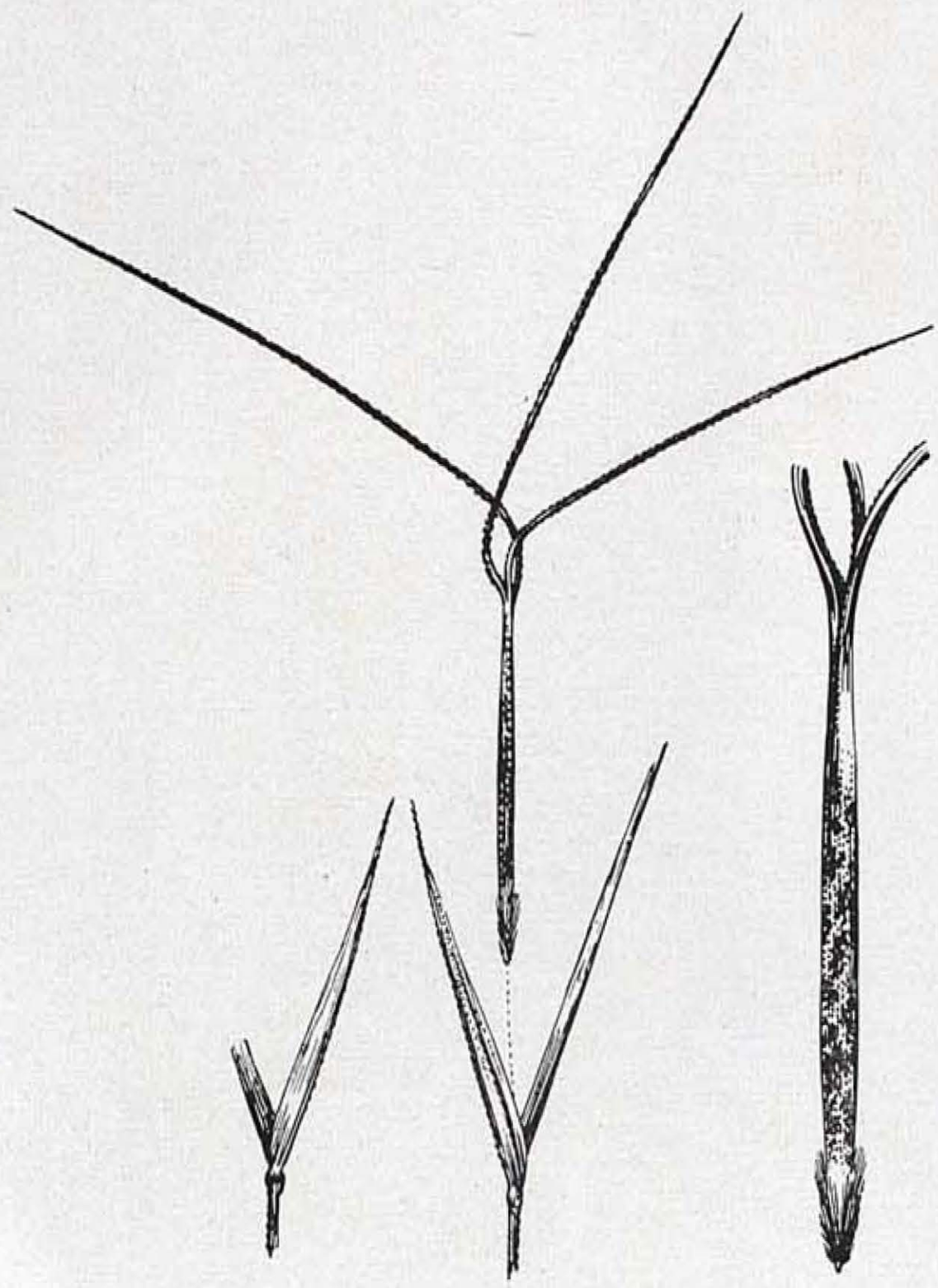


× 8 × 1¹/₃
ARISTIDA LONGISETA Steudel.



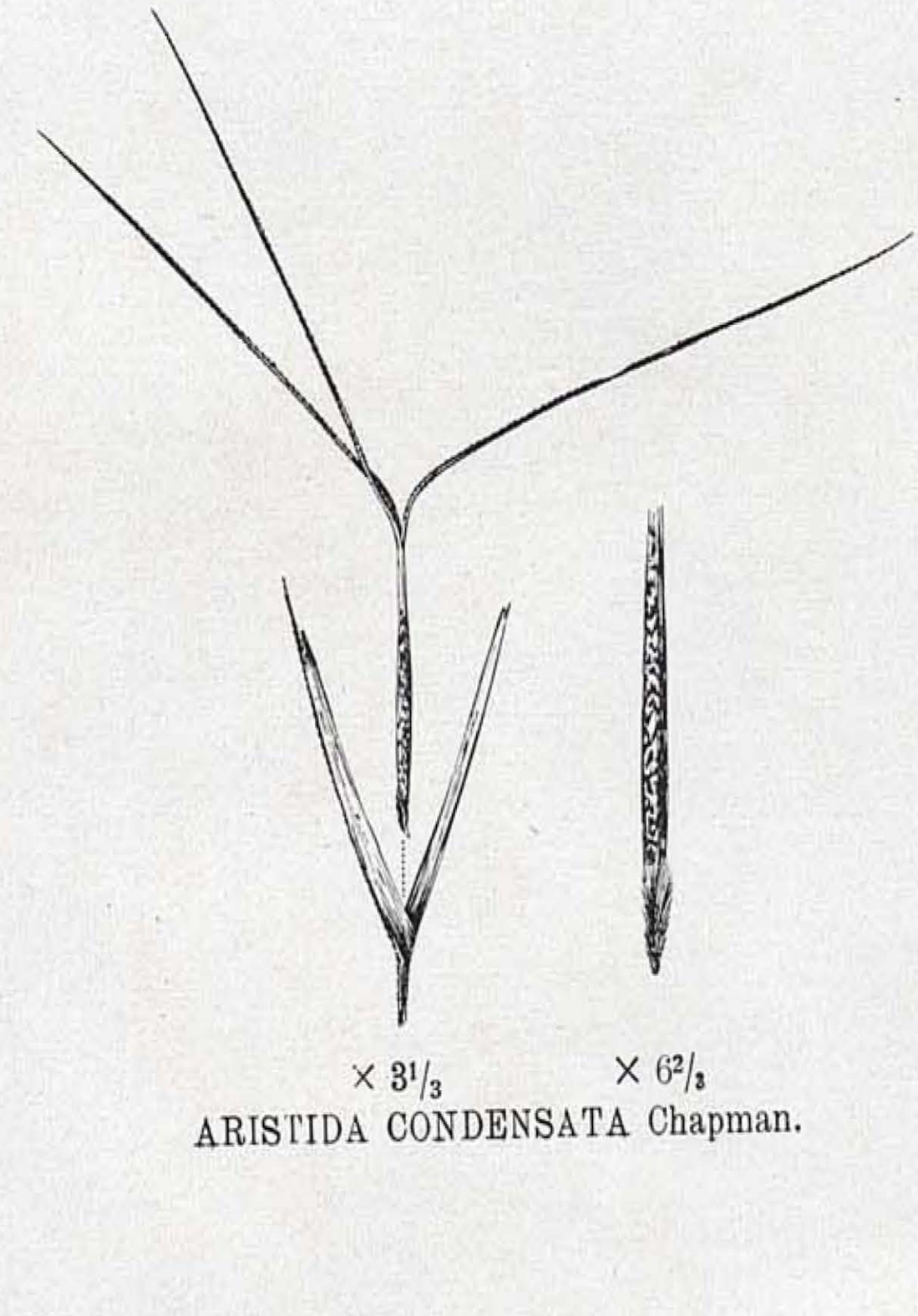
× 3 × 8 × 2²/₃ × 4 × 10 × 4

ARISTIDA FURFUROSA Henrard. ARISTIDA ADOENSIS Hochstetter. ARISTIDA VILFIFOLIA Henrard.



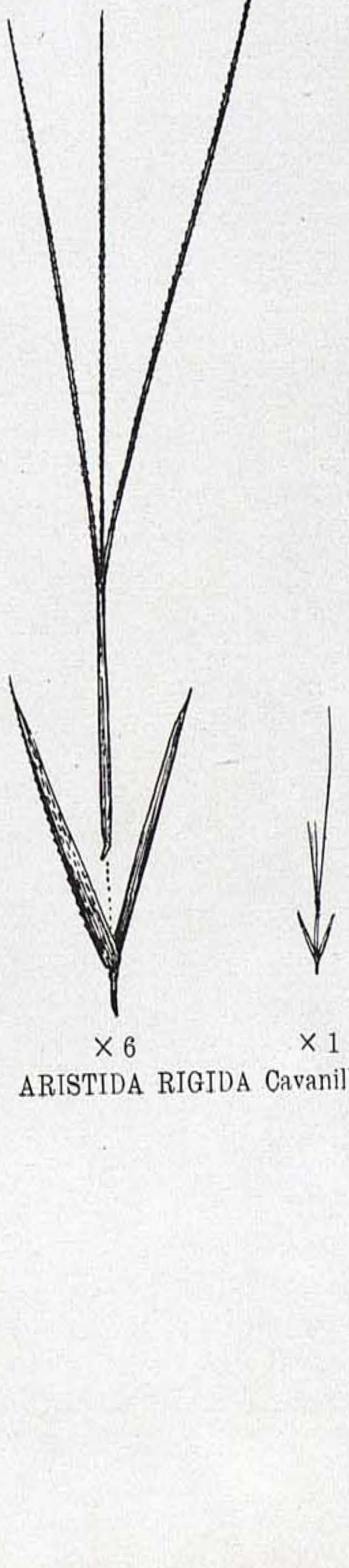
× 4 × 8

ARISTIDA TENUISPICA Hitchcock.



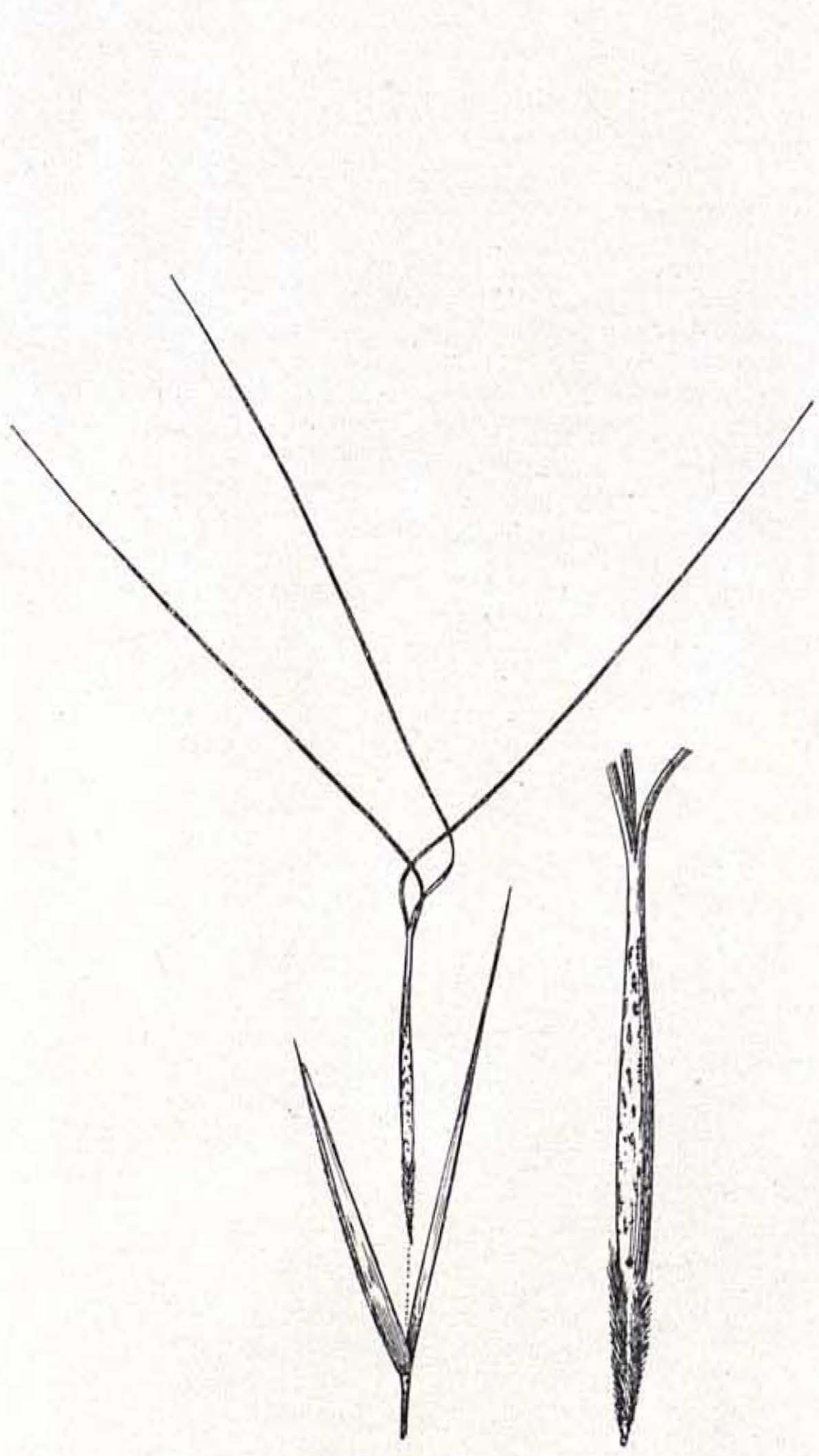
× 3 1/3 × 6 2/3

ARISTIDA CONDENSATA Chapman.



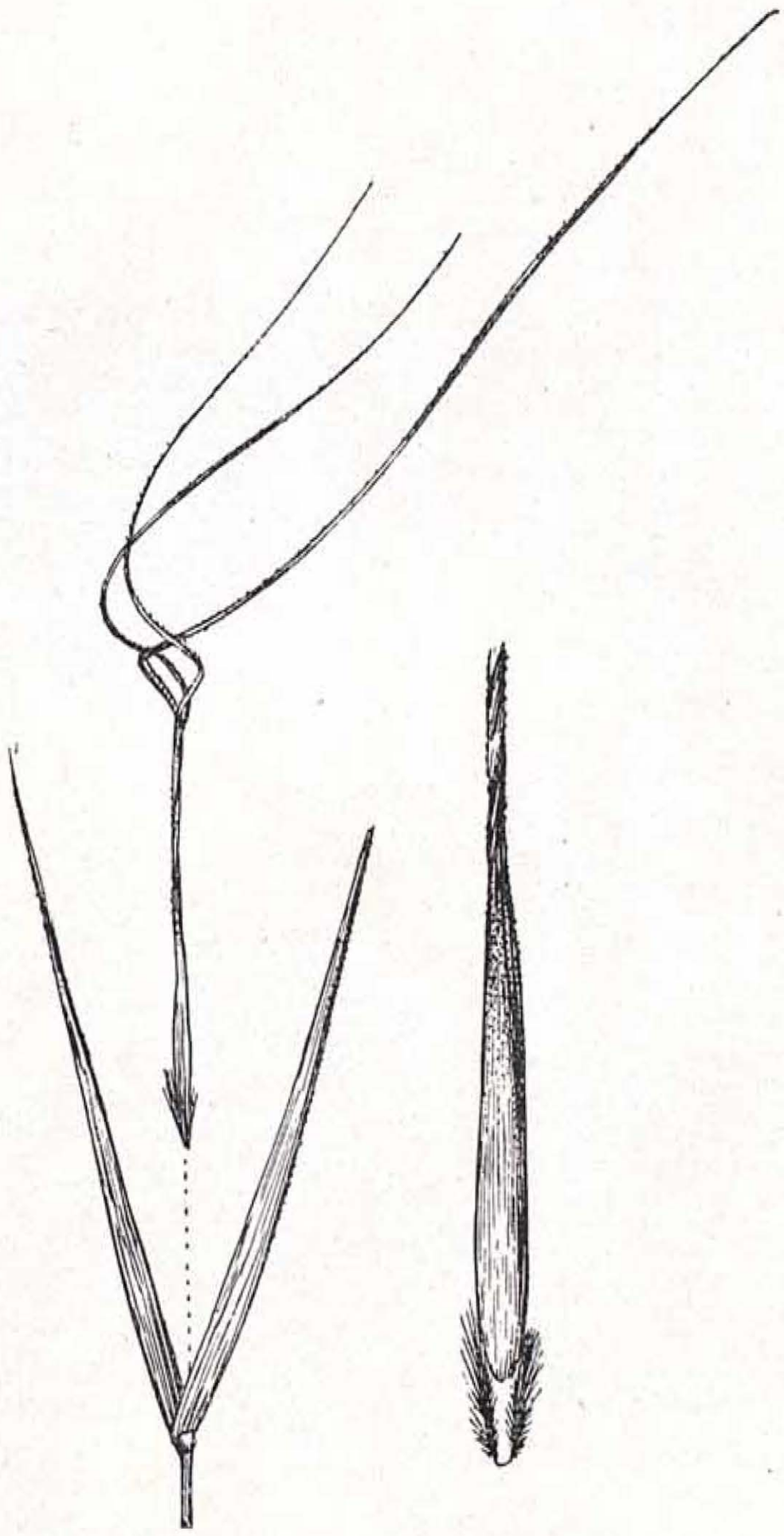
× 6 × 1

ARISTIDA RIGIDA Cavanilles.



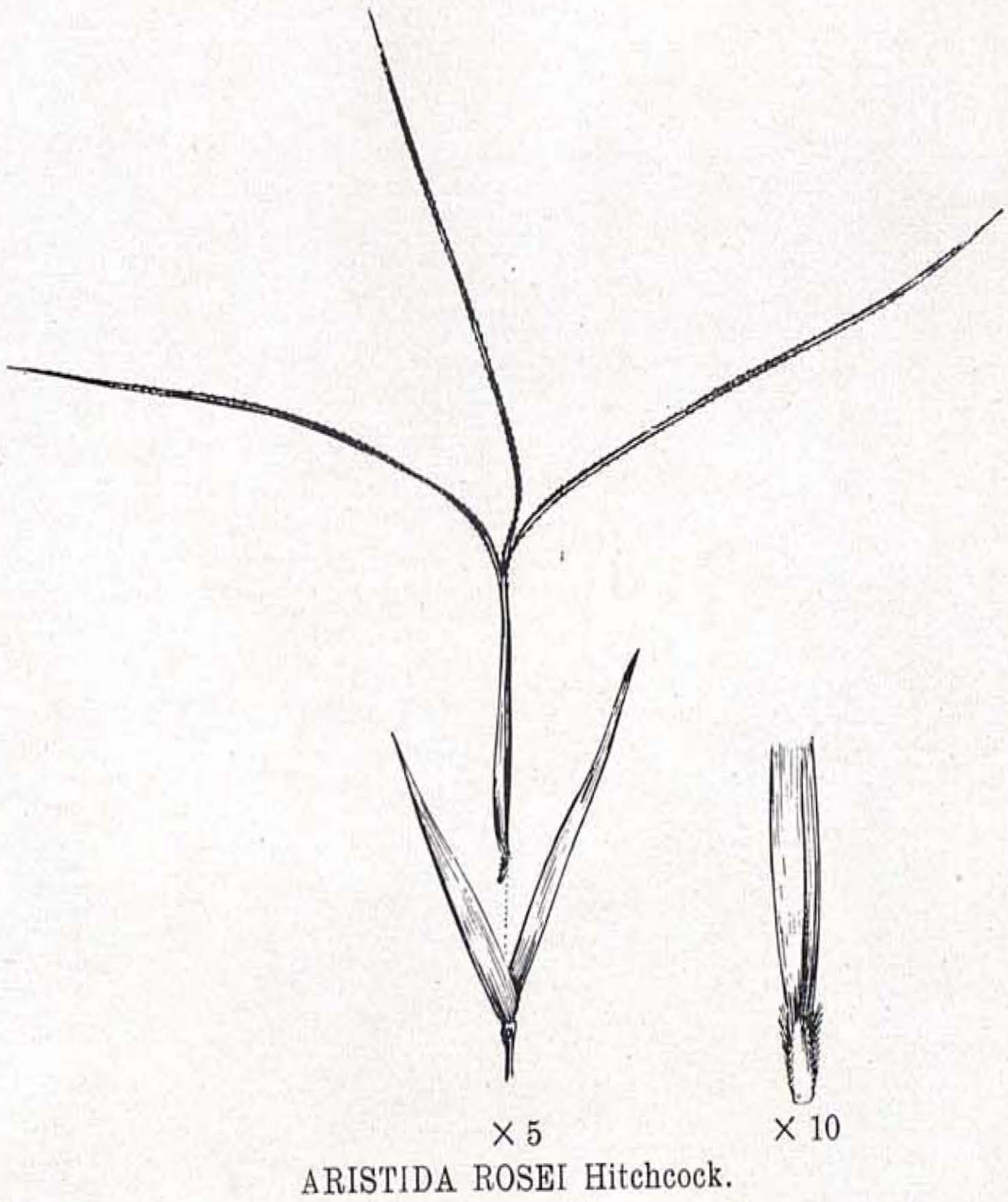
× 4 × 8

ARISTIDA GYRANS Chapman.



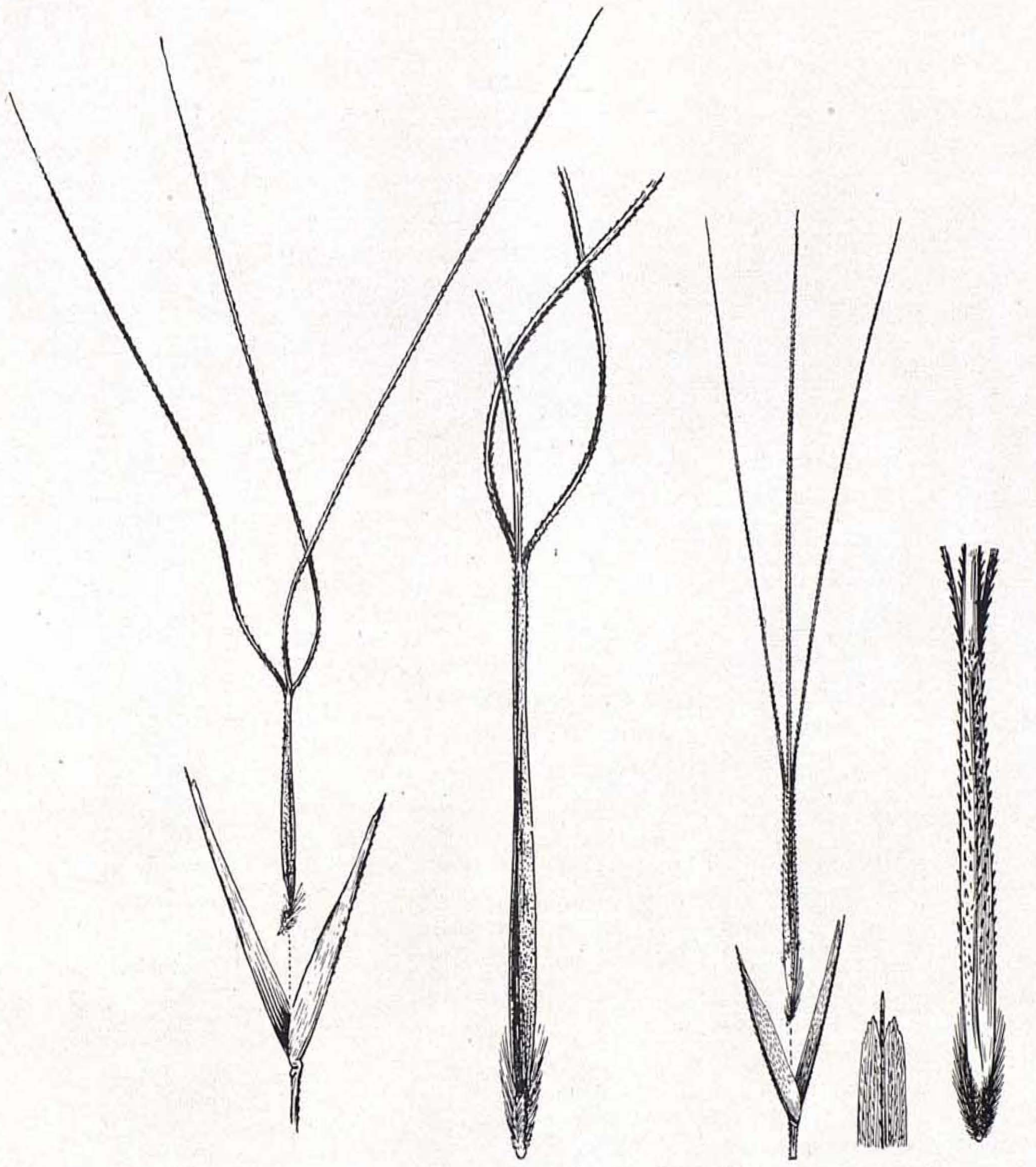
× 4 × 10

ARISTIDA BRITTONORUM Hitchcock.



× 5 × 10

ARISTIDA ROSEI Hitchcock.

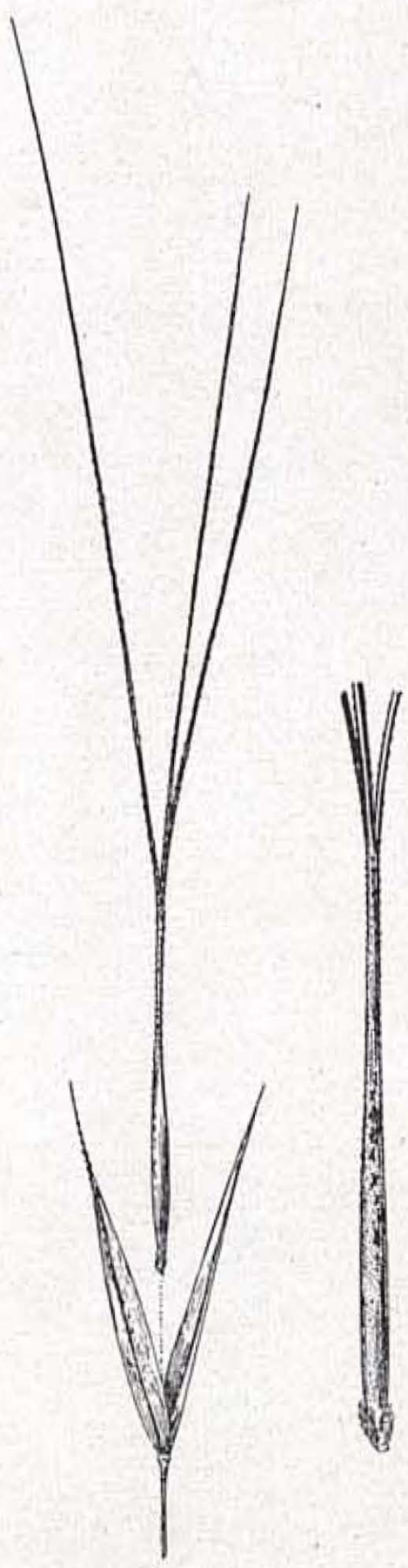


× 6 × 15

ARISTIDA REFRACTA Grisebach.

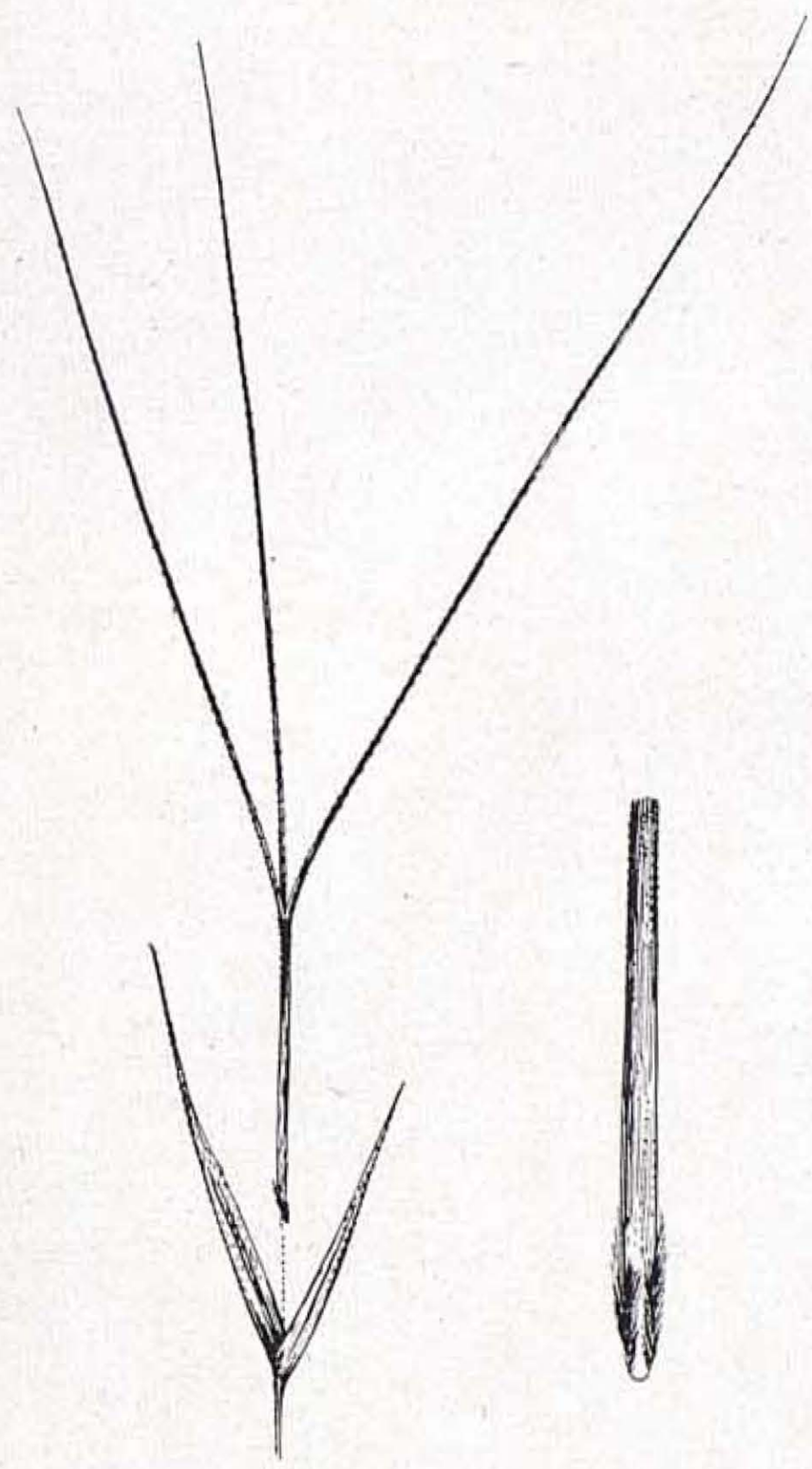
× 3 1/3 × 6 2/3

ARISTIDA ECHINATA Henrard.



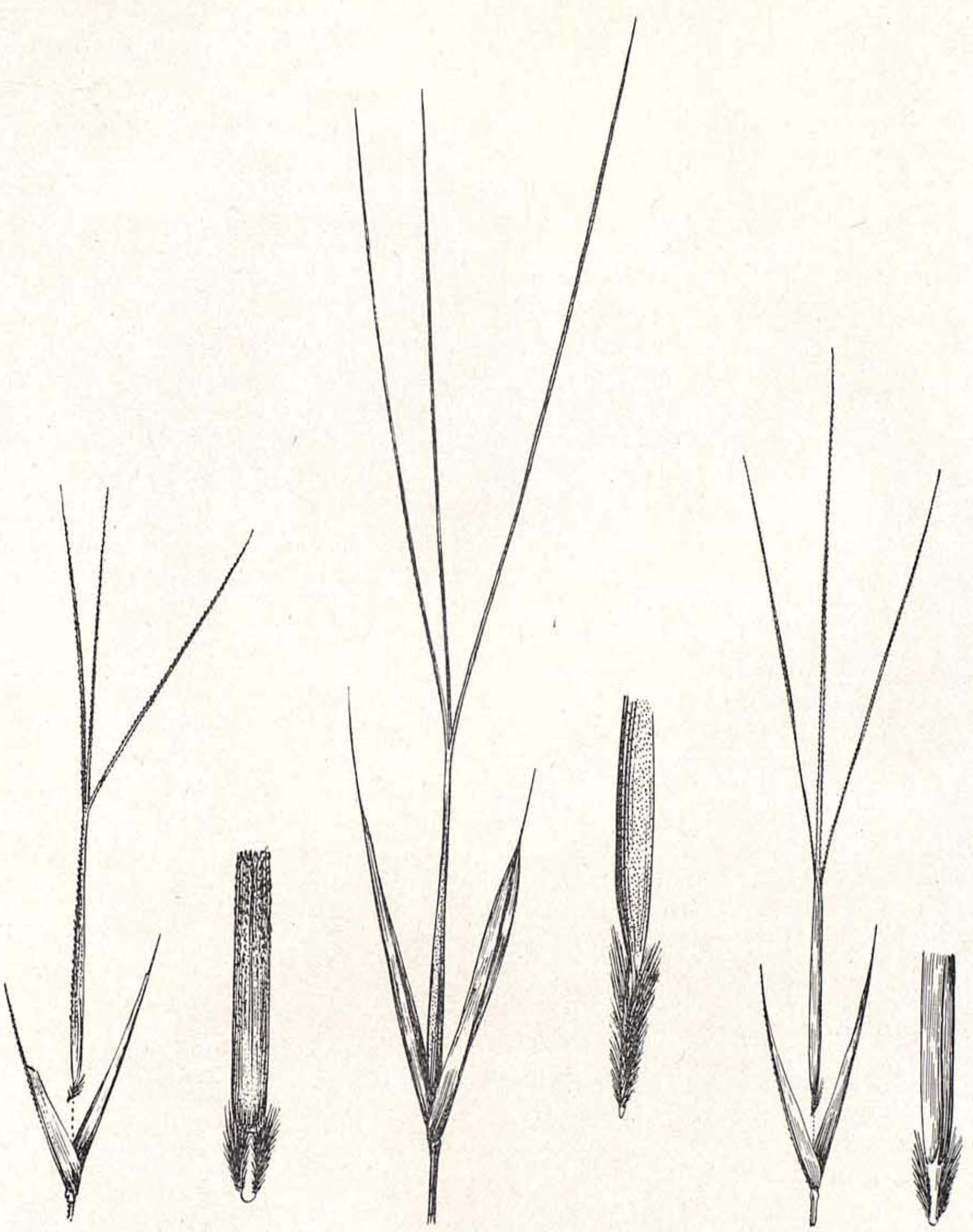
×4 ×6⅔

ARISTIDA MARGINALIS
Ekman.



×3⅓ ×10

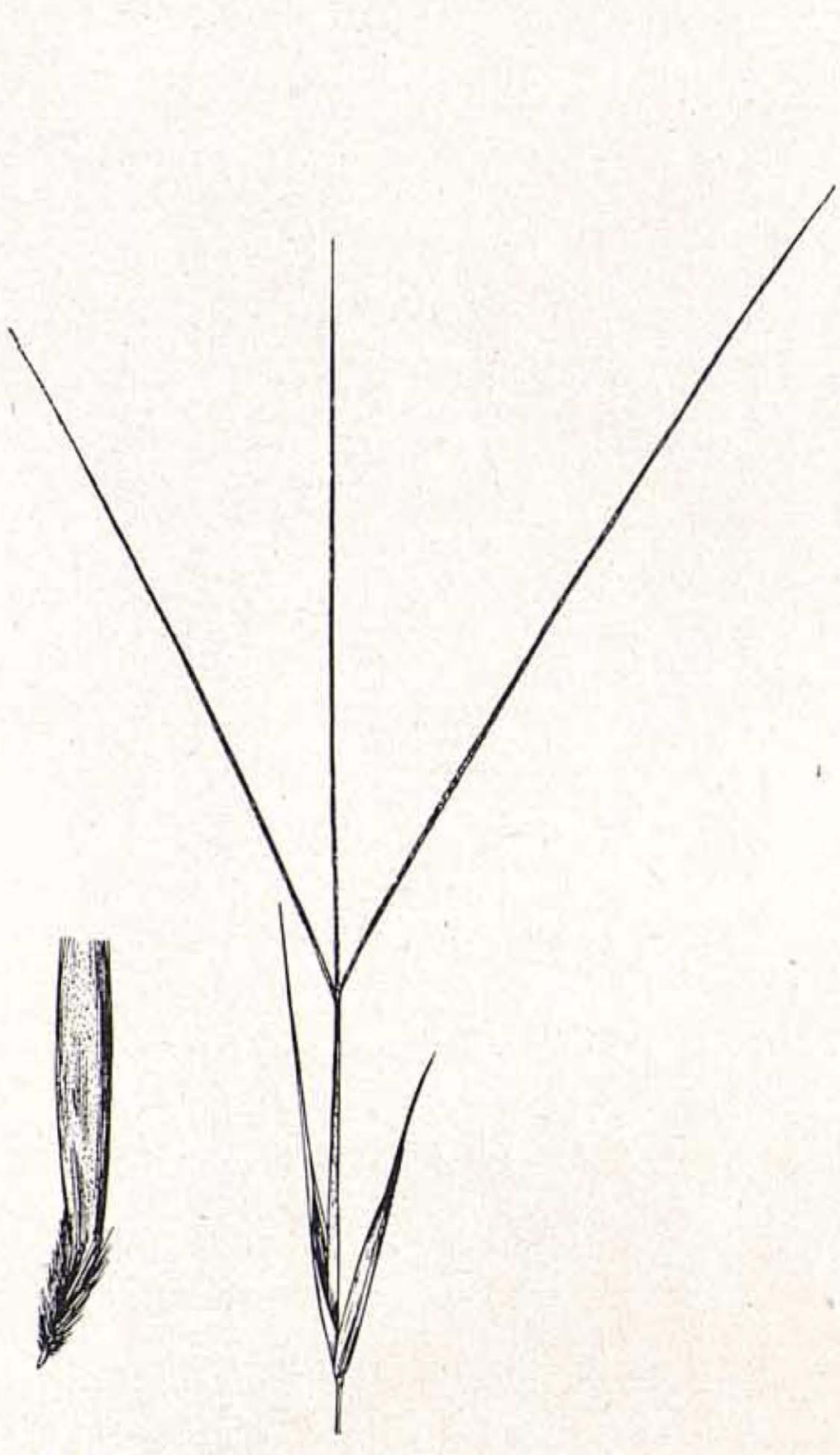
ARISTIDA
JUNCIFORMIS Trin. et Ruprecht.



× 4 × 10
ARISTIDA NEMORIVAGA
Henrard.

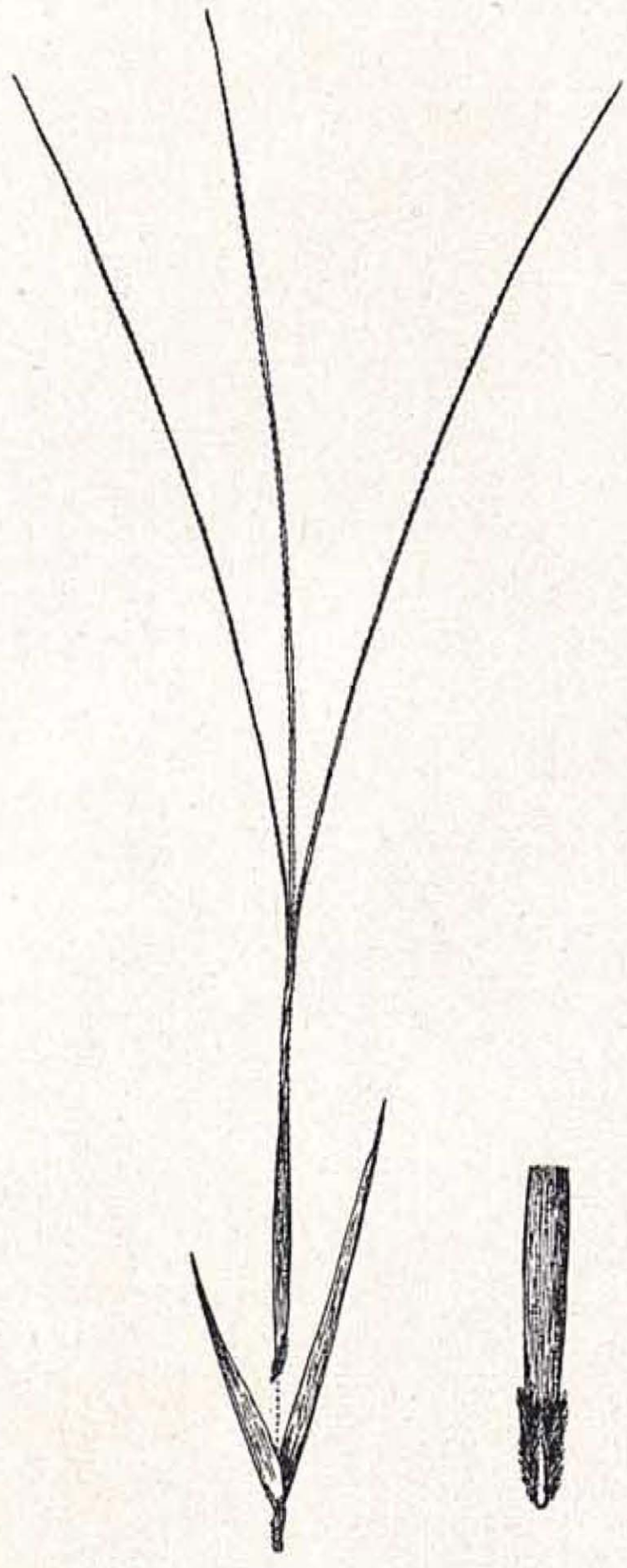
× 3 × 10
ARISTIDA SETACEA Retzius.

× 4 × $6^2/_3$
ARISTIDA PERSONATA
Henrard.



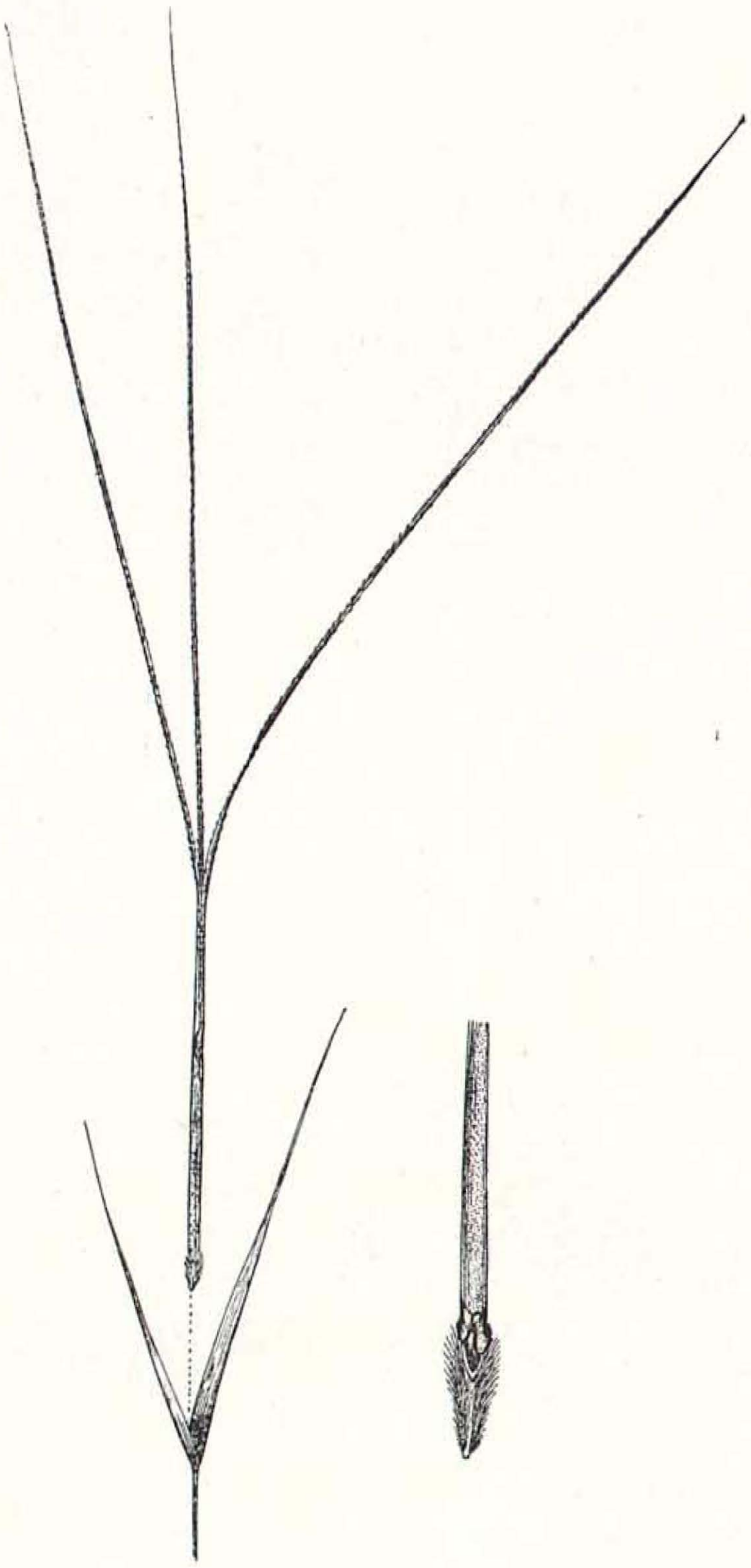
×10 ×2

ARISTIDA LAEVIS (Nees) Kunth.



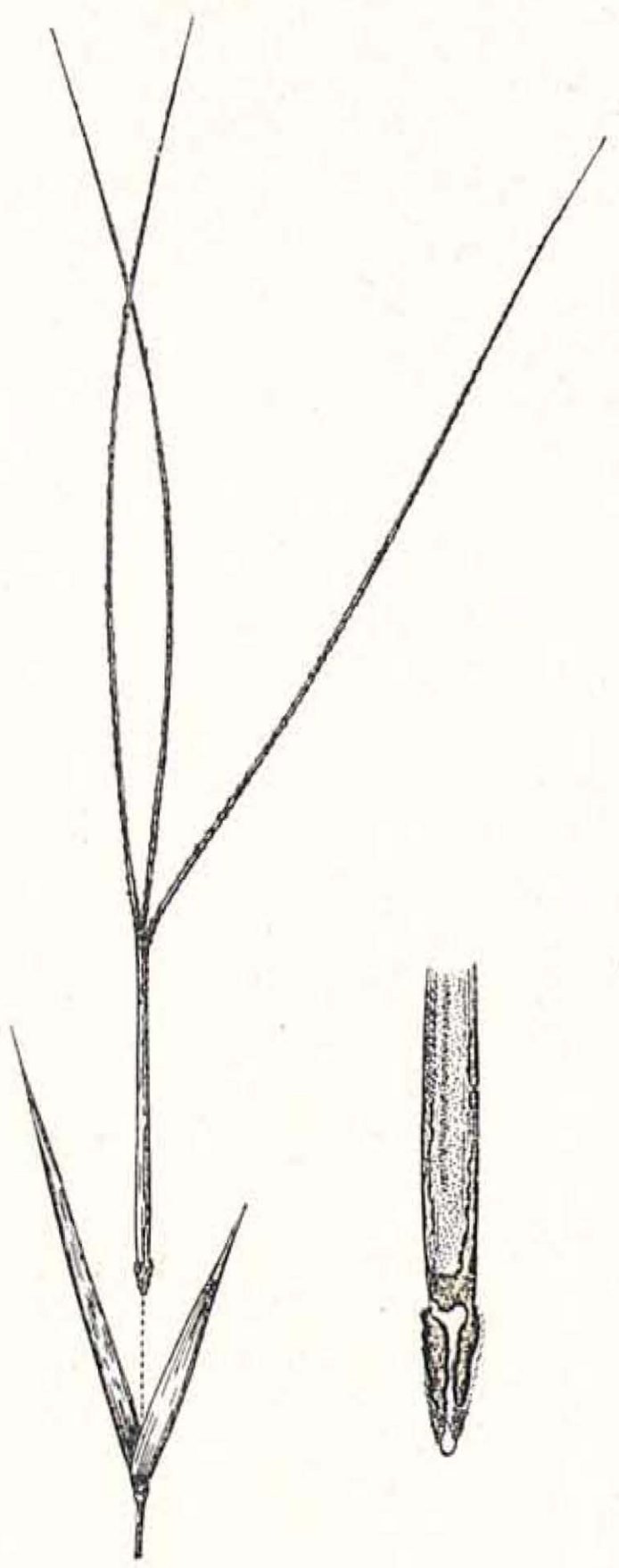
×2⅔ ×6⅔

ARISTIDA PSAMMOPHILA Henrard.



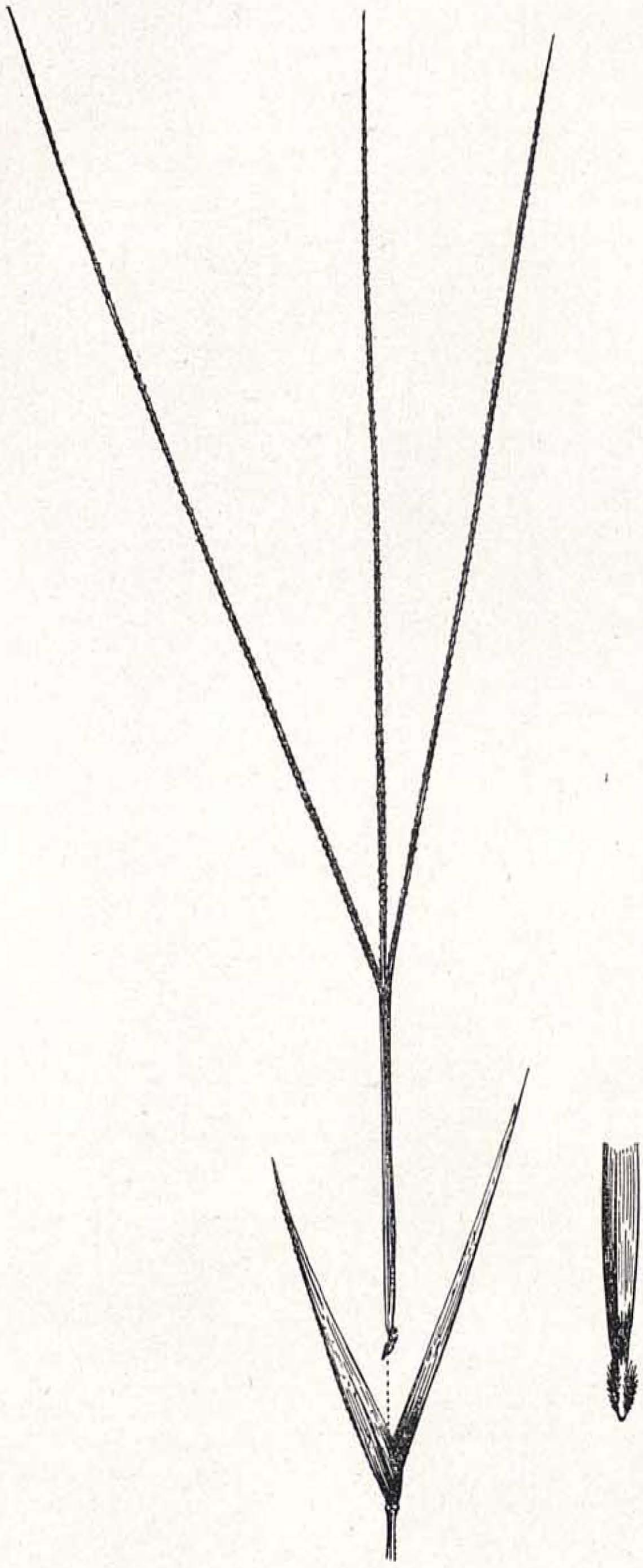
× 2⅔ × 10⅔

ARISTIDA ALTISSIMA Arechavaleta.



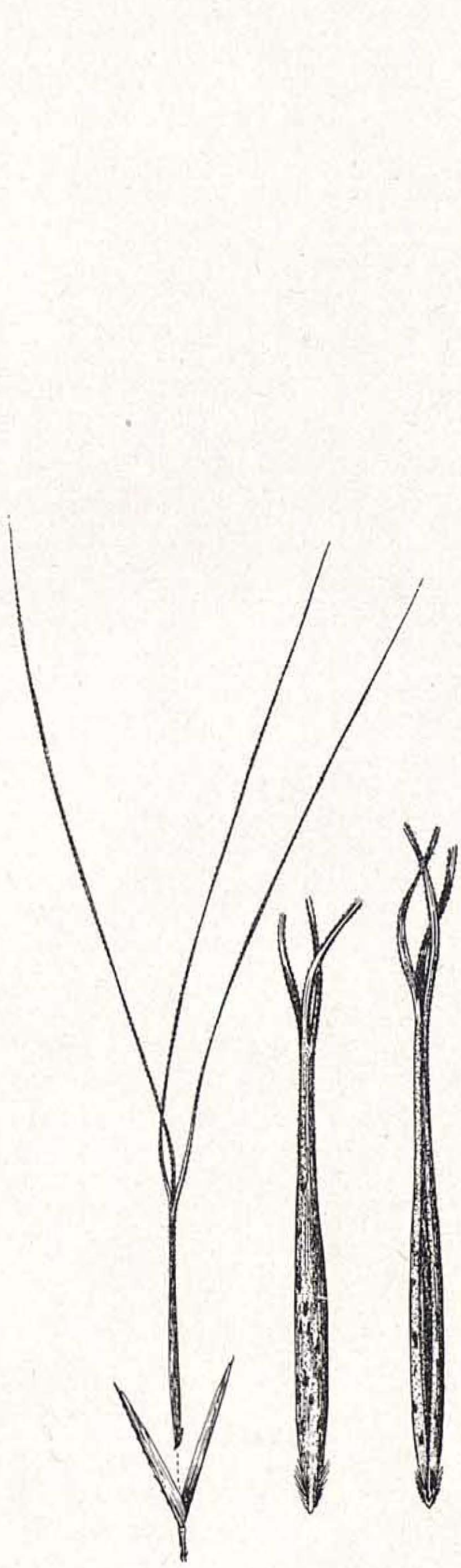
× 2 × 10

ARISTIDA TERETIFOLIA
Arechavaleta.



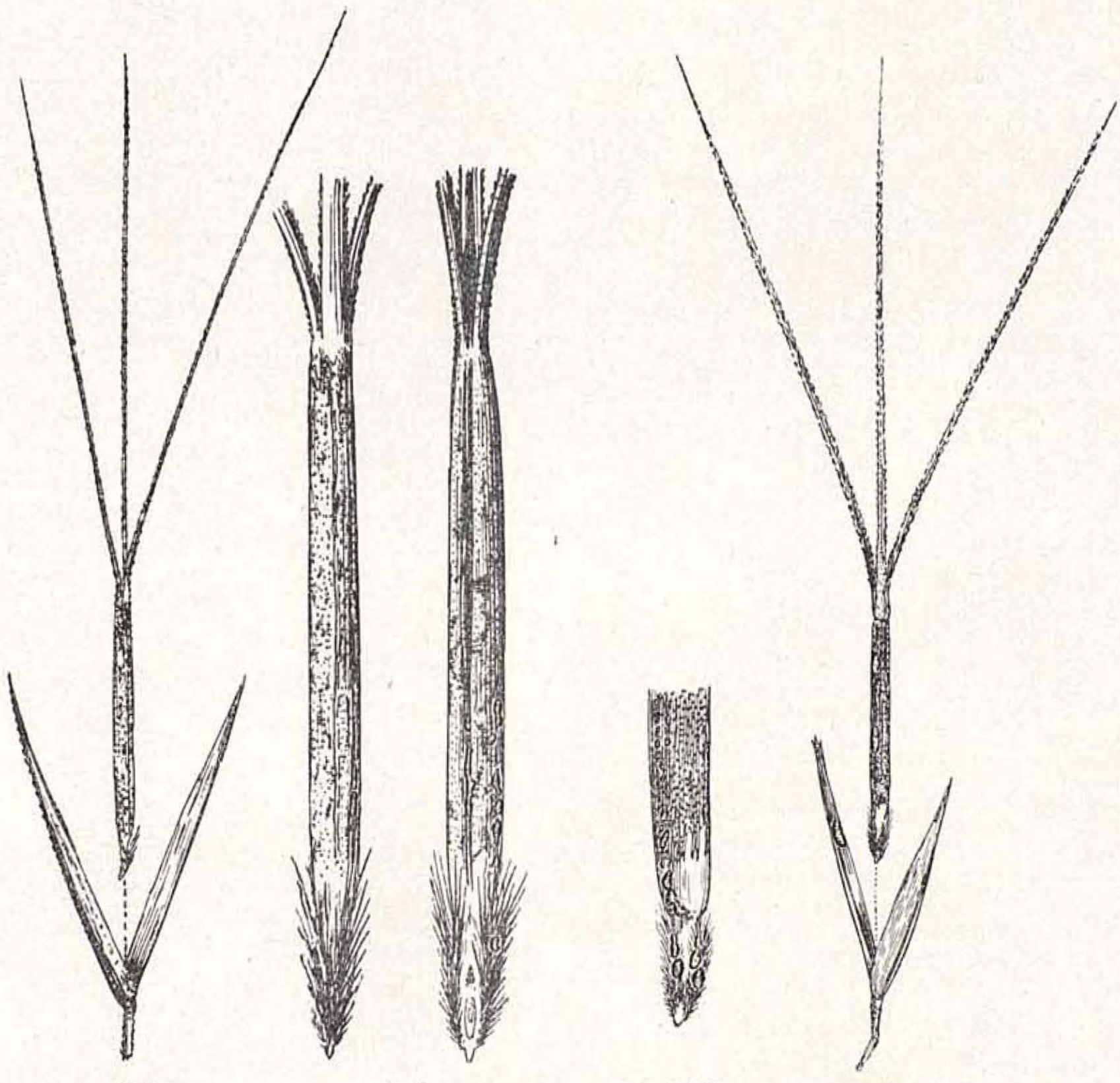
×3 ×10

ARISTIDA ARECHAVALETAE Henrard.



×2 ×4

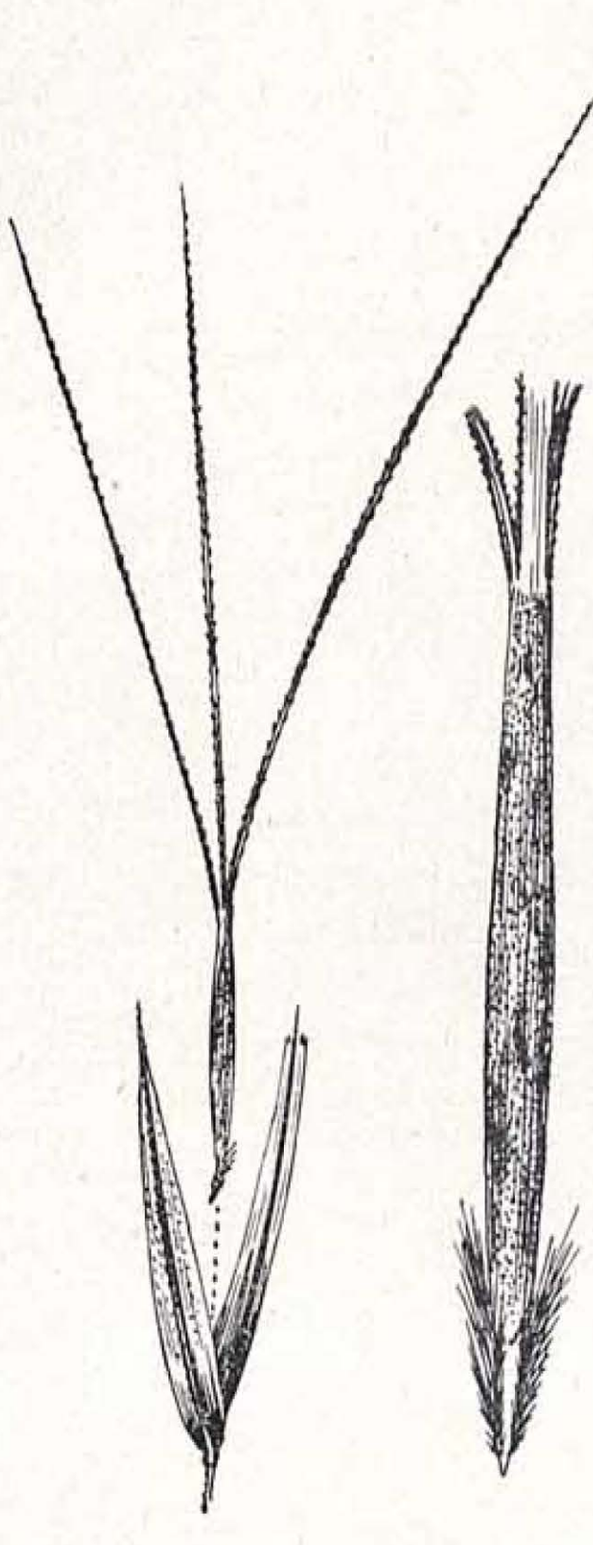
ARISTIDA SUCCEDANEA Henrard.



× 3 × 9 × 7 × 3

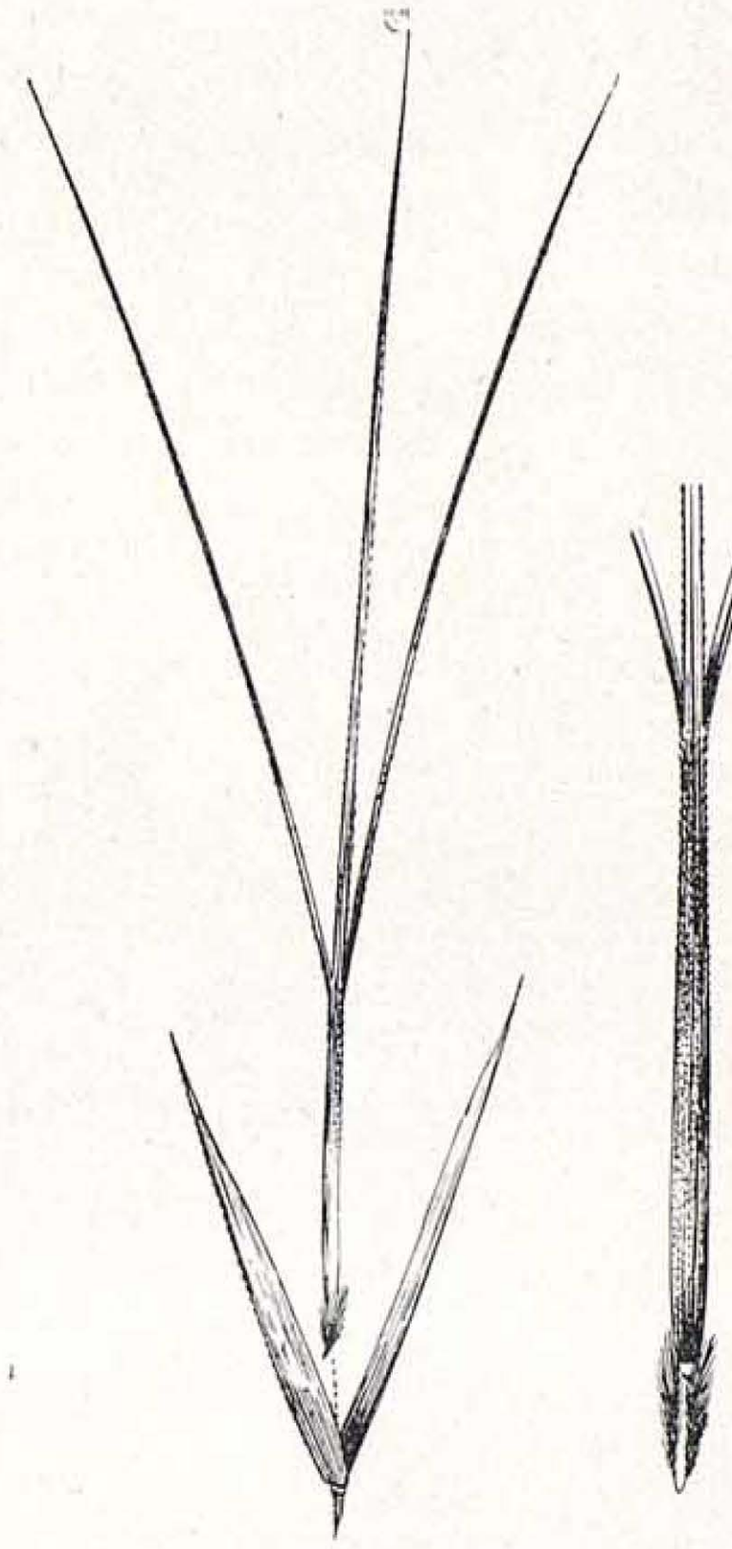
ARISTIDA SCIUROIDES Domin. ARISTIDA CALYCINA R. Br.

Plate CXLVI.



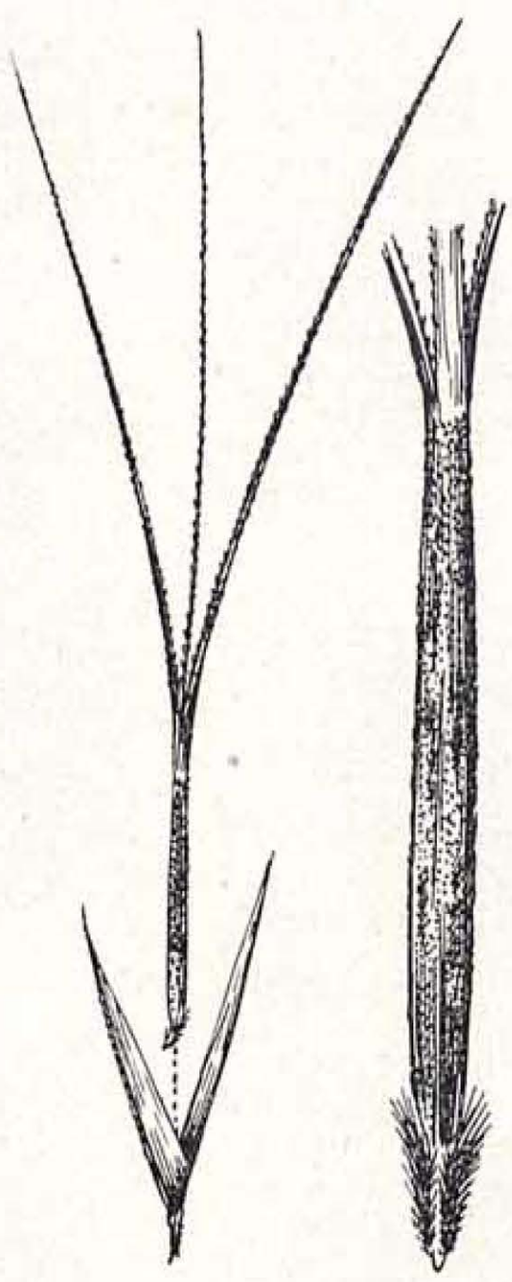
× 3 × 9

ARISTIDA INGRATA Domin.



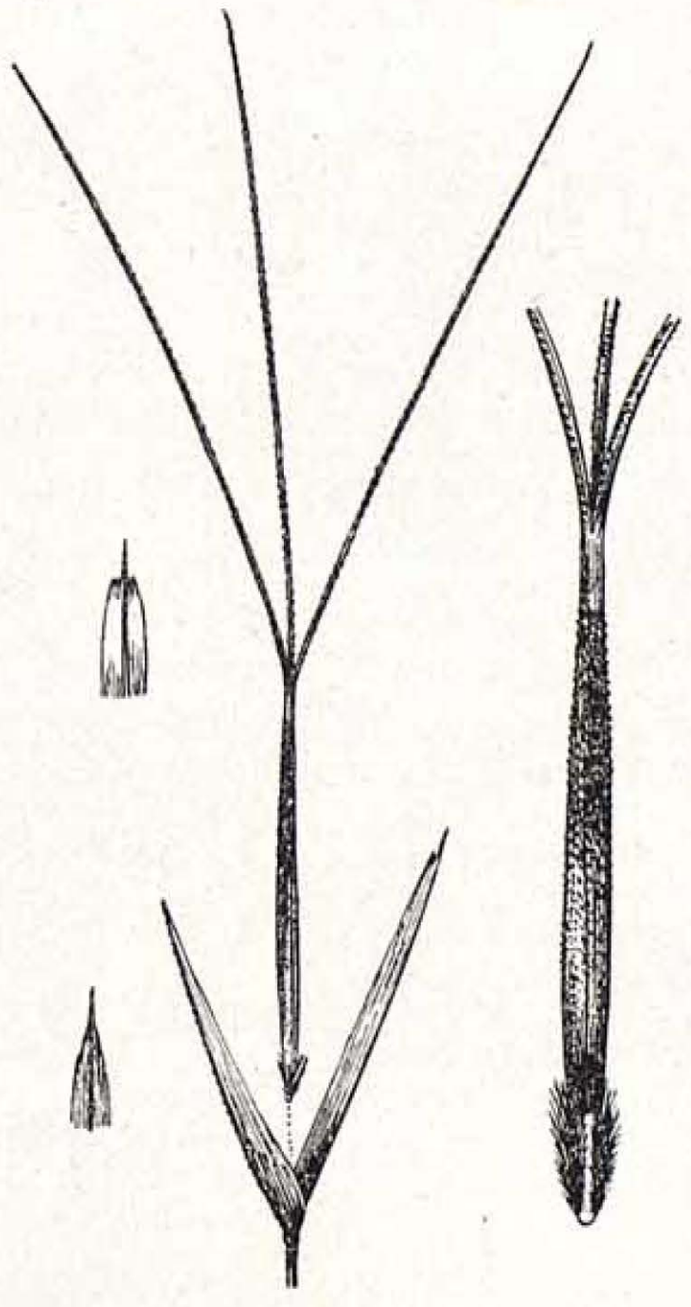
× 2⅔ × 5⅓

ARISTIDA PENNEI Chiovenda.



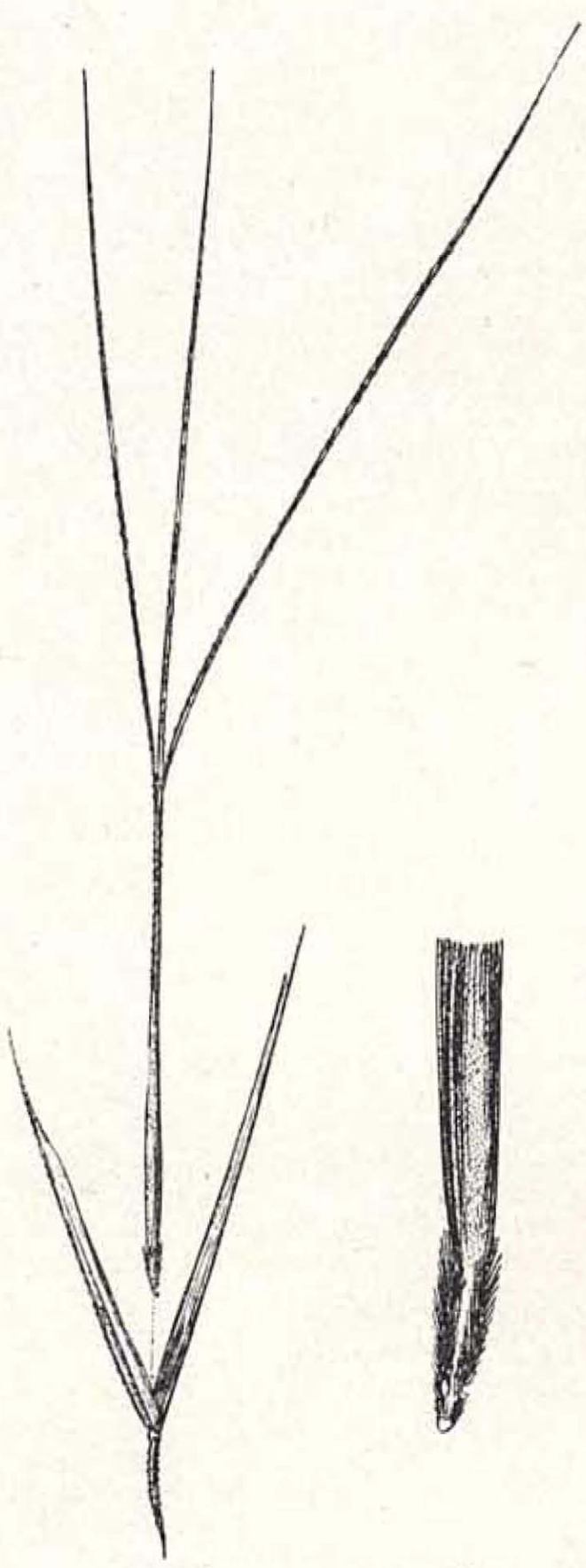
× 3 × 9

ARISTIDA JERICHOENSIS Domin.



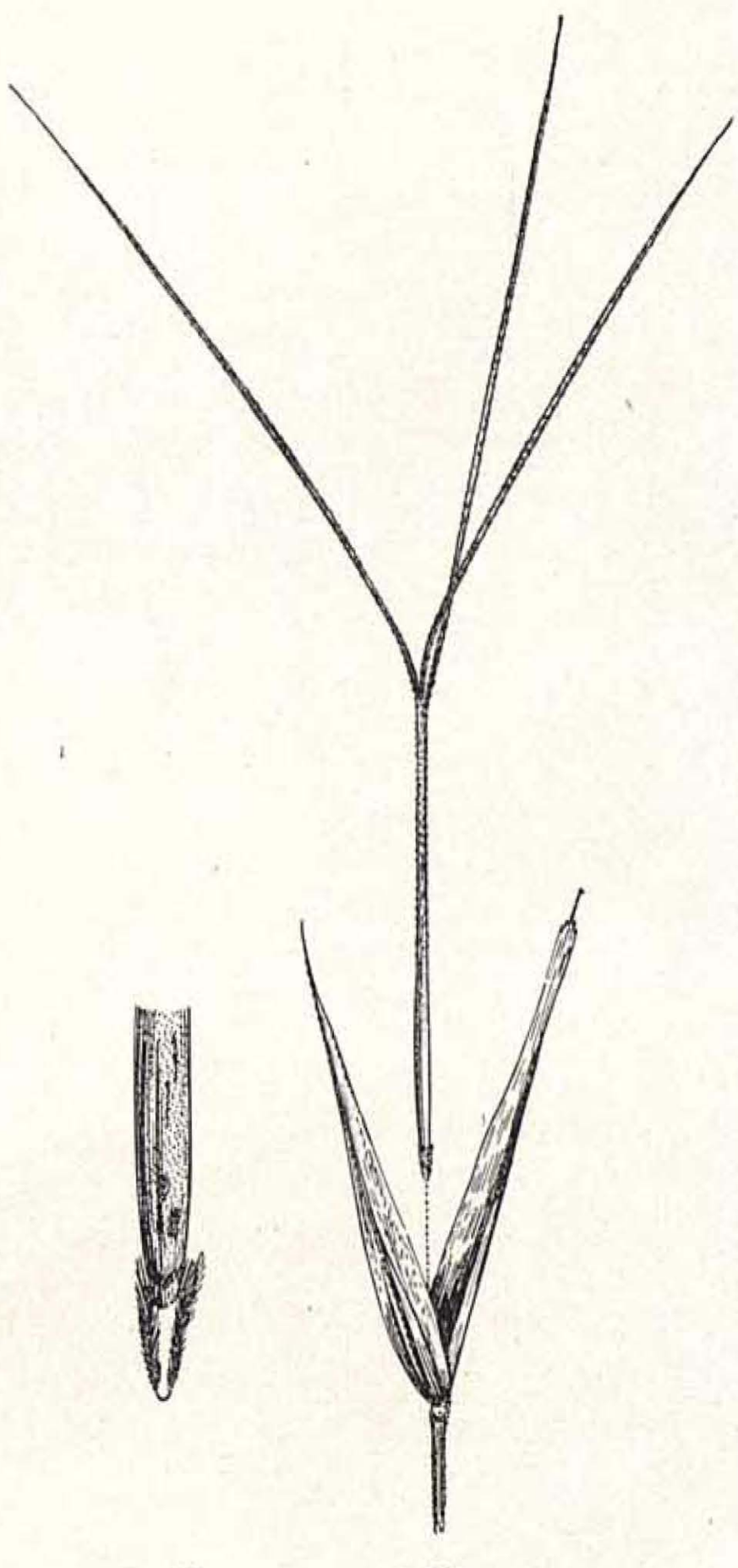
× 4 × 8

ARISTIDA ANTHOXANTHOIDES Henrard.



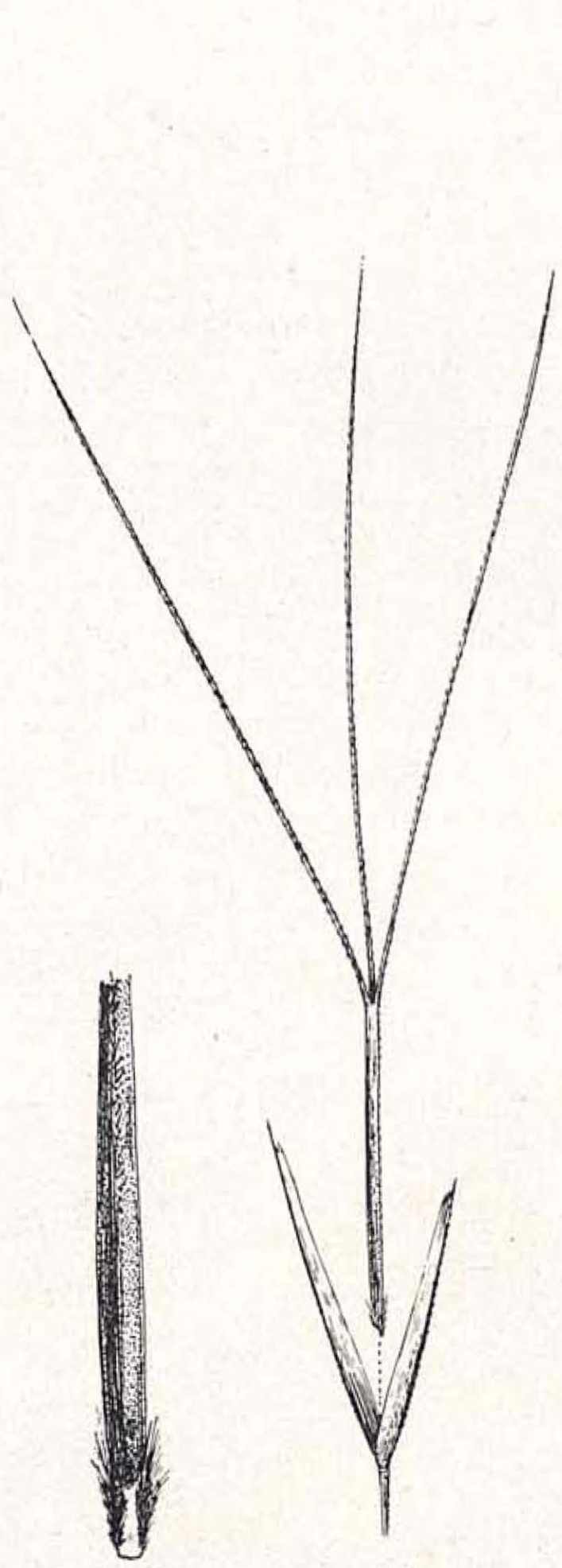
× 3⅓ × 13

ARISTIDA ENODIS Hackel.



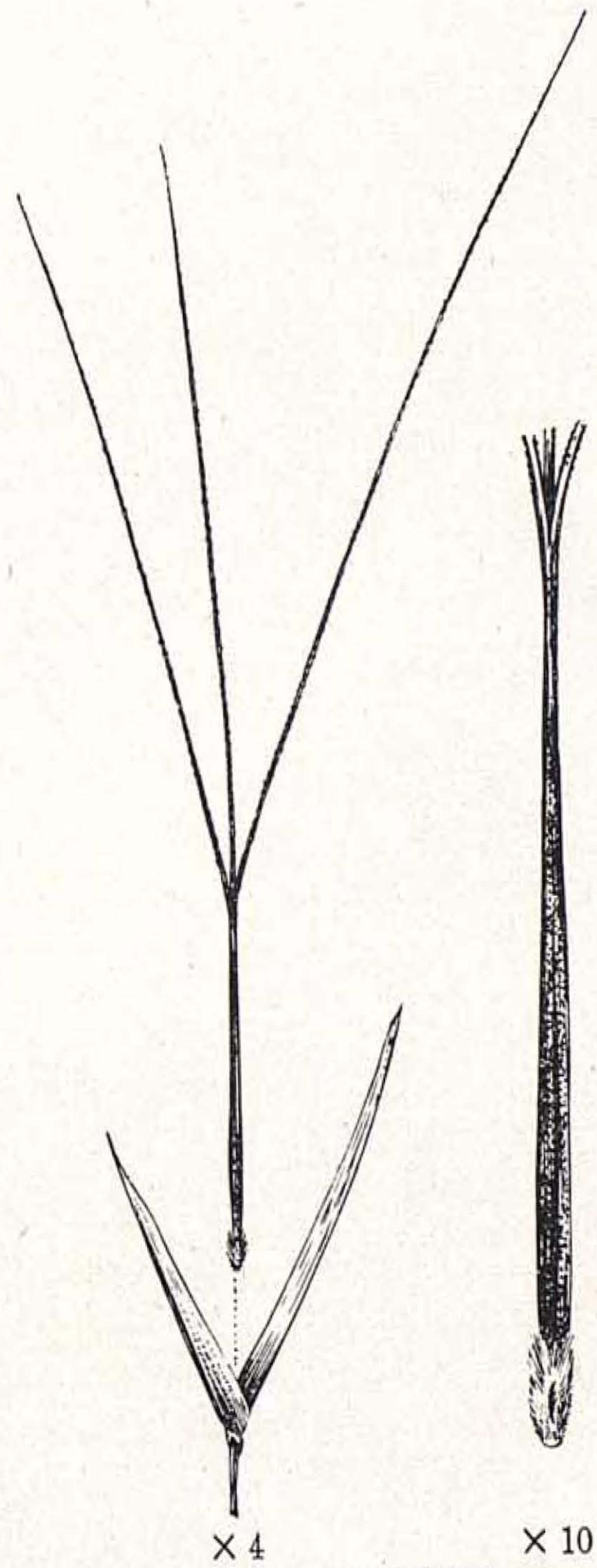
× 10 × 3⅓

ARISTIDA ANTONIANA Steudel.



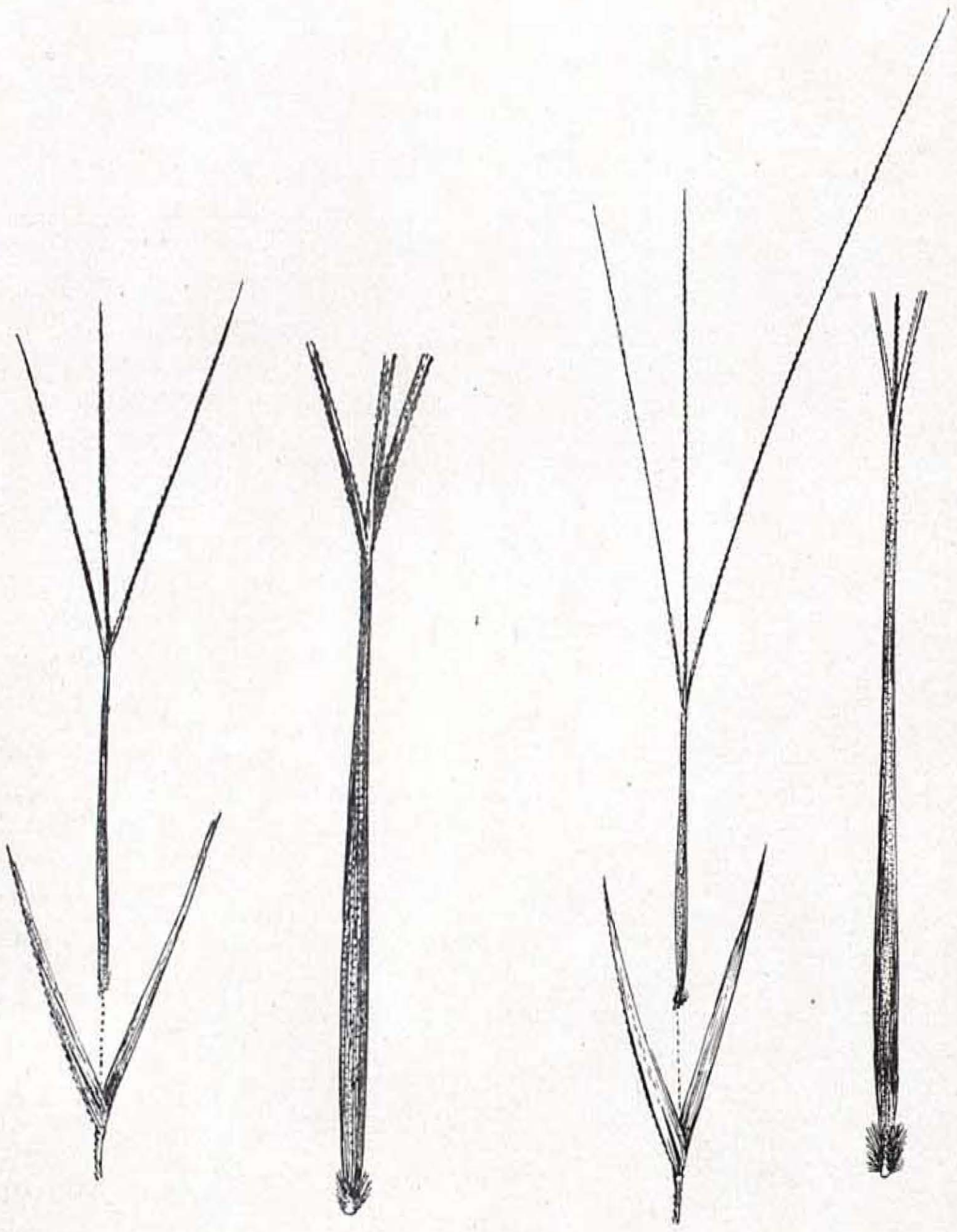
×8 ×4

ARISTIDA CHAETOPHYLLA Steudel.



×4 ×10

ARISTIDA GALPINII Stapf.

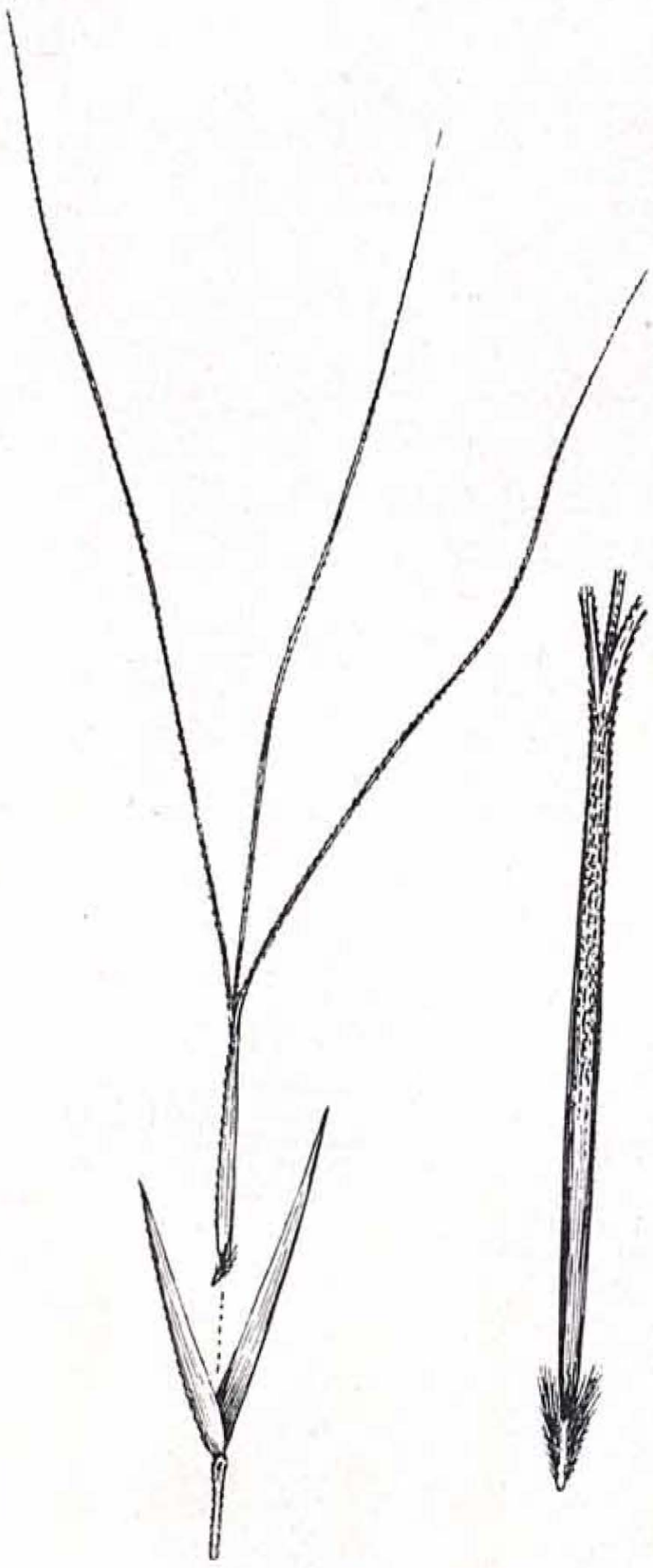


× 4 × 8

ARISTIDA FRIESII Hackel.

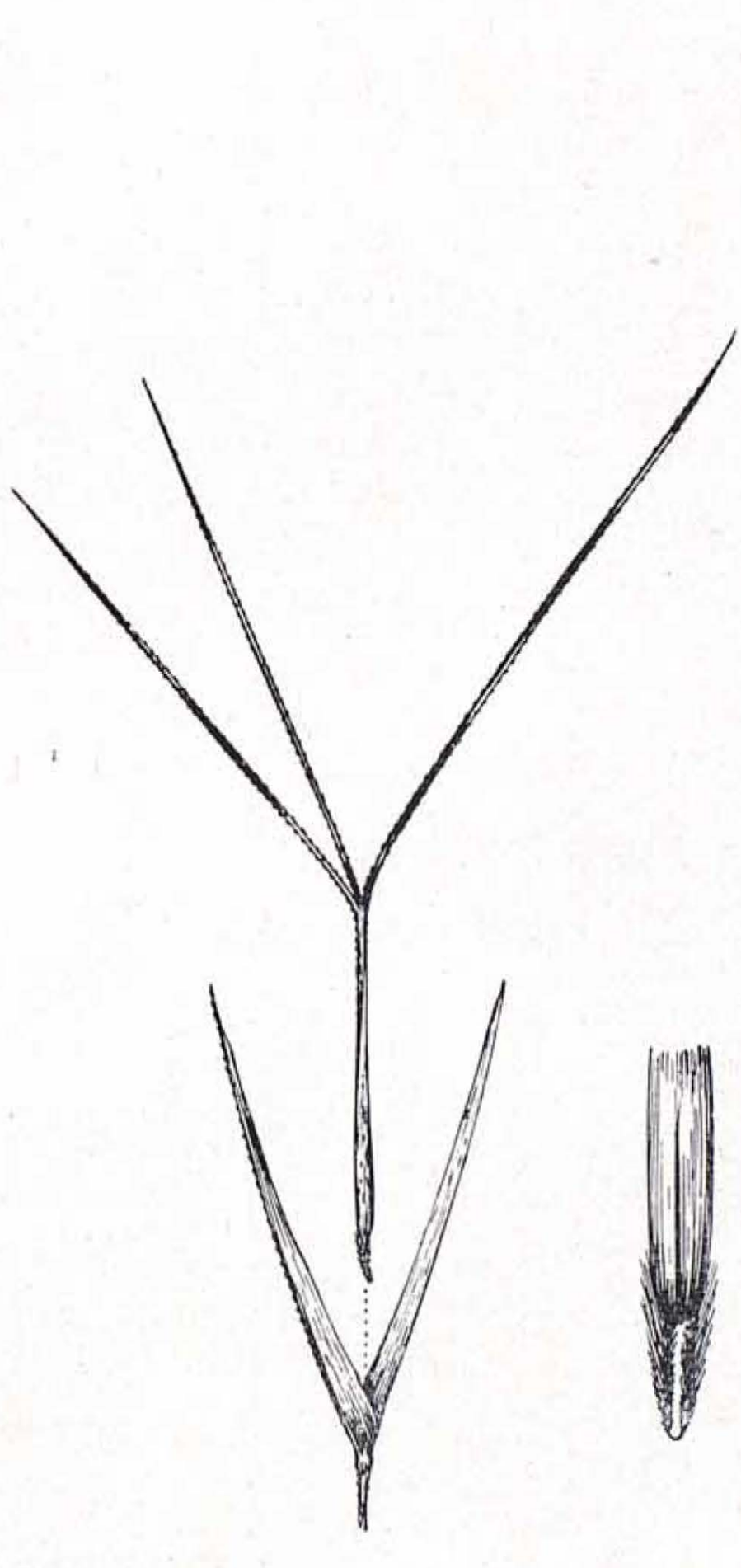
× 4 × 10

ARISTIDA ECUADORIENSIS Henrard.



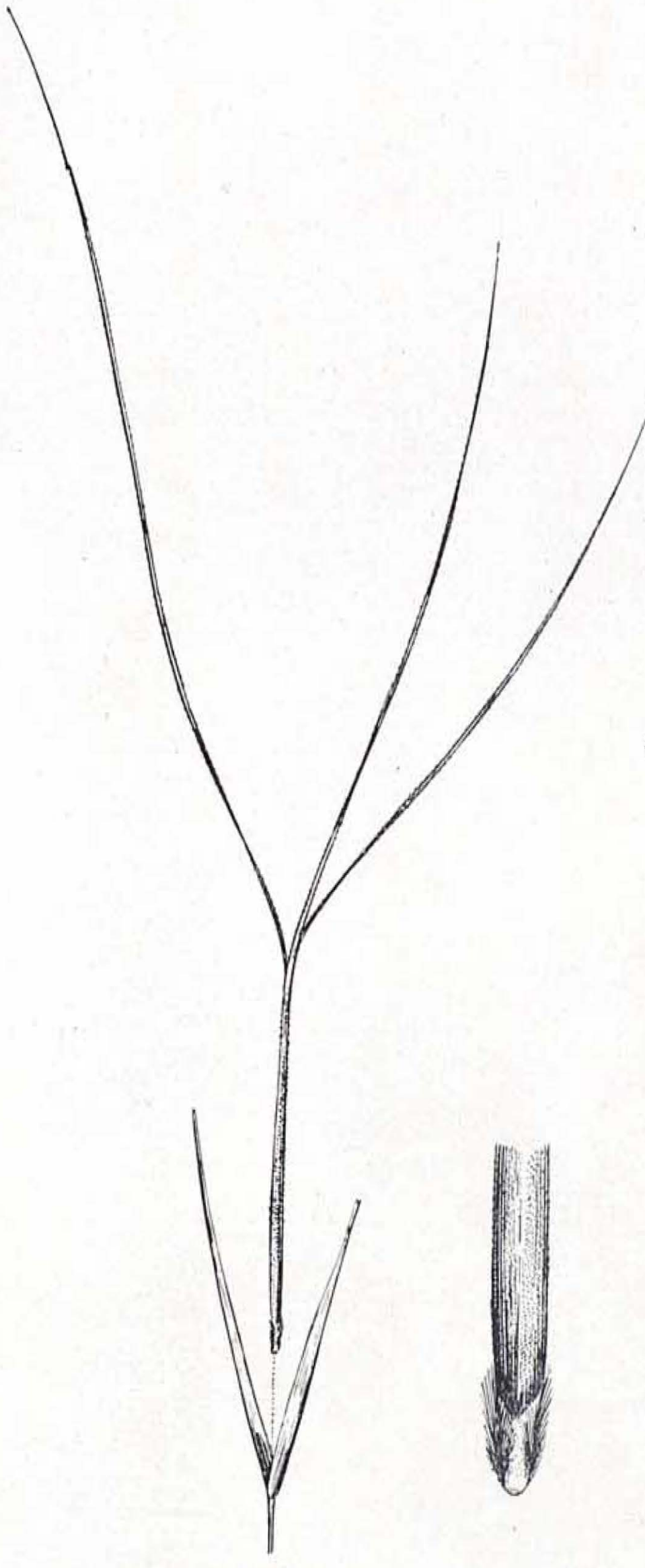
×2 ×6

ARISTIDA SUBULATA Henrard.



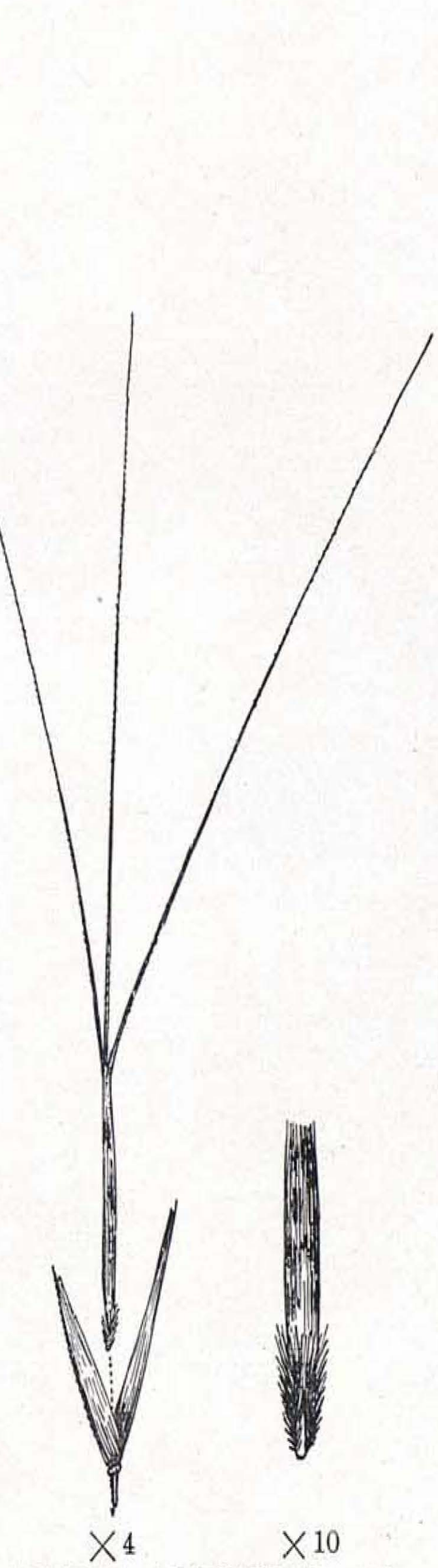
×3 ×10

ARISTIDA PARISHII Hitchcock.



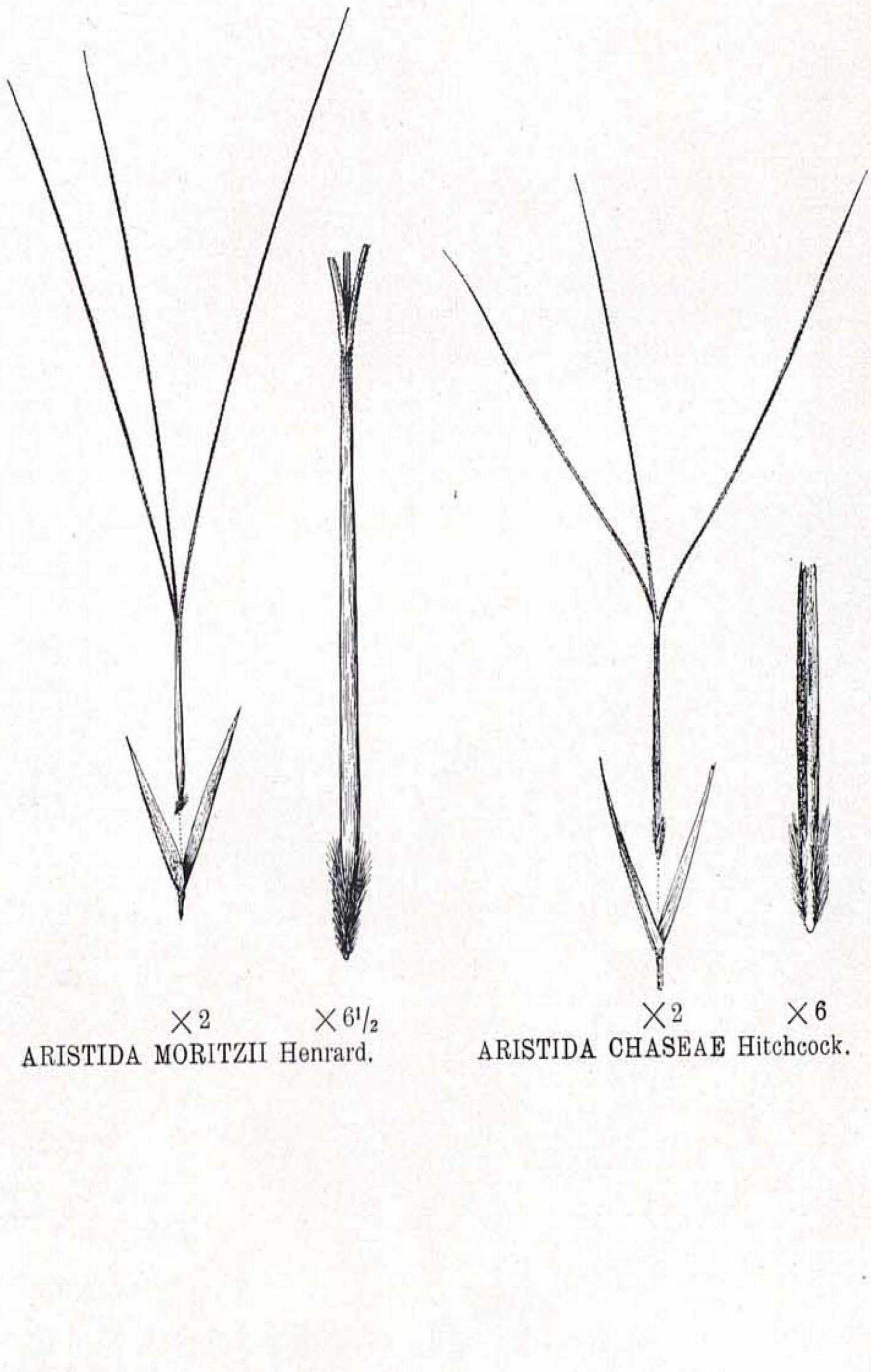
×4 ×14

ARISTIDA COERULESCENS Desfontaines.



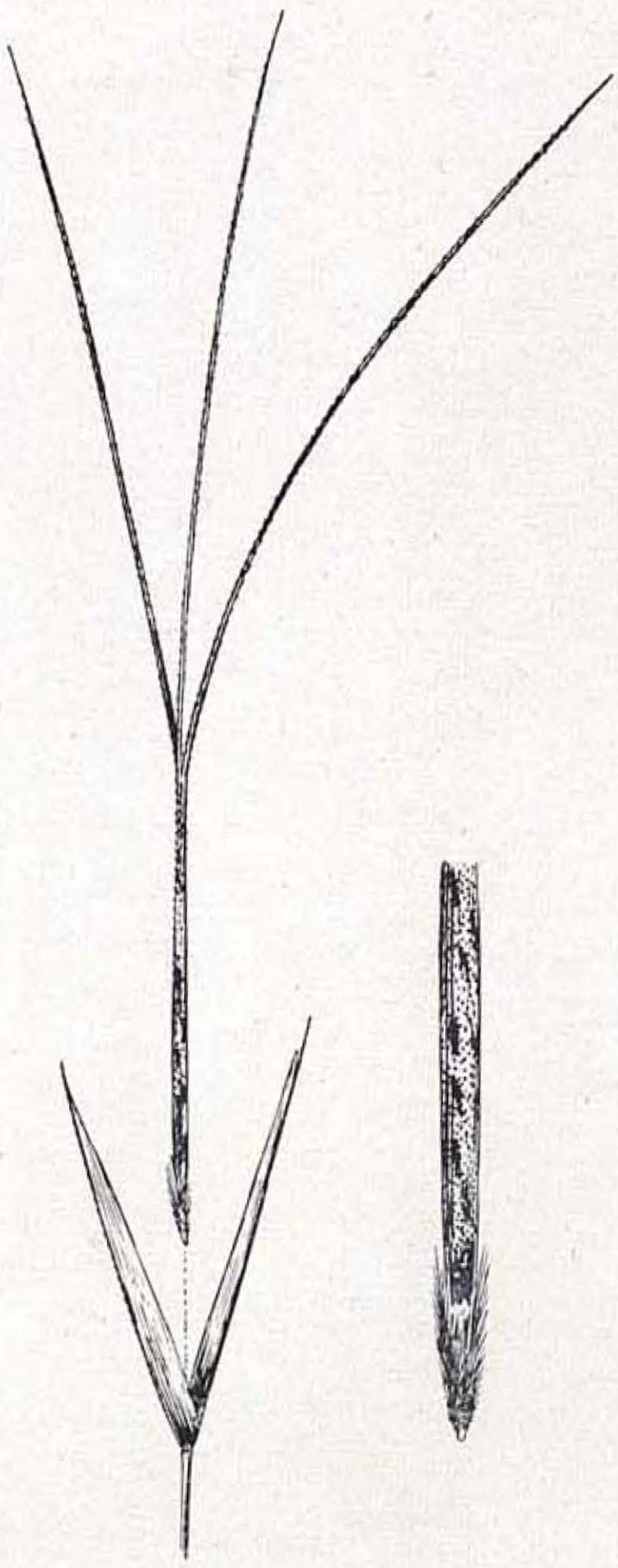
×4 ×10

ARISTIDA PITTIERI Henrard.



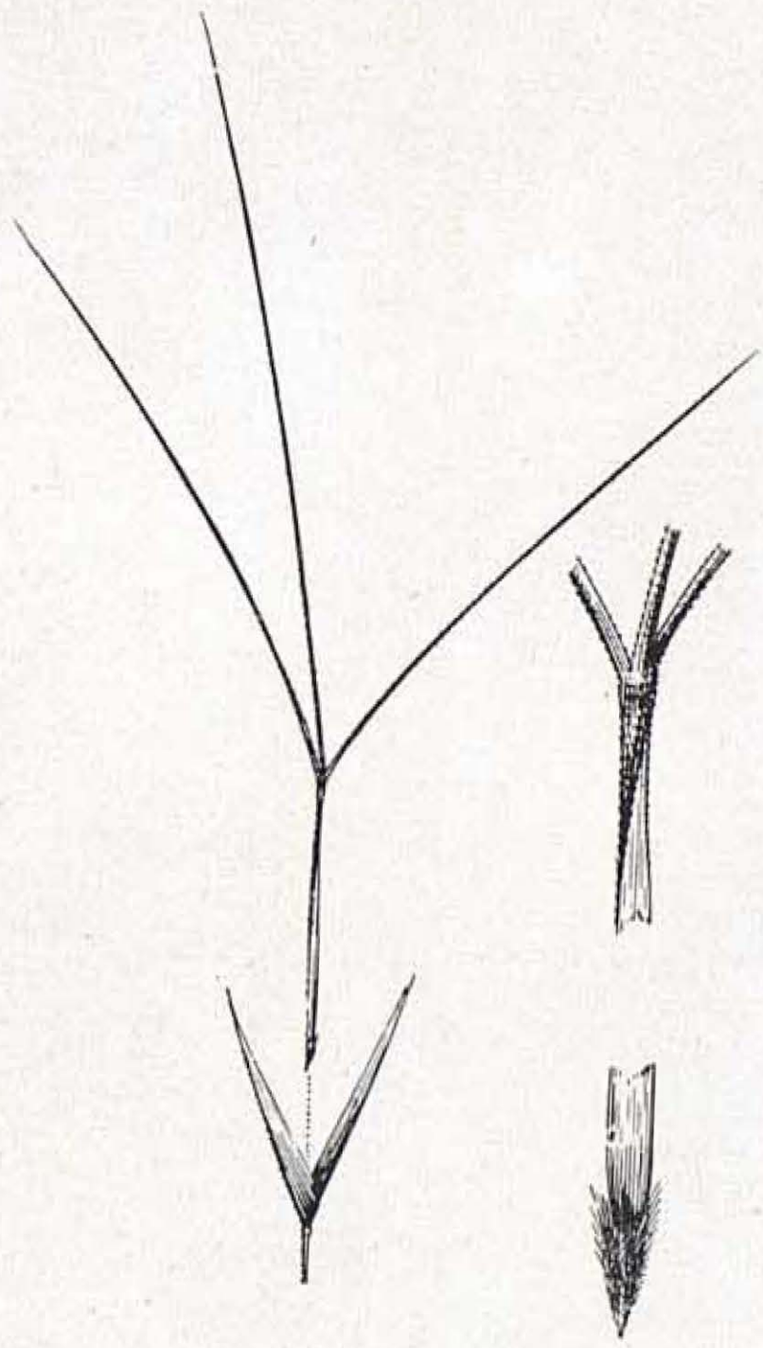
×2 ×6½
ARISTIDA MORITZII Henrard.

×2 ×6
ARISTIDA CHASEAE Hitchcock.



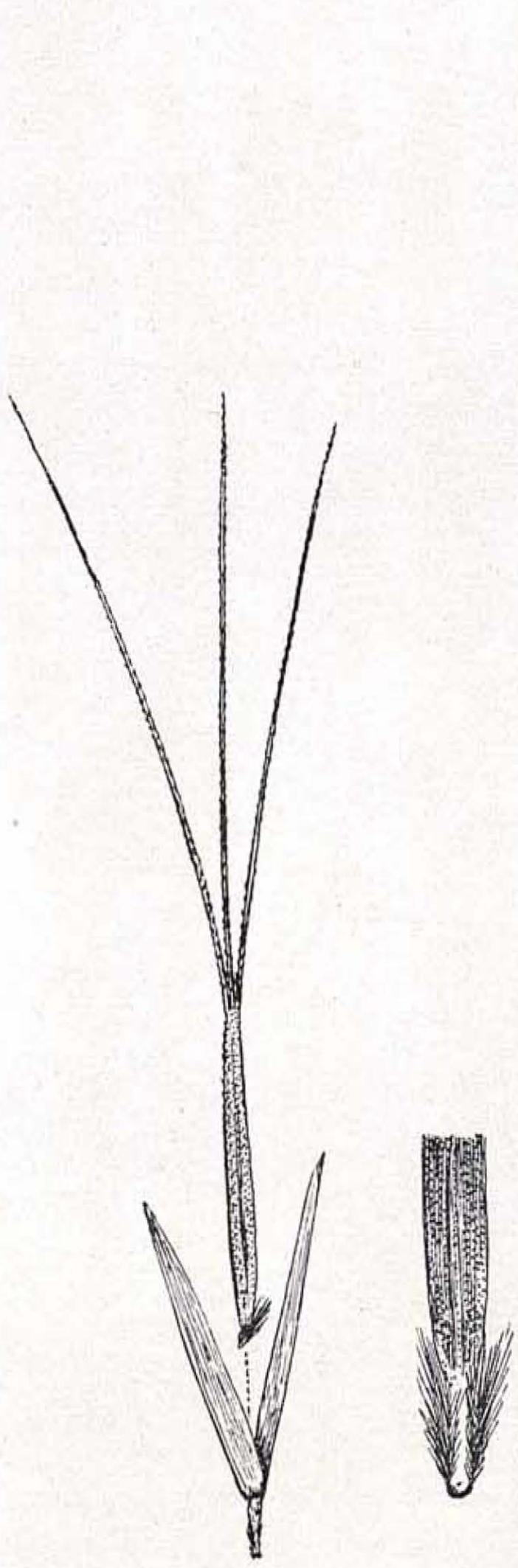
×4 ×10

ARISTIDA COGNATA Trinius et Ruprecht.



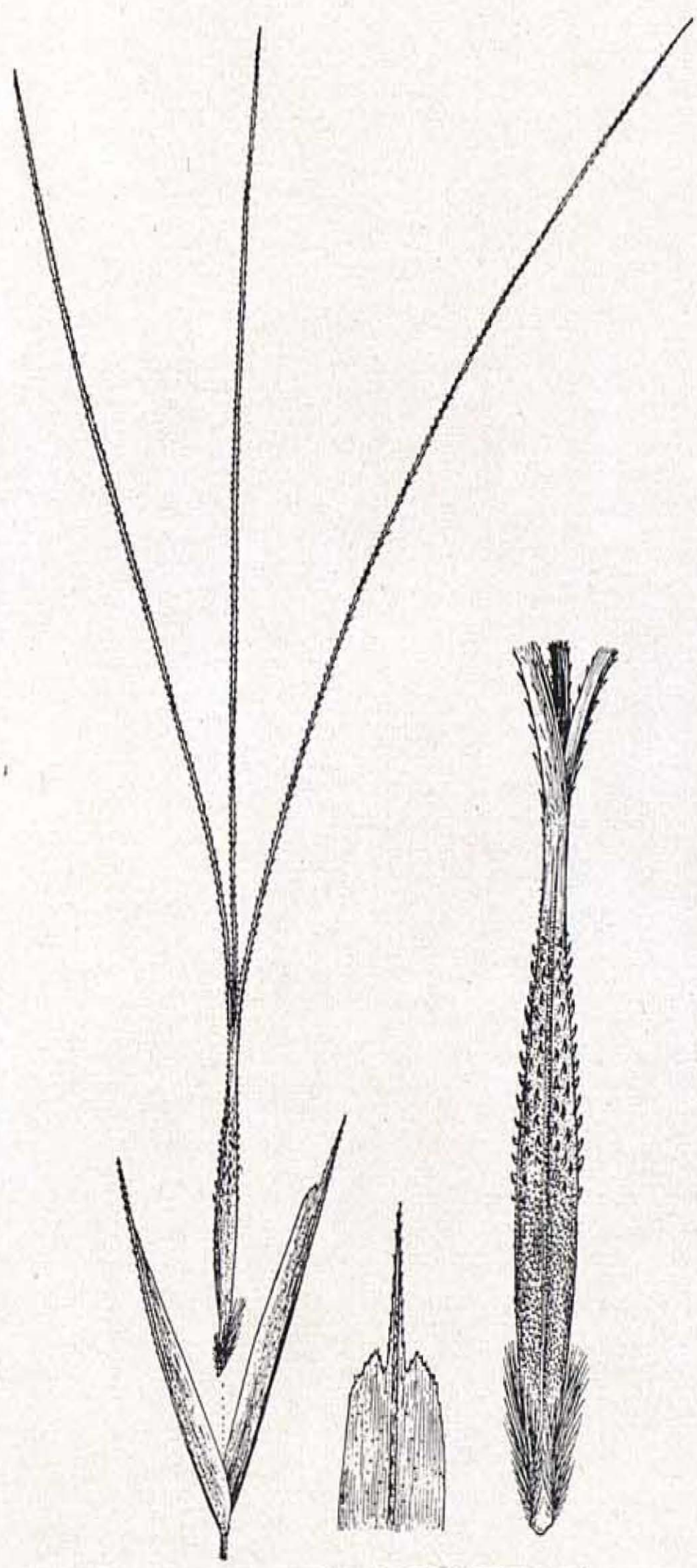
×2 ×8

ARISTIDA SWARTZIANA Steudel.



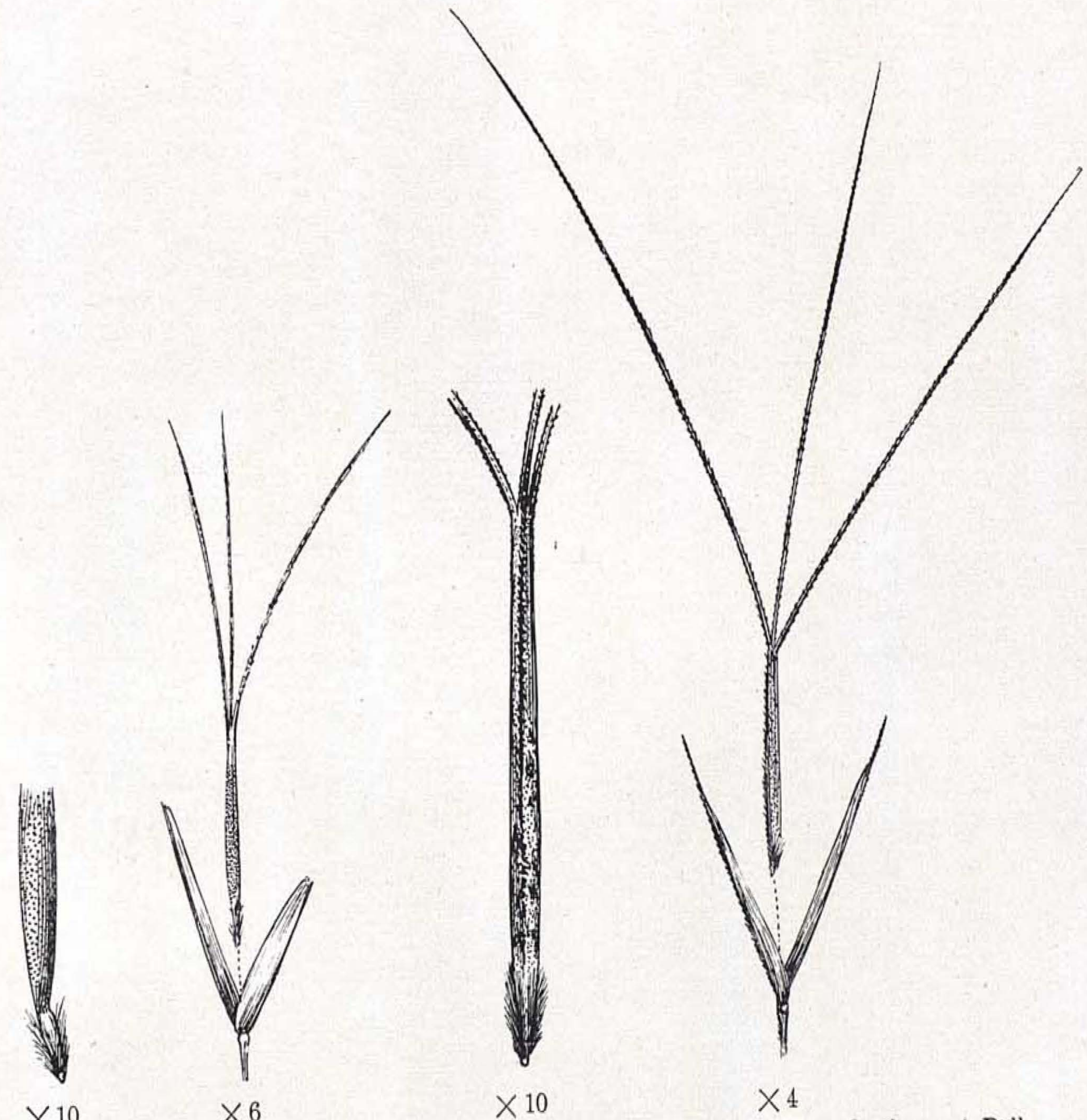
×4 ×10

ARISTIDA CAPILLIFOLIA Henrard.



×3 1/3 ×6 2/3

ARISTIDA MURICATA Henrard.

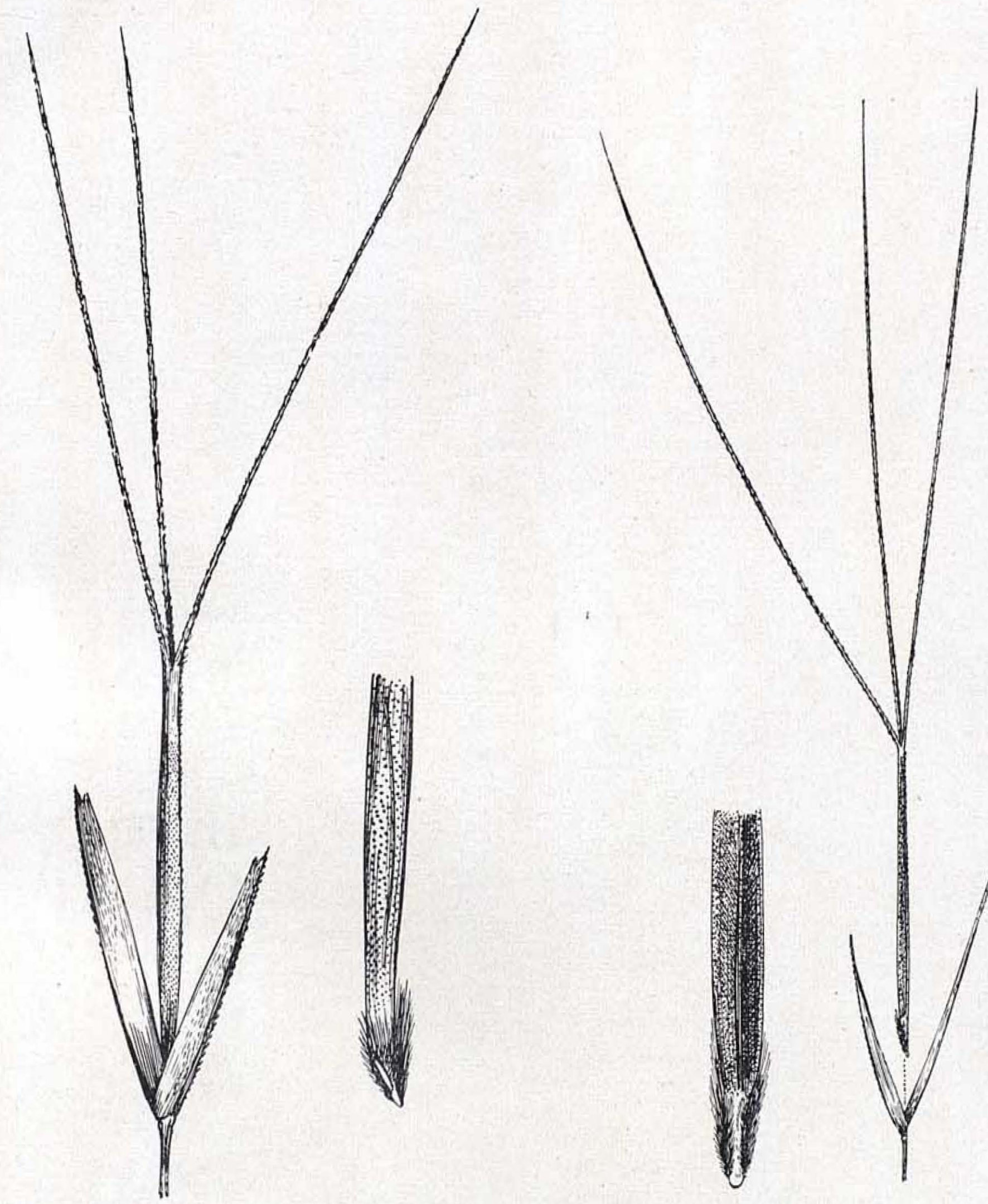


×10 ×6

ARISTIDA MAURITIANA Kunth.

×10 ×4

ARISTIDA INTERMEDIA Scribner et Ball.

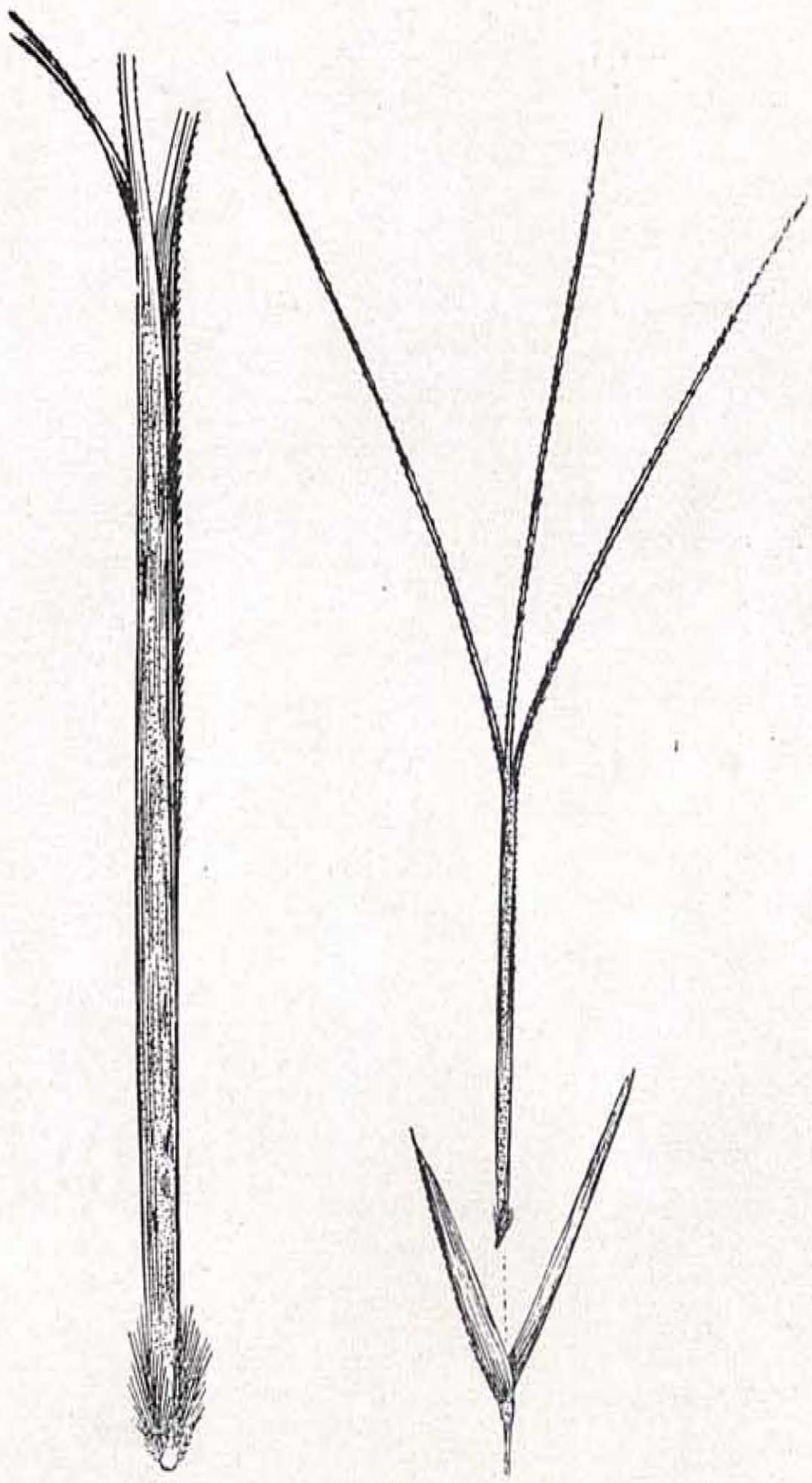


× 5 × 9

ARISTIDA CURVATA (Nees) Trin. et Rupr.

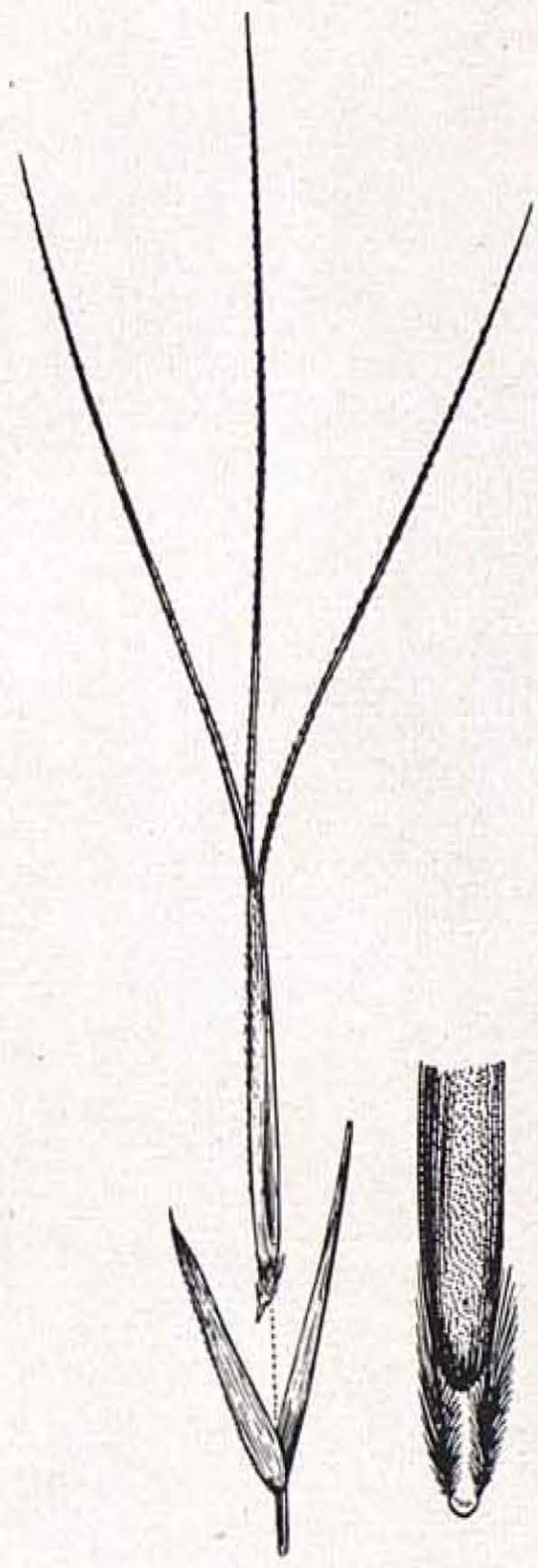
× 13 × 4

ARISTIDA DEPRESSA Retzius.



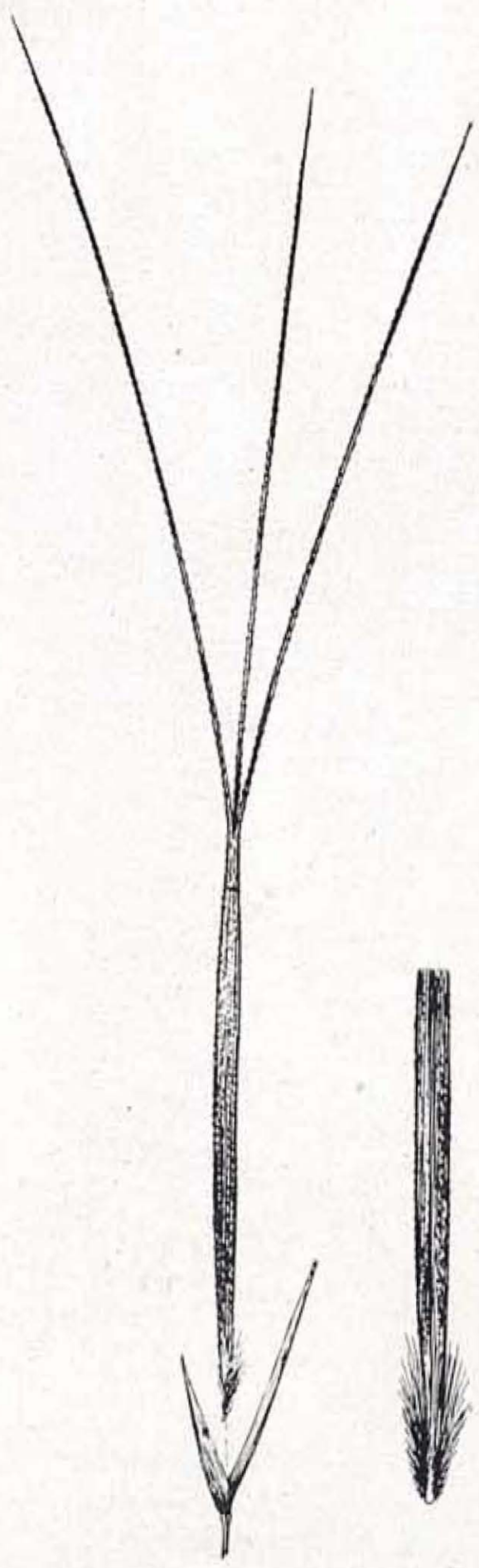
×10 ×4

ARISTIDA SUBMUCRONATA Schumacher.



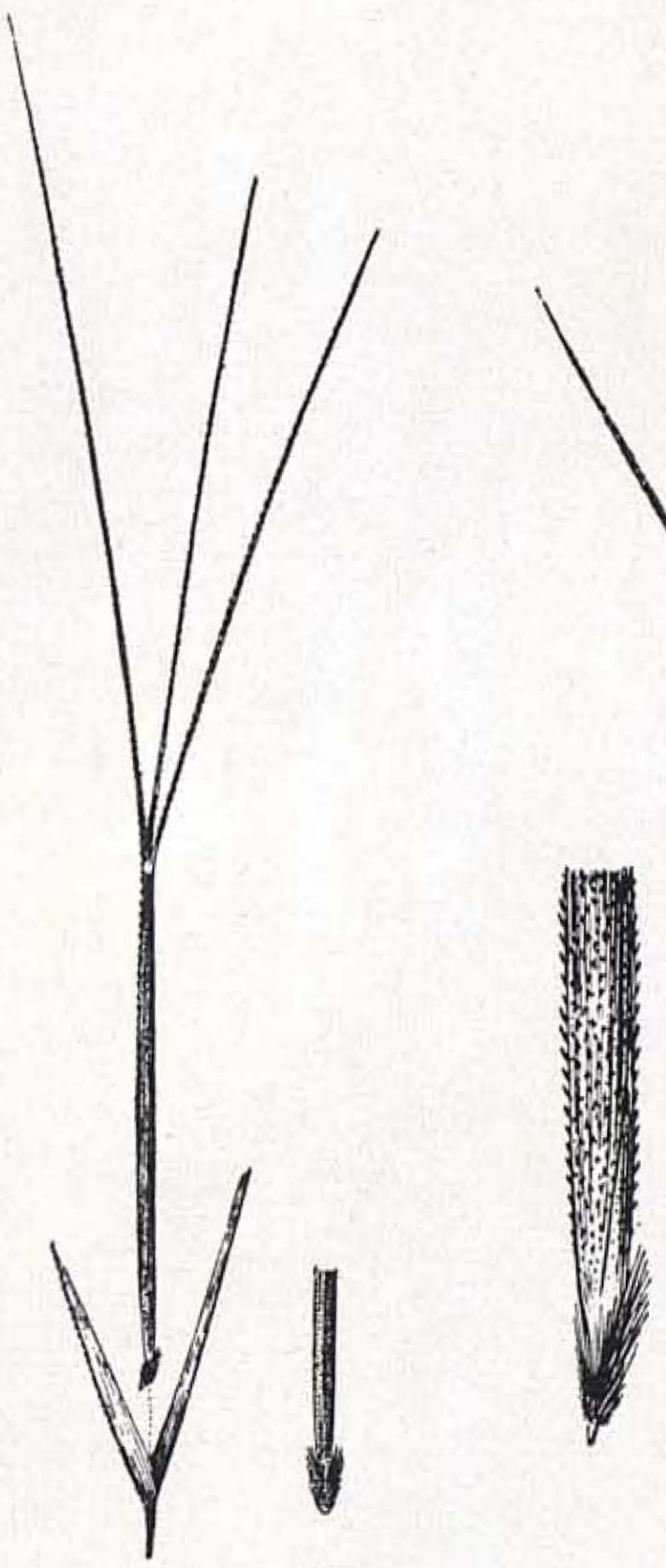
×4 ×13

ARISTIDA ADSCENSIONIS L.



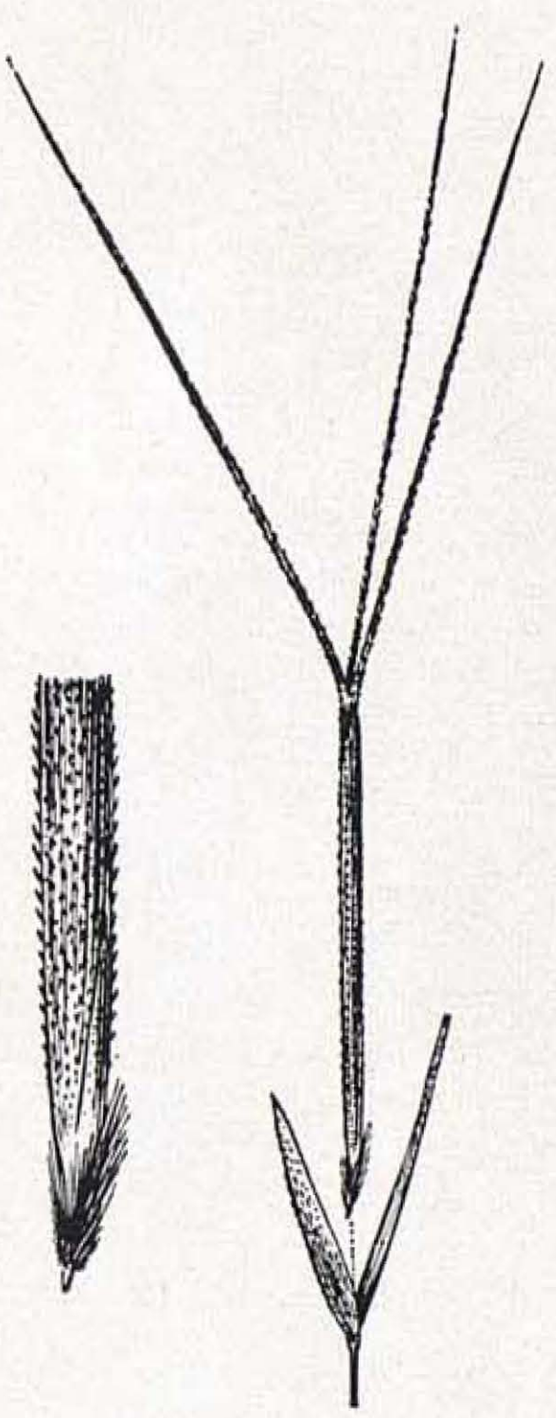
× 2²/₃ × 4

ARISTIDA ADSCENSIONIS L.
var. PUMILA Coss. et Dur.



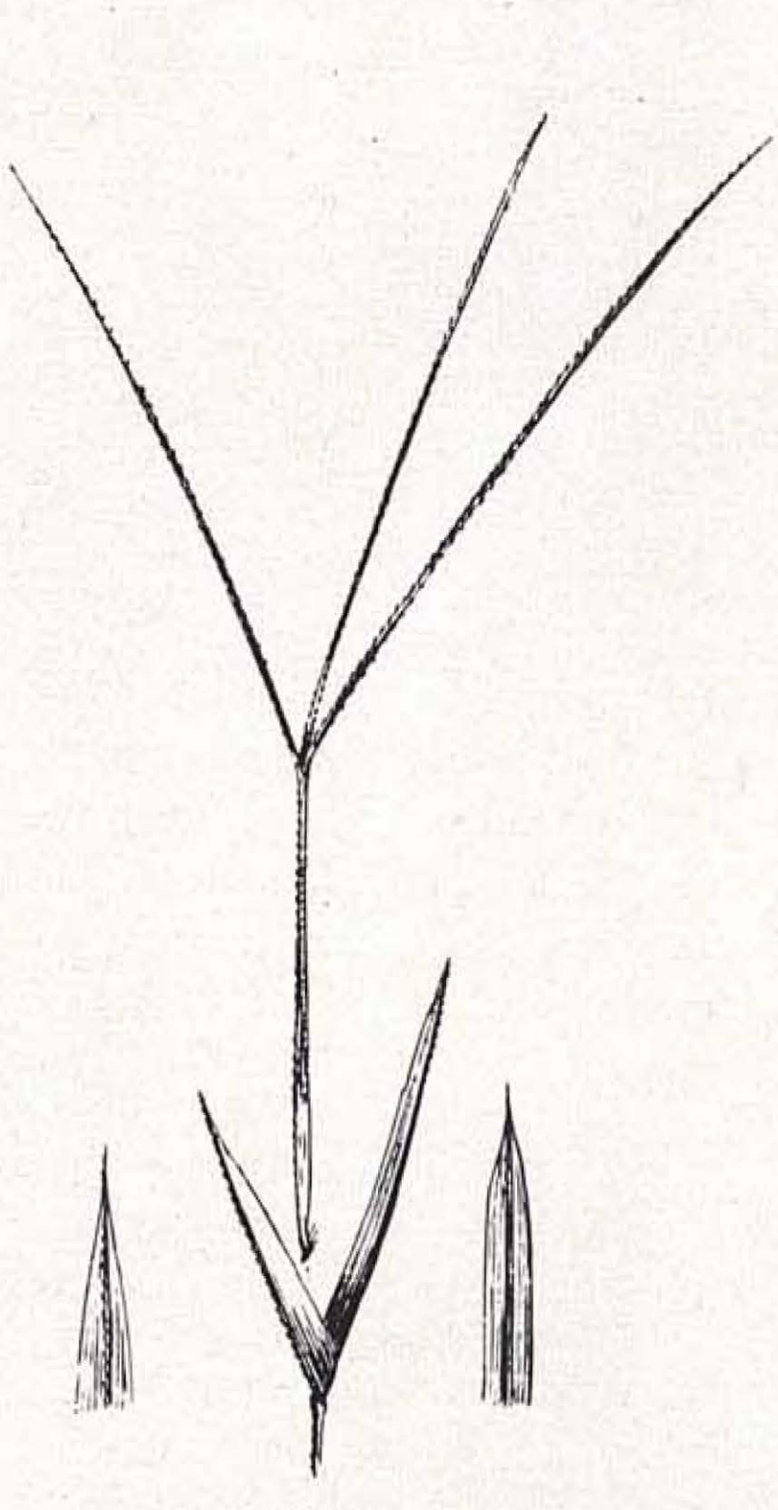
× 2²/₃ × 4

ARISTIDA ADSCENSIONIS L.
var. FESTUCOIDES Henr.



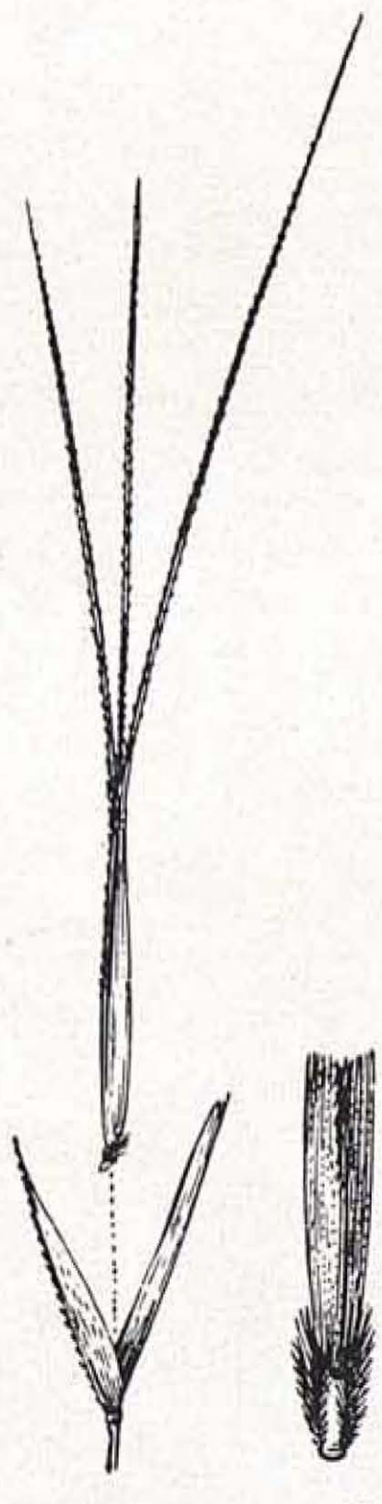
× 7 × 2¹/₃

ARISTIDA ADSCENSIONIS L.
var. EHRENBERGII Henr.



×3

ARISTIDA ADSCENSIONIS L.
subsp. BROMOIDES (H. B. K.) Henr.



×4 ×12

ARISTIDA ADSCENSIONIS L.
subsp. GUINEËNSIS Henr.