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Vasey, C  
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U. S. DEPARTMENT OF AGRICULTURE.  
 DIVISION OF BOTANY.  
 BULLETIN No. 12.

GRASSES OF THE SOUTHWEST.

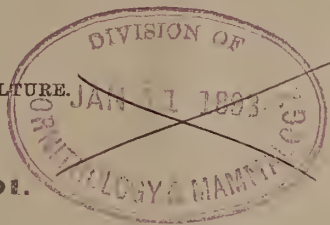
PLATES AND DESCRIPTIONS

OF THE

GRASSES OF THE DESERT REGION OF WESTERN TEXAS, NEW MEXICO,  
 ARIZONA, AND SOUTHERN CALIFORNIA.

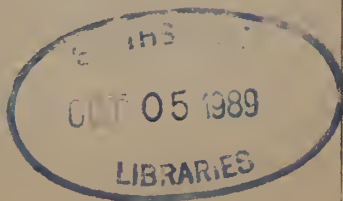
Part II.

By DR. GEO. VASEY,  
 BOTANIST, DEPARTMENT OF AGRICULTURE.



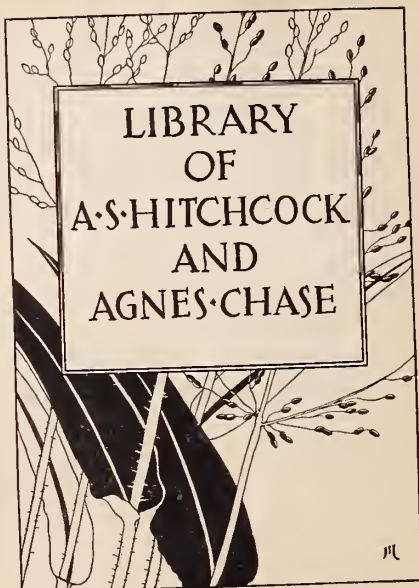
ISSUED DECEMBER, 1891.

PUBLISHED BY AUTHORITY OF THE SECRETARY OF AGRICULTURE.



WASHINGTON:  
 GOVERNMENT PRINTING OFFICE.  
 1891.

Compliment of  
J. M. Ward  
Secretary of Agriculture.



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U. S. DEPARTMENT OF AGRICULTURE.  
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BULLETIN N<sup>o</sup>. 12.

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NOTE.

This bulletin constitutes the second half of the first volume of a work entitled Illustrations of North American Grasses. It is designed to continue the work by a second volume to be entitled Grasses of the Pacific Coast.

LETTER OF TRANSMITTAL

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WASHINGTON, *August 3, 1891.*

SIR: I have the honor of herewith presenting for publication the manuscript of the second part of the Bulletin on the "Grasses of the Southwest."

GEORGE VASEY,  
*Botanist.*

Hon. J. M. RUSK,  
*Secretary of Agriculture.*



## INTRODUCTION.

---

This second part of the Grasses of the Southwest presents, like the first part, plates and descriptions of 50 species of grasses, together making 100.

The synonymy of such as have had several names is briefly given. Most of the species, however, are either new, or so little known that they have received but a single name. The drawings were made by Messrs. Scholl, Olszewski, and Holm, and in the details are generally very accurate. I wish to express my obligations to Mr. L. H. Dewey, Assistant Botanist, for important assistance in describing the species.

GEO. VASEY.

AUGUST 3, 1891.





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GRASSES OF THE SOUTHWEST.

PART II.

No. 1.

ELIONURUS TRIPSACOIDES H. B. K. (*E. ciliaris* H. B. K.)

*Plant* perennial, with short rootstock, smooth throughout or with slight pubescence near the ligule.

*Culms*, loosely tufted, erect, branching, solid, terete, glabrous and shiny, 2 to 4 feet tall.

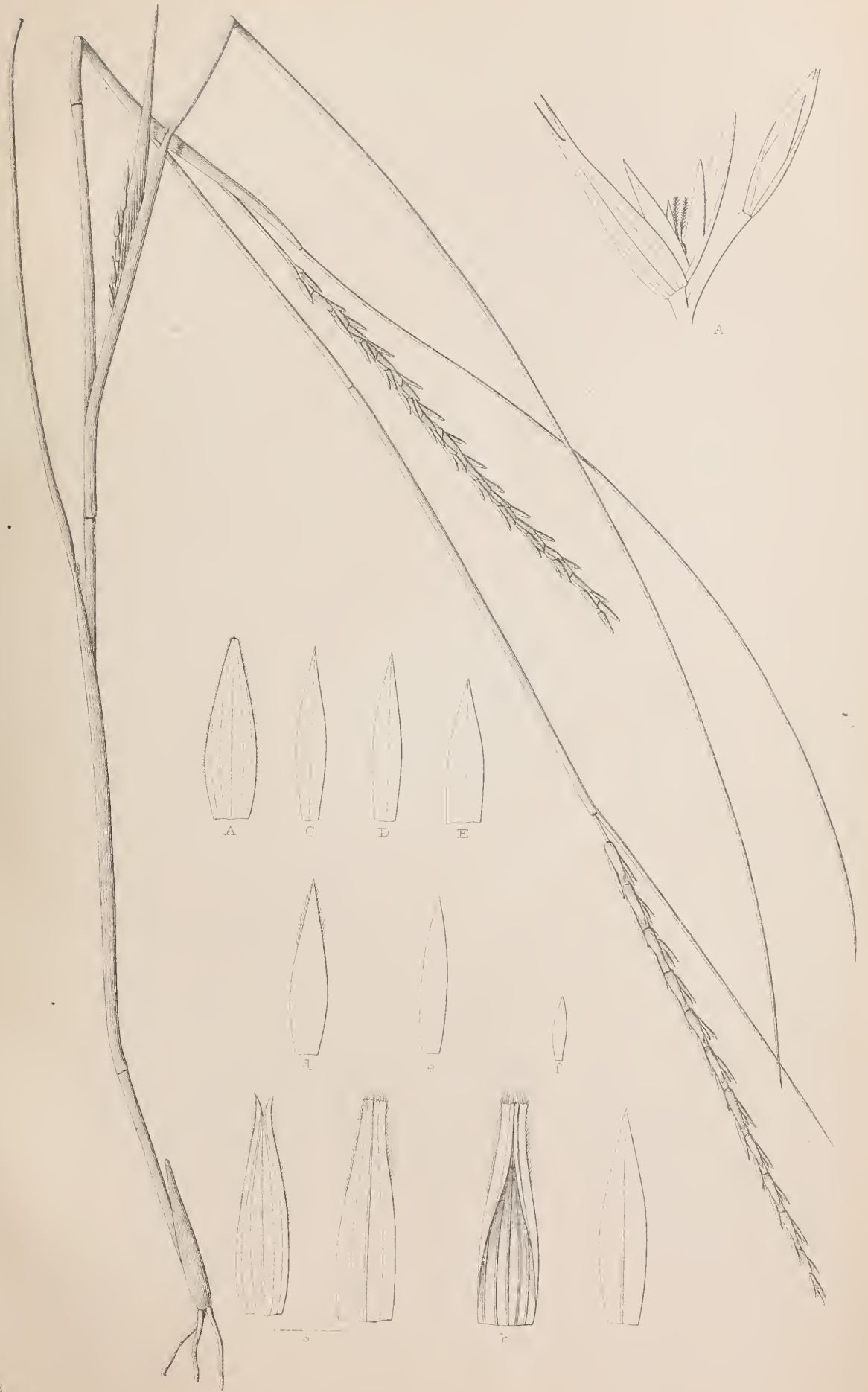
*Leaves*; radical few, the broad loose sheaths tapering into the long involute blades with scarcely a contraction at the ligule; of culm 6 to 12; sheaths rather loose, open above, lower ones exceeding internodes, upper ones shorter; blades involute, slender, 4 to 12 inches long; ligule membranaceous, ciliate, truncate,  $\frac{1}{4}$  line long or less.

*Inflorescence* consisting of a terminal, and several distant, long-peduncled, lateral spikes. Spikes linear, 3 to 4 inches long, cylindrical; two appressed, 1-flowered spikelets at each node of the hairy rachis, one sessile and perfect, and one staminate on a stout hairy pedicel  $1\frac{1}{2}$  lines long.

Sessile *spikelet* narrowly lanceolate; first glume lanceolate; nearly flat, bifid at apex, acute or obtusish, rigid, herbaceous, ciliate on the prominent marginal nerves, 5 to 7 other less prominent nerves; second glume lanceolate, membranaceous, smooth, obscurely 3-nerved,  $2\frac{1}{2}$  to 3 lines long; third and fourth glumes lanceolate, acute, scarious, thin, smooth, the third ciliate, obscurely 3-nerved,  $1\frac{1}{2}$  to  $2\frac{1}{4}$  lines long; palet small or wanting; pedicellate spikelet similar, but all parts smaller and the first glume always acute at apex; stamens 3.

PLATE I; A, two spikelets, lower one perfect, upper one staminate, *a* to *f*, parts of perfect flower; *a*, first empty glume, extreme forms, dorsal view; and *b*, ventral view; *c*, second empty glume; *d*, third empty glume; *e*, floral glume; *f*, palet. Capital letters A, E indicate corresponding parts of staminate flower.

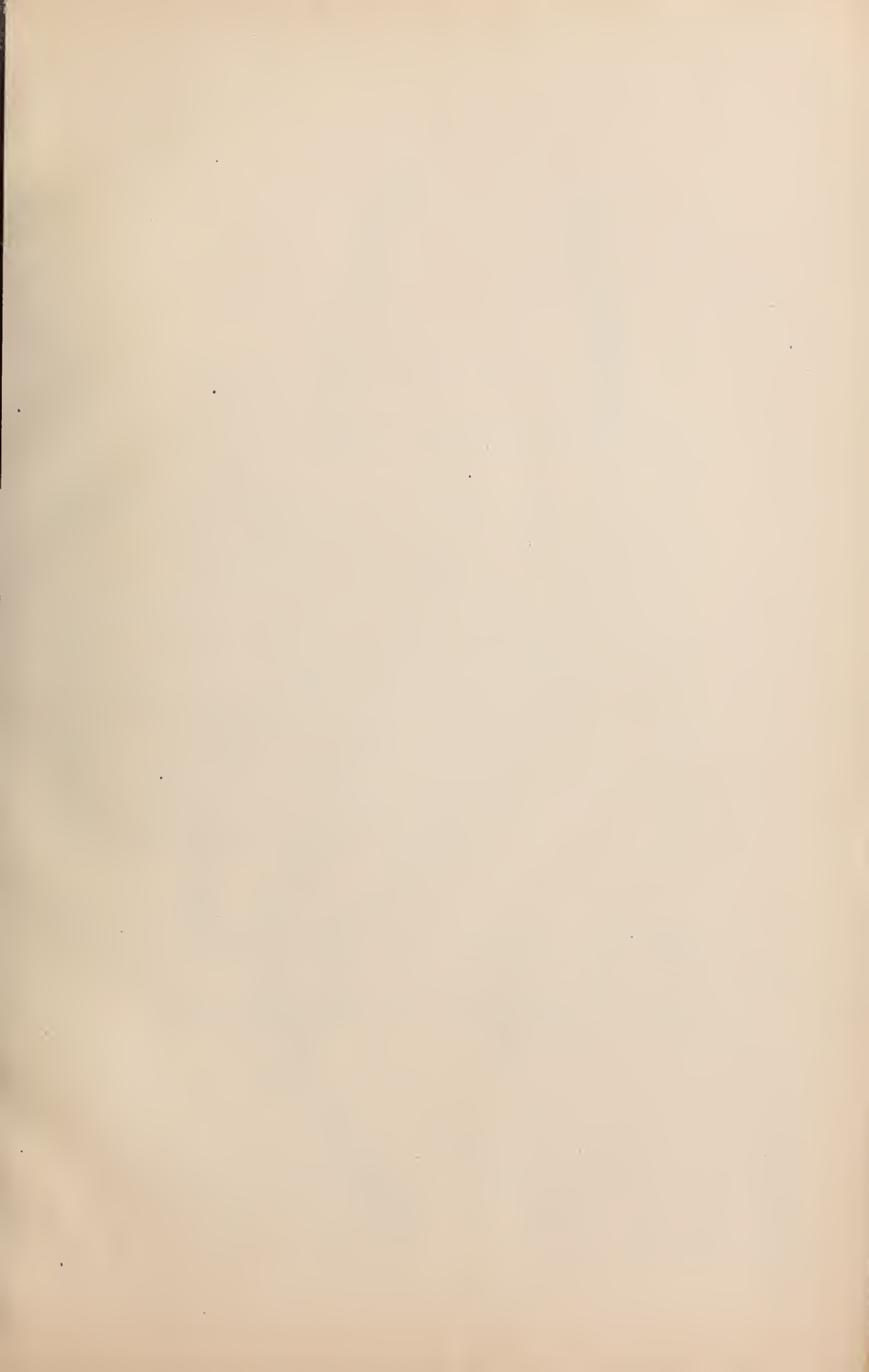
Dr Havard states that this grass constitutes a large portion of the vegetation of the plains of southern Texas. It occurs in Mexico, and also in Florida.



Julius Bien & Co. Lith.

ELIONURUS TRIPSACOIDES HBK.





**HILARIA RIGIDA** (Thurb.) Scrib. (*Pleuraphis rigida*, Thurb.)

*Plant* perennial, rigid, woody throughout, except the young growth, with hard creeping rootstock sending up scaly branches.

*Culms* spreading or ascending, branching freely, solid, 1 to 2 feet tall, woolly below.

*Leaves* of rootstock appressed, scarious scales; of culm often 2-ranked and rather crowded; sheaths longer than internodes, close, woolly; blades involute, pungent, rigid, 1 to 3 inches long; ligule a dense white, woolly collar.

*Inflorescence* a narrow, white or purplish spike, 2 to 3 inches long, formed of obovate clusters of 3 sessile spikelets at each node of the rachis.

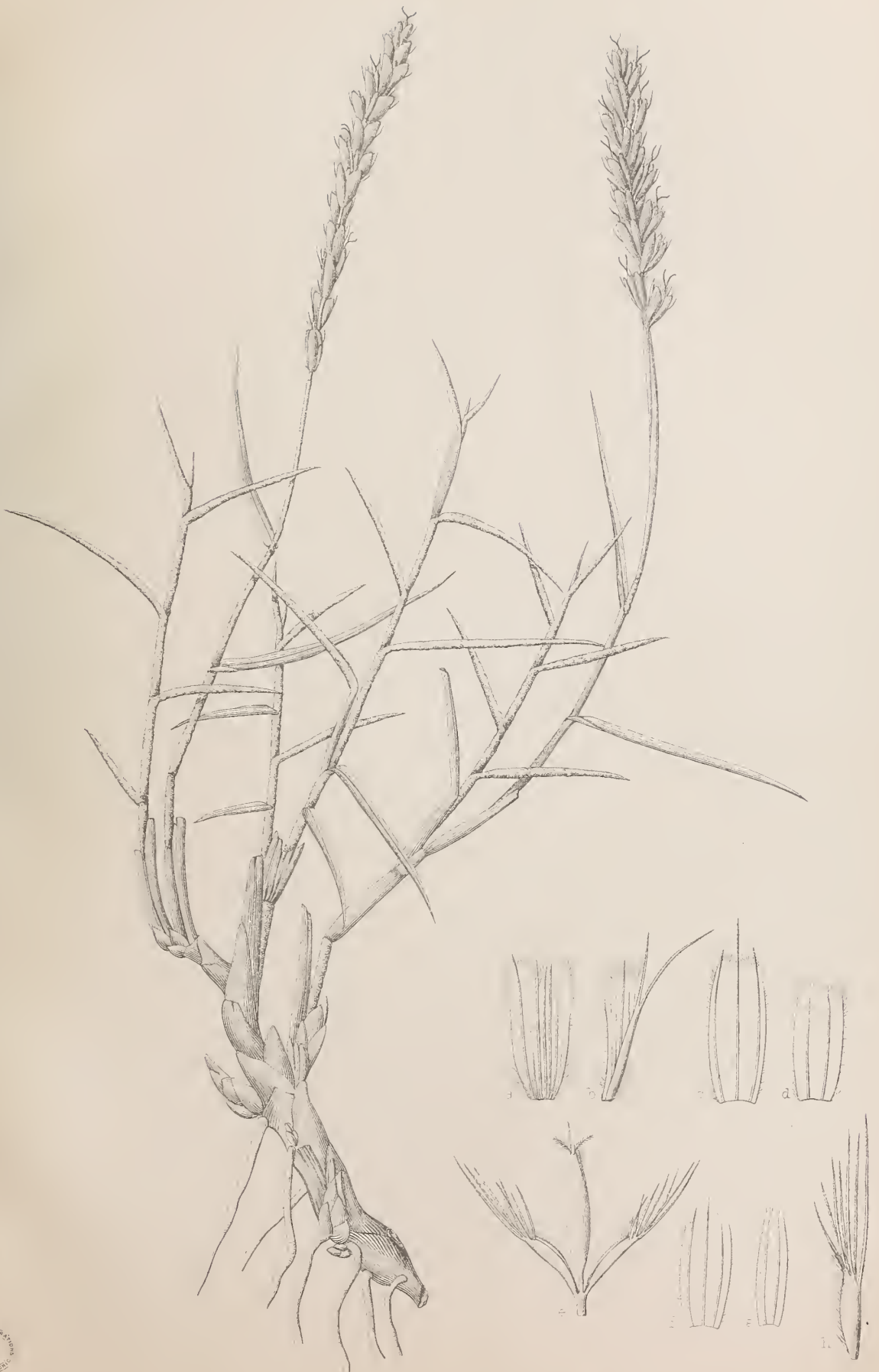
*Spikelets*; lateral ones in the cluster staminate and 2- to 3-flowered, middle one perfect and 1-flowered; empty glumes all about 3 lines long, forming an involucre about the cluster; first glume of staminate spikelet oblong, wider above, oblique, conspicuously ciliate, 5-nerved, 1 or 2 of the nerves on one side extended in short dorsal awns, second glume obovate, 2-lobed and ciliate above, 5-to 6-nerved, with 1 or 2 dorsal awns; floral glumes oblong or wedge-shaped, nearly equally 2-lobed at apex or merely obtuse, ciliate, 3-nerved, midnerve slightly excurrent, and one lateral nerve rather obscure, 2 to 2½ lines long; palet oblong, truncate, slightly scabrous on the two nerves above, 2 lines long; empty glumes of perfect flower equal, at the back of the cluster, narrow, cuneate, oblique above, 4 to 6 awned, ciliate, 2 to 3 lines long including awns; floral glume oblong, equally 2-lobed, ciliate, 2 to 3 lines long, 3-nerved, lateral nerves equal and slightly excurrent, midnerve excurrent in an awn ½ to 1 line long; palet lance-oblong, obtuse, ciliate or lacerate at apex, 2-nerved, 2 to 3 lines long; stignias 2, long, plumose.

*Grains*; no mature grains found.

PLATE II; *a* to *d*, parts of staminate flower: *a*, first empty glume; *b*, second empty glume; *c*, floral glume; *d*, palet; *e*, perfect flower with its two empty glumes; *f* to *h*, parts of perfect flower; *f*, floral glume; *g*, palet; *h*, empty glume.

New Mexico and Arizona; almost the only grass on the driest desert land; commonly called Gayetta grass. It is considered a valuable grass.

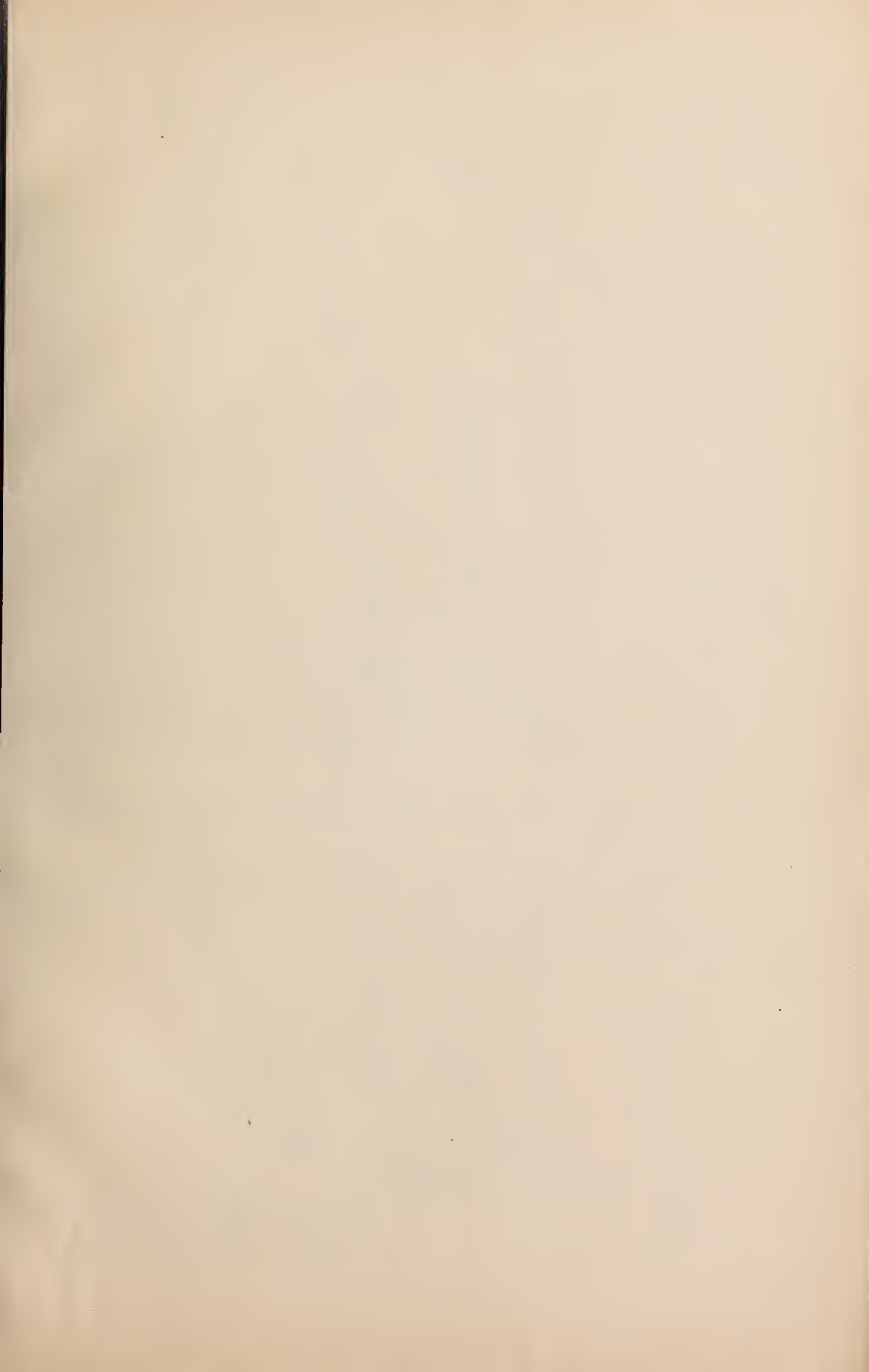




HILARIA RIGIDA







No. 3.

PASPALUM DISTICHUM Linn.

*Plant* perennial, the long creeping rootstocks rooting at the nodes and forming a rather close sod, nearly glabrous or sometimes pubescent, somewhat glaucous.

*Culms* one or two in a place ascending from the nodes of the rootstocks, branching, solid, angular below, 1 to 2 feet tall.

*Leaves* variable; of rootstocks mostly broad, loose, membranaceous scales; of culms 5 to 7; sheaths rather loose, closed, rarely compressed and open, striate; blades flat or slightly involute, 2 to 2½ lines wide, 2 to 6 inches long; ligule an inconspicuous tawny, lacerate fringe, decurrent.

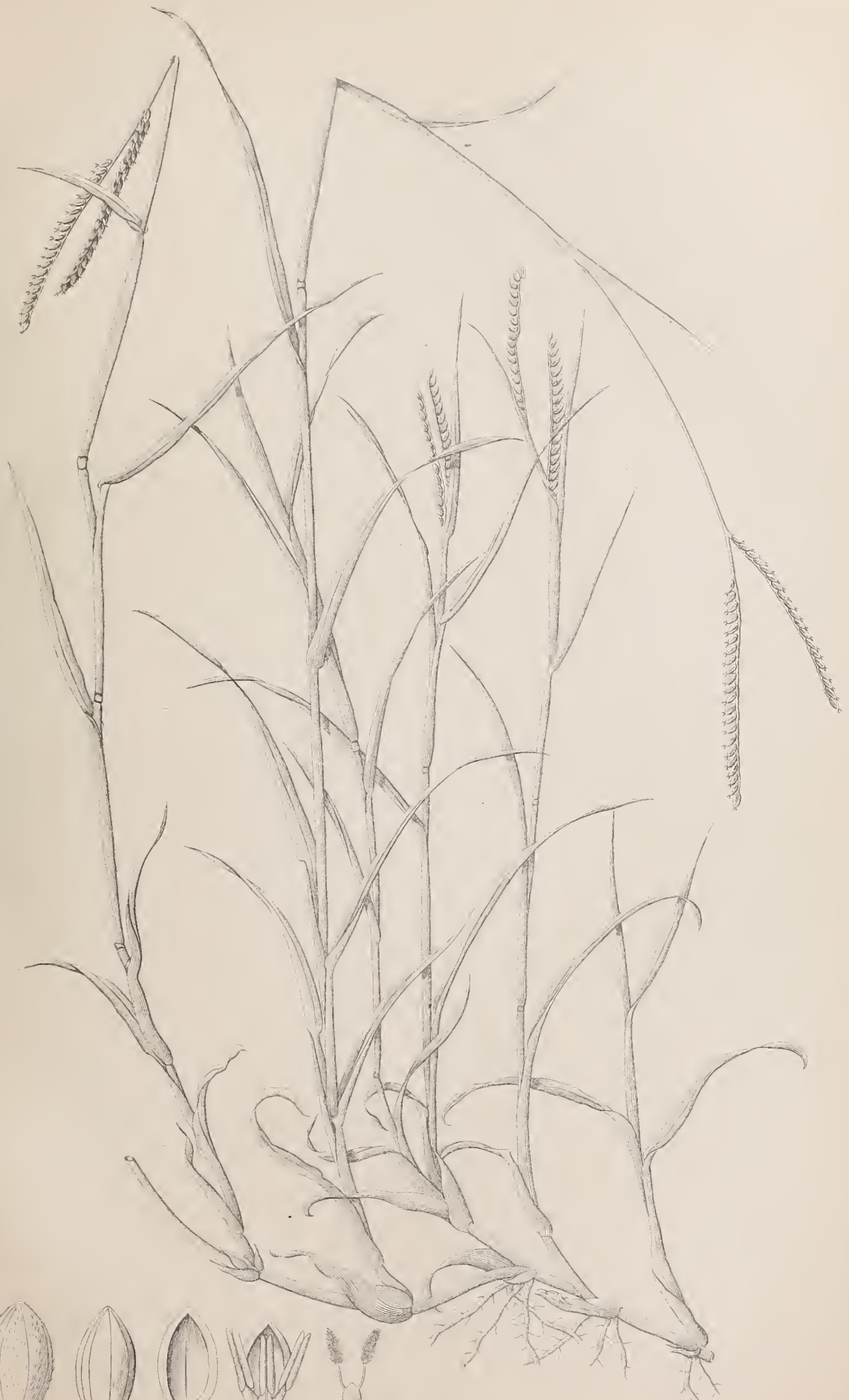
*Inflorescence* of 2 rarely 3, narrow, erect, approximate spikes, 1 to 2½ inches long, the lower one raised on a short internode of the axis; rachis flat, bearing the two crowded rows of sessile spikelets in alternate ranks.

*Spikelets* broadly oblong-lanceolate, flattened, 1-flowered, 1 to 1¼ lines long; first and second glumes equal, broadly lanceolate, 3-nerved or unsymmetrically 4-nerved; first acute, 1 line long, smooth; second with short, loose pubescence; floral glume broadly lanceolate, smooth, indurated, 3-nerved, 1 line long; palet indurated, ovoid, inclosing grain, acute, obscurely 1-nerved, 1 line long and quite as broad.

*Grain* elliptical-lanceolate, flattened, nearly black at maturity, minutely roughened, 1 line long; falling with the enveloping palet and glume. Stigmas 2, purple, prominent.

PLATE III; *a*, first empty glume, dorsal view; *b*, second empty glume; *c*, flowering glume, inside view; *d*, palet and stamens; *e*, pistil.

Common in the Southern States, Texas, and westward to California. Near the Gulf, and in moist ground it forms valuable pasturage.







No. 4.

PASPALUM LIVIDUM Trin.

*Plant* perennial, coarse, somewhat tufted on a short rootstock.

*Culms* few in a place, erect, or decumbent, geniculate below, solid, terete, 2 to 3 feet tall.

*Leaves*; radical mostly scarious; of culm 6 to 9; sheaths equaling or exceeding internode, loose, often compressed and open, lower ones often pubescent; blades flat, hispid above and below toward the tip, 3 lines wide, 2 to 6 inches long; ligule a tawny, lacerate, membranaceous fringe,  $\frac{1}{4}$  line long, decurrent.

*Inflorescence* a racemose panicle of 4 to 8 approximate spikes, alternate on the flattened axis, 2 to 4 inches long; spikes unilateral, sessile, 1 to  $1\frac{1}{2}$  inches long; rachis flat and smooth,  $\frac{1}{2}$  line wide, usually purplish.

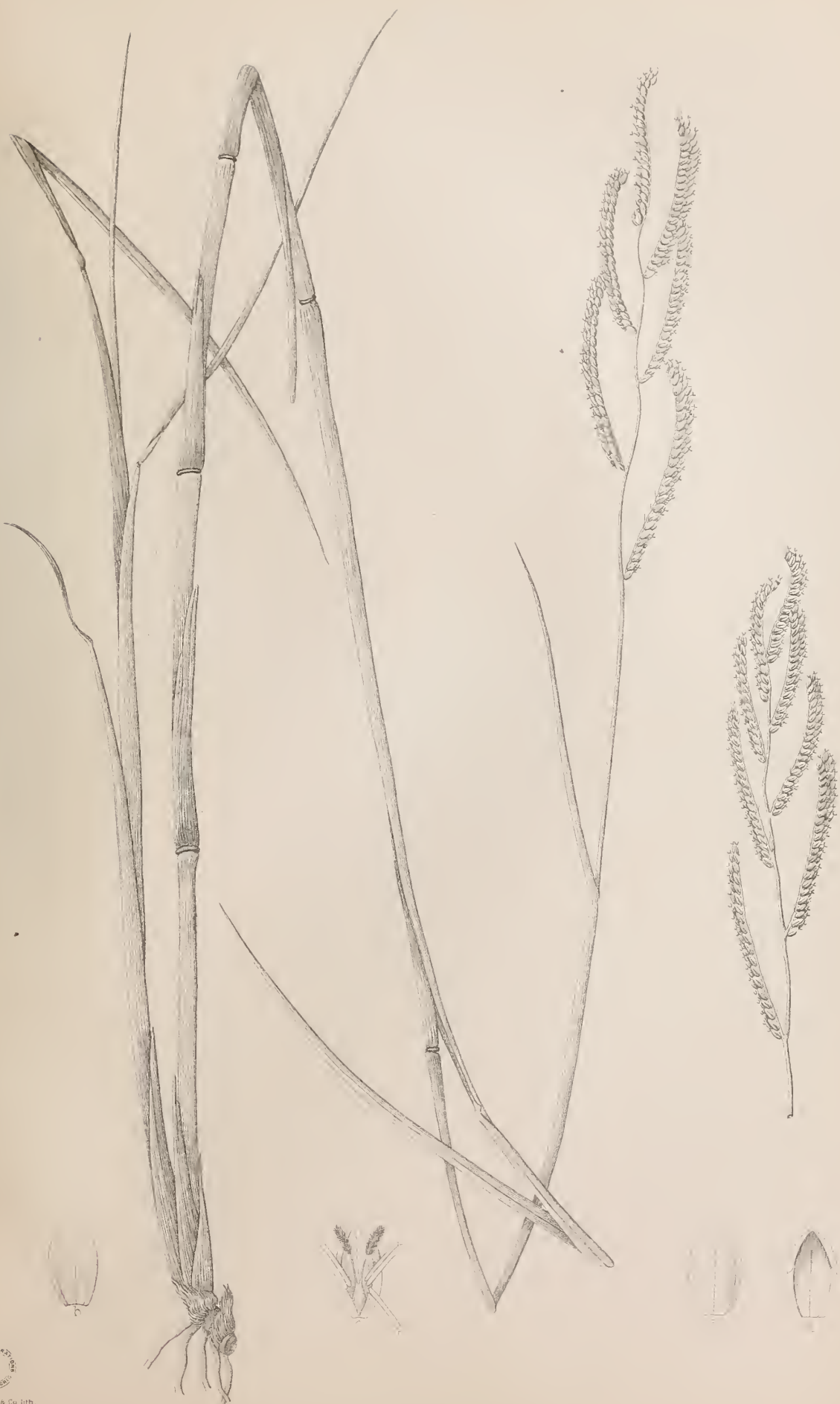
*Spikelets* crowded, usually in 4 rows, sessile or on short pedicels, oblanceolate, flattish, 1-flowered, 1 to  $1\frac{1}{4}$  lines long; first glume broadly ovate, acute, slightly convex, slightly roughened on back, 3-nerved, lateral nerves marginal and joining midnerve at apex, 1 line long; second glume same but flat and slightly smaller; floral glume, indurated, round on back, with inrolled margins, very obscurely 3-nerved,  $\frac{3}{4}$  line long; palea broadly oval, indurated, nearly flat, with irregular, hyaline margins below enfolding the seed, obscurely 2-nerved, nearly 1 line long.

*Grain*; a careful search through 18 specimens produced but one perfect grain and that immature, but old enough to show the form, obovate, rounded, flattened on both sides  $\frac{2}{3}$  line long.

PLATE IV; *a*, first empty glume; *b*, second empty glume; *c*, floral glume, stamens, and pistil; *d*, palea, ventral view, with two membranaceous lobes turned out.

Found in southwestern Texas; common in Mexico.



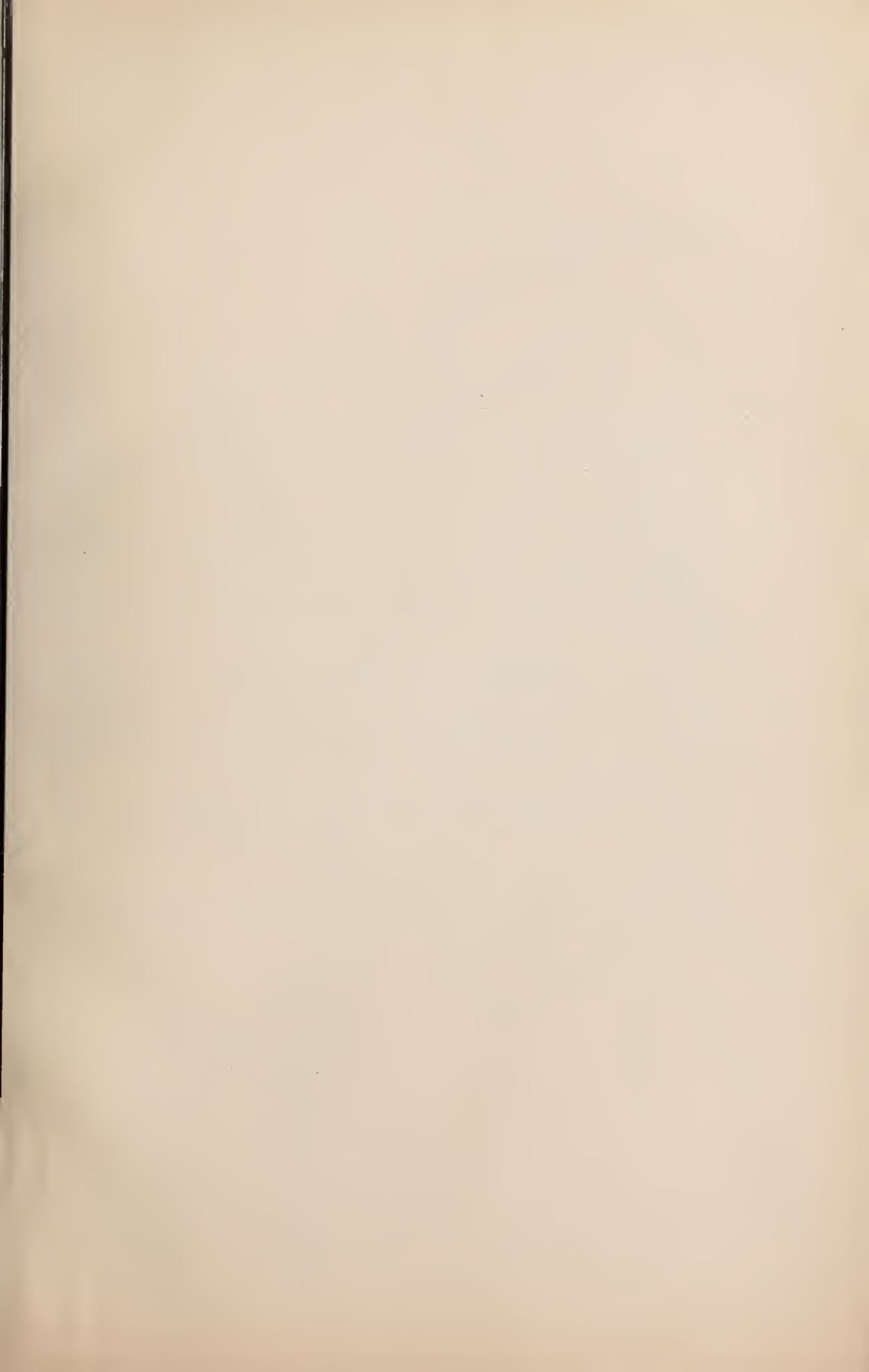


Julius Bien & Co lith.

T. Holm, del.

PASTINACA L. (L. 1844, T. 18)





PASPALUM PUBIFLORUM Rupt.

*Plant* perennial, coarse, rather glaucous.

*Rootstock* creeping, branching, and often rooting at the nodes.

*Culms* few in a place, sometimes loosely tufted, ascending or nearly erect, geniculate below, branching, solid, angular below, nearly terete above, smooth, 18 to 30 inches tall, the lower joints woolly.

*Leaves* of rootstocks rather coarse, loose scales; of culms 3 to 7; sheaths shorter than internodes, loose, smooth, often with a few scattered hairs along the upper margin; blade flat, 8- to 10-nerved, sparsely ciliate, 3 to 5 lines wide, 4 to 8 inches long; ligule membranaceous, ovate, lacerate,  $1\frac{1}{2}$  lines long, decurrent.

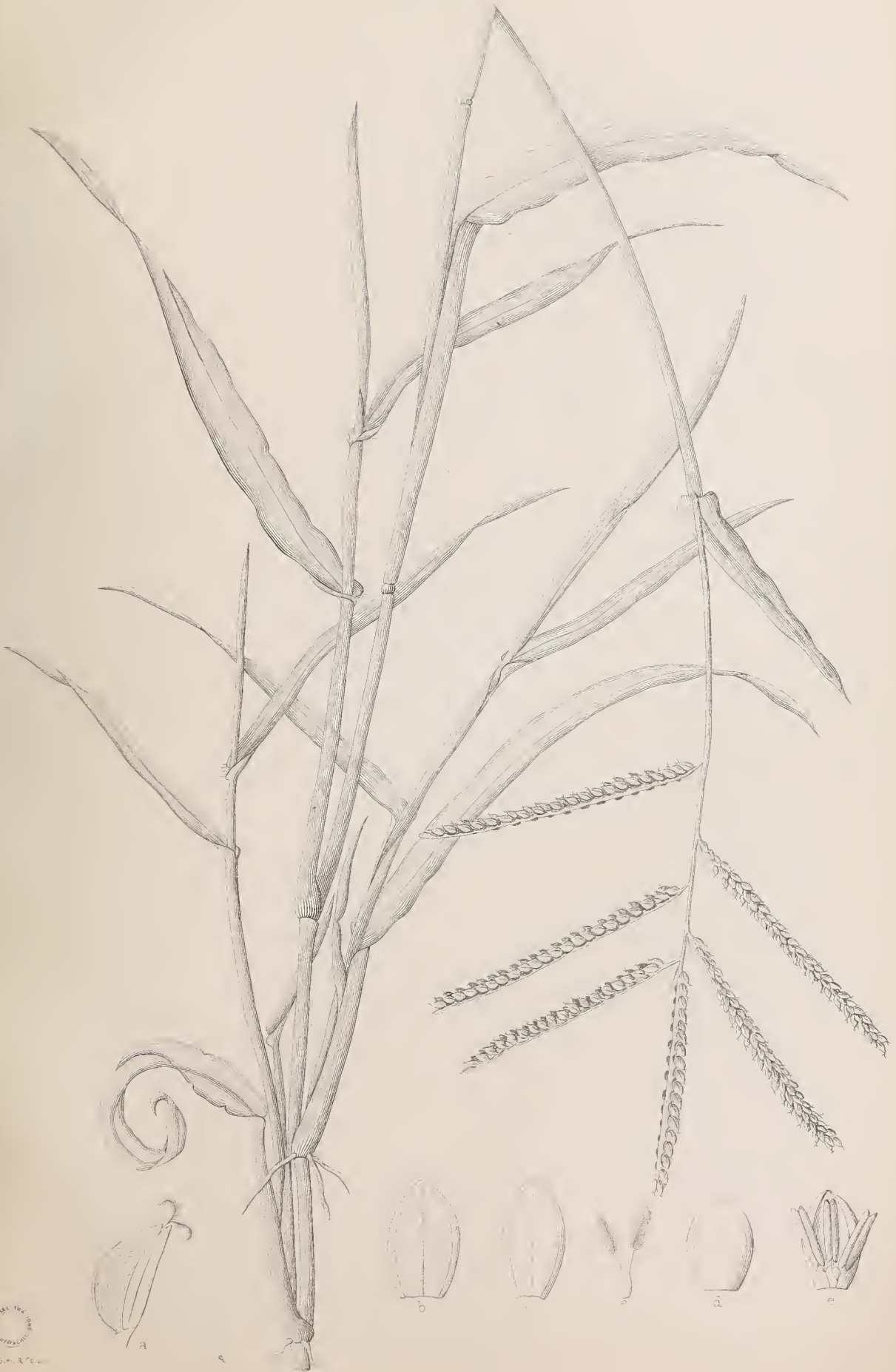
*Inflorescence* 3 to 6 narrow, spreading spikes, alternate along the angular axis, 2 to 3 inches long; rachis flat, bearing 2, often 4, rows of crowded spikelets in alternate rows.

*Spikelets* broadly oblong or ovate, 1-flowered, 1 to  $1\frac{1}{4}$  lines long; first glume broadly oval or hemispherical, with infolded margins, usually softly-pubescent, 3-nerved,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  lines long; second glume broadly oval, flat, with infolded margins, nearly smooth, 3-nerved, of the same length; floral glume indurate, ovate-oblong, convex, with infolded margins, smooth, obscurely 3-nerved, 1 line long; palet indurated, broadly ovate, flat, with infolded margins, smooth, obscurely 2-nerved, 1 line long.

*Grain* oblanceolate, thick, flat on one side, shiny, dark-brown at maturity, not translucent, 1 line long, falling free or with indurated enveloping palet.

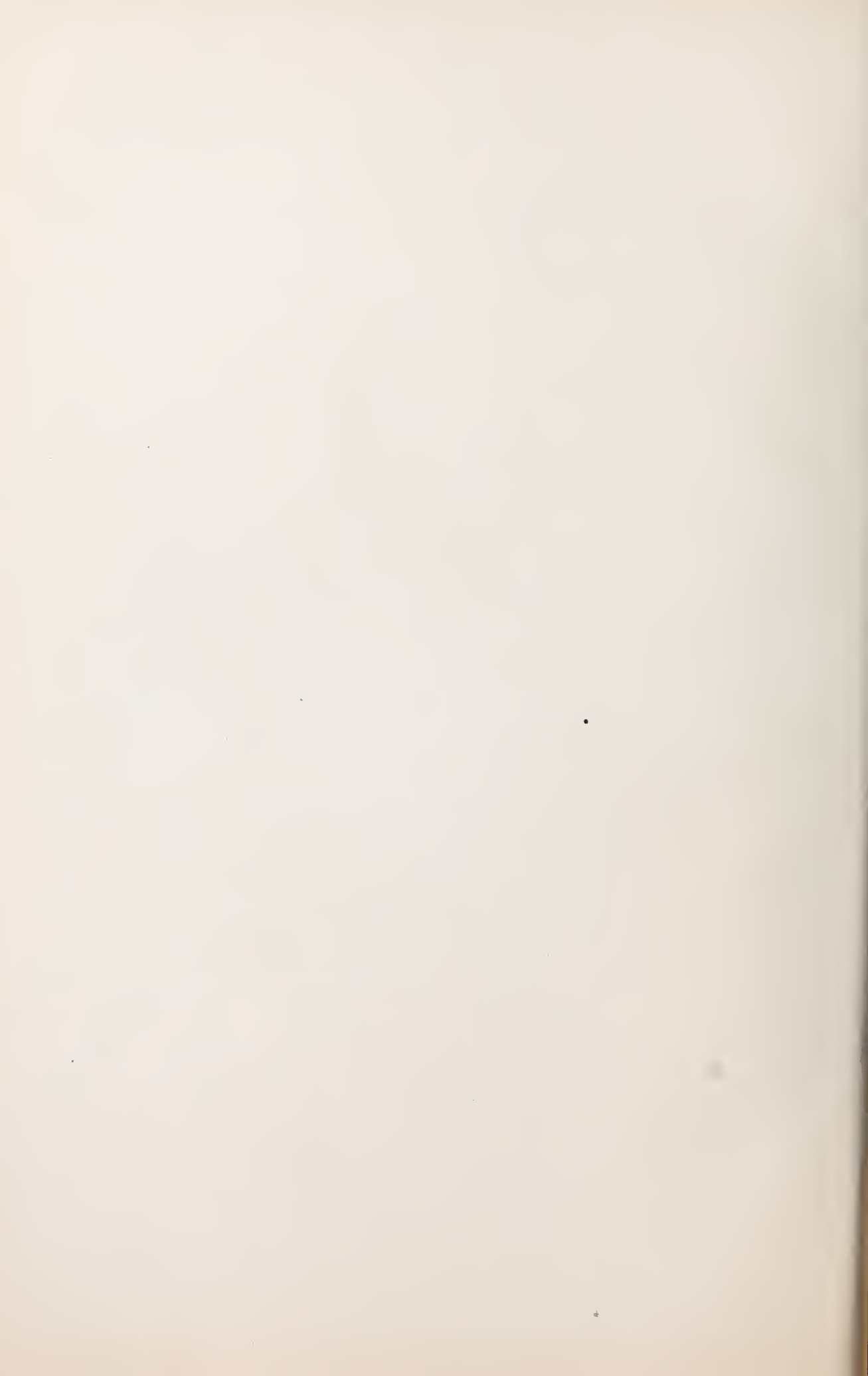
PLATE V; *a*, spikelet, side view; *b*, first empty glume; *c*, second empty glume; *d*, floral glume; *e*, palet and stamens; *f*, pistil.

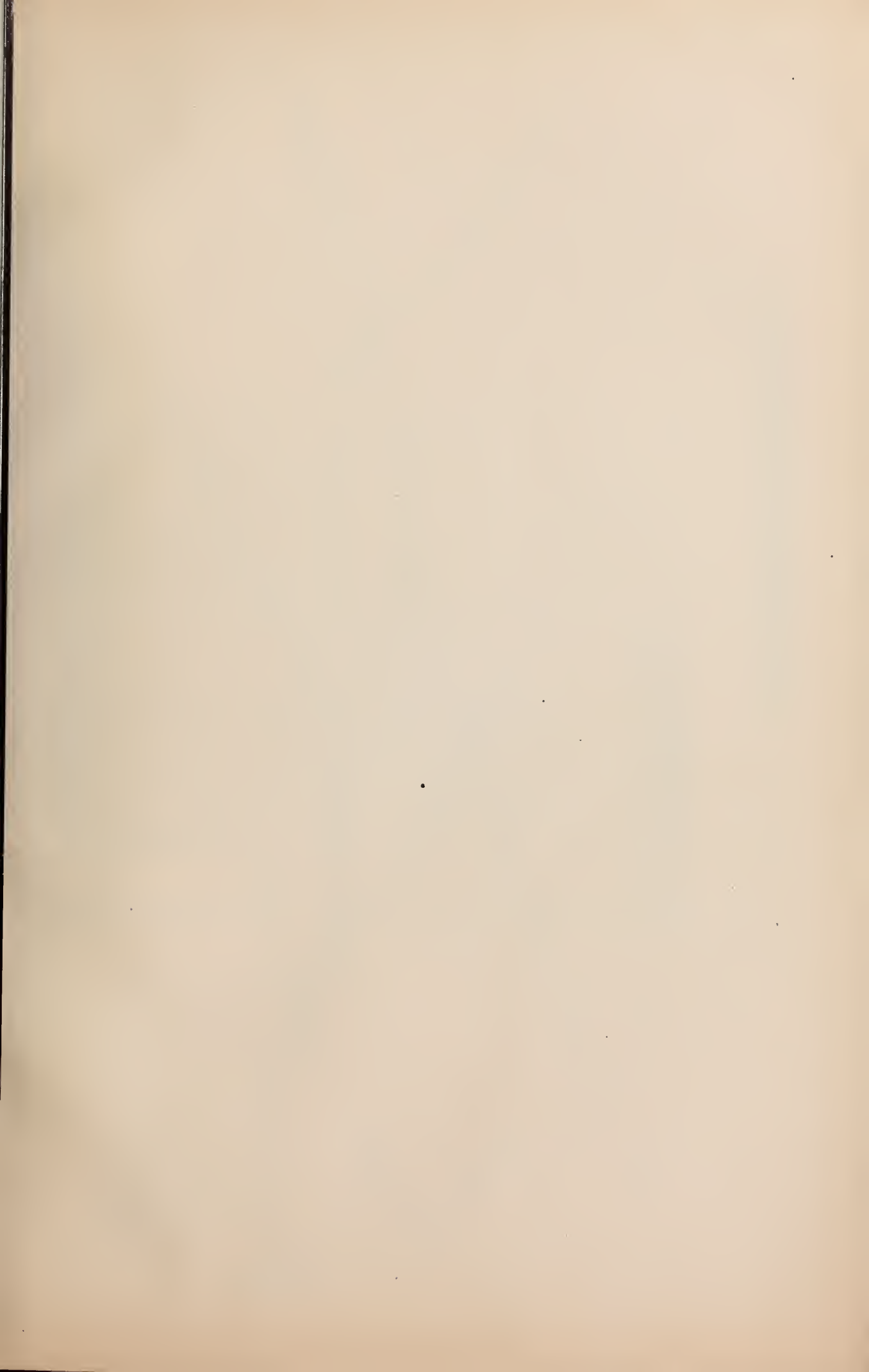
Common in Texas and extending to southern California. In the Southern States is a form with smooth spikelets. Probably a valuable pasture grass.



PASPALUM PUBIFLORUM *Desf.*

W. & A. R. C. Co.





No. 6.

PHALARIS INTERMEDIA Bosc. var. ANGUSTA Chap. (*P. angusta* Nees.).

*Plant* perennial, rather coarse, usually glaucous throughout.

*Culms* somewhat tufted, erect, sometimes branching below, terete, smooth, or scabrous above, 2 to 4 feet tall.

*Leaves*; radical, few, 2 to 4 inches long, scarious in mature specimens; of culm 4 or 5; sheaths usually shorter than internodes, rather loose, close, smooth, blades flat, taper-pointed, scabrous on both sides, 3 to 5 lines wide, 3 to 6 inches long; ligule prominent, membranaceous, obtuse, lacerate in age, 2 to 3 lines long.

*Inflorescence* a dense, cylindrical spike  $\frac{1}{3}$  inch in diameter, 2 to 4 inches long; the shortly-pedicellate spikelets crowded on short, much divided, appressed branches.

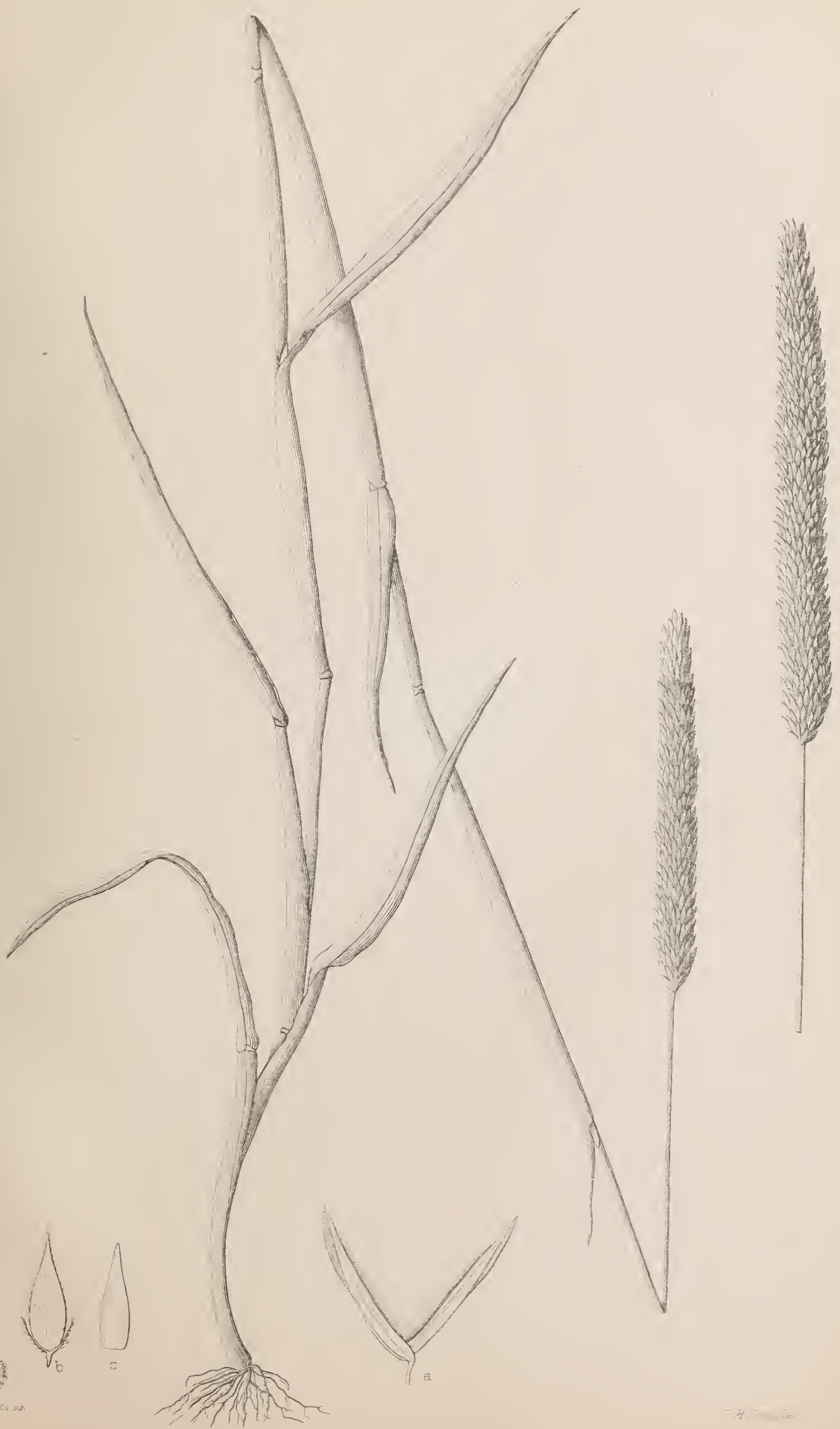
*Spikelets* with one perfect flower, and two opposite, small rudimentary scales or glumes below the perfect flower and closely appressed against it,  $1\frac{1}{2}$  to 2 lines long; first and second glumes nearly equal, lanceolate, acute, carinate, slightly winged on keel above, herbaceous, hispid on keel,  $1\frac{1}{2}$  to 2 lines long; flowering glume coriaceous, lanceolate, acute, rounded, completely enveloping grain, clothed throughout with short, appressed, brittle hairs, nearly smooth and shining at maturity, light-brown,  $1\frac{1}{2}$  lines long; palet narrow, pubescent, 1 line long, 1-nerved.

*Grain* oval, slightly compressed, and with small hook at apex, whitish,  $\frac{3}{4}$  to 1 line long, inclosed in flowering glume from which it is extracted with difficulty.

PLATE VI; *a*, empty glumes; *b*, floral glume; *c*, palet.

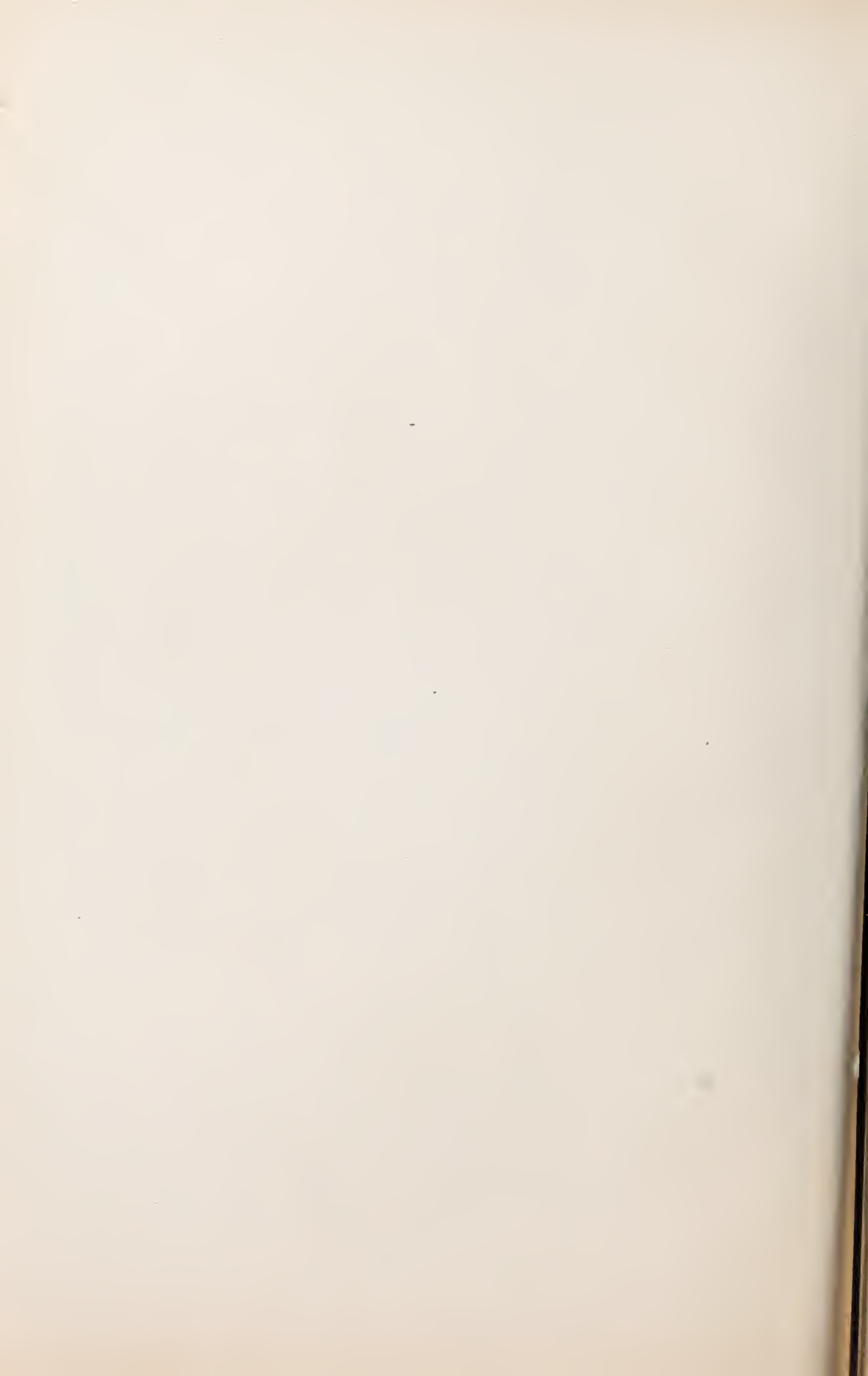
Grows from Florida to Texas and California. In Texas it has been cultivated, and is a very prolific and valuable grass.

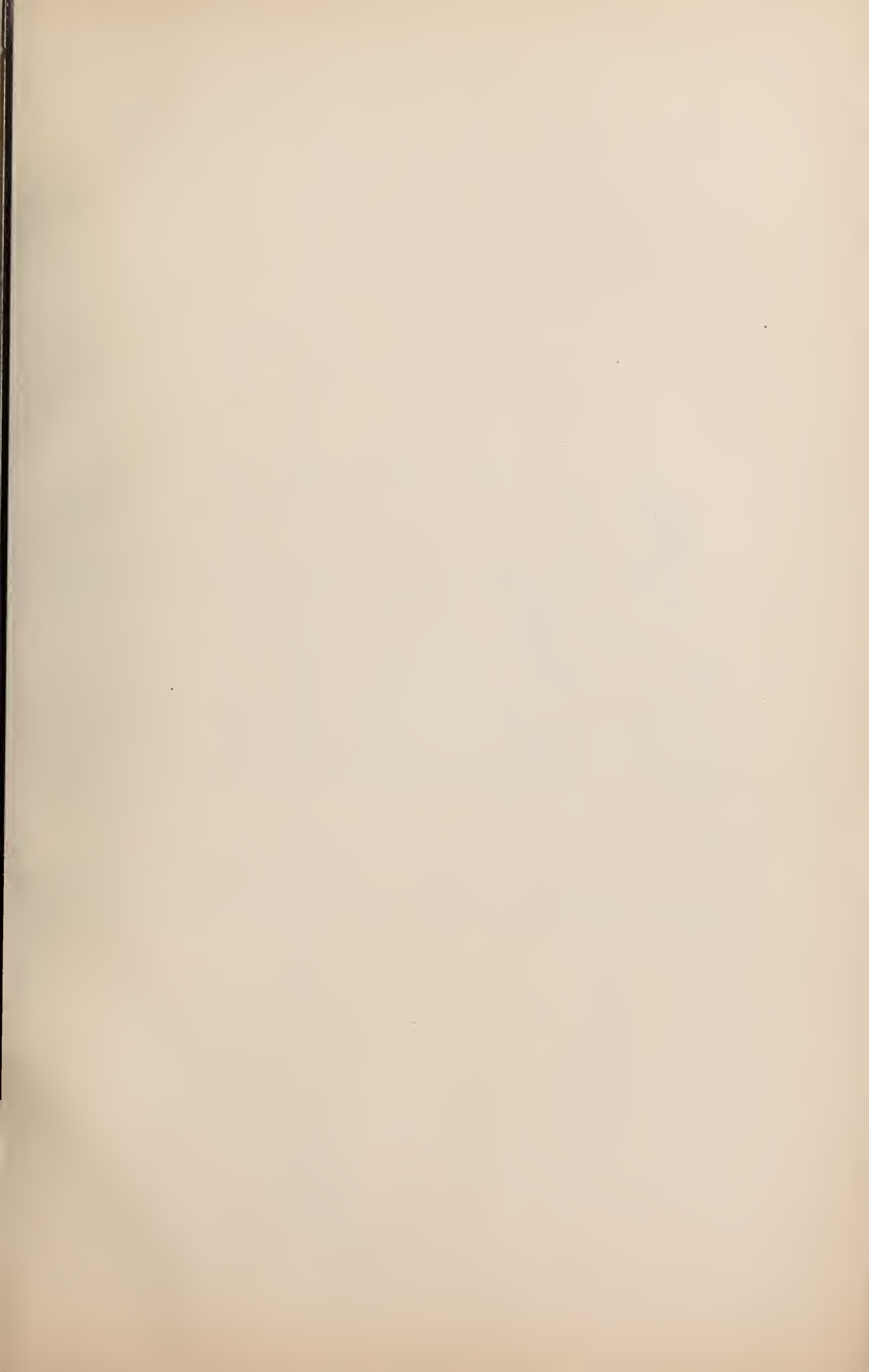





  
 University of California Press

PHALARIS INTERMEDIA, BOSCH. VAR. ANGUSTA





No. 7.

ARISTIDA PURPUREA Nutt.

*Plant* annual or short lived perennial, often purplish especially in the inflorescence.

*Culms* tufted, erect, slender, not branching, nearly smooth, 1 to 2 feet tall.

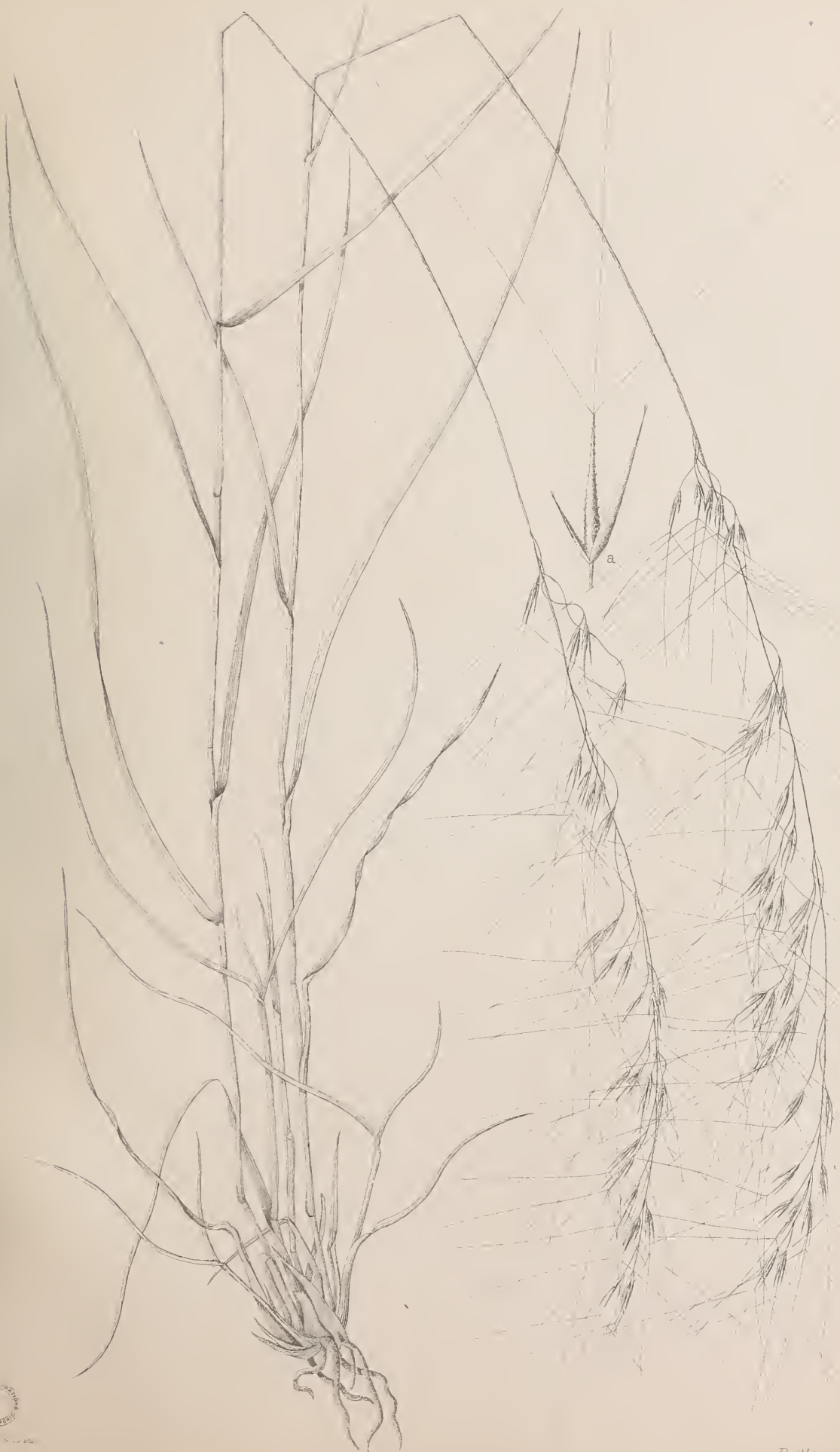
*Leaves*; radical and of radical shoots with narrow, close sheaths and slender involute blades, 4 to 10 inches long; of culm 3 or 4; lower sheaths longer than internodes, upper ones much shorter, close, smooth; blade involute, hispid above, 3 to 6 inches long; ligule a line of fine short hairs, somewhat hairy at the sides.

*Inflorescence* rather loose, narrow, erect or slightly nodding panicle, 4 to 6 inches long; branches 2 or 3 at each node, unequal, the lower 1 to 2 inches long, naked below, each bearing 2 to 5 pedicellate or nearly sessile spikelets.

*Spikelets* narrow, 1-flowered, 5 to 6 lines long; first glume narrowly lance-linear, emarginate, mucronate, rounded, hispid on keel, 1-nerved, 4 to  $4\frac{1}{2}$  lines long; second glume same but nearly 2 lines longer; stipe hairy,  $\frac{1}{2}$  line long; floral glume linear-lanceolate, rounded, slightly hispid on the nerve above, 4 lines long, terminating in 3 separate, slender, minutely hispid awns 1 to 2 inches long; palea obovate, thin,  $\frac{1}{2}$  to  $\frac{2}{3}$  line long.

PLATE VII: *a*, spikelet twice as large as natural size.

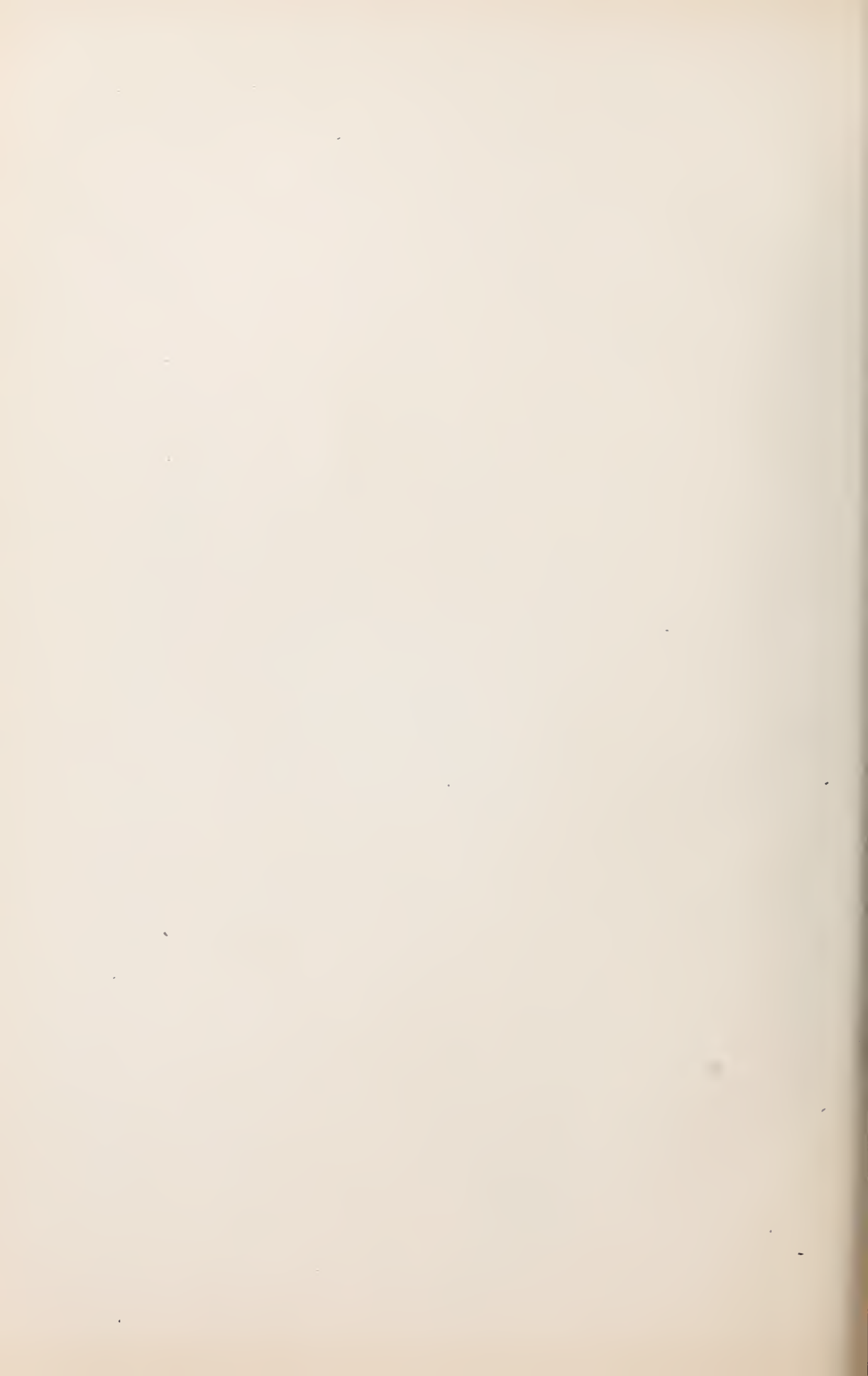
Abundant on plains and ridges, in several varieties, from Texas to British America. It is the earliest available grass for cattle in the spring, but of little value when mature.

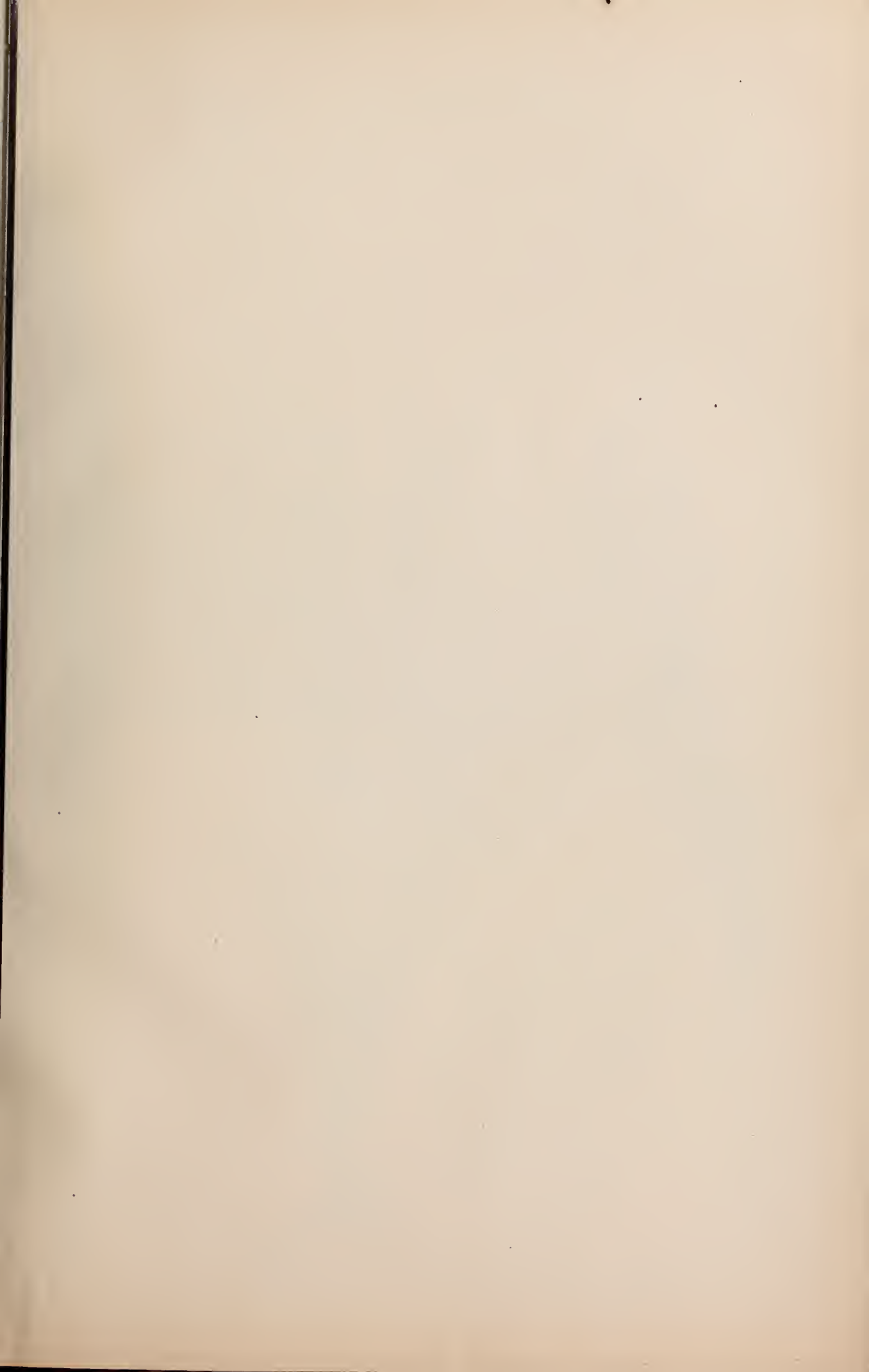


APISTIDA PURPUREA, (L.) NEES.

D. Olszewski, del.







No. 8.

STIPA PENNATA Linn. var. *Neo Mexicana* Thurb.

*Plant* perennial with strong coarse roots.

*Culms* erect, densely tufted, not branching, hollow, smooth, 1 to 3 feet tall.

*Leaves* of radical shoots numerous, with round, close, smooth sheaths, and narrow closely involute blades, 10 to 12 inches long; of culm 3 to 4, sheaths smooth, usually exceeding internodes; blades like those of radical shoots but shorter; ligules membranaceous, rounded, and ciliate above, less than  $\frac{1}{4}$  line long.

*Inflorescence* a narrow racemose panicle 4 to 5 inches long; branches almost appressed, the lower 2 to 3 inches long, each bearing 1 to 3 pedicellate spikelets.

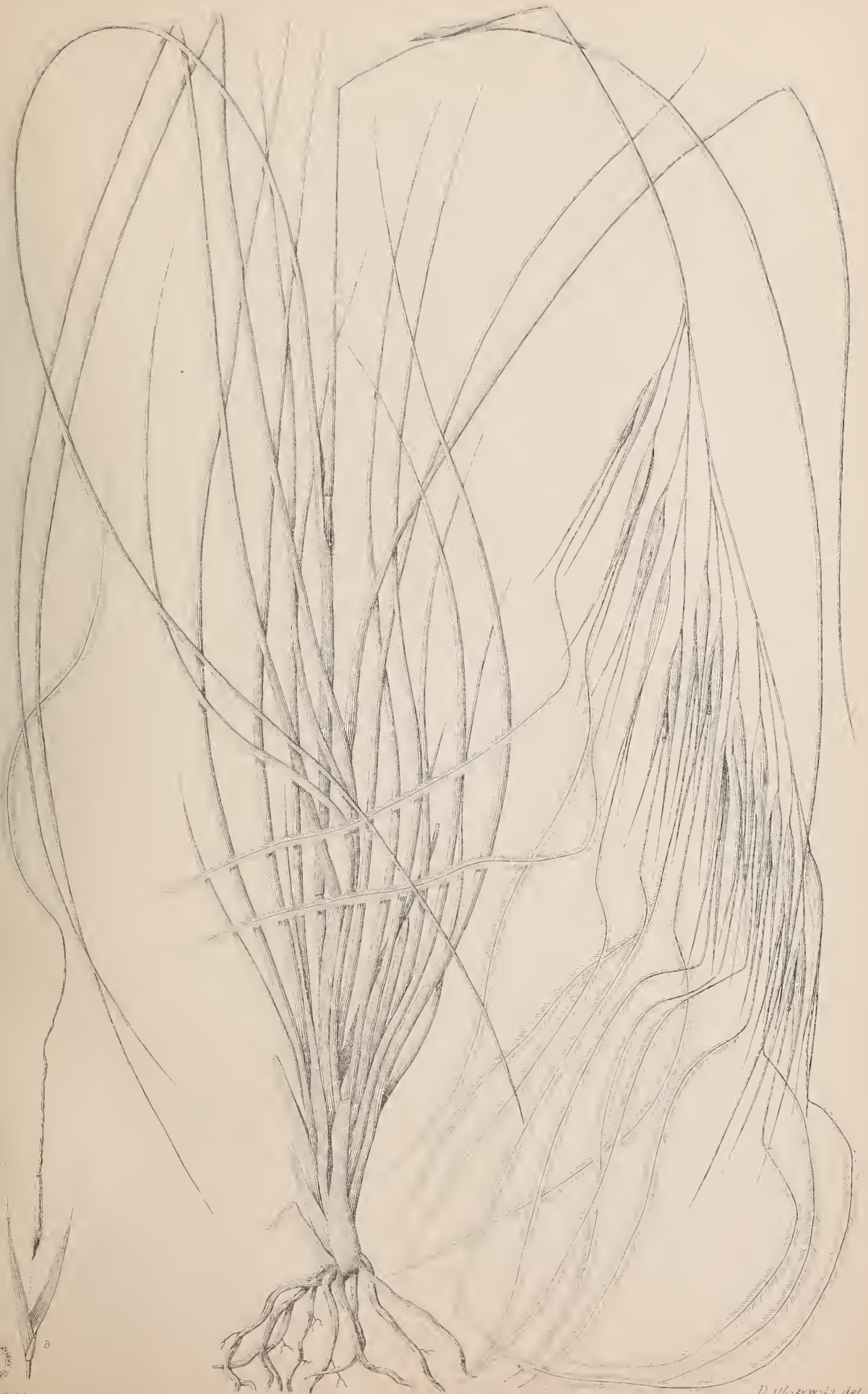
*Spikelets* 1-flowered; first and second glumes nearly equal, lanceolate, long; awn-pointed, herbaceous, 5 to 7-nerved,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches long; floral glume terete, coriaceous, yellow, clothed throughout with close appressed pubescence, 5 to 7 lines long, contracted at the apex, terminating in a twisted, bent awn, feathered above, 4 to 6 inches long; palea narrowly terete, hard, smooth, 5 to 6 lines long.

*Grain* narrow, reddish, 2 to 3 lines long.

PLATE VIII; a, spikelet dissected, about natural size.

Texas, New Mexico, and Arizona.



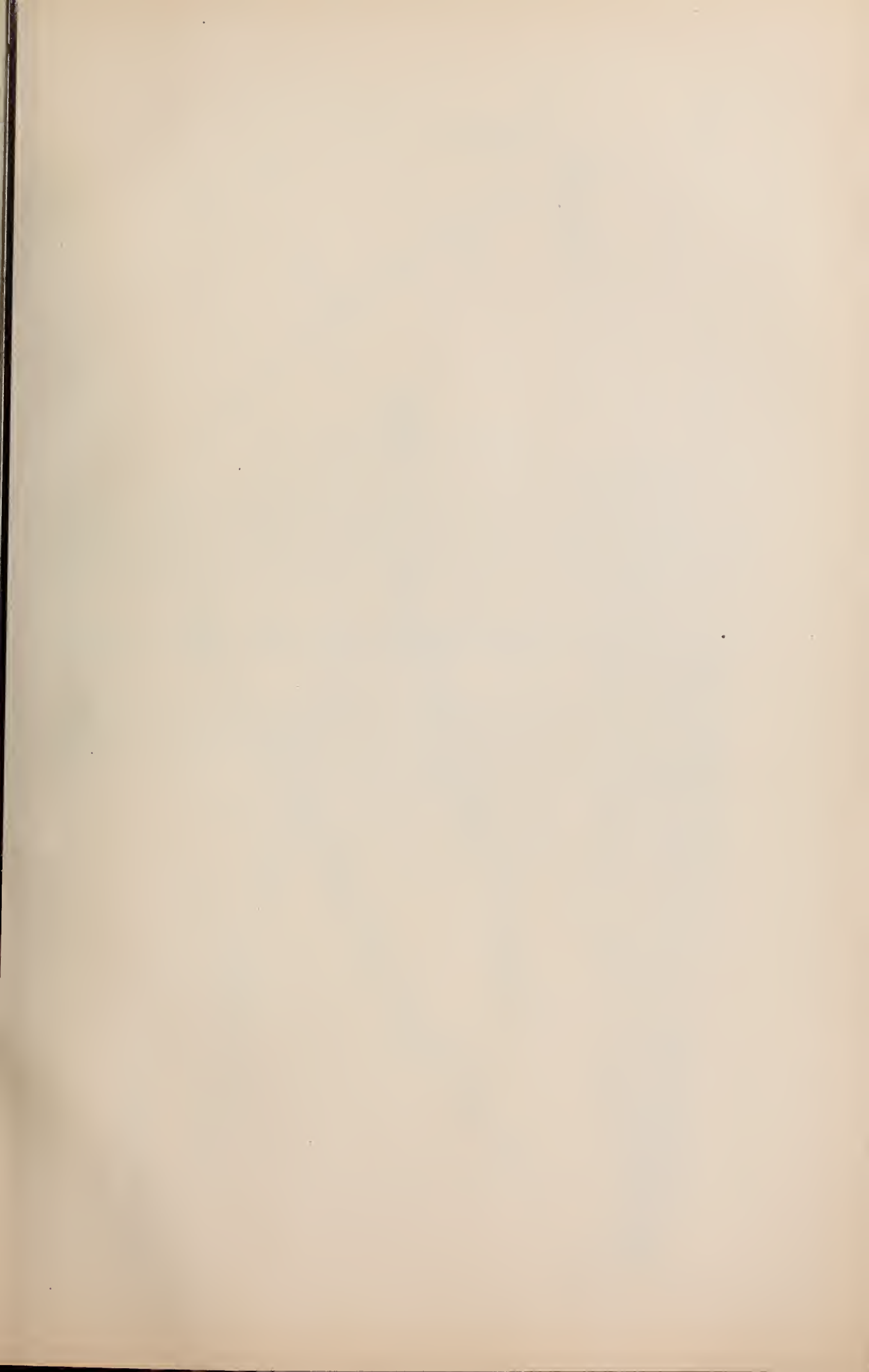



 a  
 W. S. Bier & Co. lith

*D. Ulzuiser del*

STIPA PENNATA VAP NEO MEXICANA





No. 9.

STIPA SCRIBNERI Vasey.

*Rootstock* short, horizontal, with coarse fibrous roots.

*Culms* tufted, erect, terete, smooth,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  feet tall, unbranched.

*Leaves*; from base half as long as the culm; of stem 3 or 4; sheaths smooth, or lower ones slightly scabrous, nearly equaling or slightly exceeding the internodes, close; blade flat below, involute above toward the long tapering point, mid-nerve inconspicuous, 1 to 2 lines wide, 4 to 10 inches long; ligule truncate, 1 line long.

*Inflorescence* an erect slender panicle, its base inclosed by the upper sheath, narrow and close, 5 to 8 inches long; rachis slightly angular, not flexuous; branches in twos or threes, appressed, 1 to 2 inches long, each bearing 2 to 4 spikelets on short pedicels.

*Spikelets* 1-flowered; empty glumes unequal, the first 6 to 7 lines, and second 5 lines long, linear-lanceolate, acuminate, both 3-nerved, smooth; floral glume about 4 lines long, white-hairy, the hairs longer above forming a crown or tuft 1 line long; awn rather slender, 8 to 9 lines long, not hairy; stipe short, acute; palea less than 1 line long, obtuse, and adherent to grain.

*Grain* nearly cylindrical, yellow, opaque, 2 to  $2\frac{1}{2}$  lines long.

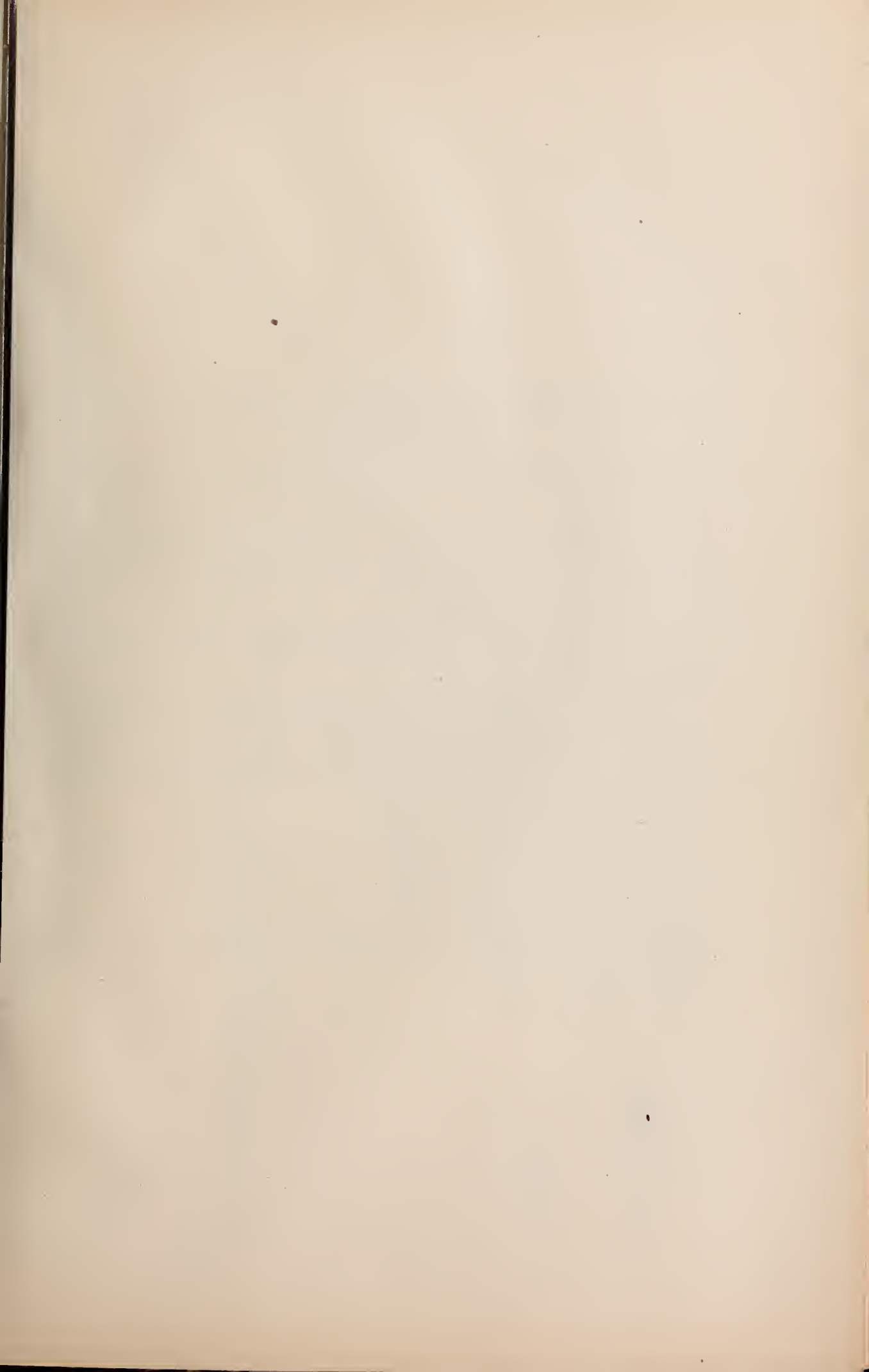
PLATE IX: *a*, spikelet dissected and enlarged.

Arizona and New Mexico. Generally in strong tufts.



W.P. S. H. 111





ORYZOPSIS MEMBRANACEA (Pursh.). (*Stipa membranacea* Pursh.)  
*Eriocoma cuspidata* Nutt.)

*Plant* perennial, closely tufted, thickened at base.

*Culms* slender, nearly erect, not branching, geniculate, solid, terete, smooth, 12 to 18 inches tall.

*Leaves*; radical, numerous, the scarious sheaths clustered thick about the base of the culms; blades involute, smooth, 6 to 10 inches long; of the culms 3; lower sheaths shorter than internodes, smooth and close, upper sheath longer and loose; blades like those of radical leaves; ligule membranaceous, ovate, acute, or lacerate, 1 line long, prominently decurrent.

*Inflorescence* a very loose, erect or flexuous panicle 4 to 6 inches long, included at the base, usually with 2 or 3 nearly equal axes; branches mostly in pairs, distant, horizontal, divided in pairs beyond the middle, bearing solitary spikelets on long flexuous pedicels.

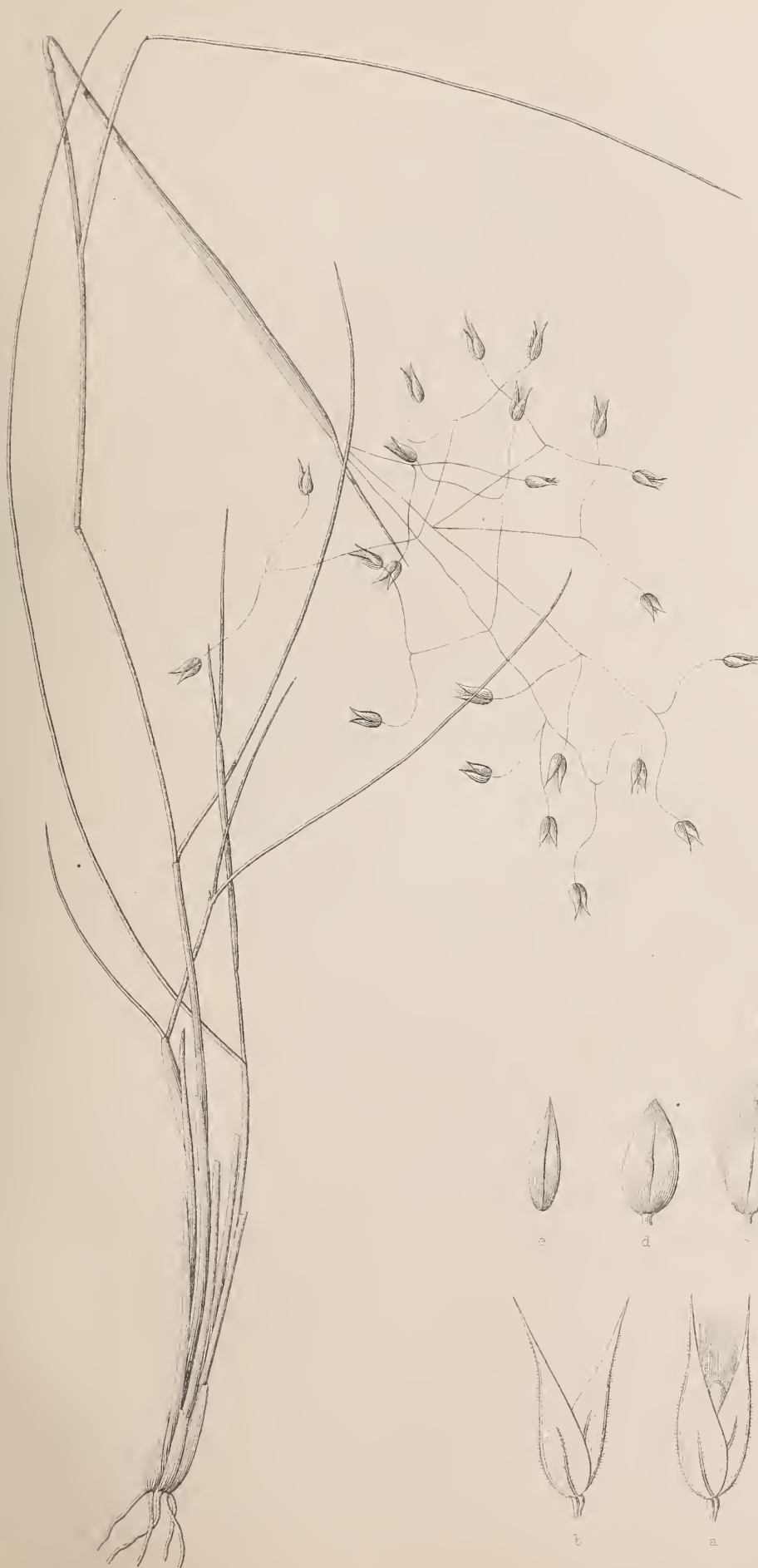
*Spikelets* 1-flowered, 3 lines long; first and second glumes equal, inflated and widened below, narrowed above to a long sharp point, scarious except the 5 rather obscure nerves, minutely pubescent throughout, 3 lines long; floral glume ovoid or oblong, hard, dark-brown, profusely clothed with long white hairs, 1½ lines long, obscurely nerved, terminating in an awn 2 lines long, which falls at maturity; palet conical, smooth, hard, brown, obscurely nerved, 1½ lines long.

*Grain* oval, light-yellow, ⅔ line long.

PLATE X; *a*, spikelet; *b*, empty glumes; *c*, floral glume, with hairs and awn; *d*, same after hairs and awn have fallen; *e*, palet. In the floral glume, *c*, the awn should be represented more to one side.

Texas to California, northward to British Columbia, usually in sandy or gravelly soil. A valuable grass. The large seeds are nutritious, and cattle fatten where the grass is abundant.

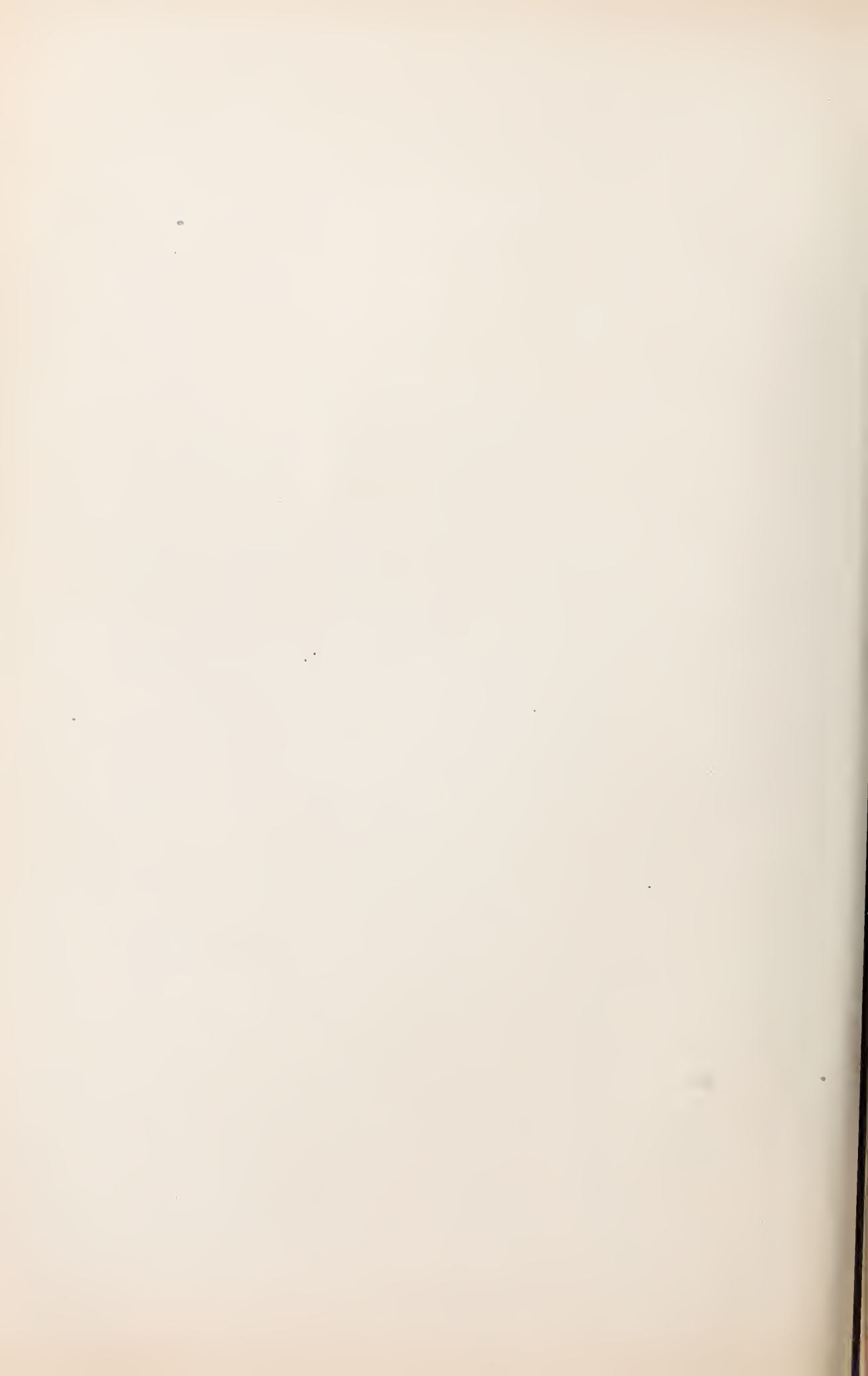


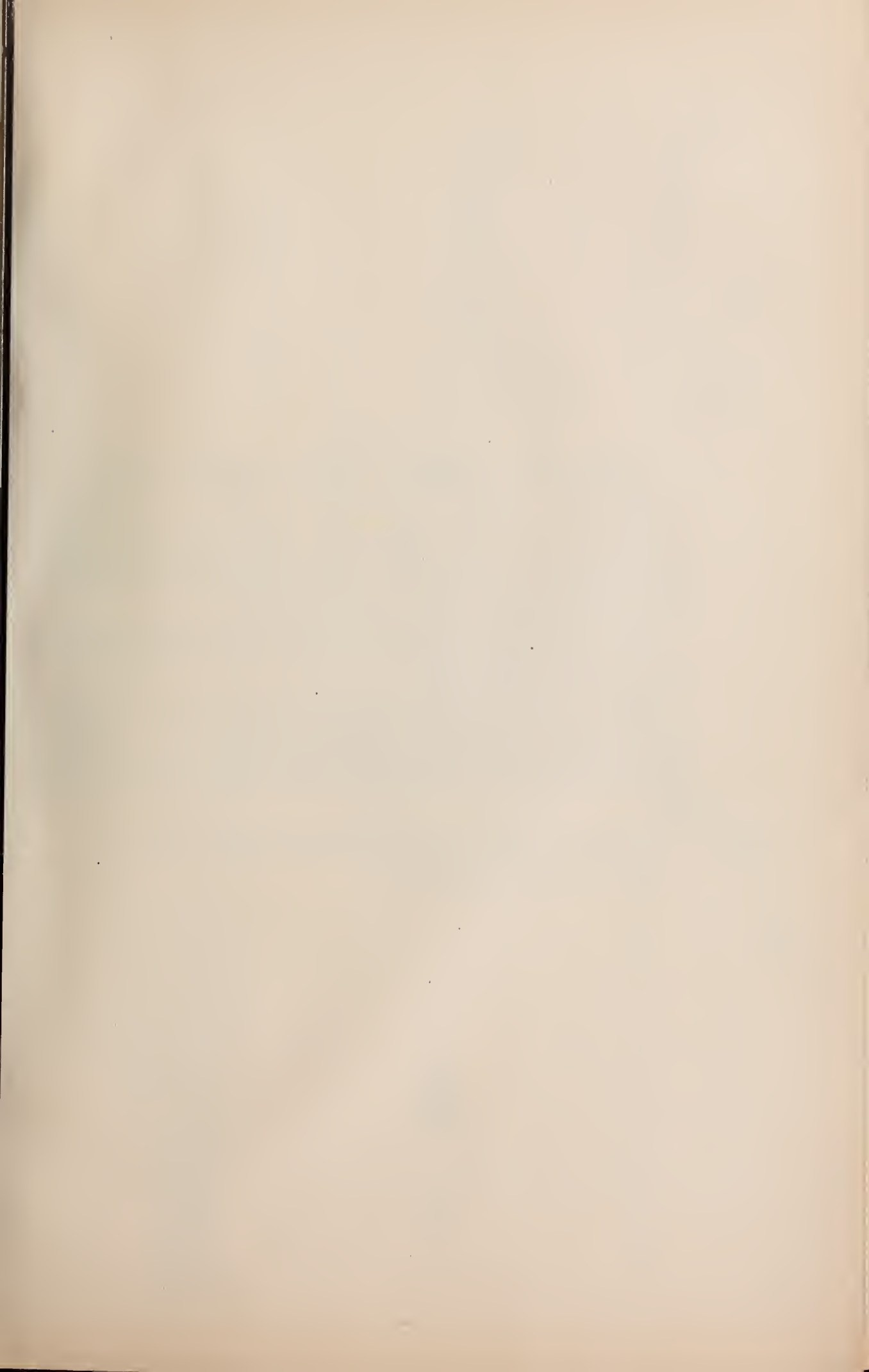


Wash. Serv. Co. Lith.

ORYZOPSIS MENZIESIANA, L. *Pursh*

*T. G. Smith*





No. 11.

ORYZOPSIS FIMBRIATA Hemsl. (*Stipa fimbriata* Kth.)

*Culms* tufted with many root leaves at base, erect, striate, smooth, slender, 1 to 2 feet tall.

*Leaves* of stem 2 to 4; lower sheaths much shorter than internodes, closely wrapping the culm with the membranaceous inner fold; blade filiform, involute,  $\frac{1}{2}$  line wide, 1 to 3 inches long, much exceeded by the involute setaceous root leaves; ligule conspicuous, obtuse, wider than blade, 1 line long.

*Inflorescence* a loose, erect, or spreading panicle, 4 to 6 inches long; rachis angular, slightly scabrous, flexuous toward apex, branches in twos or threes, spreading or lower ones even deflexed, filiform, 1 to 2 inches long, each bearing 2 to 4 spikelets on pedicels 3 to 5 lines long.

*Spikelets* obovate, 2 to  $2\frac{1}{2}$  lines long; first glume broadly lanceolate, upper half scarious with acuminate apex, often purplish, 5-nerved, smooth, 2 to  $2\frac{1}{4}$  lines long; second glume same but slightly smaller; floral glume coriaceous, orbicular, obscurely 5-nerved, covered with loose white hairs longer at base, and bearing a smooth flexuous awn 5 to 8 lines long; palea obovate, acuminate, 2-nerved,  $1\frac{1}{2}$  lines long.

PLATE XI; *a*, spikelet dissected and enlarged; *b*, panicle at maturity.

Texas, New Mexico, and Arizona.

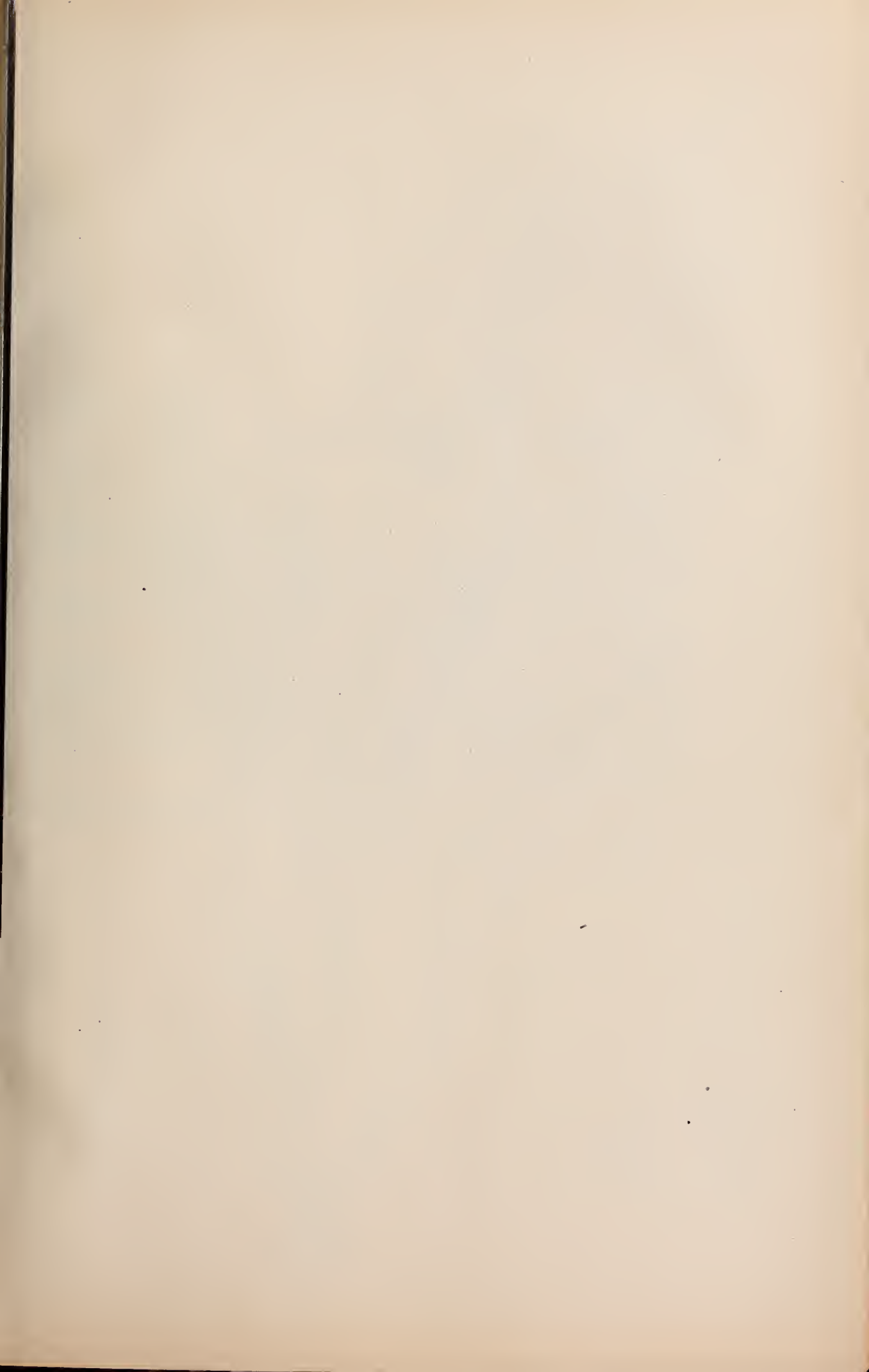


Julius Bien & Co lith

W.R. Scholl, del.

ORYZOPSIS FIMBRIATA *Hems.*





No. 12.

MUHLENBERGIA BUCKLEYANA Scribn. (*Muhlenbergia Texana*  
Buckl. not *Thurb.*)

*Plant* annual, diffuse, spreading.

*Culms* tufted at base, spreading, terete, slender, smooth, branching below, 10 to 15 inches tall.

*Radical* leaves few and small; of culm 1 to 3, usually 2; sheaths rather loose, somewhat vaginate, or compressed and open, slightly scabrous, longer than internodes; blade flat or involute, scabrous on both sides, 1 to 2 inches long.

*Inflorescence* an oblong, loose, spreading panicle 4 to 8 inches long; rachis and branches slender, terete, often purple, the latter mostly alternate, 1 to 3 inches long, bearing solitary spikelets on slender pedicels 1 to 2 lines long.

*Spikelets* narrowly lanceolate, 1-flowered, 1 line long; first glume ovate, acute, hyaline, pubescent, 1-nerved,  $\frac{1}{2}$  line long with a very short awn; second glume same but little larger; floral glume oblong, 2-toothed at apex,  $\frac{1}{2}$  to 1 line long, 3-nerved, slightly pubescent on the nerves, midnerve excurrent in an awn as long as the glume; palet lanceolate, nearly acute, thin, 2-nerved,  $\frac{1}{2}$  line long.

*Grain* narrowly obovate, rounded at apex, compressed, reddish-amber,  $\frac{1}{2}$  line long, falling with floral glume and palet but easily escaping.

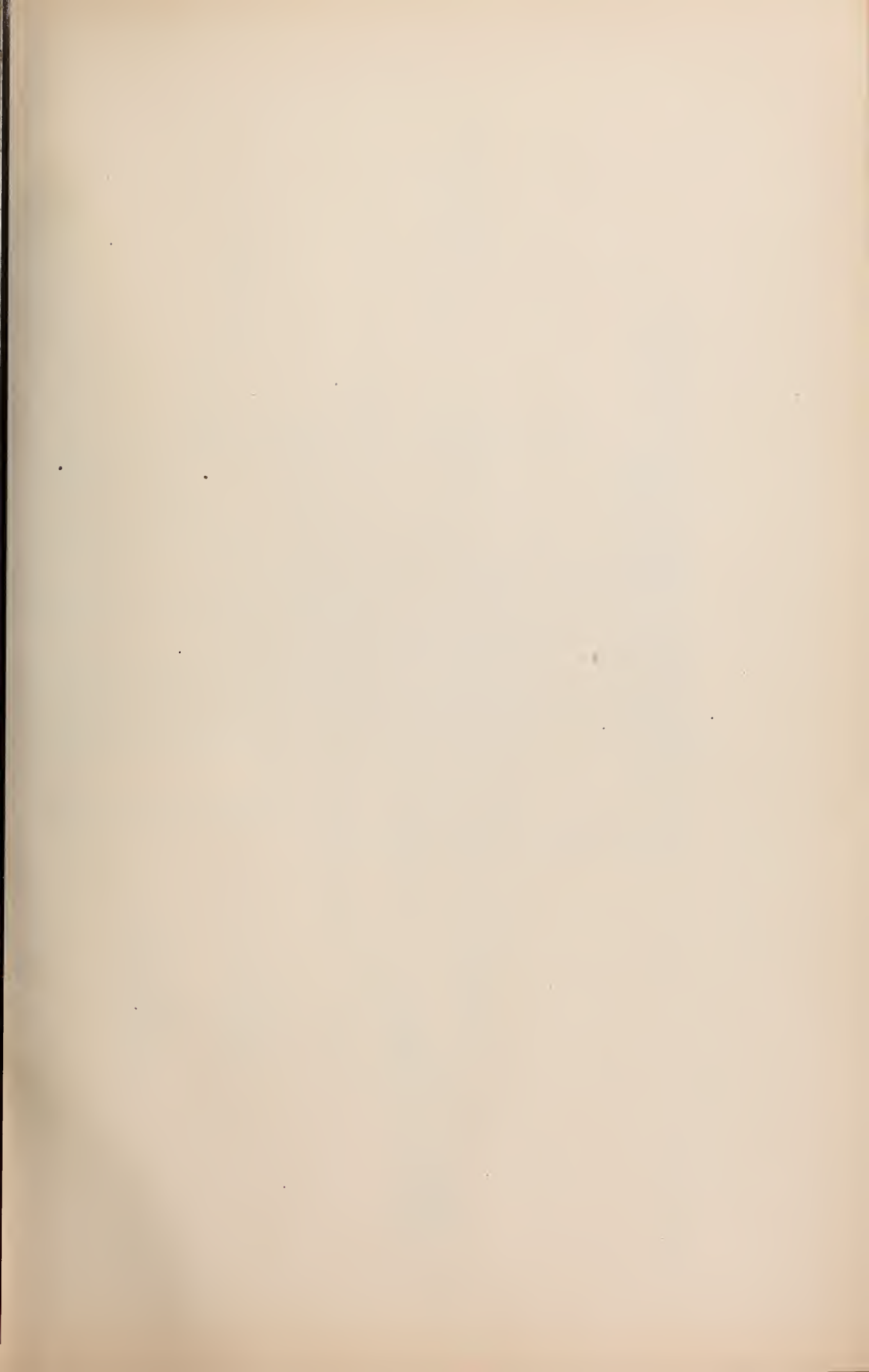
PLATE XII; *a*, spikelet enlarged; *b*, empty glumes; *c*, floral glume; *d*, palet.

Texas, New Mexico to Mexico on rocky hills.









No. 13.

MUHLENBERGIA NEO-MEXICANA Vasey.

*Plant* slender, tufted, perennial, from thick, knotted, or sometimes creeping rootstocks.

*Culm* branching freely below, erect, slender, terete, nearly smooth, 12 to 18 inches tall.

*Leaves*; of culms 4 to 6; sheaths longer than internodes, close, slightly roughened; blades erect, appressed, closely involute and setaceous, 2 to 3 inches long; ligule an irregular, ovate, lacerate membrane  $\frac{1}{4}$  line long.

*Inflorescence* a narrow, erect or slightly nodding panicle, 3 to 4 inches long, often purple; branches alternate, erect, hispid,  $\frac{1}{2}$  to 1 inch long, bearing rather close clusters of spikelets on hispid pedicels  $\frac{1}{2}$  to  $1\frac{1}{2}$  lines long.

*Spikelets* narrow, 1-flowered, 2 lines long; empty glumes equal, lance-ovate, acute, carinate, hyaline, 1-nerved, 1 line long, terminating in a slender awn  $\frac{1}{4}$  to  $\frac{1}{2}$  line long; floral glume narrowly conical, lanceolate, acute when unrolled, thin, smooth, minutely pubescent at base, 3-nerved, terminating in an awn  $\frac{1}{2}$  inch long; palea obscurely 2-nerved, 2 lines long, often projecting out of the floral glume; stamens 3.

*Grain*, none present in the 24 specimens examined.

PLATE XIII; *a*, panicle at maturity; *b*, cluster of spikelets; *c*, spikelet enlarged.

Rocky ledges, New Mexico and Arizona.

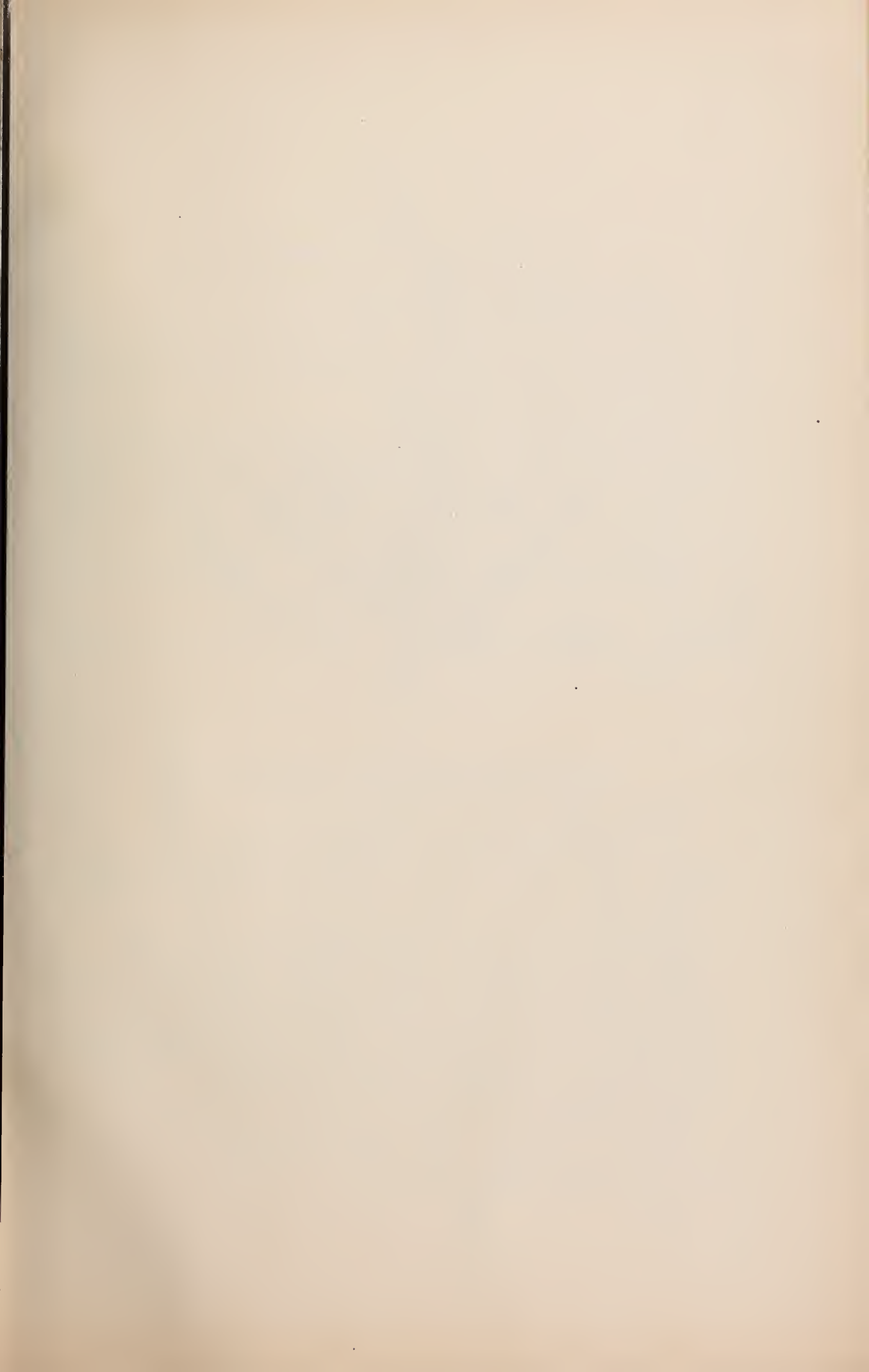


D. Olszewski del.

MUHLENBERGIA NEO-MEXICANA (L.) B. & P.







## MUHLENBERGIA SCHAFFNERI Fourn.

*Plant* low, annual or short-lived perennial.

*Culms* tufted, procumbent or spreading, branching freely, 2 to 4 inches tall.

*Leaves*; radical, few and small; of culm 3 to 5; sheaths compressed, open, striate, scabrous on both sides, margins white,  $\frac{1}{2}$  to 1 inch long; ligule membranaceous, lacerate,  $\frac{3}{4}$  line long, decurrent in prominent hyaline margins on the sheath.

*Inflorescence* a narrow contracted panicle, 1 to 2 inches long, often included at base, rachis and branches angular, hispid.

*Spikelets* sessile, appressed, narrow,  $1\frac{1}{2}$  to 2 lines long; first glume lanceolate, the apex lobed, with 2 short unequal or nearly equal teeth at apex, hispid, 2-nerved, herbaceous, rigid, 1 to  $1\frac{1}{3}$  lines long; second glume linear-lanceolate, acute, carinate, short-awned at apex, hispid, 1-nerved,  $1\frac{1}{2}$  to  $2\frac{1}{4}$  lines long, including awn; floral glume ovate, 2 minute hyaline teeth at apex, slightly hispid, ciliate below, 3-nerved, with slender awn  $\frac{3}{4}$  to 2 lines long, or sometimes awnless; palet ovate, acute, 2-nerved, thin, smooth,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  lines long.

*Grain* narrowly cylindrical, reddish amber color,  $\frac{3}{4}$  line long, falling with palet and glume but easily escaping.

PLATE XIV, No. 2, lower figure; *a*, first empty glume; *b*, second empty glume; *c*, floral glume; *d*, palet.

Arizona.

## MUHLENBERGIA DEPAUPERATA Scrib.

*Plant* low, tufted, annual or short lived perennial.

*Culms* spreading, branching at each node, 3 to 4 inches tall.

*Leaves*; radical, few or none; of culm 2 to 4, with loose, smooth, broad, open sheaths, and short folded or involute blades; ligule membranaceous, lacerate, decurrent.

*Inflorescence* a narrow, contracted, rather close panicle, 2 to 3 inches long, usually included below, rachis and branches angular, hispid, pedicels short.

*Spikelets* narrow, 1-flowered,  $1\frac{1}{2}$  to 2 lines long; first glume ovate, obliquely 2-toothed at apex, scarious, minutely hispid, obscurely 1-nerved,  $\frac{3}{4}$  to 1 line long; second glume lanceolate, narrowing at apex to a slender, awn-like point, scarious, minutely hispid, 1 to  $1\frac{1}{4}$  lines long; floral glume narrowly lanceolate, with 2 minute teeth at apex, rounded on back, hispid, 3-nerved,  $1\frac{1}{2}$  to 2 lines long, midnerve excurrent in an awn 2 to 5 lines long; palet lanceolate, acuminate, rounded, enveloping grain, minutely pubescent, 2-nerved,  $1\frac{1}{2}$  to  $1\frac{3}{4}$  lines long.

*Grain* narrowly cylindrical, reddish-amber, lighter above, 1 line long, falling with palet and glume but easily escaping.

PLATE XIV, No. 1, upper figure; *a*, spikelet enlarged; *b*, empty glumes; *c*, floral glume; *d*, palet.

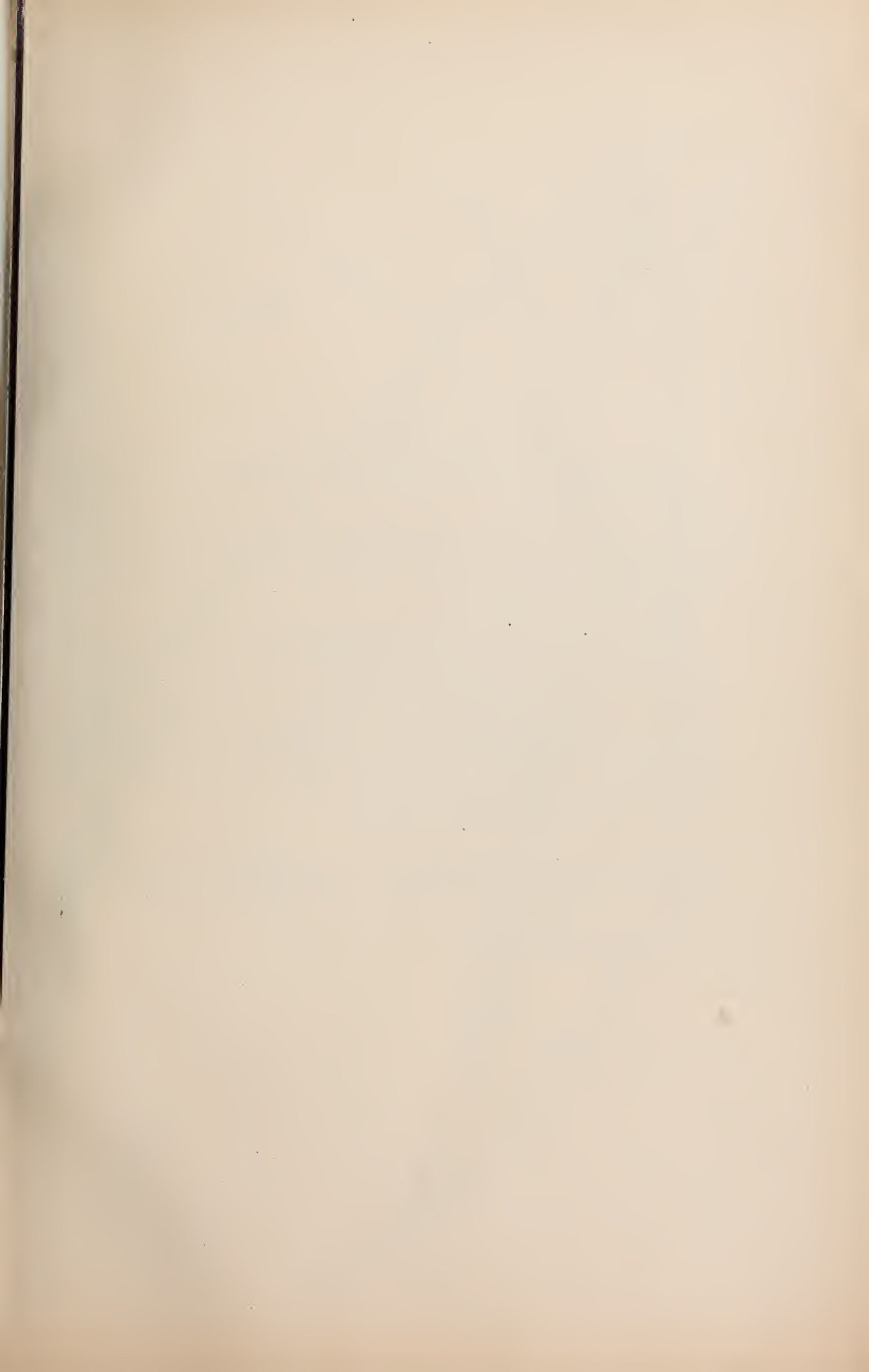
Very close to *M. Schaffneri* and perhaps but a variety of it.

Arizona.









No. 15.

LYCURUS PHLEOIDES H. B. K.

*Plant* perennial from thickened, slightly bulbous base.

*Culms* tufted, erect or ascending, rather weak, branching, solid, nearly terete, smooth, 1 to 2 feet tall.

*Leaves*; radical numerous, with short, close sheaths and flat, folded or involute blades 1 to 2 inches long, with white margins and midrib; of culm 4 or 5; sheaths much shorter than internodes, loose and open, smooth; blades like those of radical leaves but longer; ligule membranaceous, ovate, acute, oblique, decurrent on one side, 1 line long.

*Inflorescence* a dense, cylindrical spike  $\frac{1}{4}$  inch in diameter, 2 to 3 inches long.

*Spikelets* 1 to 3 on each of the short branches of the rachis, one or two of which are commonly imperfect; first glume oblong, thin, 2-nerved,  $\frac{1}{2}$  to  $\frac{3}{4}$  line long, terminating in 2 or (rarely) 3, unequal, hispid awns, 1 to 3 lines long; second glume ovate, acute, carinate, membranaceous, 1-nerved,  $\frac{3}{4}$  to 1 line long, terminating in an awn 2 to 3 lines long; floral glume lanceolate-oblong, acute, pubescent throughout, thicker than the empty glumes, 3-nerved,  $1\frac{3}{4}$  to 2 lines long, terminating in a hispid awn  $1\frac{1}{2}$  to 2 lines long; palet lanceolate, 2-toothed at apex, rounded, 2-nerved, thinly pubescent,  $1\frac{1}{2}$  lines long; the flowers are subject to the attack of an insect, which renders the palet inflated and hardened below.

*Grain* narrowly lanceolate or linear, yellow,  $\frac{1}{3}$  line long.

PLATE XV; A, perfect spikelet, with abortive spikelet below; *a*, spikelet with the palet distorted; *b*, first empty glume; *c*, second empty glume; *d*, floral glume, ventral view; *e*, palet; *f*, palet of pistillate flower distorted by an insect.

Texas and Mexico, northward to Colorado.

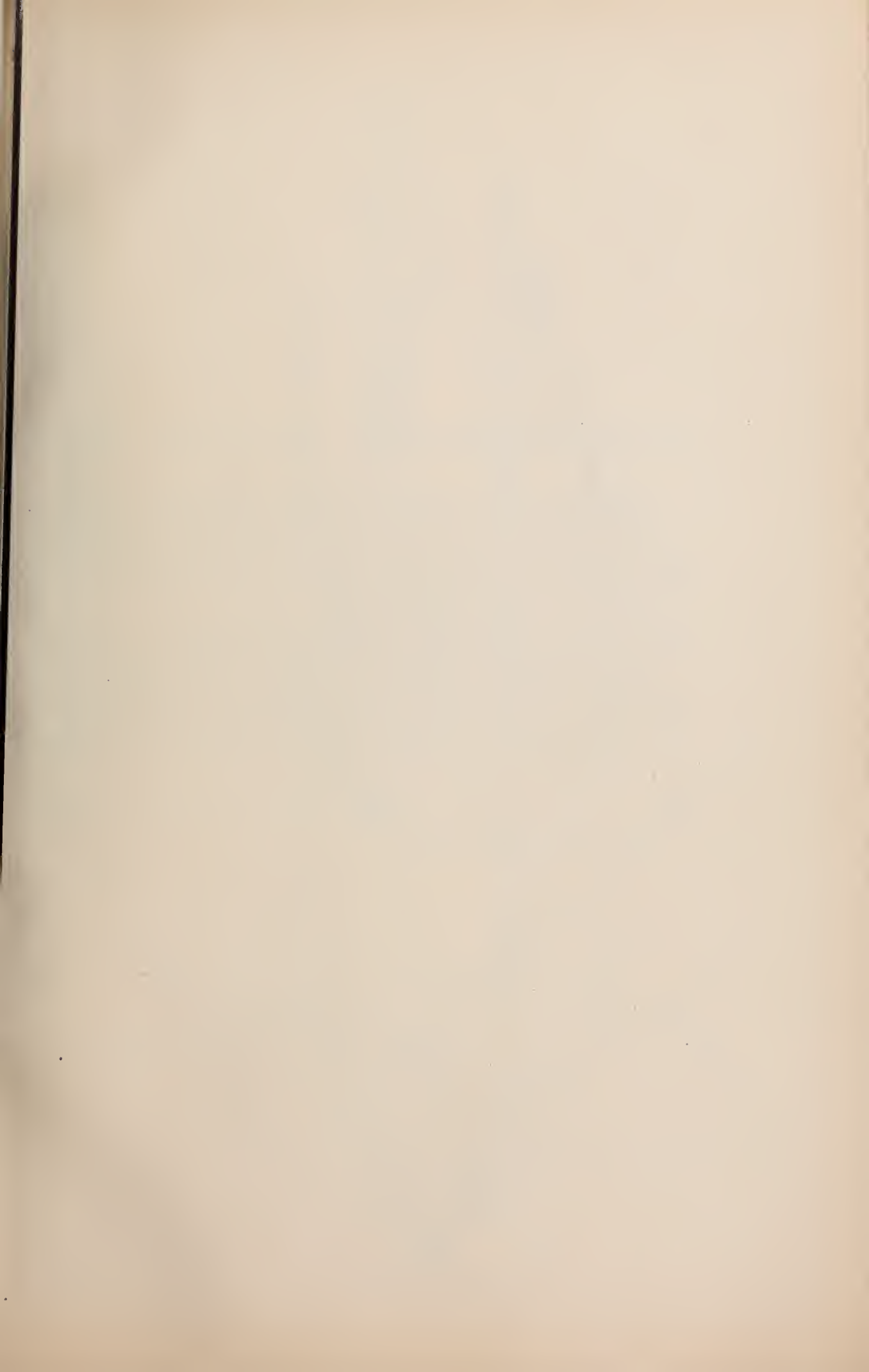


W. H. & Co. Inc.

T. H. M. de

LYCURUS PHLEOIDES HAY





No. 16.

**SPOROBOLUS ARGUTUS** Kth. (*Vilfa Arkansana* Trin. *Vilfa arguta* Nees.)

*Plant* annual, smooth throughout except the scabrous margins of the leaves.

*Culm* tufted, spreading, weak, branching below, smooth, 6 to 12 inches tall.

*Leaves* of radical shoots numerous, with mostly smooth, loose, scarious sheaths and flat blades 2 to 3 inches long; of culm 2 or 3, lower sheaths mostly shorter than internodes, close; blades like those of radical shoots, but upper ones much shorter; ligule a line of short tawny bristles.

*Inflorescence* a rather narrow or sometimes spreading, erect panicle, 2 to 3 inches long, often included at base; branches 3 to 5 at base, alternate above, divided and bearing many pedicellate spikelets on the outer two-thirds.

*Spikelets* oblong-ovate, 1-flowered,  $\frac{3}{4}$  line long; first glume oblong, obtusish, thin, hyaline, smooth, 1-nerved,  $\frac{3}{4}$  line long; floral glume lance-ovate, acute, thin, 1-nerved,  $\frac{2}{3}$  line long; palet broadly ovate, thin, obscurely 2-nerved,  $\frac{2}{3}$  line long.

*Grain* elliptical, compressed, light-brown, with reddish scar, utricular, falling free.

PLATE XVI; *a*, empty glumes enlarged; *b*, floral glume and palet inclosing grain.

Texas to Arizona and Mexico.



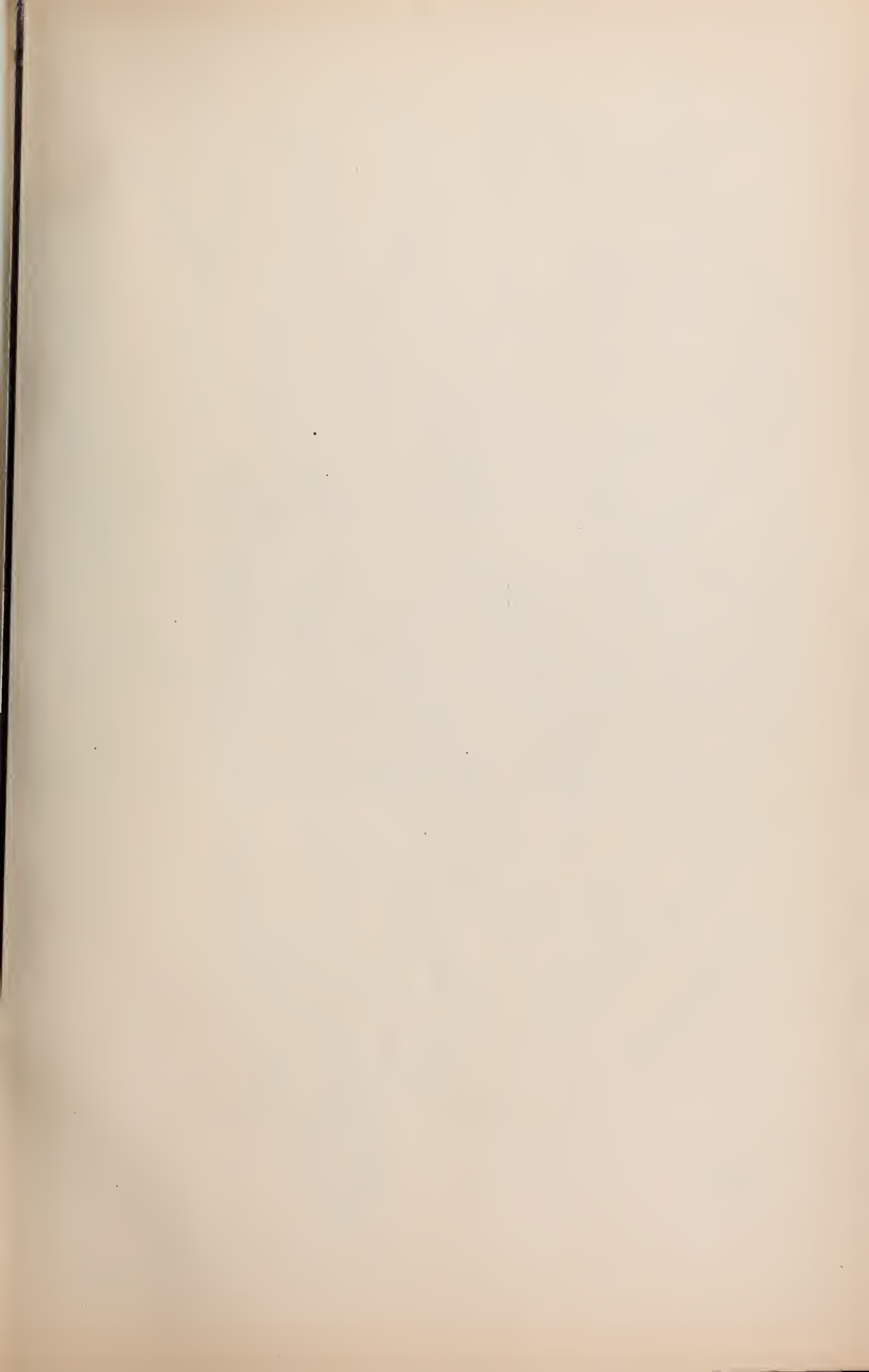



 UNIVERSITY AND JEPSON HERBARIUM ARCHIVES  
 1900-1950

*W. C. Cresswell*

STYLOSANCTIS APOCYNUS, L. F.





No. 17.

SPOROBOLUS BUCKLEYI Vasey.

*Culms* erect, loosely tufted, slender, not branching, compressed, especially below, smooth, 2 to 3 feet tall.

*Leaves*; radical, few, sheaths green or purplish, compressed, tapering into slender, mostly folded, smooth, long pointed blades, 6 to 15 inches long, green at maturity; of culm 4 or 5; sheaths mostly exceeding internodes, lower ones compressed and open, upper close, blades like those of radical leaves; ligule a minute tawny fringe.

*Inflorescence* a loose, spreading, erect panicle, 10 to 15 inches long; branches spreading or becoming reflexed, mostly alternate, 3 to 5 inches long, slender, bearing beyond the lower third, short branches of pedicellate spikelets.

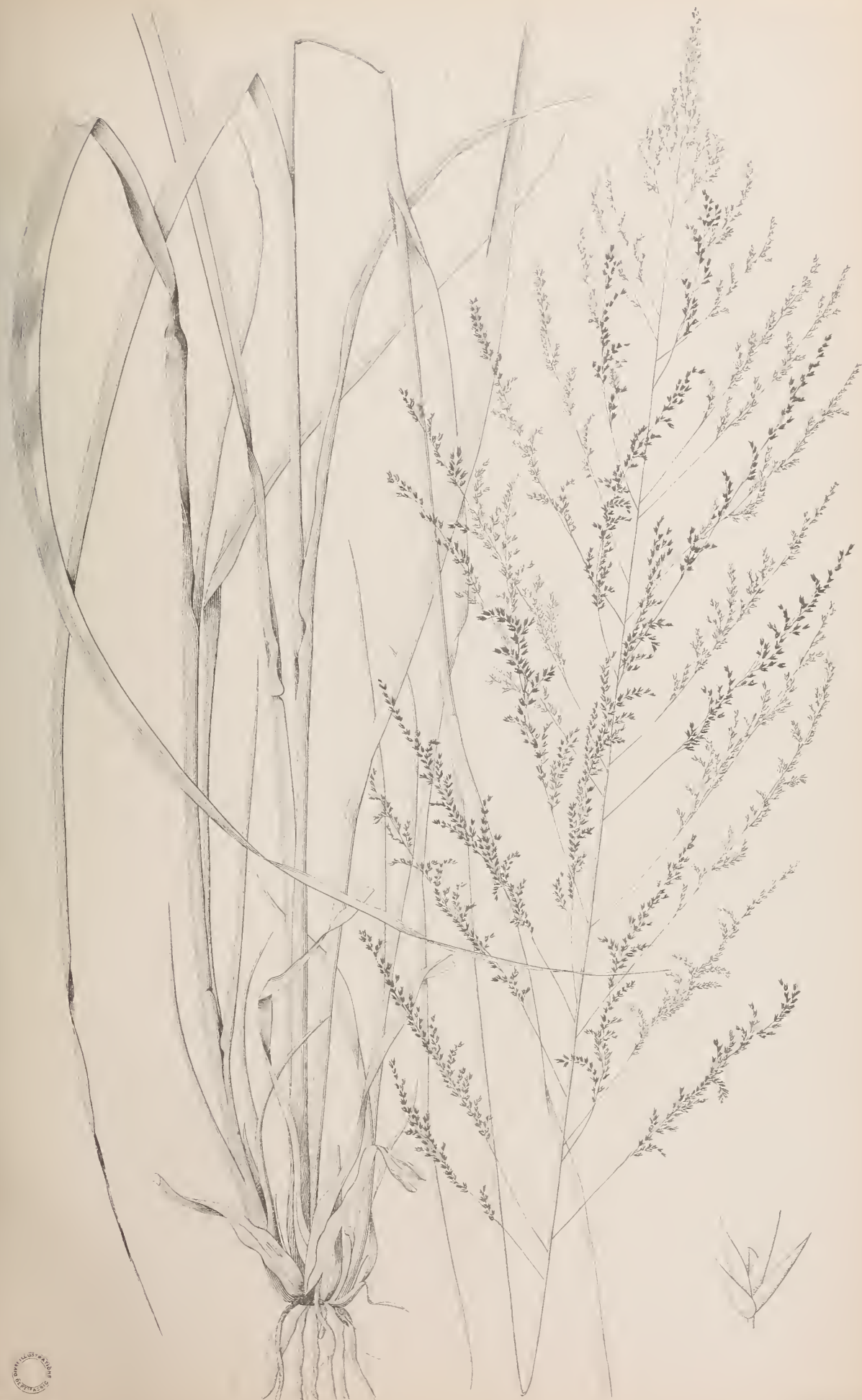
*Spikelets* obovate, 1-flowered,  $\frac{2}{3}$  line long; first glume lanceolate, acute, thin, smooth, 1-nerved,  $\frac{1}{3}$  line long; second glume same, but nearly twice as large; floral glume ovate, acuminate, hyaline, smooth, 1-nerved,  $\frac{2}{3}$  line long; palea lance-ovate, acute, obscurely 2-keeled,  $\frac{1}{2}$  line long, in age splitting to the base.

*Grain* elliptical-globose, utricle light-brown,  $\frac{1}{3}$  line long.

PLATE XVII; *a*, spikelet enlarged.

Well distinguished by the large panicle of capillary branches and many flowered, small spikelets. A handsome species.

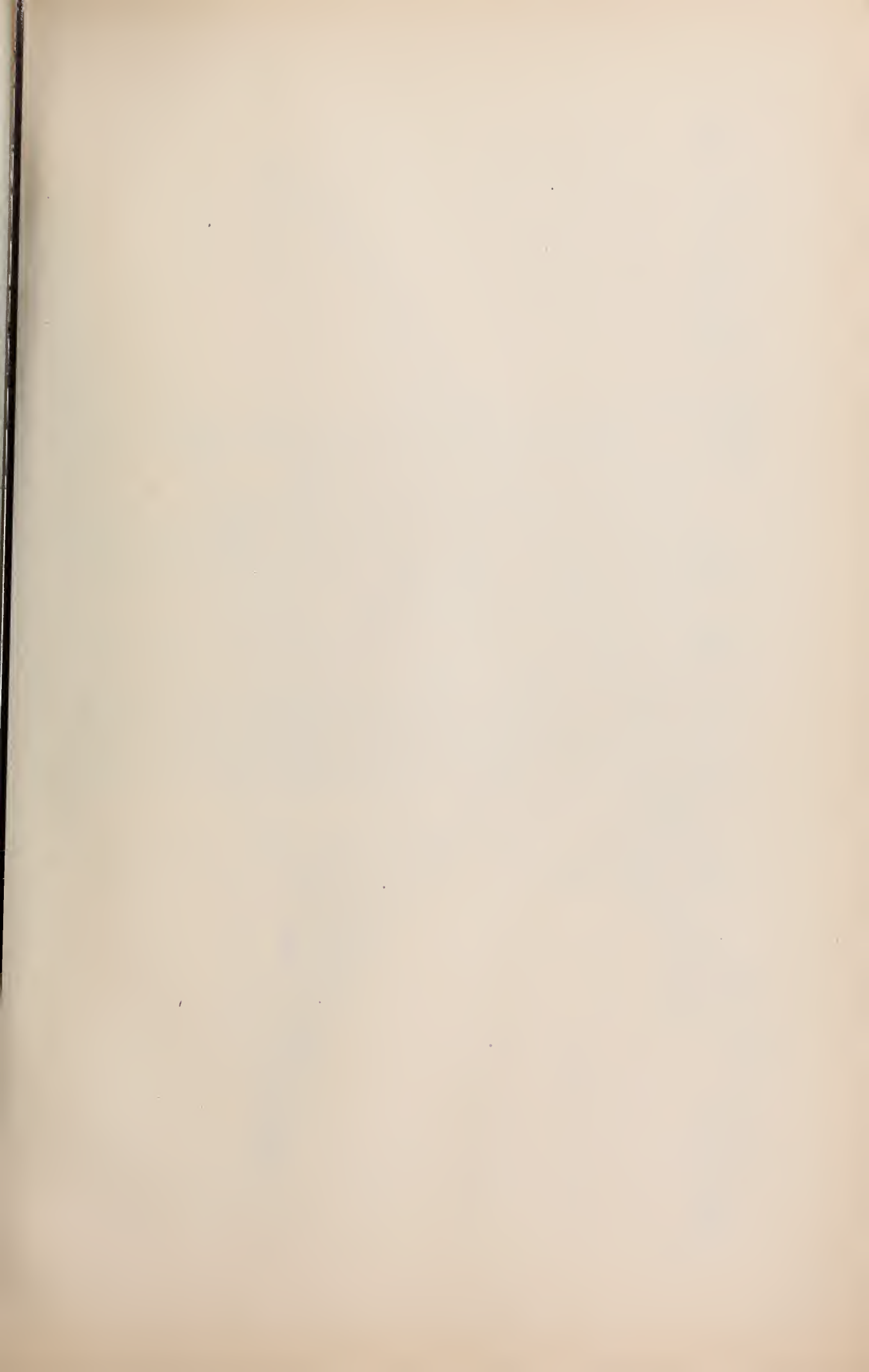
Texas to Mexico.



Blatt. 5. 20. 1874

SPERMATOPHYTES





**SPOROBOLUS INTERRUPTUS** Vasey. (*Vilfa interrupta* Vasey in Special Report No. 63, Department of Agriculture, 1883.)

*Plant* perennial, with densely tufted, bulbous base.

*Culms* erect, not branching, smooth, terete, 1 to 2 feet tall.

*Leaves*; radical and from radical shoots, numerous, with scarious, often reddish, glabrous or pubescent, tapering sheaths, and mostly flat, smooth or loosely pubescent erect blades, 3 to 5 inches long; of culm 2 or 3; sheaths longer than internodes, close, open above, smooth blades, mostly involute, erect, 1 line wide, 1 to 3 inches long; ligule a narrow ciliate fringe.

*Inflorescence* a narrow, open or interrupted, erect panicle, 4 to 6 inches long; rachis flexuous, branches alternate or verticillate below, in twos or threes above, 1 to 2 inches long.

*Spikelets* short-pedicellate, narrow, 1- or 2-flowered, 2 to 3 lines long; first glume lanceolate, acute, carinate, scarious, smooth, 1-nerved, 1 to 1¼ lines long; second glume ovate-lanceolate, nearly twice as large; floral glume ovate-lanceolate, acute, membranaceous, smooth, 1-nerved or obscurely 3-nerved above, 2 to 3 lines long; palet broadly lanceolate, bifid at apex, thin, hyaline, smooth, slightly 2-keeled, 2 lines long; anthers 3, long, reddish purple; stigmas 2, greenish, plumose.

*Grain*, no mature grains seen.

PLATE XVIII; *a*, spikelet enlarged; *b*, empty glumes; *c*, floral glume; *d*, palet; 2, typical panicle.

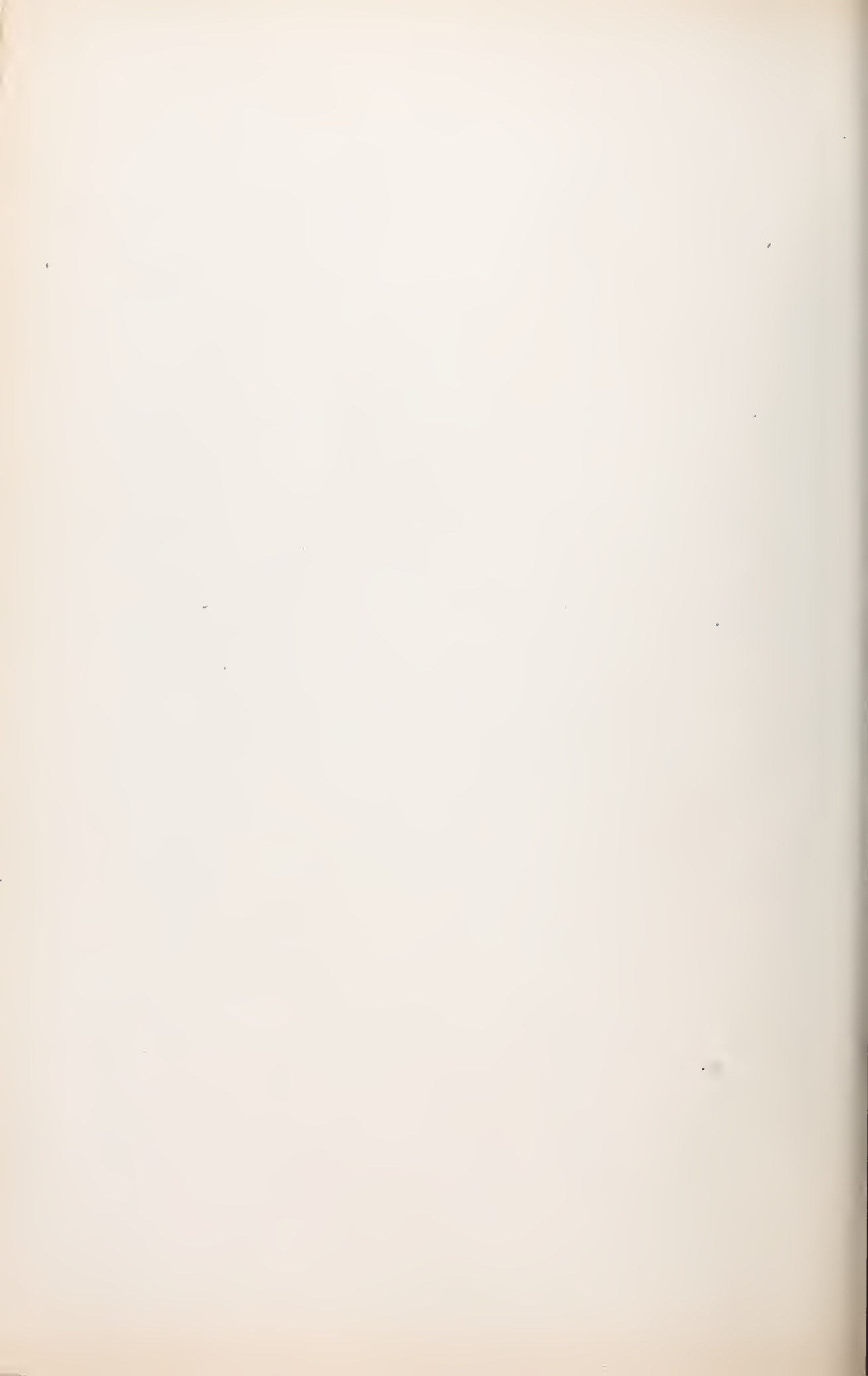
Arizona.

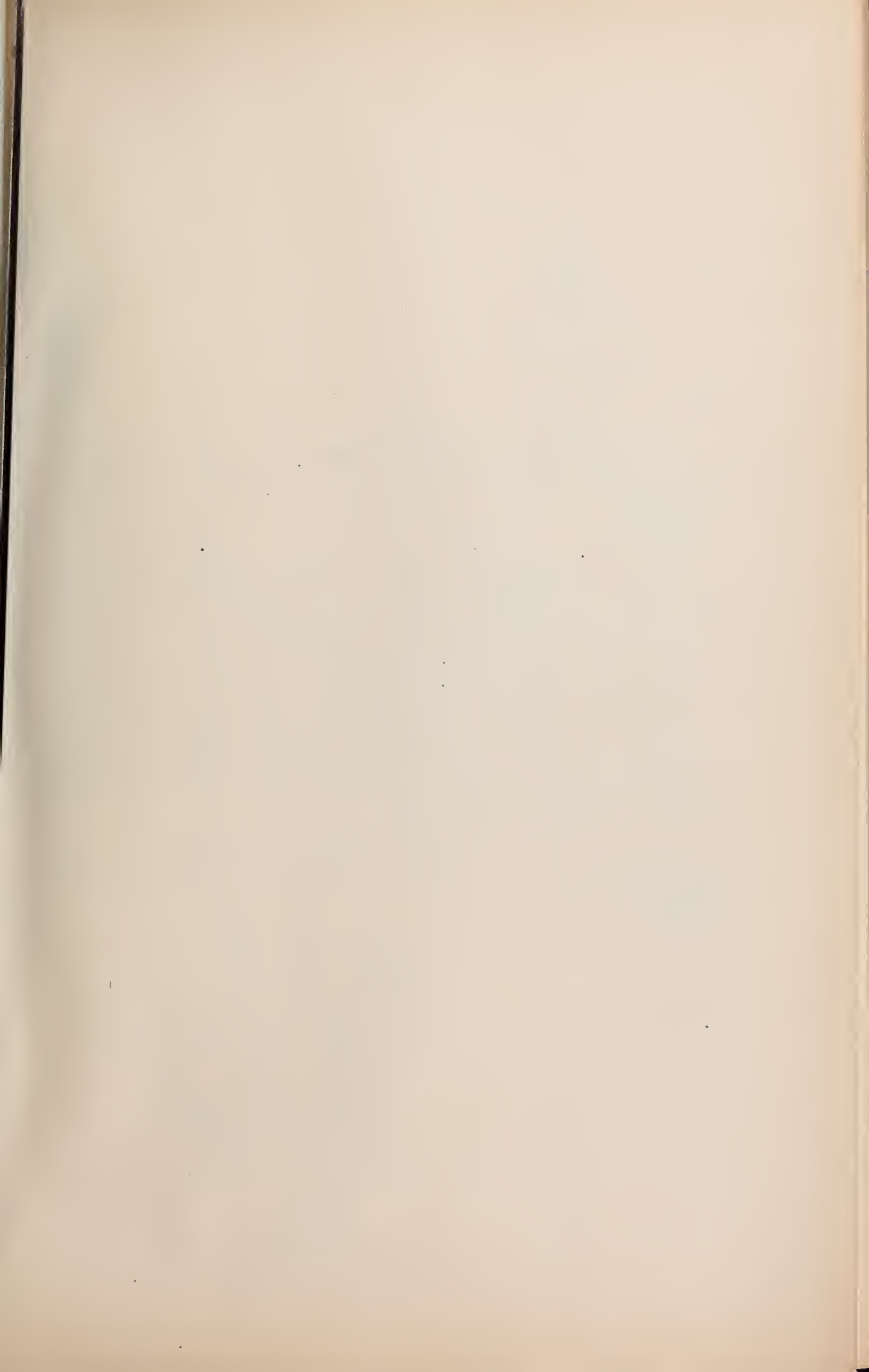




SECT. TRITICUM INTERMEDIUM 720 4







SPOROBOLUS TRICHOLEPIS (Torr). (*Vilfa tricholepis* Torr.)

*Plant* slender, perennial, often purplish in culm and inflorescence, smooth throughout.

*Culms* tufted, erect, seldom branching, smooth, slightly compressed, 1 to 2 feet tall.

*Leaves* of radical shoots with rather loose, scarious sheaths and narrow involute blades 2 to 4 inches long; of culm 2 or 3; sheaths close, nearly equaling or exceeding internodes, blades involute, erect, 2 to 3 inches long; ligule membranaceous, truncate, lacerate, decurrent,  $\frac{1}{4}$  line long or less.

*Inflorescence* an ovate, pyramidal, erect, or flexuous panicle, 4 to 6 inches long; branches mostly alternate, slightly spreading, 1 to 2 inches long, divided and rather loosely flowered on the upper two-thirds.

*Spikelets* on long slender pedicels, lanceolate, 1-flowered,  $1\frac{1}{2}$  lines long; first and second glumes nearly equal lanceolate, acute or obtuse, carinate, thin, smooth, 1-nerved, 1 to  $1\frac{1}{4}$  lines long; floral glume lanceolate, acute, or obtuse, membranaceous, pubescent or villous on the 3 nerves,  $1\frac{1}{2}$  lines long; palet lanceolate, acute, membranaceous, slightly ciliate above, pubescent on the 2 approximate nerves, or nearly smooth,  $1\frac{1}{2}$  lines long.

*Grain* narrowly elliptical, compressed, yellow,  $\frac{1}{2}$  line long.

PLATE XIX; *a*, empty glumes; *b*, floral glume and palet opened to show stamens and pistil.

Mexico northward to Colorado.

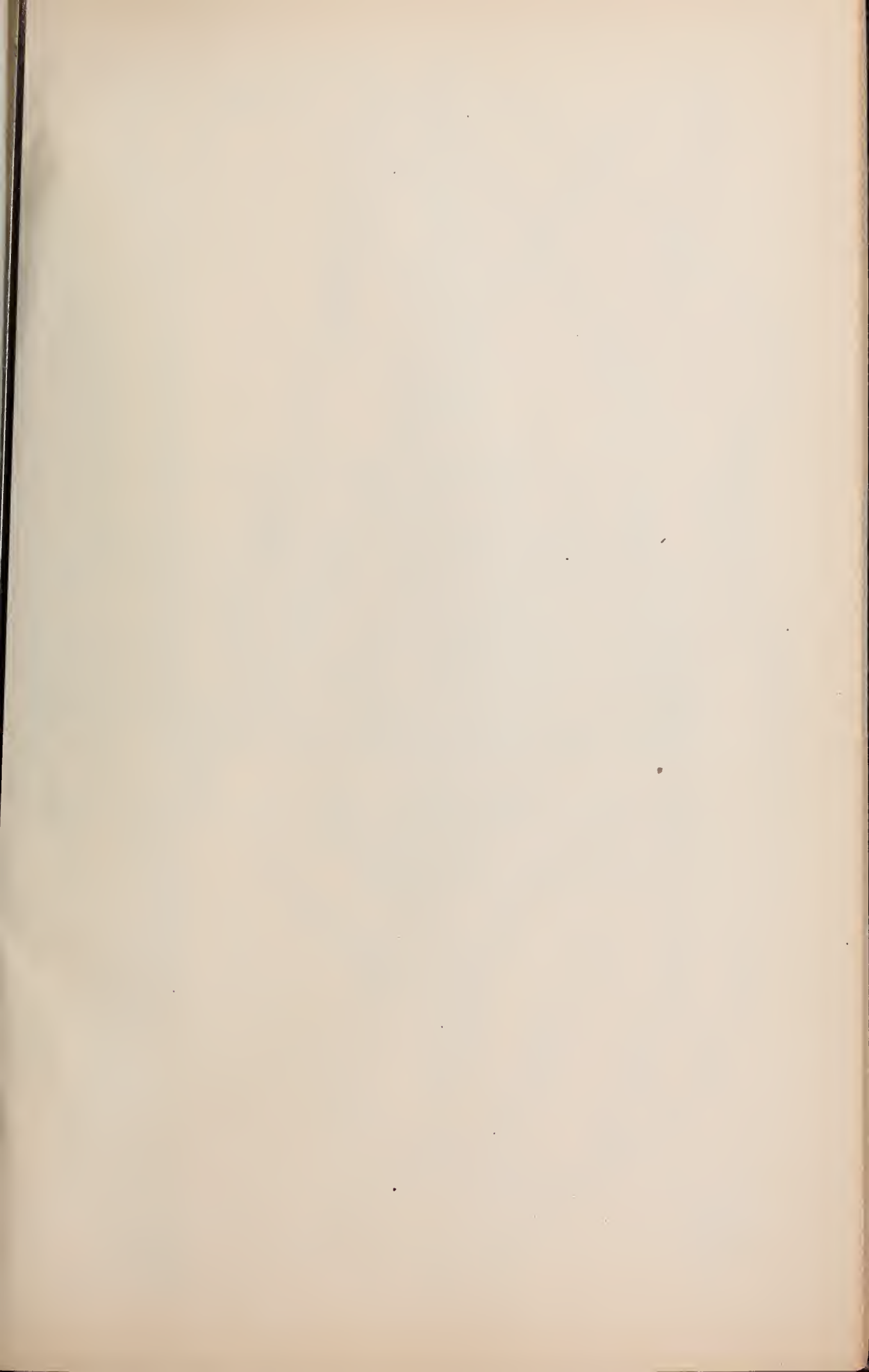


SECRIPOLUS TRICHOLEPIS TW

L. M. S. 1862







No. 20.

SPOROBOLUS WRIGHTII Munro in Herb.

*Plant* perennial, coarse, with thickened bulbous base.

*Culms* erect, not branching, terete, smooth and shining, 2 to 4 feet tall.

*Leaves*; radical, few, scarious sheaths at maturity; of culm 4 or 5; sheaths mostly exceeding internodes, closed, slightly hairy at the throat; blades flat or involute, 2 or 3 lines wide, 1 to 2 feet long; ligule a minute fringe.

*Inflorescence* a slender, erect, lanceolate panicle, 10 to 13 inches long; branches mostly alternate, slender, erect-spreading, 1 to 4 inches long, bearing many shortly-pedicellate spikelets on the outer two-thirds.

*Spikelets* lanceolate, 1-flowered, 1 line long; first glume ovate, barely acute, membranaceous, 1-nerved,  $\frac{1}{4}$  to  $\frac{1}{2}$  line long; second glume same, but twice as large; floral glume broadly lanceolate, acute, membranaceous, smooth, 1-nerved,  $\frac{3}{4}$  line long; palea lanceolate, cleft at apex, slightly 2-keeled,  $\frac{2}{3}$  line long.

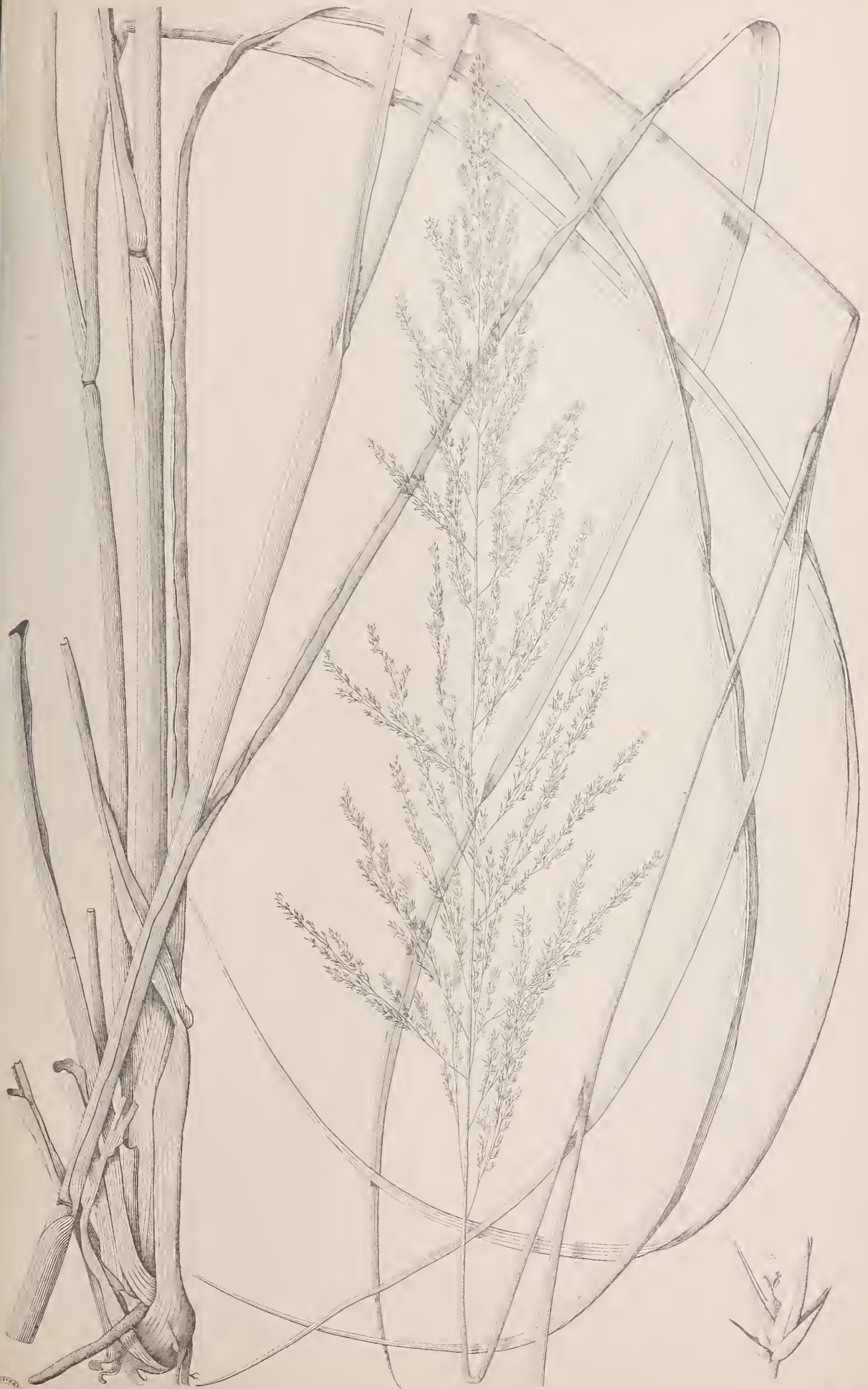
*Grain* elliptical, compressed, brown,  $\frac{1}{3}$  line long.

PLATE XX; *a*, spikelet enlarged.

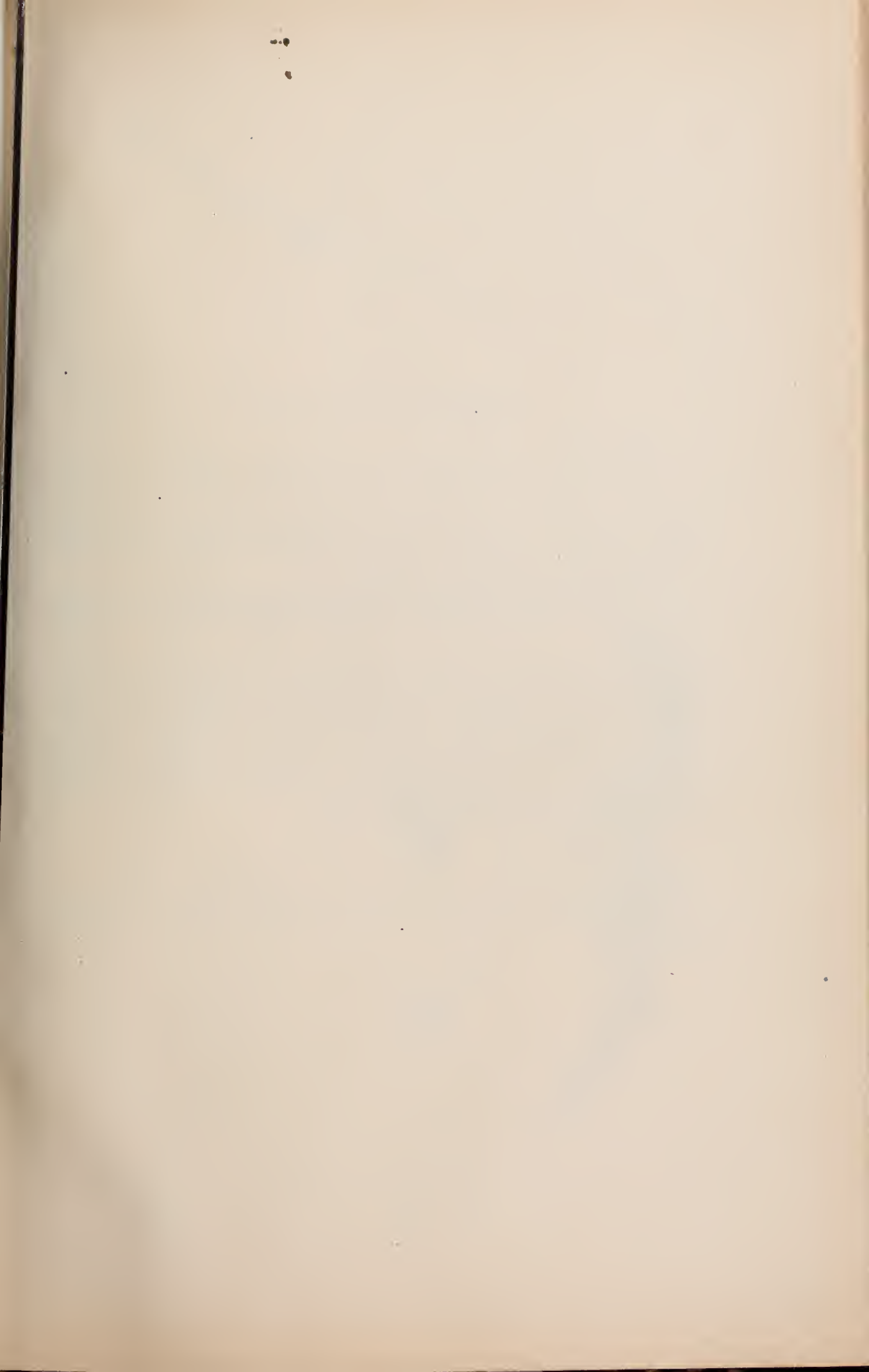
A tall coarse grass, growing in dense tufts, commonly called Saccaton or Zacate. Probably too coarse to be of agricultural value.

Western Texas to southern California.









TRISETUM HALLII Scrib.

*Plant* annual.

*Culms* slender, not branching, geniculate, ascending, scabrous, 1 to 1½ feet tall.

*Leaves*; radical, few and small; of culm 3 or 4; sheaths usually exceeding internodes, open above, somewhat scabrous; blades flat or slightly involute, taper-pointed, scabrous on both sides, 1 to 1½ lines wide, 3 to 5 inches long; ligule membranaceous, truncate, lacerate, 1 line long.

*Inflorescence* a rather narrow, contracted, close, erect, or flexuous panicle, 4 to 6 inches long, included or but slightly exerted; branches mostly in threes, slightly spreading, ½ to 1 inch long, bearing pedicellate spikelets; crowded along their entire length.

*Spikelets* obovate, 3- to 4-flowered, upper one sterile, small and abortive, 2 to 2½ lines long; first glume narrowly lanceolate, acute, herbaceous, hispid on keel, 3-nerved, ½ line wide, 2 lines long; second glume oblong-lanceolate, 5-nerved, twice as wide as the first; internode of rachilla slender, curved, articulate above, smooth, ½ line long; floral glume lanceolate, with two attenuate teeth at apex, scarious, scabrid, 1½ to 2 lines long, obscurely 3-nerved, mid-nerve excurrent in a slender awn 2 to 4 lines long; palet narrowly linear, lanceolate when spread out, thin, 2-keeled, 1 line long, not inclosed in floral glume.

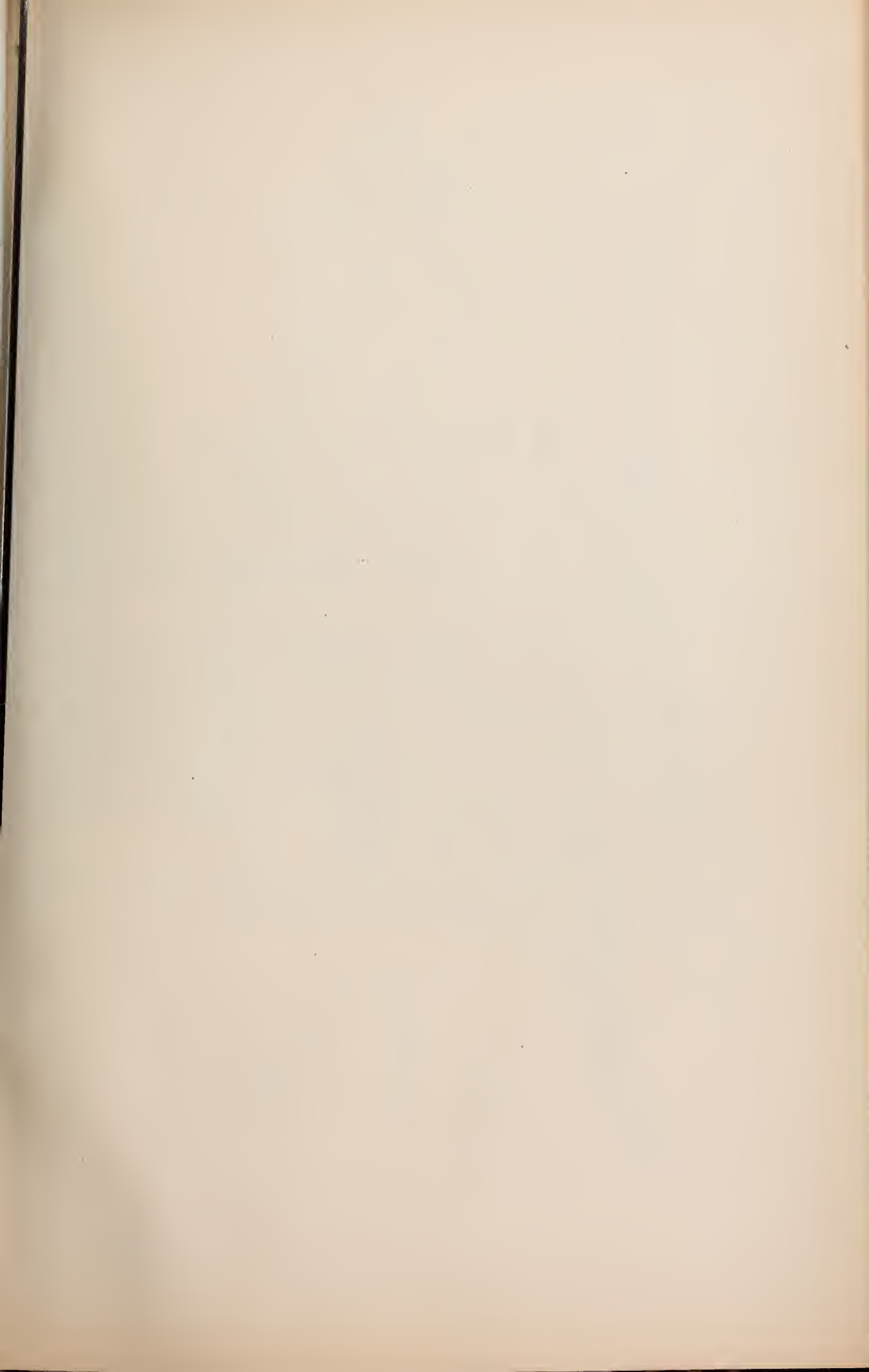
*Grains*, none found in the specimens examined

PLATE XXI; *a*, spikelet; *b*, empty glumes; *c*, floral glume; *d*, palet.

This differs from *T. interruptum* Buckl. in its heavier panicle, shorter teeth of the flowering glume, and the higher insertion of the awn. Both species occur in Texas.







TRISETUM INTERRUPTUM Buckley.

*Plant* slender, tufted, annual, rather glaucous throughout.

*Roots* numerous, fine.

*Culms* ascending, geniculate, branching, terete, smooth, 6 to 18 inches tall.

*Leaves* of radical shoots numerous, with smooth or cinerous-pubescent sheaths and flat blades, hispid above, 2 to 3 inches long; of culm 3 to 5; sheaths usually little shorter than internodes, smooth or somewhat scabrous or pubescent; blades flat or involute, scabrous, 2 to 3 inches long; ligule membranaceous, lacerate, obliquely truncate, 1 line long.

*Inflorescence* a narrow, somewhat interrupted, erect or flexuous panicle, 3 to 5 inches long; branches in 2's or 3's of unequal length,  $\frac{1}{2}$  to 1 inch long.

*Spikelets* sessile, obovate, 3- to 4-flowered, upper one sterile or small and abortive, 2 to  $2\frac{1}{2}$  lines long; first glume oblanceolate, acute, herbaceous, hispid on keel, 3-nerved,  $1\frac{1}{2}$  to 2 lines long; second glume same, but twice as wide and 5-nerved; internode of rachilla curved, glabrous,  $\frac{1}{2}$  line long; floral glume lanceolate, rounded on back, scarious above, rigid, smooth, about 2 lines long, 3-nerved, ending in 2 slender teeth, 2 lateral nerves uniting above with the midnerve and forming above the middle a slender hispid awn, 2 to 3 lines long; palet narrowly linear, wider at top, lanceolate when spread out, thin, smooth, 2-keeled, cleft at apex, standing out of floral glume, 1 line long.

*Grain* yellowish, opaque, elliptical, flattened, 1 line long.

PLATE XXII; *a*, floral glume, side view; *b*, palet; *c*, spikelet; *d* (marked *a* in plate), empty glumes. The floral glume, *a*, is not well figured.

Abundant in Texas.



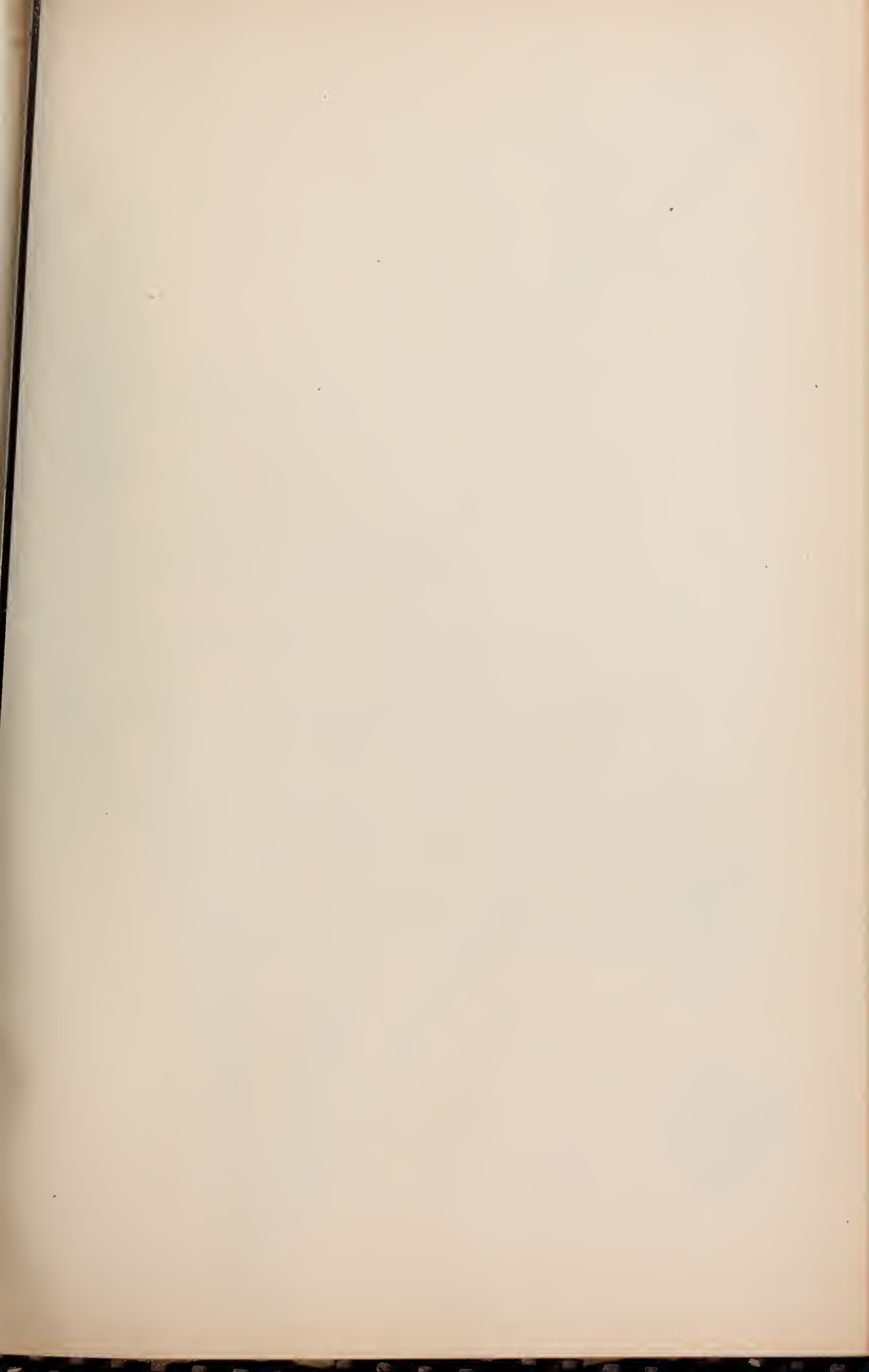


W. A. Steud. Bot. Beechb. 1. 1. 18

T. H. 1861

TRISETUM INTERRUPTUM Steud.





CHLORIS SWARTZIANA Döll. (*Chloris petraea* Swz. non. Thunb.)  
 (*Schultesia petraea* Spreng.) (? *Eustachys petraea* Desv.)

*Plant* perennial, from short rootstock, light green or more or less purplish throughout.

*Culm* erect, or genticulate and spreading below, frequently branched, flatly compressed, smooth, 1 to 2 feet tall.

*Leaves*; radical, with closely compressed, smooth, equitant, divergent sheaths, and flat or folded blades, round-pointed, scabrous on the edge, 2 lines wide,  $\frac{1}{4}$  to 10 inches long; of stem 3 to 5, sometimes opposite; sheaths compressed, loose, smooth, shorter than internodes; lower blades like those of radical leaves but shorter, and upper ones reduced to nearly none; ligule a minute, ciliate, membranaceous fringe.

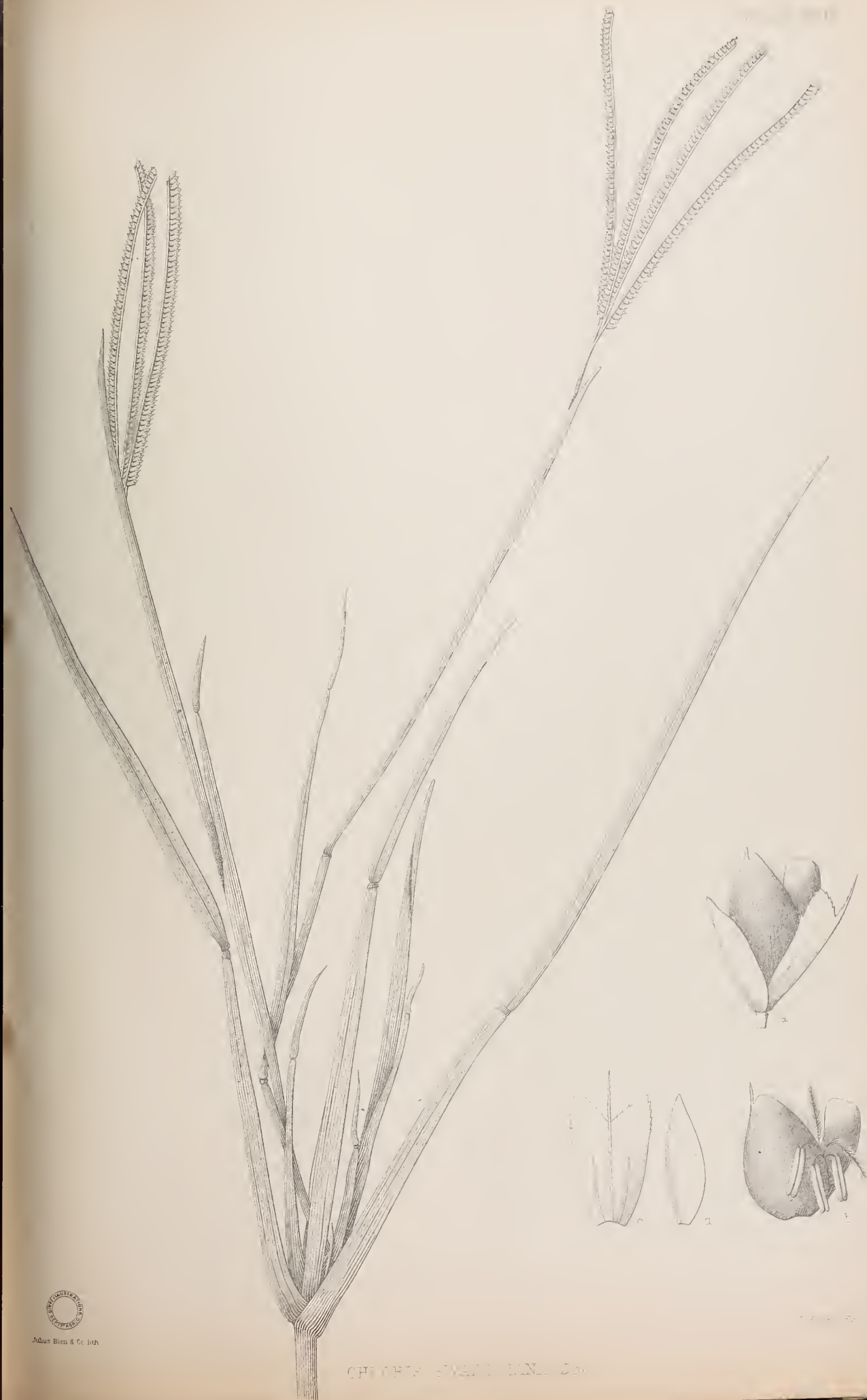
*Inflorescence* a digitate cluster of 3 to 6 sessile, linear, erect, slightly spreading spikes, 2 to 3 inches long, bearing the crowded sessile spikelets in two rows on one side of the slender, scabrid rachis.

*Spikelets* 2-flowered, upper flower sterile; first glume broadly ovate-acute, smooth, 1-nerved, scarious,  $\frac{1}{2}$  line long; second glume obovate, 2 minutely toothed lobes at apex and a short hispid awn formed by the excurrent nerve, hispid on back,  $\frac{3}{4}$  to 1 line long; floral glume, rotund, broadly acute, or rounded and mucronate, coriaceous, brown, ciliate, pubescent on the lower two-thirds of the single nerve, smooth above; palet ovate-lanceolate, convex, obscurely 2-nerved, 1 line long; sterile flower a broadly ovate, truncate glume, folded triangular, brown,  $\frac{1}{2}$  line long.

*Grain* translucent, creamy-white, triangular,  $\frac{1}{2}$  line long, falling with spikelet intact except the empty glumes which are left on the rachis.

PLATE XXIII; *a*, spikelet; *b*, floral glume, sterile flower, stamens and stigmas; *c*, second empty glume; *d*, first empty glume; palet not shown.

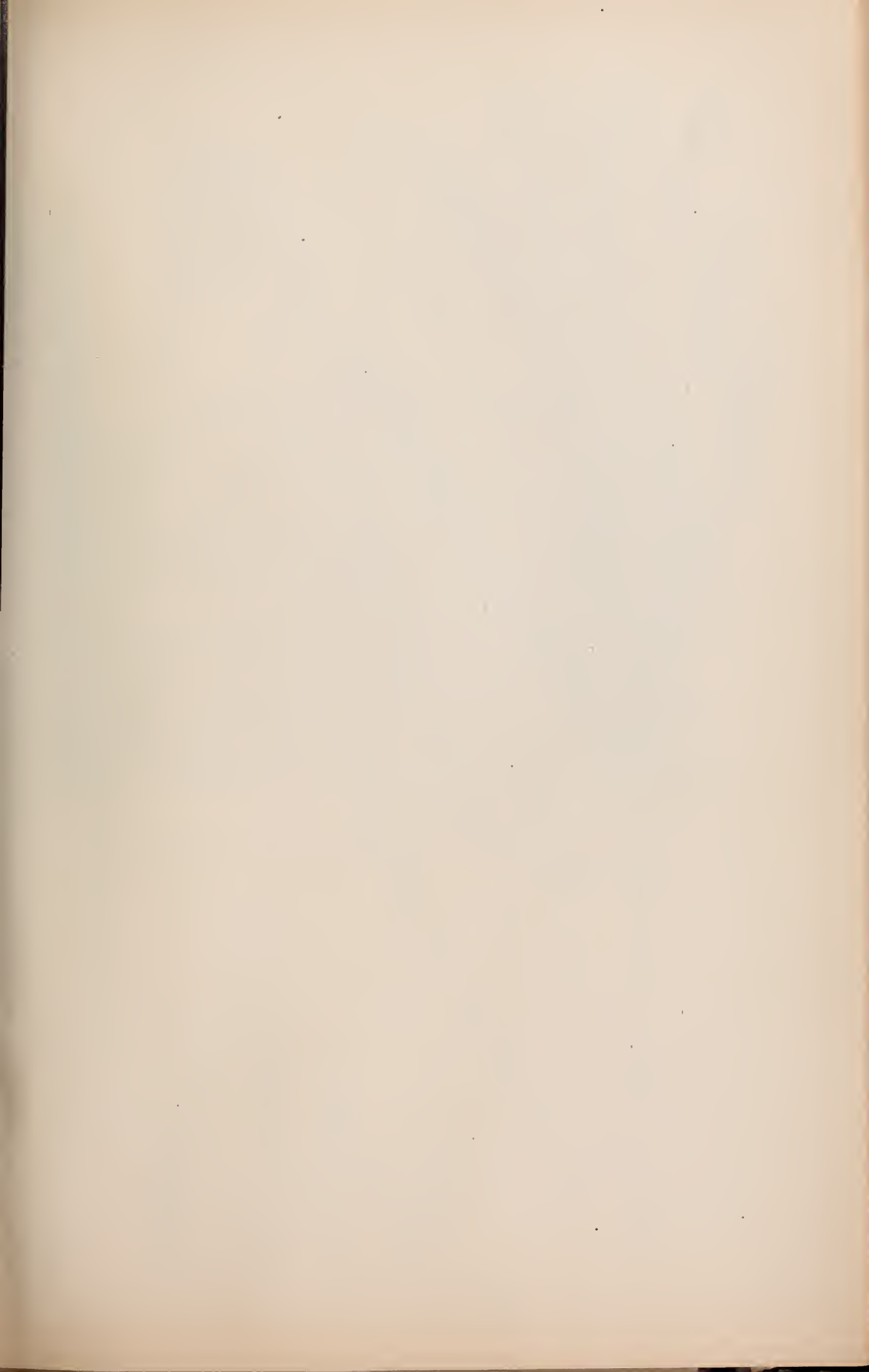
Low grounds near the Gulf, from Florida westward to Texas.



CHLOPS SWARTZ LIN. 200







No. 24.

TRICHLORIS PLURIFLORA Fourn.

*Plant* rather coarse, somewhat glaucous throughout or purplish in the inflorescence.

*Culms* few, from loosely tufted, slightly bulbous base, erect, solid, terete, smooth, rarely branching, 2 to 3 feet tall.

*Leaves*; radical and from sterile culms, numerous, with loose sheaths, and flat, taper-pointed blades, 3 to 4 lines wide and 8 to 10 inches long, scabrous above and below, with scattered hairs near the ligule; of stem 5 to 7; sheath equaling or exceeding internode, loose and open above, smooth; blade like that of the radical leaves; ligule a row of rusty, fine hairs  $\frac{1}{4}$  line long.

*Inflorescence* an obovate panicle of 10 to 15 slightly spreading, narrow, sessile approximate spikes, scattered one or two in a place along the short rachis. Spikes unilateral, rachis hispid, 2 to 4 inches long.

*Spikelets* nearly sessile, with 3 or 4 flowers, the upper ones sterile; first glume narrowly-lanceolate, terminating in an awn-like point, hyaline, about 1 line long; second glume larger,  $1\frac{1}{2}$  to 2 lines long; floral glumes narrowly-lanceolate, scabrous, ciliate on the margins, 1-nerved, 2 lines long, terminating in 3 hispid awns, middle one 4 lines and lateral ones about 1 line long; palet lanceolate, acute, 2-nerved, hyaline margins infolded; upper sterile glumes same as floral glumes but smaller and lateral awns sometimes minute.

*Grain* yellow, narrowly triangular,  $\frac{1}{2}$  line long.

PLATE XXIV; *a*, spikelet; *b*, floral glume; *c*, palet; *d*, empty glumes.

Texas to Mexico.

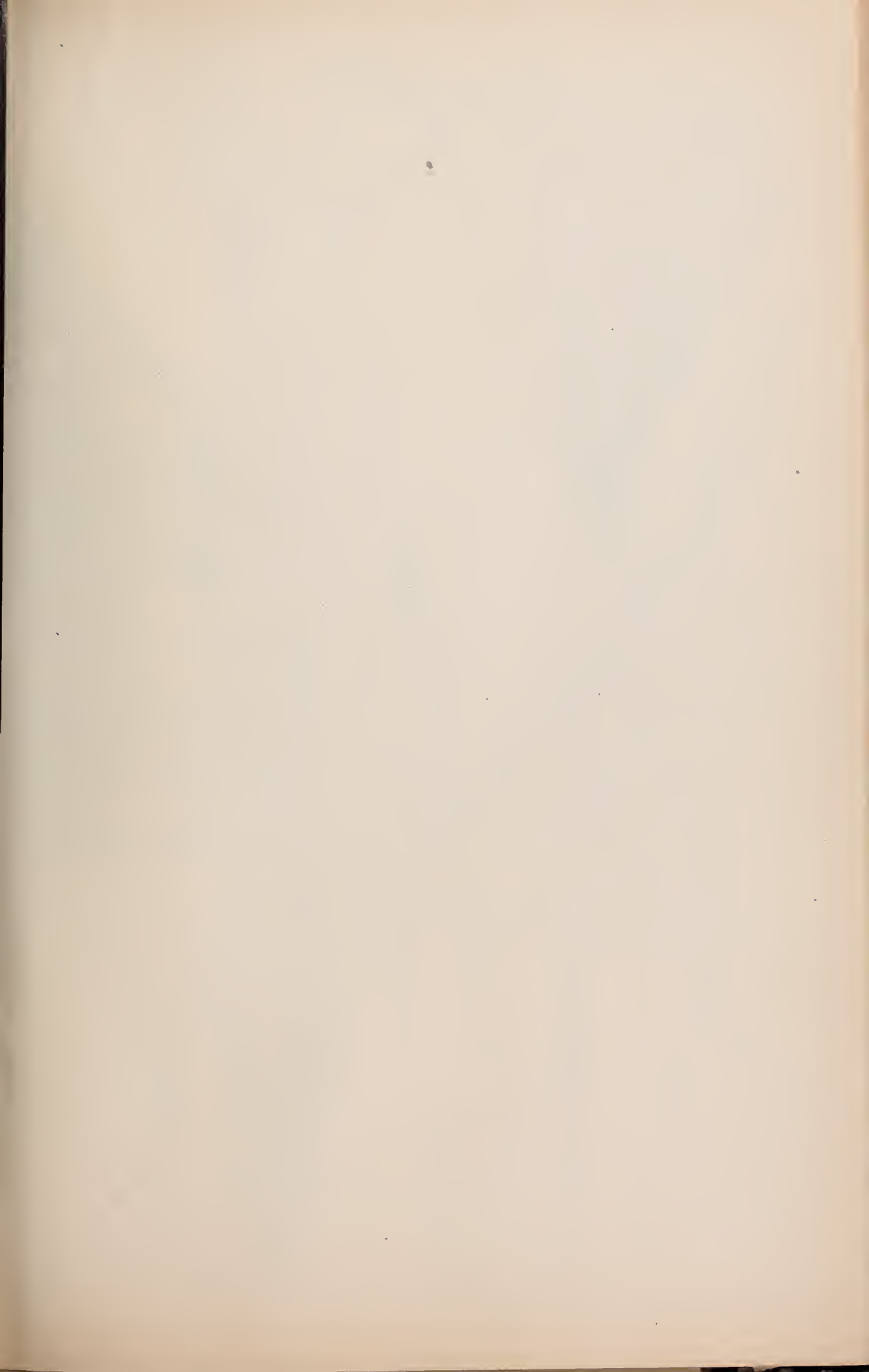




Julius Bien & Co. Lith.

TRICHLORIS PLUMIFERA, DC.





TRICHLORIS VERTICILLATA Fourn. (*Chloropsis Blanchardiana*  
Gay in Herb.)

*Plant* perennial, mostly glaucous, or light-green, or purplish in the inflorescence.

*Culms* tufted from somewhat bulbous base, erect or sometimes prostrate below and rooting at the lower nodes, terete, solid, smooth, 1 to 2½ feet tall.

*Leaves*; radical and from sterile culms, with compressed, hairy-fringed sheaths and hispid, flat or somewhat revolute, slender-pointed blades 3 to 8 inches long; of stem usually 4; lower sheaths equaling nodes, upper ones often much shorter, striate, hispid, hairy along the margins, blade flat or V-shaped with revolute margins, hispid above and below and with scattered white hairs above the ligule, which is a dense row of fine white hairs ½ line long.

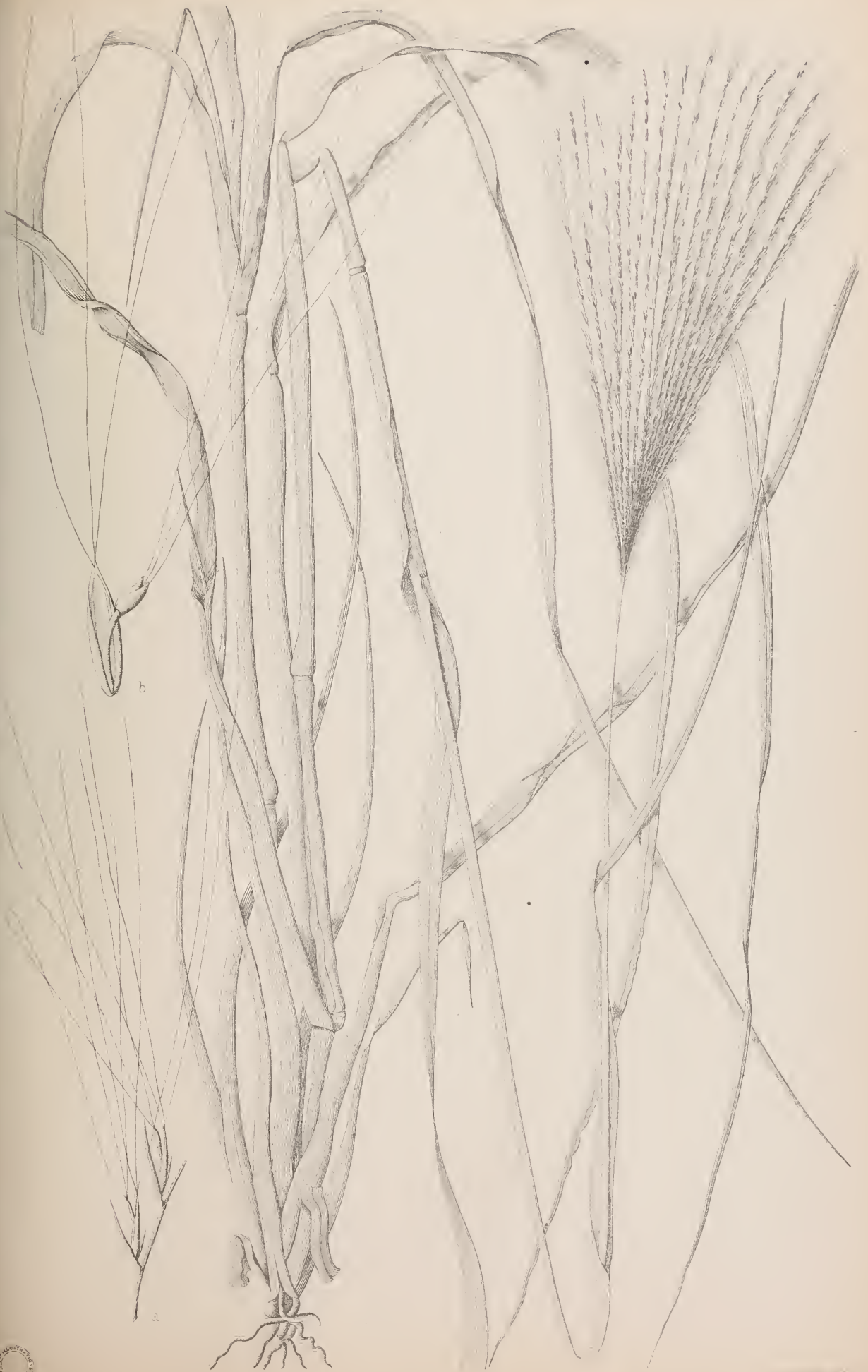
*Inflorescence* an umbellate cluster of 8 to 12 or more narrow, sessile, slightly spreading spikes, 3 to 4 inches long, with the spikelets narrowly-sessile in two rows on one side of the hispid rachis.

*Spikelets* lance-linear, with one fertile and one sterile flower; first glume linear-lanceolate, acute or short awned, hyaline, 1-nerved, ¼ to ½ line long; second glume ovate, ¾ line long, with an awn of equal length; third or floral glume narrowly lanceolate, scabrous on back, obscurely 3-nerved, 1¼ lines long, terminating in 3 scabrous awns 5 to 9 lines long; palea lance-linear, ciliate at the rounded apex, hyaline, 2-nerved, 1¼ lines long; fourth (sterile) glume, cylindrical, filiform, 1 line long, terminating in 3 hispid awns 3 to 6 lines long.

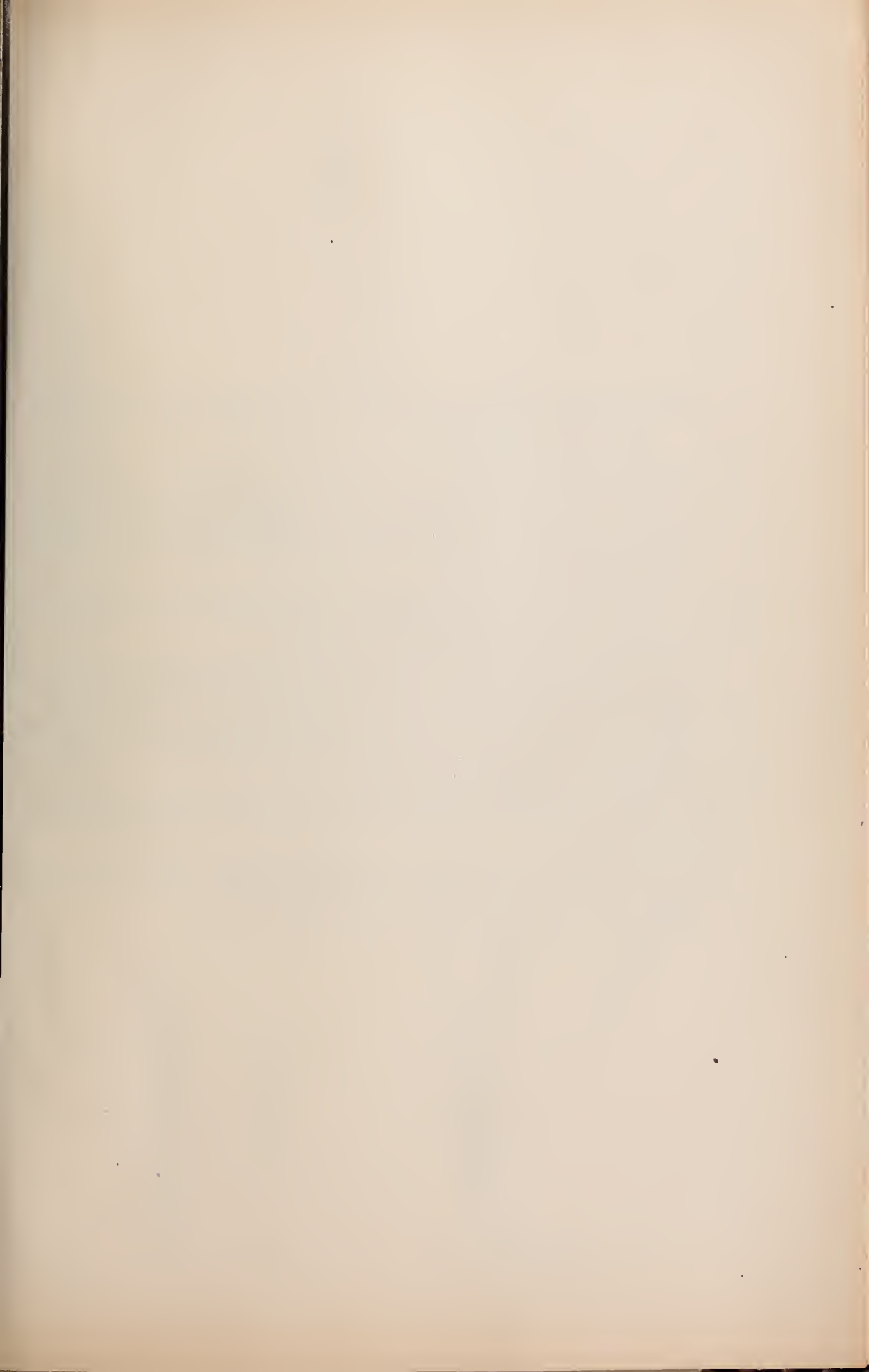
*Grain* lance-elliptic, triangular in cross section, translucent, light yellow, with light orange chit, falling with the spikelet, entire except the persistent empty glumes.

PLATE XXV; *a*, and *b*, spikelets enlarged.

Texas, Arizona to Mexico.







**SCHEDONNARDUS TEXANUS** Steud. (*Lepturus paniculatus* Nutt.)

*Plant* a low straggling annual.

*Culm* tufted and branching at base, spreading, slender, terete, or compressed, hollow, minutely pubescent.

*Leaves*; radical and from radical shoots, numerous, folded, spirally twisted, with short, cartilaginous points; of culm 1 or 2 equaled or exceeded by those of the base; sheaths loose, compressed, open above; blades flat or folded, spirally twisted, smooth, 2 to 3 inches long; ligule ovate, acute, lacerate, decurrent in scarious margins down the sheath.

*Inflorescence* a loose racemose panicle, the spikelets sessile and appressed in excavations in the horizontally spreading branches, which are 1 to 4 inches long, alternate and distant on the triangular hispid rachis.

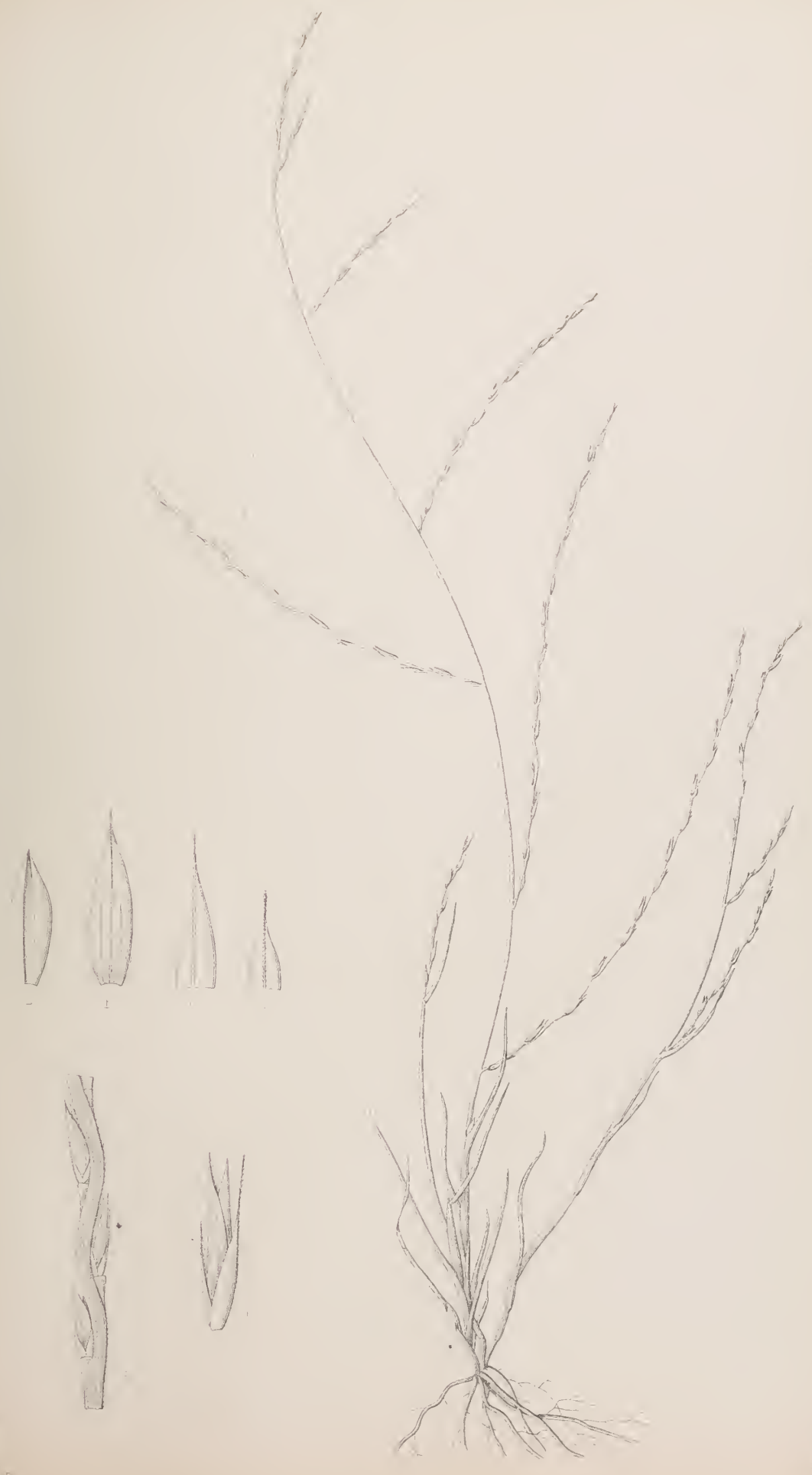
*Spikelets* 1-flowered, narrow,  $1\frac{1}{2}$  to 2 lines long; first glume lanceolate, sometimes toothed on the margin, scarious-margined,  $\frac{3}{4}$  line long, sometimes 1 sided, 1 prominent hispid nerve, sometimes excurrent in an awn one-half as long as the glume; second glume same but nearly twice as large; floral glume narrowly lanceolate, acute or mucronulate, 3-nerved, rounded on back, hispid on the midnerve, slightly pubescent at base,  $1\frac{1}{2}$  lines long; palet ovate, obtuse, or slightly toothed, round on back, hyaline, 2-nerved,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  lines long.

*Grain* dark reddish, translucent-amber, with darker oblique chit extending one-third way from base, narrowly cylindrical, 1 line long, falling free or with disarticulate branch.

PLATE XXVI; *a*, branch with spikelets in position; *b*, spikelet; *c*, second empty glume; *d*, first empty glume; *e*, palet; *f*, floral glume.

Texas to Arizona, northward to Dakota and British America.

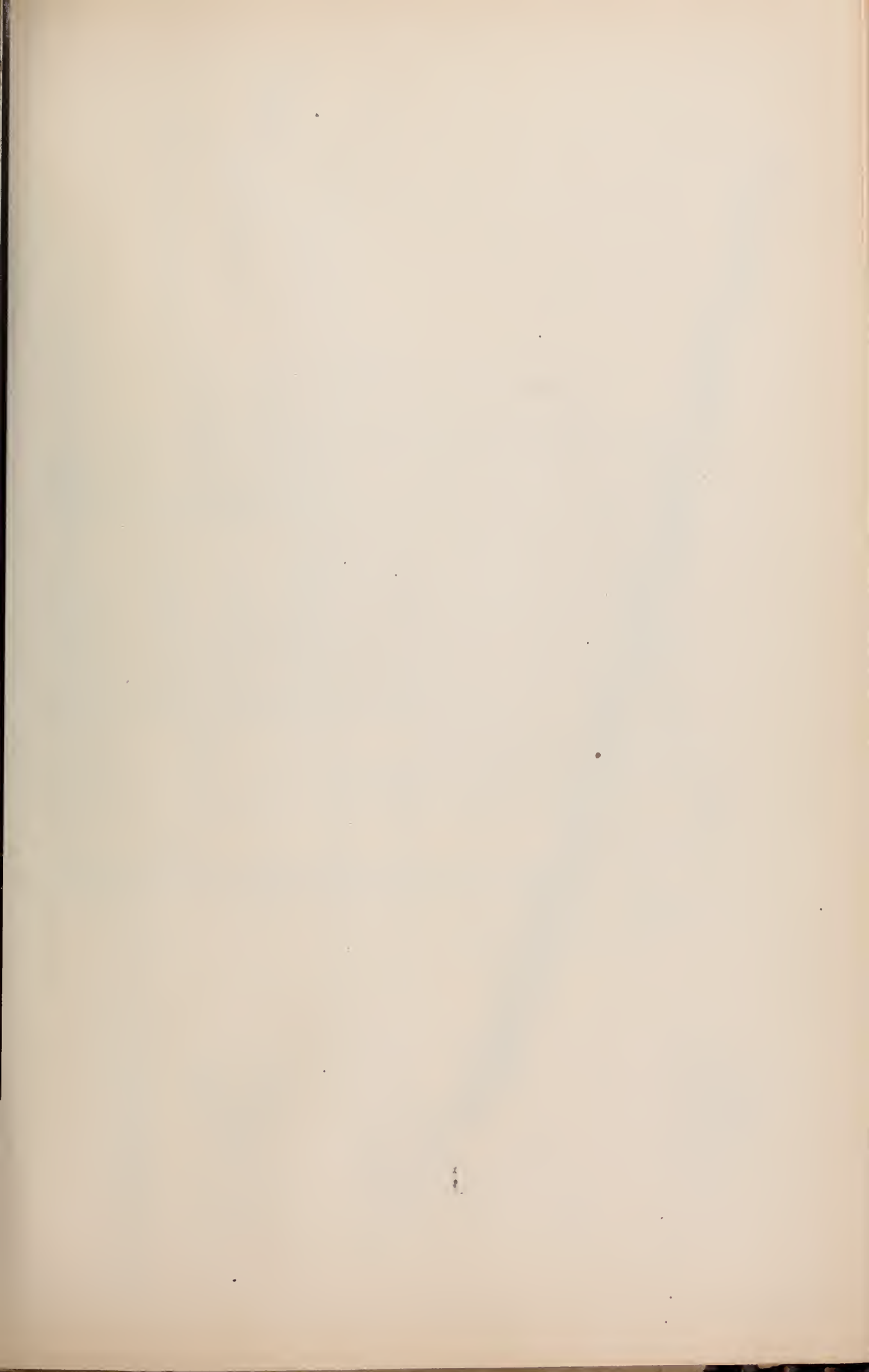




SCHIZANTHUS TEXANUS (WALP.)







PAPPOPHORUM APERTUM Munro, in Herb.

*Plant* perennial, loosely tufted with somewhat bulbous base.

*Culms* erect, not branched, solid, terete, smooth, 18 to 30 inches tall.

*Leaves*; radical few and small; from radical shoots, with slightly hispid sheaths, and narrow, involute blades, 4 to 10 inches long; of culm 3 or 4; sheaths nearly equaling or often exceeding internodes, slightly hispid; blade involute, hispid above, 2 lines wide with long tapering point, 6 to 10 inches long; ligule a rather conspicuous, loose hairy fringe  $1\frac{1}{2}$  to 2 lines long.

*Inflorescence* a close, linear, spike-like, panicle, 6 to 10 inches long, with short branches below, none above, often included at base.

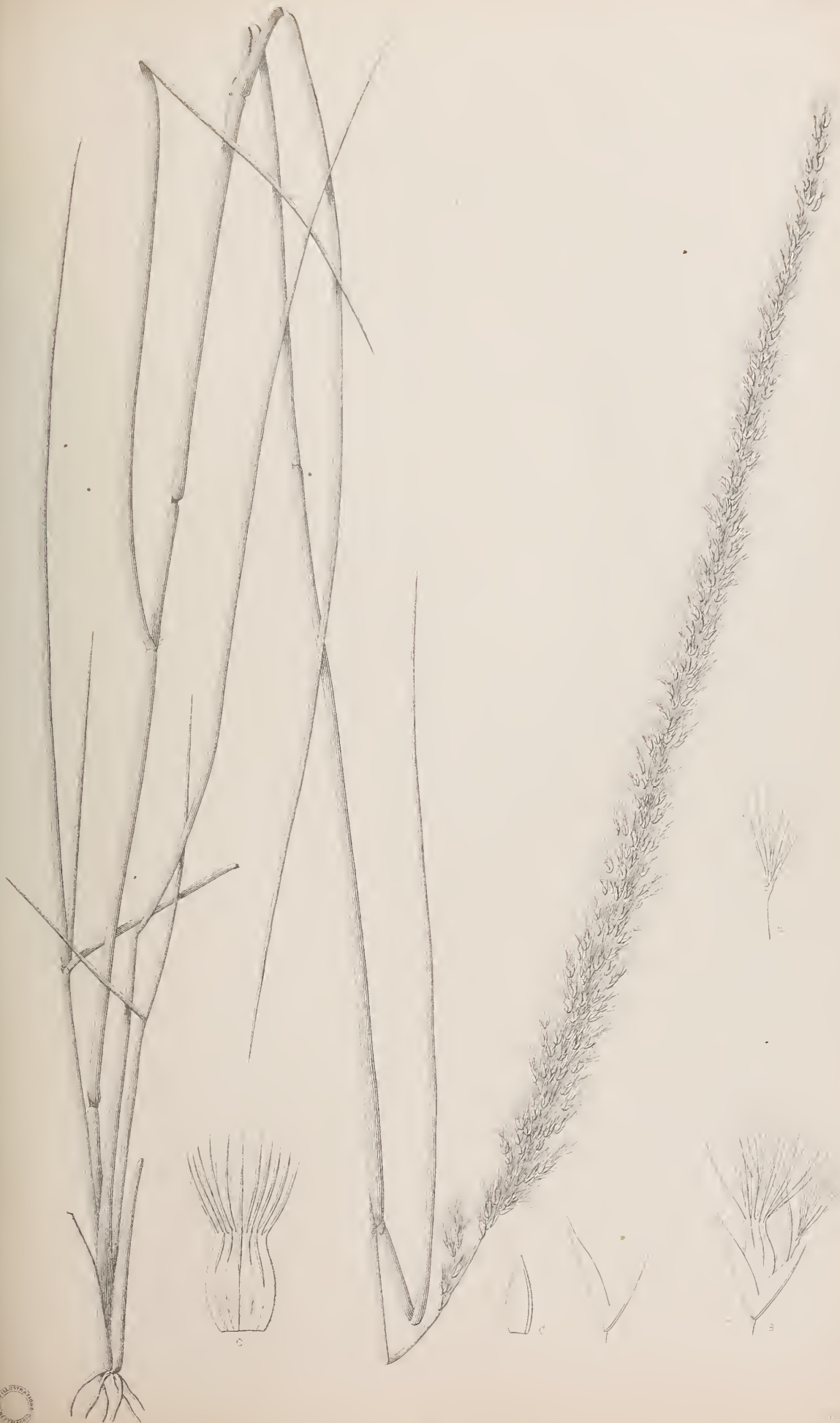
*Spikelets* oblong, 3-flowered (upper one sterile), 2 lines long, on short hispid pedicels less than  $\frac{1}{2}$  line long; first glume lanceolate acute, carinate, hyaline, minutely hispid on keel, 1-nerved,  $1\frac{3}{4}$  lines long; second glume same but  $\frac{1}{4}$  line longer; floral glumes vasiform, nearly square unrolled, pubescent especially below, 1 line long, 7-nerved, each nerve terminating in a hispid awn 2 lines long, and alternating with these are 7 or 8 slightly smaller awns; sterile glume similar but half as large and raised on an internode of the rachilla  $\frac{1}{2}$  line long; palea lanceolate, lacerate at apex, 2-keeled,  $1\frac{1}{2}$  lines long.

*Grain* narrowly lanceolate, light brown, 1 line long, falling with the entire spikelet, except the persistent empty glumes.

PLATE XXVII; *a*, spikelet; *b*, empty glumes; *c*, floral glume; *d*, palea; *e*, sterile upper flower

There is a variety of this species with much looser inflorescence, the lower branches 1 to 2 inches long, flowering mostly to the base and subdivided; spikelets purplish.

Western Texas to Arizona.



PAPPOPHYS PUMILUS (L.) B. & P.







PAPPOPHORUM WRIGHTII Watson. (*P. boreale* Torr. non Griseb.)

*Plant* perennial (?) from densely tufted, bulbous base.

*Roots* fibrous, flexuous.

*Culms* erect or ascending, geniculate at the lower nodes, branching, slender, solid, terete, minutely pubescent with long white hairs at the nodes, 10 to 15 inches tall.

*Leaves* of radical shoots numerous, minutely pubescent, blade filiform-involute, 2 to 4 inches long; of culm 4 to 6; sheaths shorter than the internodes, loose, open; blade filiform-involute, 1 to 3 inches long; ligule a dense line of hairs  $\frac{1}{4}$  inch long.

*Inflorescence* a compact, spike-like panicle, 1 to 3 inches long, simple, or with numerous short appressed branches below.

*Spikelets* on short hispid pedicels, about 3-flowered, 1 line long; empty glumes lanceolate, acutish, 5-nerved; hyaline, sparsely pubescent,  $\frac{3}{4}$  line long; second glume same but  $\frac{1}{4}$  longer; floral glumes broadly oval, pubescent, 1 line long and nearly as broad; 5 nerves terminating in feathered awns  $1\frac{1}{4}$  lines long, purple at base, 4 similar intermediate awns alternating; sterile glume similar but smaller and raised on a longer internode of the rachilla; palet elliptical, hyaline, 2-keeled, nerves rather inconspicuous,  $\frac{3}{4}$  line long.

*Grain* about oval, dull-yellow, falling with the floret.

PLATE XXVIII; *a*, spikelet dissected; *b*, sterile flowers; *c*, floral glume; *d*, palet.

Texas to California and Mexico.





PAPPOPHORUM WRIGHTII Watson

T. Holm. del.







## COTTEA PAPPOPHOROIDES Kunth.

*Plant* perennial from a short, scaly rootstock, light green or often purplish in the inflorescence and lower sheaths.

*Culms* loosely tufted at base, erect or somewhat spreading, branching, hollow, terete, pubescent, 1 to 2 feet tall.

*Leaves*; radical and from radical shoots few and small; of culm 7 to 10, sheaths close, minutely cinerous pubescent, nearly equaling or usually exceeding the internodes; blade flat or involute toward the tapering point, somewhat scabrous on both sides,  $1\frac{1}{2}$  to 2 lines wide, 3 to 6 inches long; ligule a minute hairy fringe.

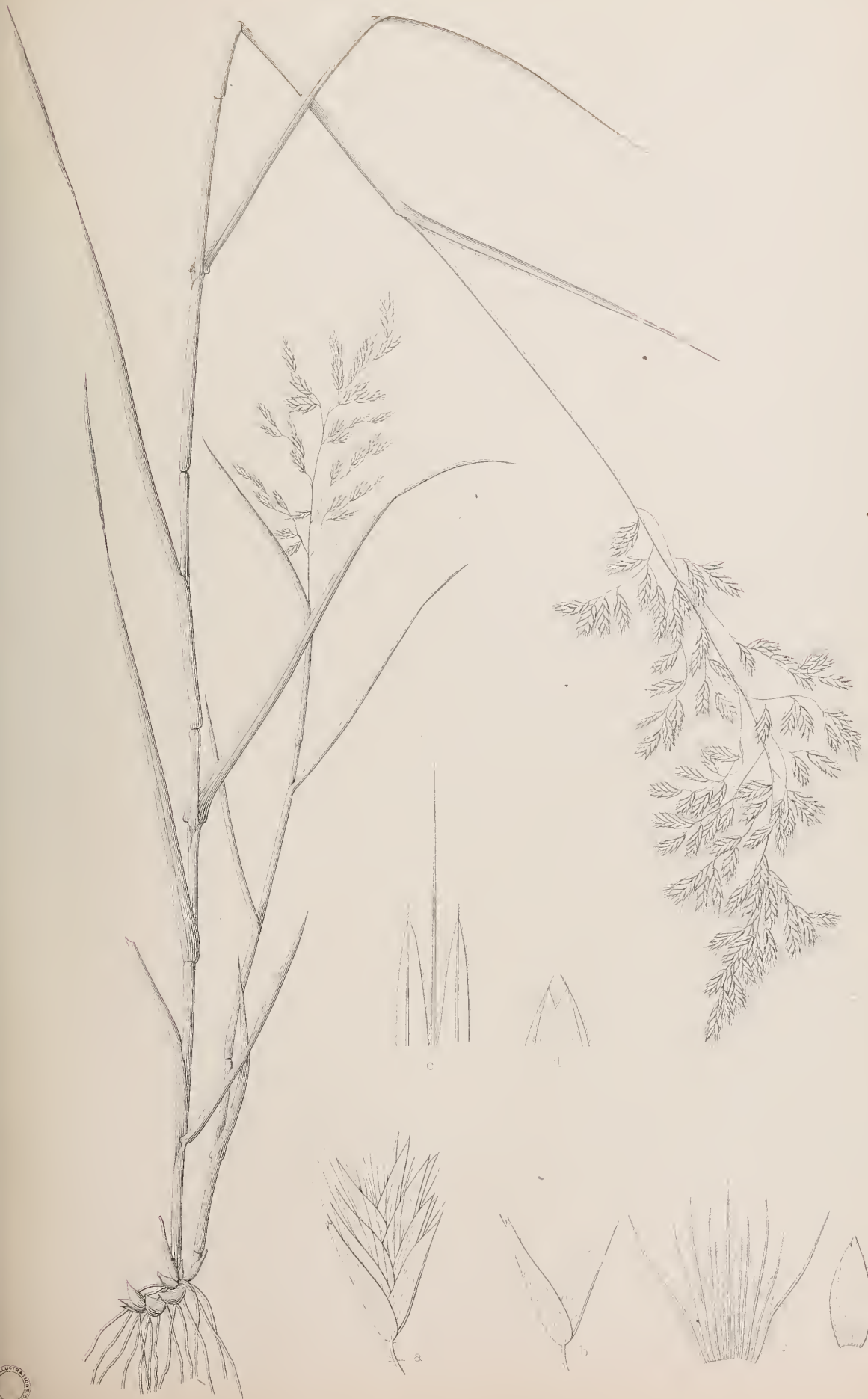
*Inflorescence* a rather close, or becoming loose, lanceolate or narrowly pyramidal panicle, 3 to 6 inches long, peduncle but little exerted, rachis pubescent, nearly terete; branches mostly alternate, flower-bearing nearly to the base, slightly spreading, 1 to 2 inches long, bearing the spikelets on short pubescent pedicels.

*Spikelets* obovate, flat, 7- to 10-flowered, 3 to 4 lines long; empty glumes oblong or oblong-ovate, nearly equal, 2 lines long; first glume irregularly 3-toothed at apex, about 13-nerved, pubescent on back, margins hyaline; second glume acutish or short awned, about 9-nerved, with hyaline margins, less pubescent than first glume; floral glumes obovate, 1 to  $1\frac{1}{2}$  lines long, pubescent especially at base, about 15-nerved, cleft above into 11 narrow divisions, the outer more deeply cleft, and ciliate on the margins, with long white hairs, each terminating in a hispid awn  $\frac{1}{2}$  to  $1\frac{1}{2}$  lines long; palet lanceolate, with 2 pubescent nerves continuing and connivent about the cleft apex, narrow hyaline margins infolded,  $1\frac{1}{4}$  lines long.

*Grain*, dull whitish yellow, oblong, slightly curved, falling with the disarticulated spikelet or easily escaping free.

PLATE XXIX; *a*, spikelet; *b*, empty glumes; *c*, floral glumes; *c*<sup>1</sup>, part of apex of floral glume enlarged; *d*, palet; *d*<sup>1</sup>, apex of palet. The figure *b* does not show the full number of nerves.

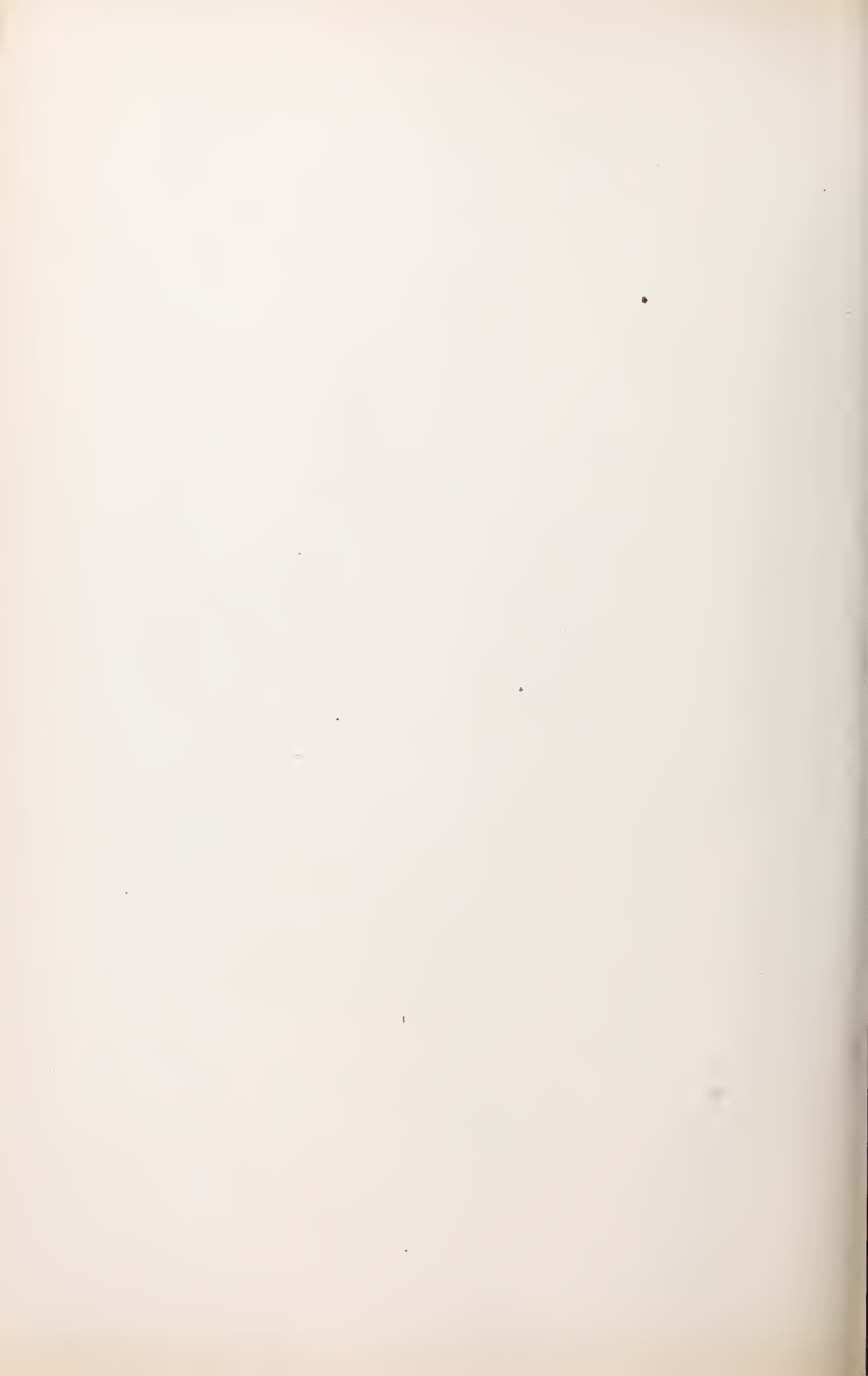
Texas to Arizona and Mexico.



COTLEA FAPPOPHOROIDES. X 6

T. Holm. det.







SCLEROPOGON KARWINSKIANUS Benth. (*Lesourdia* Fourn.)

*Plant* perennial, from horizontal rootstock, culms of the season often rising from branches thickly covered with pubescent scales which are the bases of the leaf sheaths of previous seasons; new growth, rather glaucous throughout.

*Culm* ascending, slender, terete, smooth, branching below, 6 to 12 inches tall.

*Leaves* of sterile culms, and radical, numerous, with flat blades 1 to 2 inches long; of culm 2 or 3; sheaths usually much shorter than internodes, close, smooth; blade flat or folded, hispid on the back of the midnerve toward the rigid point, 1 line wide, 1 to 2 inches long; ligule a dense row of minute stiff bristles,  $\frac{1}{3}$  line long.

*Inflorescence* unisexual, flowers on distinct culms. *Male flowers* forming a short, close panicle of 5 to 8 spikelets on short pedicels, often subtended by a narrow bract on the rachis. Spikelets 15- to 30-flowered, 2 to 3 lines wide,  $\frac{1}{2}$  to  $1\frac{1}{4}$  inches long, rachilla glabrous, internodes  $\frac{2}{3}$  line long; first and second glumes equal, narrowly lanceolate, acute, carinate, scarious, smooth, 1-nerved, 2 lines long; floral glumes lance-ovate, acute or often with short awn and 2 or 4 teeth at apex, scarious, 3-nerved, smooth,  $2\frac{1}{2}$  to  $3\frac{1}{2}$  lines long; palet oblong, flat, with margins infolded, scabrous on the two nerves.

*Female flowers* forming an irregular narrow panicle of 3 to 7 few-flowered spikelets, each subtended by a narrow bract; first glume narrowly lanceolate, with long, tapering point, smooth, obscurely 5-nerved, 4 to 6 lines long; second glume lanceolate, smooth, 3-nerved, 6 to 8 lines long; internodes of rachilla 1 line long, stipe bristly pubescent; floral glume linear, 4 to 5 lines long, the 3 nerves terminating in slender twisted awns, 2 to 5 inches long, with membranaceous expansions at the sides between each awn; palet lanceolate, acute or somewhat lacerate at the apex, hispid on the 2 nerves above, scarious margins folding closely over the grain, 4 to 5 lines long.

*Grain* light amber color, cylindrical, bifid at top, 2 lines long.

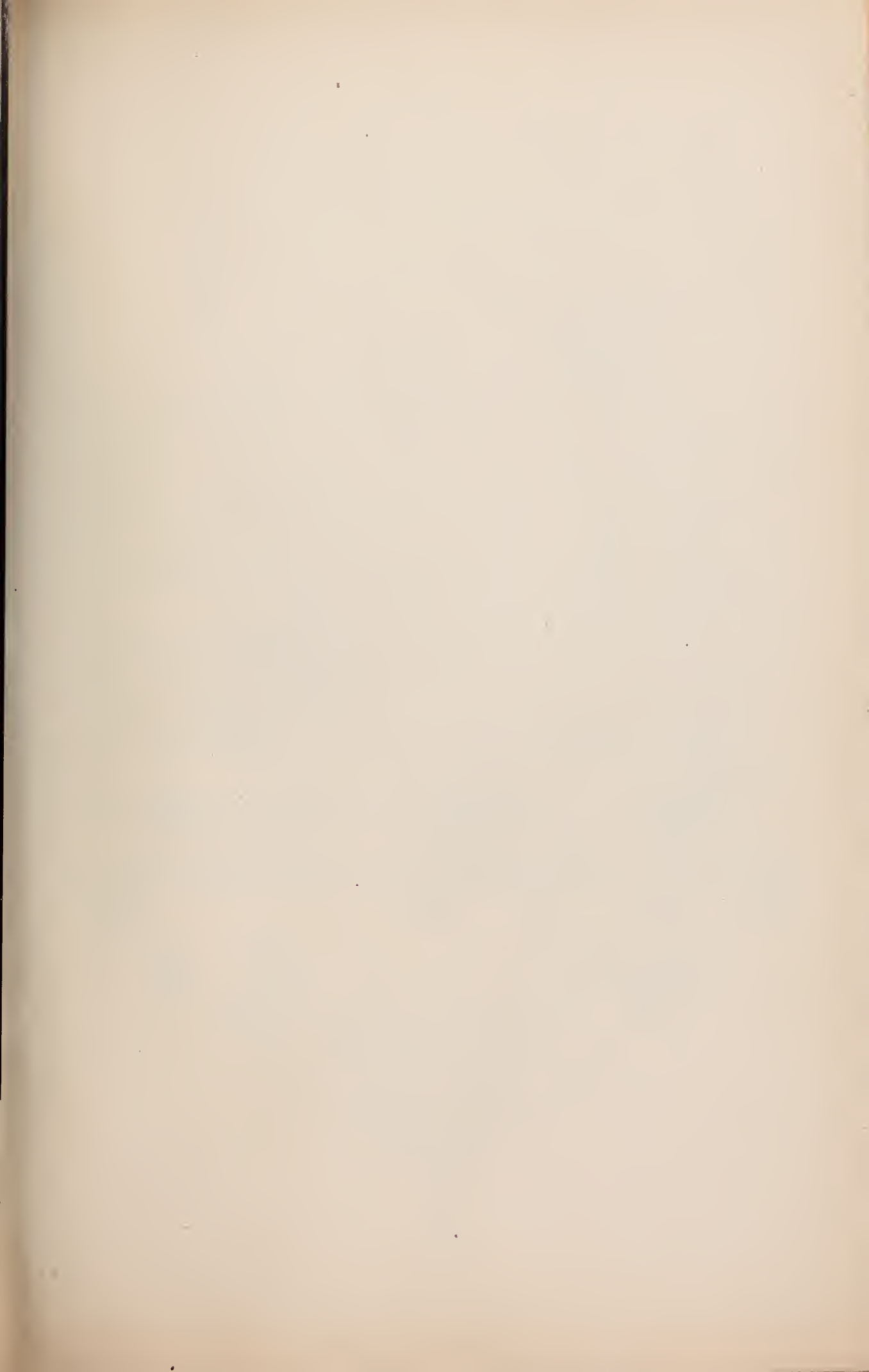
PLATE XXX; 1, staminate plant; 2, pistillate plant; *a*, staminate flower; *b*, pistillate spikelets partly dissected and the awns cut off; *c*, floral glume of pistillate flower spread out, dorsal view.

Western Texas and Arizona to Mexico,









MUNROA SQUARROSA Torr. (*Crypsis squarrosa* Nutt.)

*Plant* annual, low, glaucous, more or less woolly throughout or glabrous except at the nodes.

*Root* slender, filiform.

*Culm* tufted, spreading, often prostrate, fasciculately branched, primary stems 2 to 4 inches long, secondary shorter, naked internodes striate, angular, and hispid on the angles.

*Leaves* ; radical and from sterile culms numerous, with flat blades  $\frac{1}{2}$  to 1 inch long ; of stem several, crowded with the spikelets at the nodes, or ends of branches ; sheaths short, membranaceous, 7-nerved, ciliate ; blade flat, hispid, ciliate, acute,  $\frac{1}{2}$  to 1 inch long ; ligule a row of short, fine hairs.

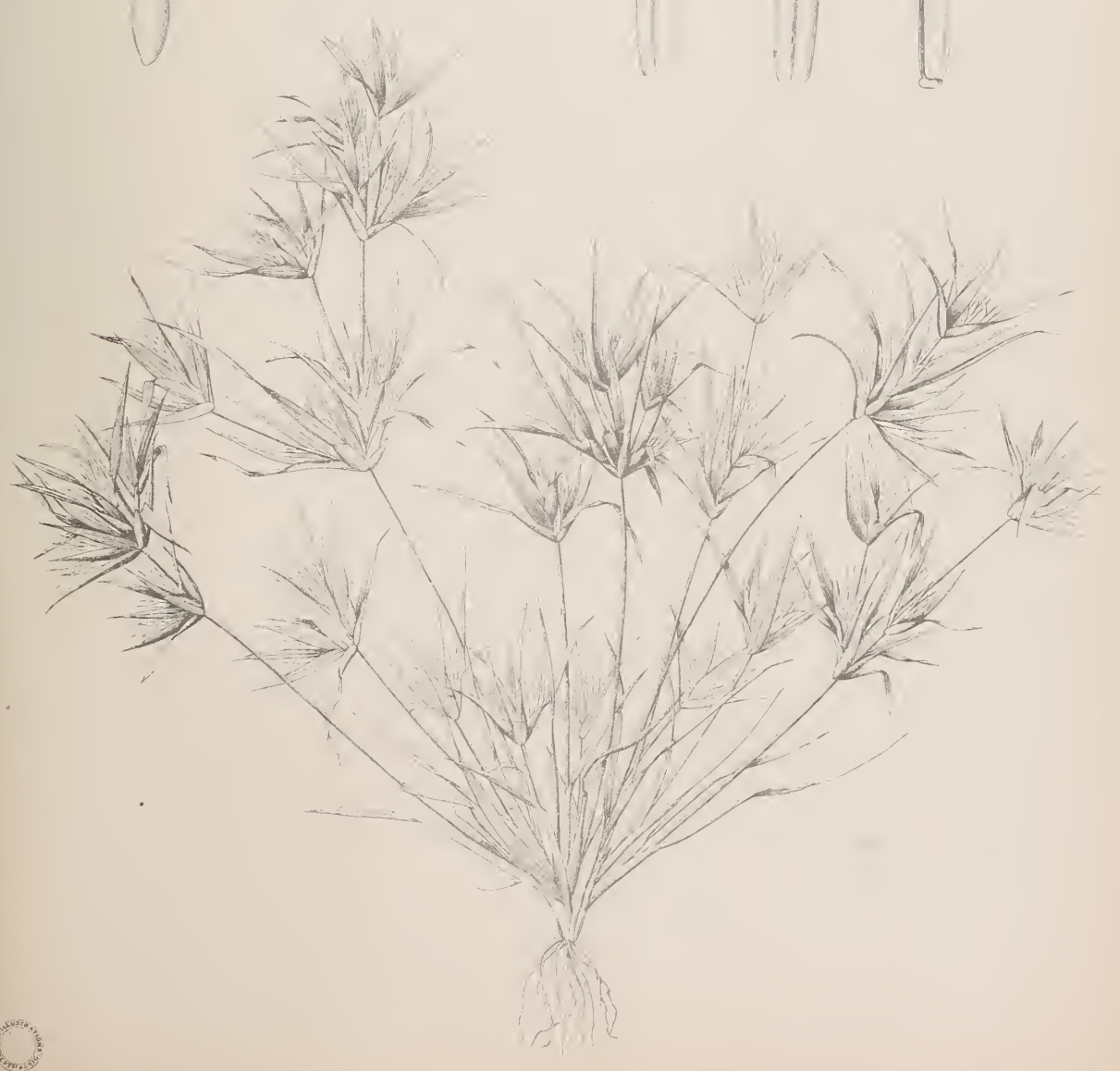
*Inflorescences* hidden in the tufts of leaves at the nodes and ends of branches.

*Spikelets* 3- to 5-flowered, crowded in dense clusters at the apex of the branches ; first glume narrowly lanceolate, hyaline, 1-nerved,  $1\frac{1}{4}$  lines long ; second glume same but  $\frac{1}{4}$  line longer ; floral glumes herbaceous, becoming coriaceous, 3-nerved, tufts of pubescence on lateral nerves and near base of keel, entire or 2-toothed, 2 to  $2\frac{1}{2}$  lines long, the central nerve excurrent in a short awn ; palet narrow, hyaline, pubescent on the two nerves complicate ; upper flower in spikelets usually sterile.

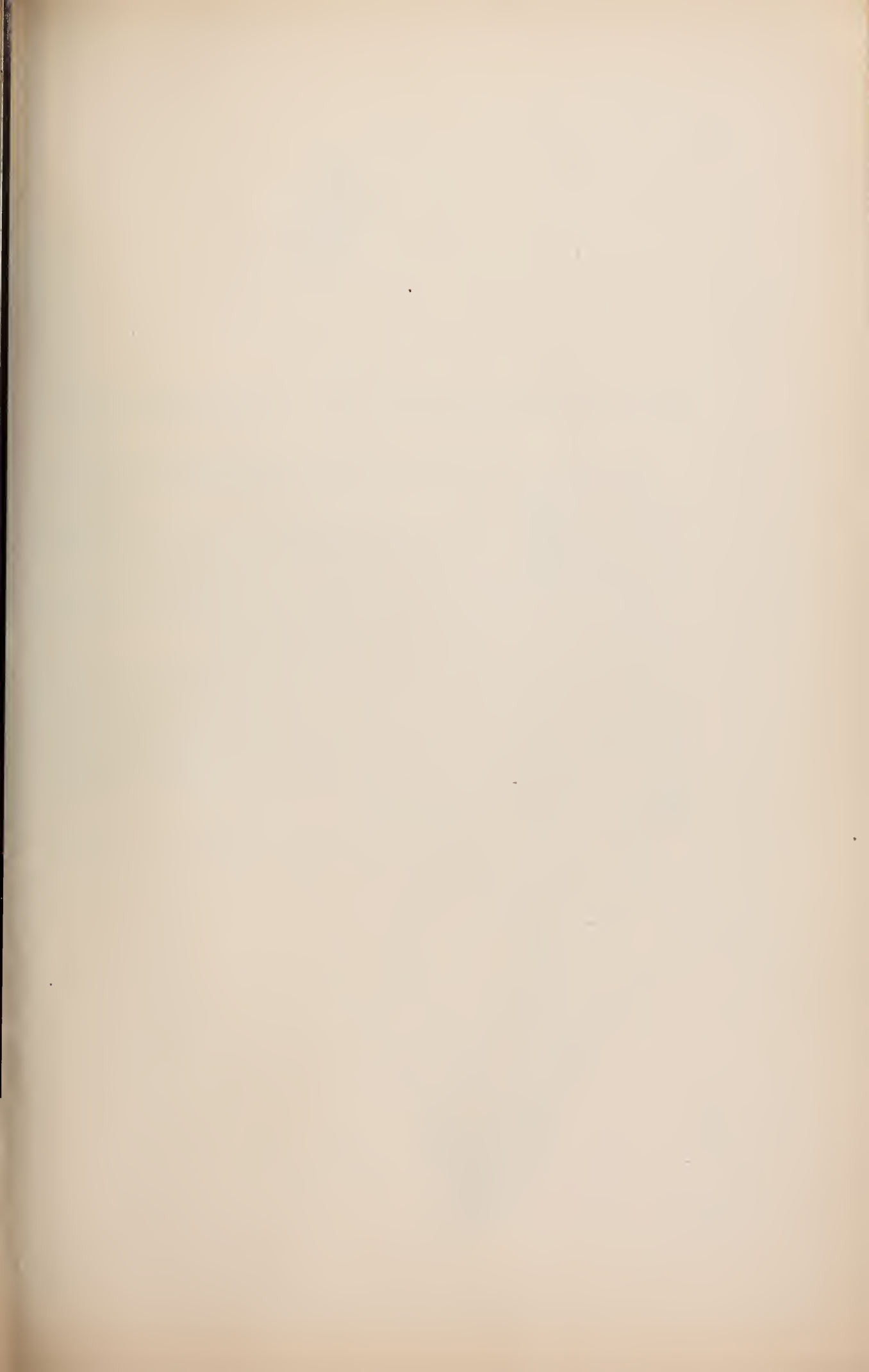
*Grain* translucent, cream-white, lance-oval,  $\frac{1}{2}$  to  $\frac{1}{4}$  line long.

PLATE XXXI ; 1, cluster of spikelets ; 2, spikelet ; 3, second empty glume ; 4, first empty glume ; 5, floral glume, side view, and 6, same spread out, dorsal view ; 7, palet ; 8, pistil ; 9, mature grain.

A low, tufted grass growing on elevated plains from Mexico to British America, usually associated with *Buchloë dactyloides*, but not liked by cattle.







TRIODIA ACUMINATA (Munro.) Vasey. (*Tricuspis acuminata* Munro in Herb.)

*Plant* annual or short-lived perennial, tufted with rather bulbous base.

*Culms* erect, slender, not branching, slightly compressed, smooth or sparsely pubescent, 6 to 12 inches tall.

*Leaves*; radical, numerous, with short, tapering, compressed sheaths, and flat or folded, abruptly pointed, pubescent blades, 2 to 3 inches long; of culms 2 or 3; sheaths mostly shorter than internodes, close, nearly smooth; blades like those of radical leaves but shorter; ligule a minute, bristle-like fringe.

*Inflorescence* a contracted, close head or panicle, 1 to 2 inches long, light colored or often purplish, composed of 7 to 15 nearly sessile, densely flowered spikelets or branches,  $\frac{1}{2}$  to  $\frac{3}{4}$  inch long, sometimes interrupted below.

*Spikelets* lanceolate, compressed, 9- to 12-flowered, 2 to 3 lines wide, 5 to 7 lines long; internode of pubescent rachilla less than  $\frac{1}{4}$  line long; first glume ovate, acuminate, or awl-pointed, carinate, scarious, smooth, 1-nerved, 2 to  $2\frac{1}{4}$  lines long; second glume same but nearly  $\frac{1}{2}$  line longer; floral glumes ovate, acuminate, slightly obtuse or somewhat 2-toothed at apex, carinate, membranaceous, pubescent on the 3 nerves at base, 2 to  $2\frac{1}{2}$  lines long, 2 lateral nerves marginal, midnerve ex-current in a short slender awn; palet lanceolate, finely pubescent on the two prominent keels and at base, 1 to  $1\frac{1}{2}$  lines long.

*Grain* irregularly spindle shaped, light-green,  $\frac{1}{2}$  line long.

PLATE XXXII; *a*, spikelet; *b*, empty glumes; *c*, floral glume; *d*, palet.

Texas to Arizona, and Mexico.

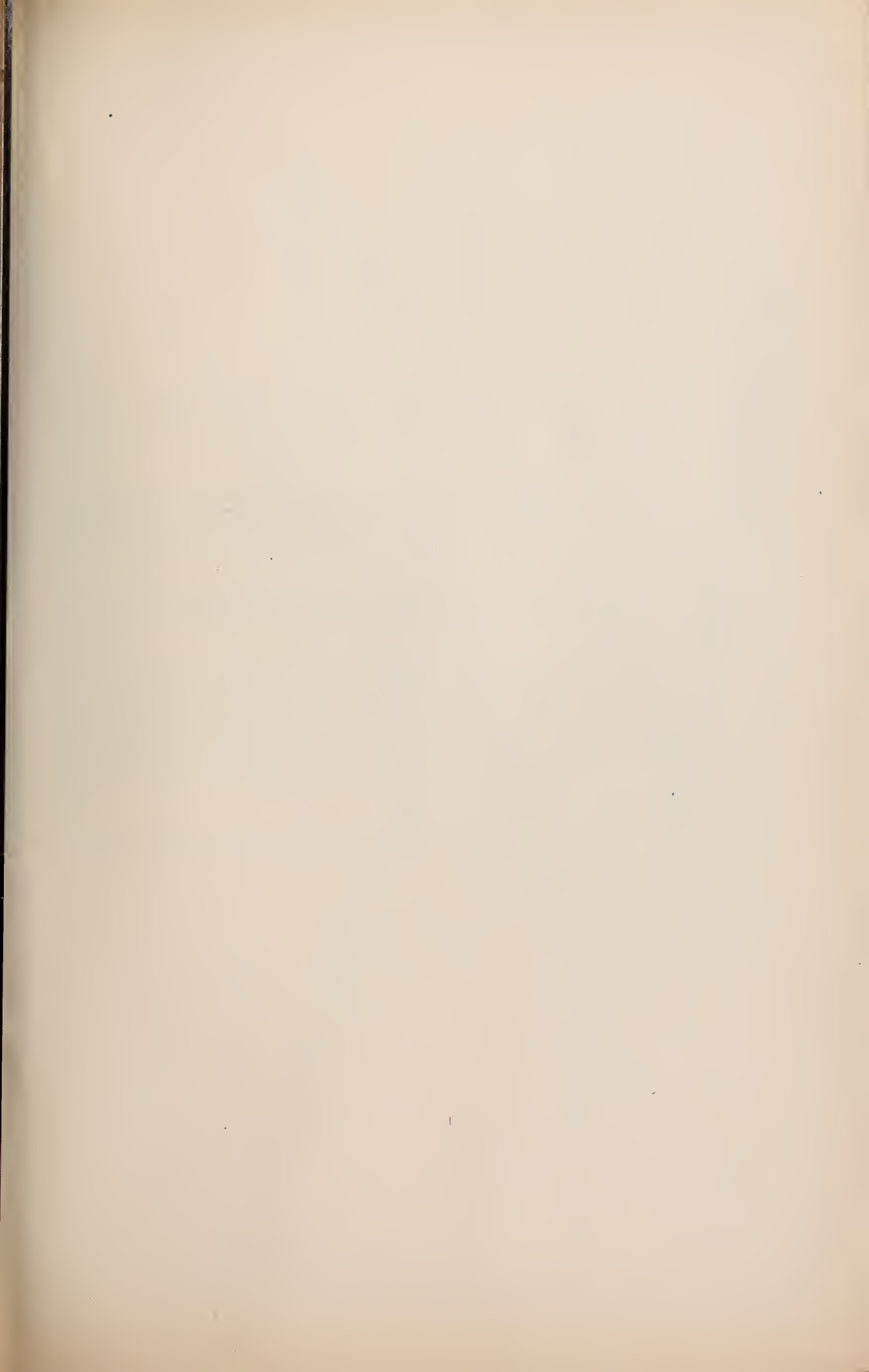




TRIDIA ACUMINATA MUNRO 1821







TRIODIA ALBESCENS (Munro). (*Tricuspis albescens* Munro in Herb.)

*Plant* perennial, with slightly thickened base, smooth and often glaucous throughout.

*Roots* coarse.

*Culms* loosely tufted, erect, solid, terete, not branching, 15 to 30 inches tall.

*Leaves*; radical, sheaths short and open; blades flat or folded, involute, slender-pointed, 2 to 3 lines wide, 5 to 12 inches long; of culm 2 to 4, sheaths shorter than internodes, open above; blades like those of radical leaves; ligule a dense line of short, fine hairs.

*Inflorescence* a slender, contracted, close panicle, somewhat interrupted below, erect or slightly nodding,  $\frac{1}{2}$  inch wide, 4 to 8 inches long; branches appressed, unequal,  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches long, bearing along their entire length rather crowded short-pedicelled spikelets.

*Spikelets* oval, compressed, 8- to 12-flowered,  $2\frac{1}{2}$  to 3 lines long and  $\frac{2}{3}$  as wide; first and second glumes nearly equal, second, slightly larger, broadly ovate, acute, carinate, hyaline, smooth, 1-nerved,  $1\frac{1}{2}$  lines long; internodes of rachis curved,  $\frac{1}{4}$  line long or less; floral glume broadly-elliptical, 3-nerved, emarginate or nearly entire, hyaline, smooth, or nearly so, midnerve slightly if at all excurrent, lateral nerves not marginal; palet broadly ovate, obtuse, 2-keeled with the margins folded flat,  $1\frac{1}{4}$  lines long.

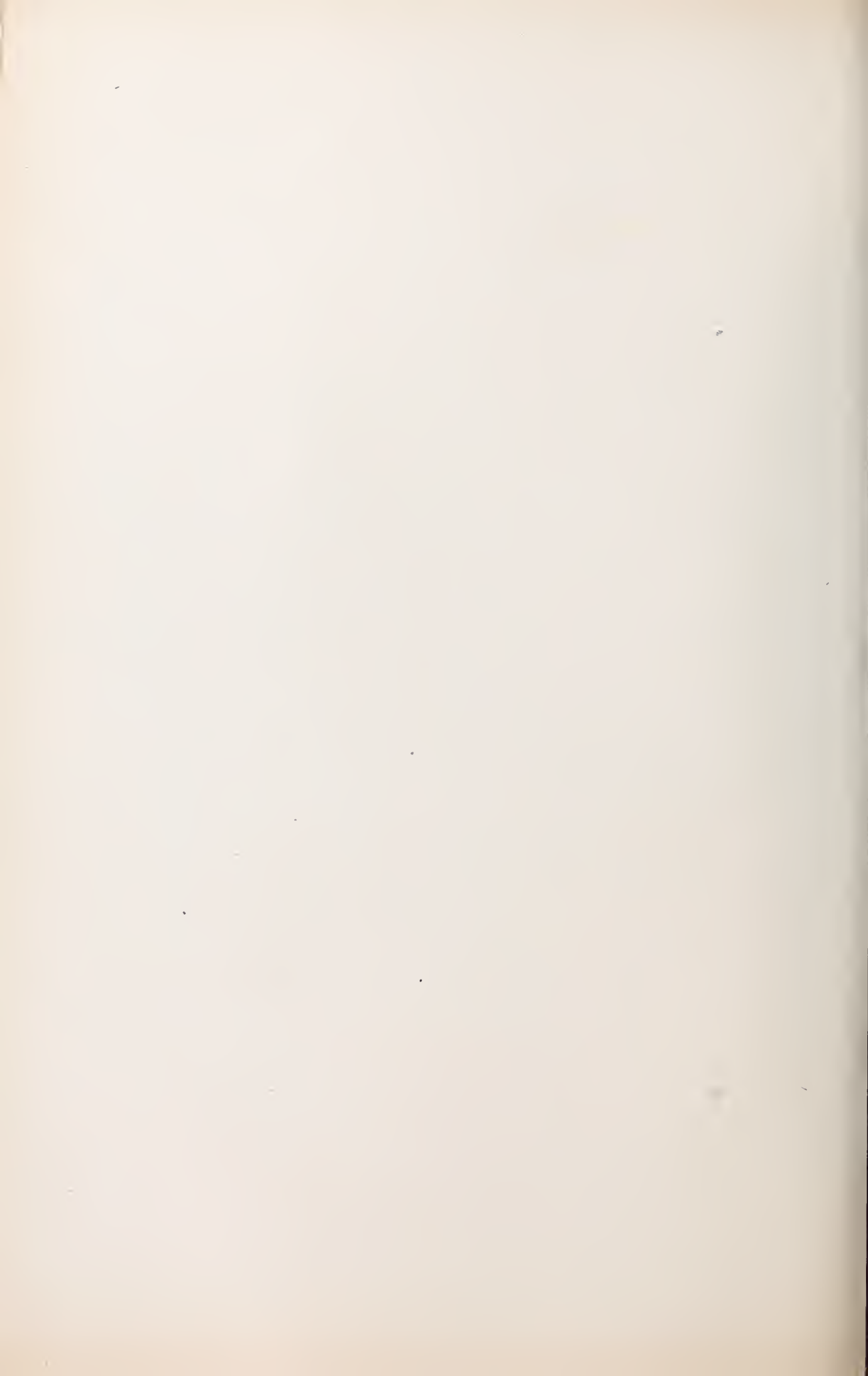
*Grain* elliptical, yellow,  $\frac{1}{2}$  line long.

PLATE XXXIII; *a*, spikelets; *b*, empty glumes; *c*, floral glumes; *d*, palet.

Texas and New Mexico.



TRIFLUA ALBER EUCALYPTI





TRIODIA ERAGROSTOIDES Vasey & Scrib.

*Plant* annual or short-lived perennial, with slightly thickened base.

*Culms* erect, branching, solid, terete, smooth, 2 to 3 feet tall.

*Leaves*; radical, few; of culm 5 to 9, sheaths usually exceeding the internodes, rather loose and open above, striate and slightly scabrous, blades flat or involute toward the long tapering point, scabrous on both sides, 2 to 3 lines wide, 6 to 10 inches long; ligule membranaceous, truncate, lacerate, tawny, 1 line long.

*Inflorescence* a loose, spreading, lance-ovate, or pyramidal, erect or drooping panicle 8 to 12 inches long; rachis angular, hispid near top, branches mostly alternate, slender, scabrous only toward the extremities, sometimes reflexed at maturity, 3 to 6 inches long, bearing the nearly solitary spikelets on slender, scabrous pedicels 1 to 3 lines long.

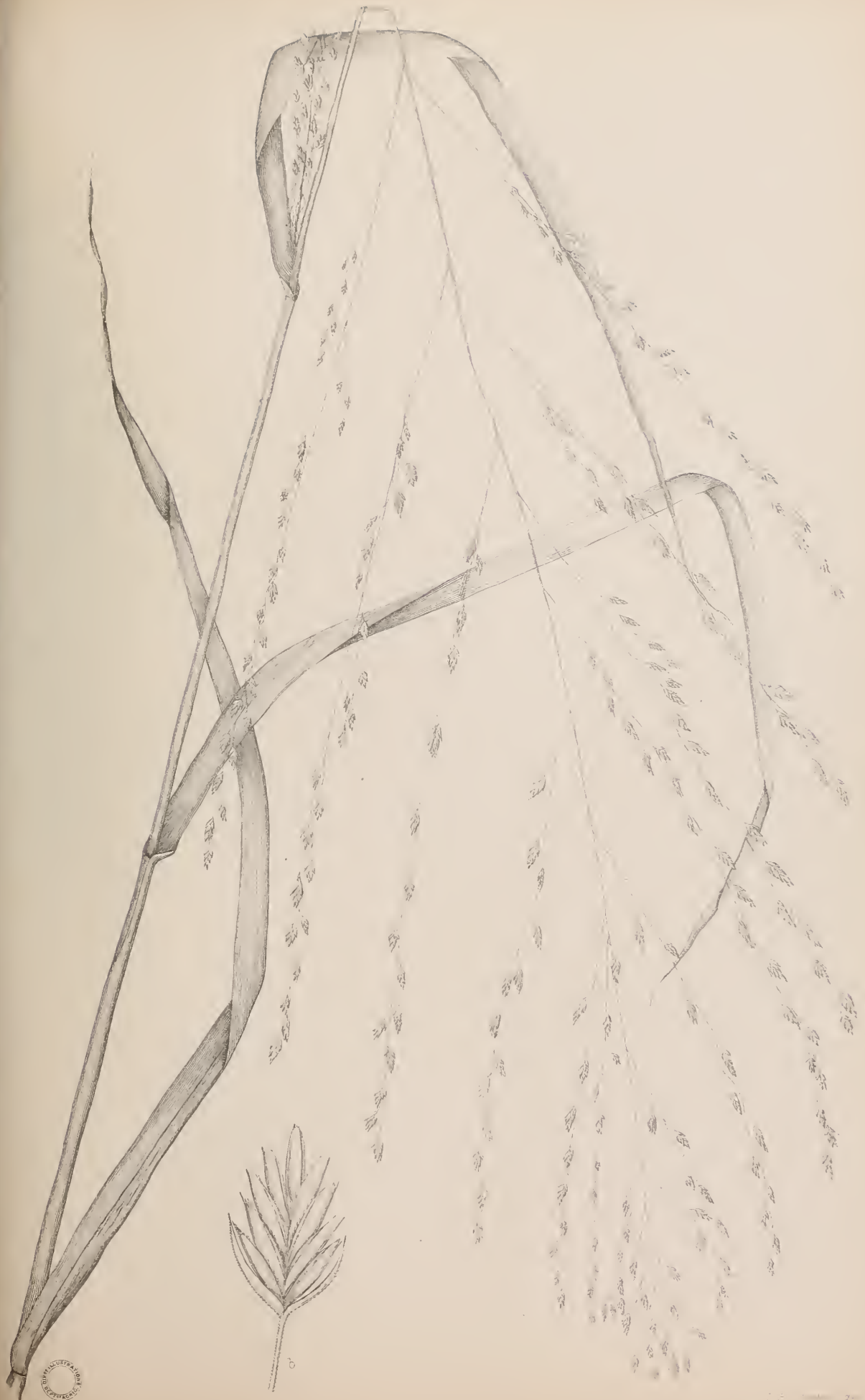
*Spikelets* oblong-ovate, compressed, 7- to 9-flowered, 2 to 3 lines long; first glume linear-lanceolate, acute or acuminate, 1-nerved, 1 line long; second glume ovate-lanceolate, acuminate and longer; internodes of slender glabrous rachilla articulating above,  $\frac{1}{4}$  line long; floral glumes oblong, truncate or slightly 2-lobed, mucronate, rounded on back, membranaceous, often purplish, pubescent near the base on the 3 nerves, lateral nerves near the margins, 1 line long; palea lance-oblong, truncate, minutely ciliate, membranaceous, smooth, 2-keeled, scarcely 1 line long.

*Grain* oblong, angular, 2-horned at apex, opaque, brown, falling with spikelet, usually disarticulate above empty glumes.

PLATE XXXIV; *b*, spikelet enlarged.

Florida, Texas to Mexico. A large leafy grass which promises to be serviceable in agriculture.

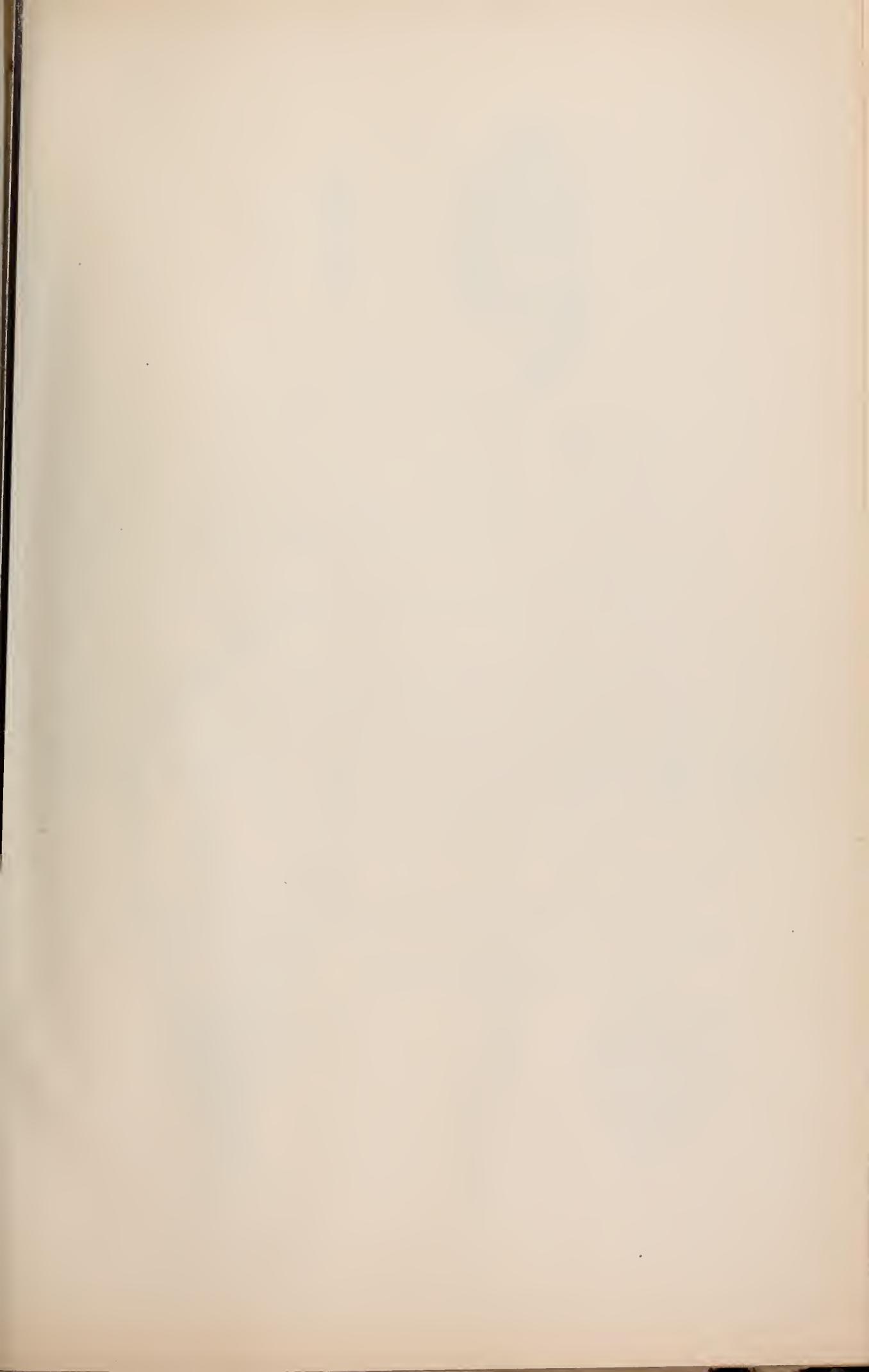




W. H. & C. Co. Lith.

TRIODIA ERACOSTOIDES, Vasey





## TRIODIA GRANDIFLORA Vasey.

*Plant* perennial, with tufted bulbous base, rather glaucous or minutely cinerous-pubescent throughout.

*Culms* slender, erect, not branching, often geniculate at the hairy nodes, terete, sparingly pubescent, 1 to 2 feet tall.

*Leaves*; radical, numerous with compressed, equitant, hairy-fringed sheaths and flat or folded, white-margined, pubescent, obtuse or abruptly pointed blades, 2 to 4 inches long; of culm 3, rarely 2 or 4; sheaths half as long as internode, close, slightly pubescent or nearly glabrous; blades like those of radical leaves but upper ones shorter and erect.

*Inflorescence* a close, contracted, head-like white panicle, composed of numerous, nearly sessile branches, 1 to 2 inches long; rachis and branches somewhat pubescent, or scabrous.

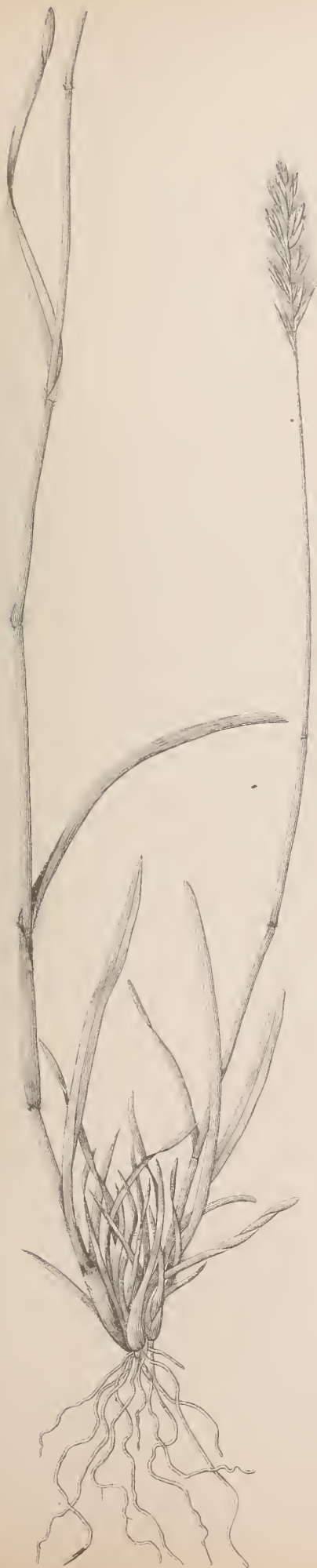
*Spikelets* nearly sessile, oblanceolate, compressed, 4- to 6-flowered, 2 lines wide, 4 to 5 lines long; first glume lance-ovate, acute, carinate, membranaceous, minutely scabrous on keel, 1-nerved or sometimes 3-nerved on lower spikelets, 2 to 3 lines long; second glume same, but ciliate at base, always 1-nerved, and 1 line longer; floral glume lance-ovate, obtuse and minutely ciliate, or with 2 narrow lobes at apex, pubescent below, profusely ciliate, 3-nerved, 2 to 3 lines long; hispid mid-nerve excurrent in an awn  $\frac{1}{2}$  to 1 line long; palet broadly lanceolate, pubescent at the base and on the 2 prominent keels, 1 to  $1\frac{1}{2}$  lines long.

*Grain* not present in the specimens examined.

PLATE XXXV; *a* and *b*, floral glumes showing the extremes of variation at the apices; *c*, palet.

This species has been called *T. avenacea* H. B. K., from which it differs in its much larger size, and in its flowers, as is shown by a comparison of the figure in H. B. K.

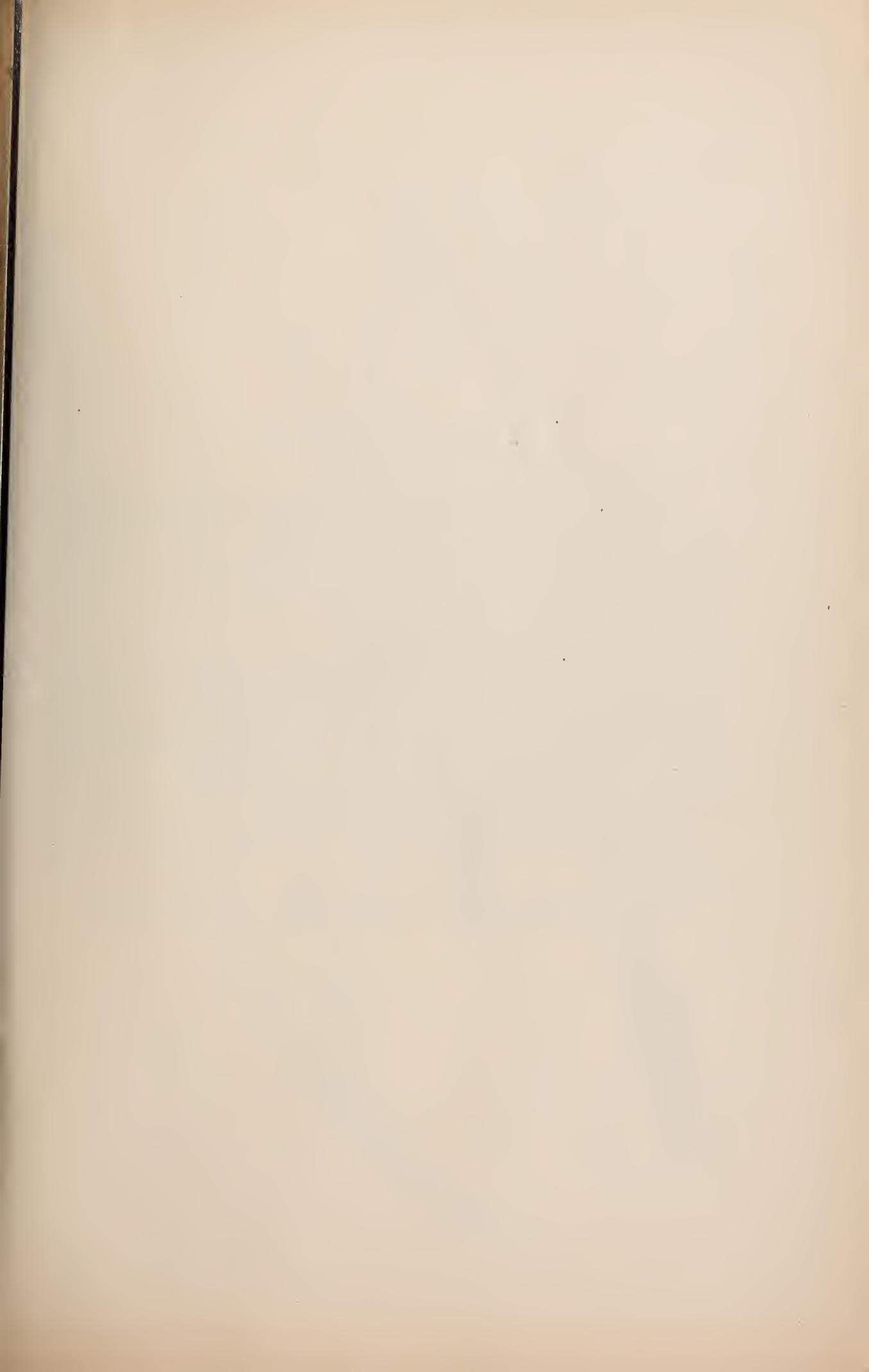
Western Texas to Arizona and Mexico.



TRIODIA GRANDIFLORA Vasey

J. R. Chittenden del.





No. 36.

TRIODIA NEALLEYI Vasey.

*Plant* perennial, tufted, with a bulbous base.

*Culms* erect, slender, not branched, terete, smooth, 1 to 2 feet high, nodes ciliate.

*Leaves*; radical with pubescent, fringed, scarious-margined sheaths, tapering into narrow, folded, nearly smooth blades 2 to 6 inches long; of culm 3 or 4, sheaths close, smooth, lower ones equaling or exceeding internodes, upper much shorter; blades flat or folded, nearly smooth, 1 to 3 inches long; ligule a narrow, callous line with a loose fringe of hairs.

*Inflorescence* a dense spike-like panicle, white, 1 to  $2\frac{1}{4}$  inches long, the branches  $\frac{1}{2}$  to 1 inch long, alternate, closely appressed.

*Spikelets* broadly oblanceolate, compressed,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  lines wide,  $2\frac{1}{2}$  to 3 lines long, 4- to 7-flowered; first glume ovate, acute, carinate, translucent, smooth, about 2 lines long; second glume same, but  $\frac{1}{2}$  line longer; floral glumes oblong, truncate, translucent, profusely ciliate on the margins and pubescent on the back below, 2-lobed or cleft one-third way to base, the two minutely ciliate lobes equaled or exceeded by the intermediate awn, 3-nerved, lateral nerves marginal; palet lanceolate, strongly arched, thin, pubescent on the two prominent keels.

*Grain* pale translucent-green, shaped like the quarter of a sphere with brownish opaque projection extending along the axis,  $\frac{3}{4}$  line long.

PLATE XXXVI; *a*, spikelet; *b*, empty glumes; *c*, floral glume, dorsal and side view; *d*, palet.

Thus far collected only in Texas, by G. C. Nealley, for whom it is named.

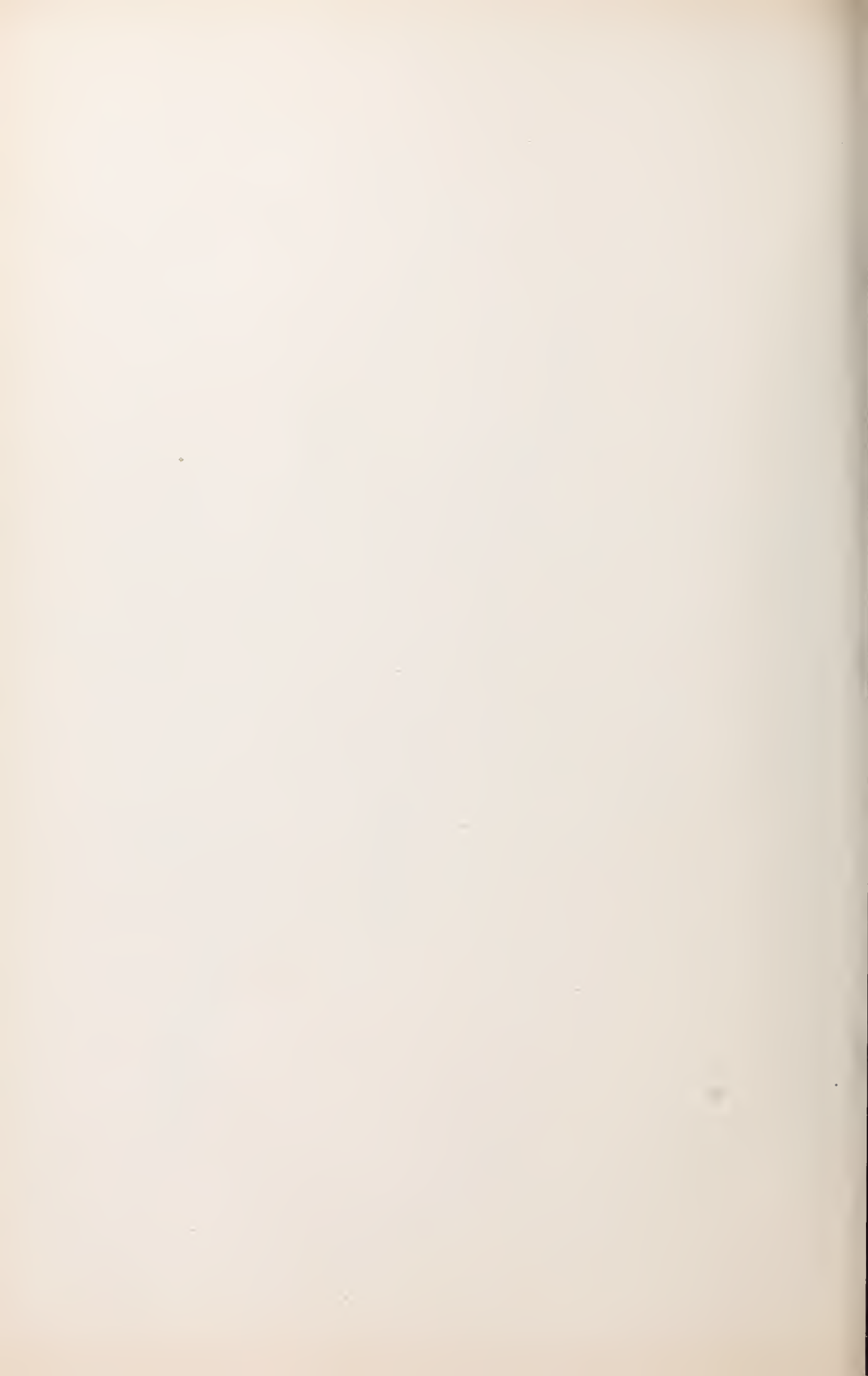


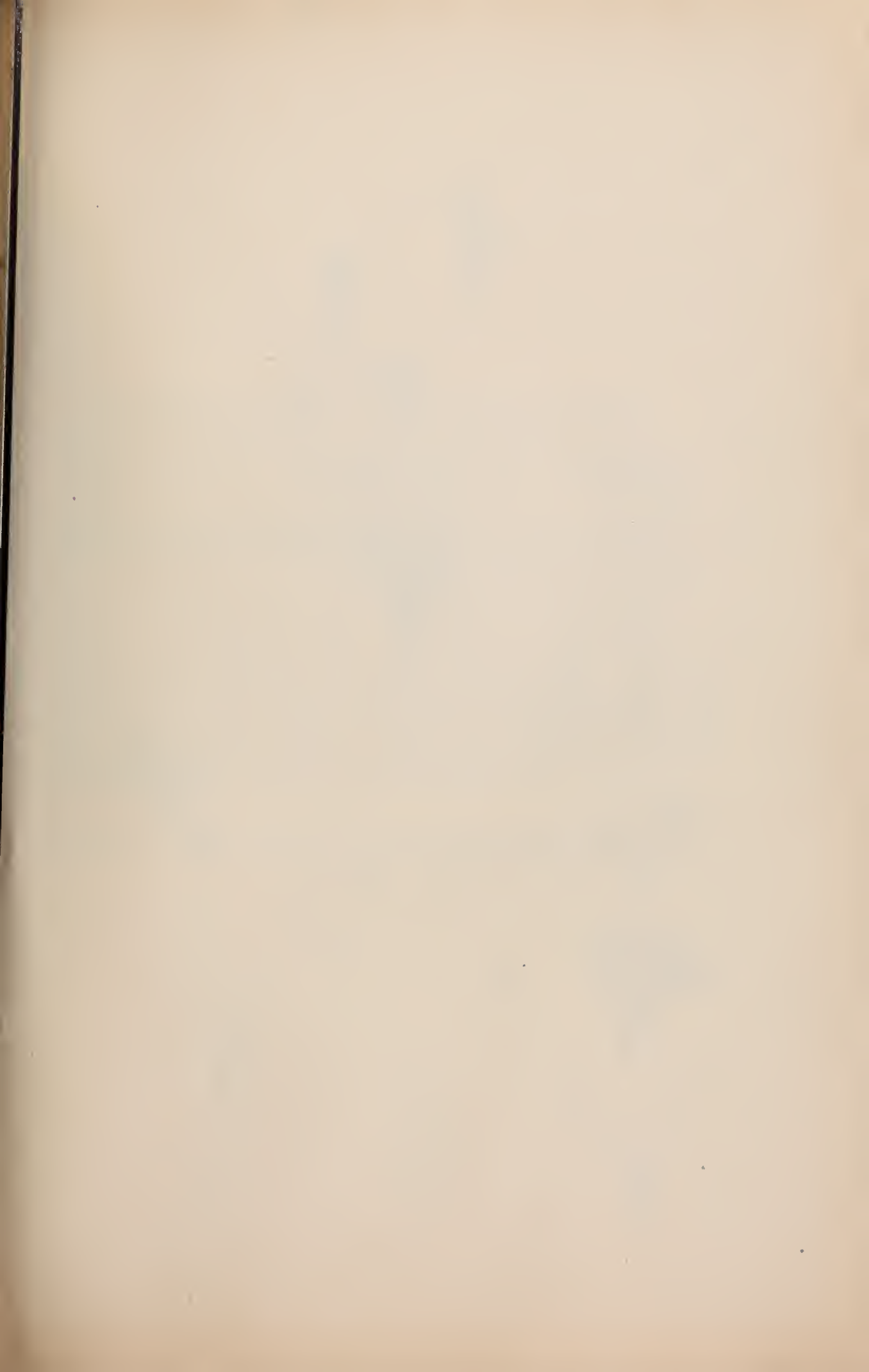


1897: Bot. 5. - 104

T. A. C. del

TRIODIA NEALLEYI Va.sey





TRIODIA PULCHELLA H. B. K. (*Uralepis pulchella* Kth.)

*Plant* a low, tufted perennial, with bulbous base, arising from a slender creeping rootstock.

*Culms* spreading, fasciculately branched, at the extremity of long, naked internodes.

*Leaves*; radical and of culm alike, numerous, clustered at the base, and around the fascicles of branches leaving the internodes naked; sheaths short, open, tapering, scarious; blades narrow, folded and involute; ligule a minute fringe, decurrent down the membranaceous margin of the sheath.

*Inflorescence*, small clusters of light-colored spikelets terminating the short clustered branches.

*Spikelets* lanceolate, compressed, 7- to 10-flowered, 2 lines wide, 3 to 4 lines long; internode of rachilla articulate below,  $\frac{1}{8}$  line long; first glume lance-ovate, acuminate, carinate, hyaline, smooth, 1-nerved, 2 to  $2\frac{1}{2}$  lines long; second glume same but  $\frac{1}{2}$  line longer; floral glume oblong, 2 lines long, cleft above half way to base or more, making 2 long narrow margined lobes, between which the midrib is extended as an awn longer than the lobes, 2 lateral nerves nearly marginal, profusely ciliate, pubescent below; palet oblong, truncate, thin, pubescent below, and on the 2 keels.

*Grain* pear shaped, translucent, light yellowish color, with opaque, brownish base  $\frac{1}{2}$  line long.

PLATE XXXVII; 1, young plant; 2, plant in flower; 3, at maturity; *a*, spikelet; *b*, empty glumes; *c*, floral glume, dorsal and side views; *d*, palet.

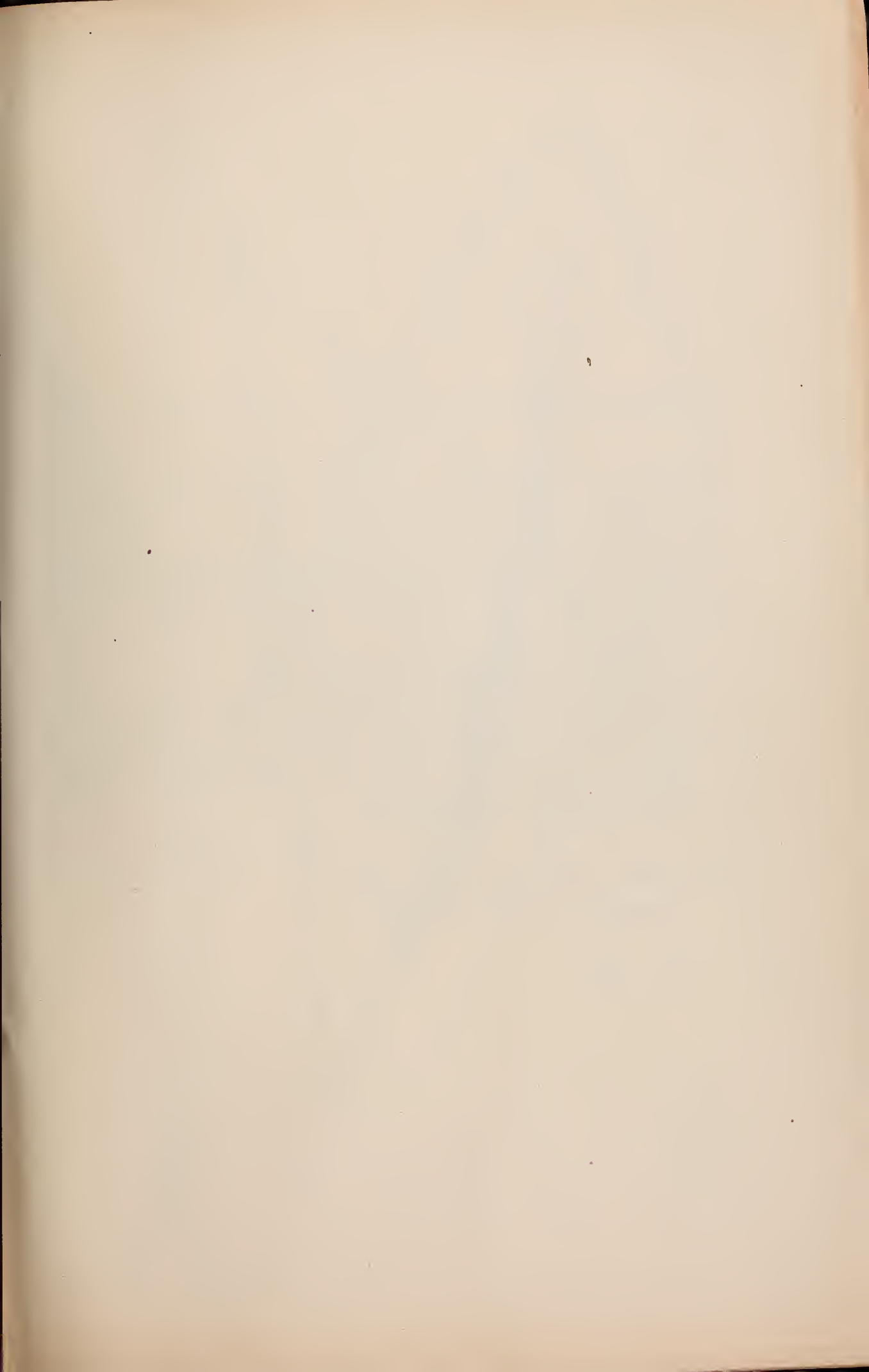
Texas to California and Mexico.



TRIODIA PULCHELLA. HBK.







TRIODIA STRICTA (Nutt.) Vasey. (*Tricuspis stricta* Thurb. *Windsoria stricta* Nutt.)

*Plant* coarse, apparently perennial, glabrous throughout except near the ligule.

*Culms* erect, few in a place, tufted, with sterile culms at base, not branched, terete, thick, 2 to 3 feet tall.

*Leaves*; radical and from radical shoots numerous, the long tapering sheaths continuing with but slight constriction at the ligule, into the flat or involute smooth blade, 2 lines wide, 8 to 12 inches long; of culm 4 or 5, sheaths usually exceeding the internodes, open above, blade like those of radical leaves, ligule an inconspicuous, tawny fringe.

*Inflorescence* a constricted, dense, erect, spike-like panicle, 4 to 12 inches long, branches sessile, alternate, appressed,  $\frac{1}{2}$  to 1 inch long.

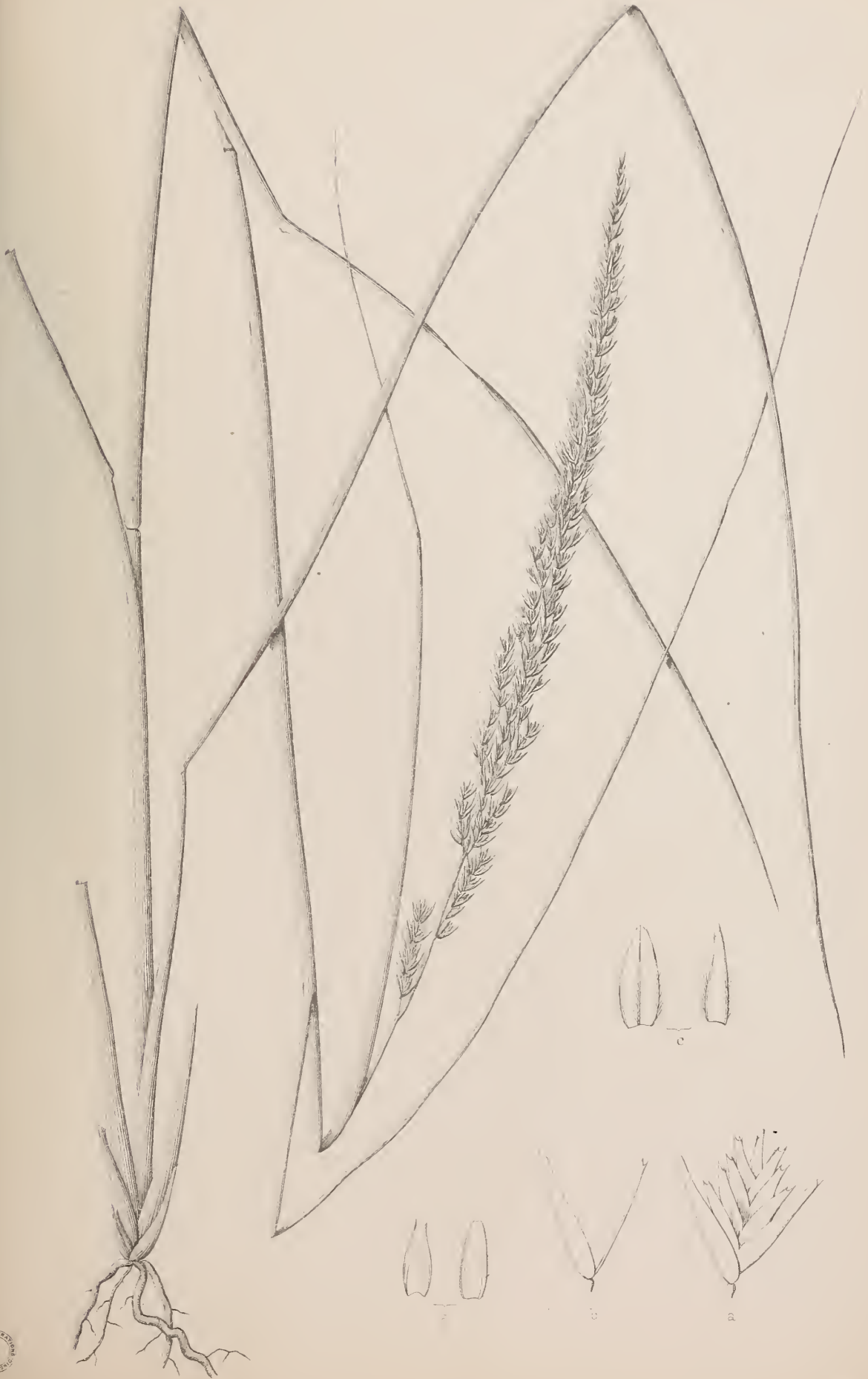
*Spikelets* nearly sessile, obovate, compressed, 5- to 8-flowered,  $1\frac{1}{2}$  to 2 lines wide, 2 to  $2\frac{1}{2}$  lines long; first and second glumes equal, narrowly lanceolate, longer than the spikelet, acute, or irregularly toothed at apex, carinate, membranaceous, smooth, 1-nerved, 2 to 3 lines long; floral glumes oblong, toothed at apex, obtuse, membranaceous, 3-nerved, lateral nerves nearly marginal, middle one slightly excurrent, all pubescent below, 1 to  $1\frac{1}{2}$  lines long; palet elliptical, obtuse, arched, thin, the 2 keels minutely velvety pubescent.

*Grain* obovate, 2-horned at summit, opaque, yellow,  $\frac{2}{3}$  line long.

PLATE XXXVIII; *a*, spikelet; *b*, empty glumes; *c*, floral glume dorsal and side views; *d*, palet, dorsal and ventral views.

Louisiana to Texas and Indian Territory.





TRIODIA STRICTA Vahl.

W. E. Hill del.



W. E. Hill & Co. lith.





No. 39.

TRIODIA TEXANA Watson.

*Plant* perennial, with somewhat bulbous, tufted base.

*Culms* erect, simple or sparingly branched, slightly geniculate, terete, slightly pubescent,  $1\frac{1}{2}$  to 2 feet tall.

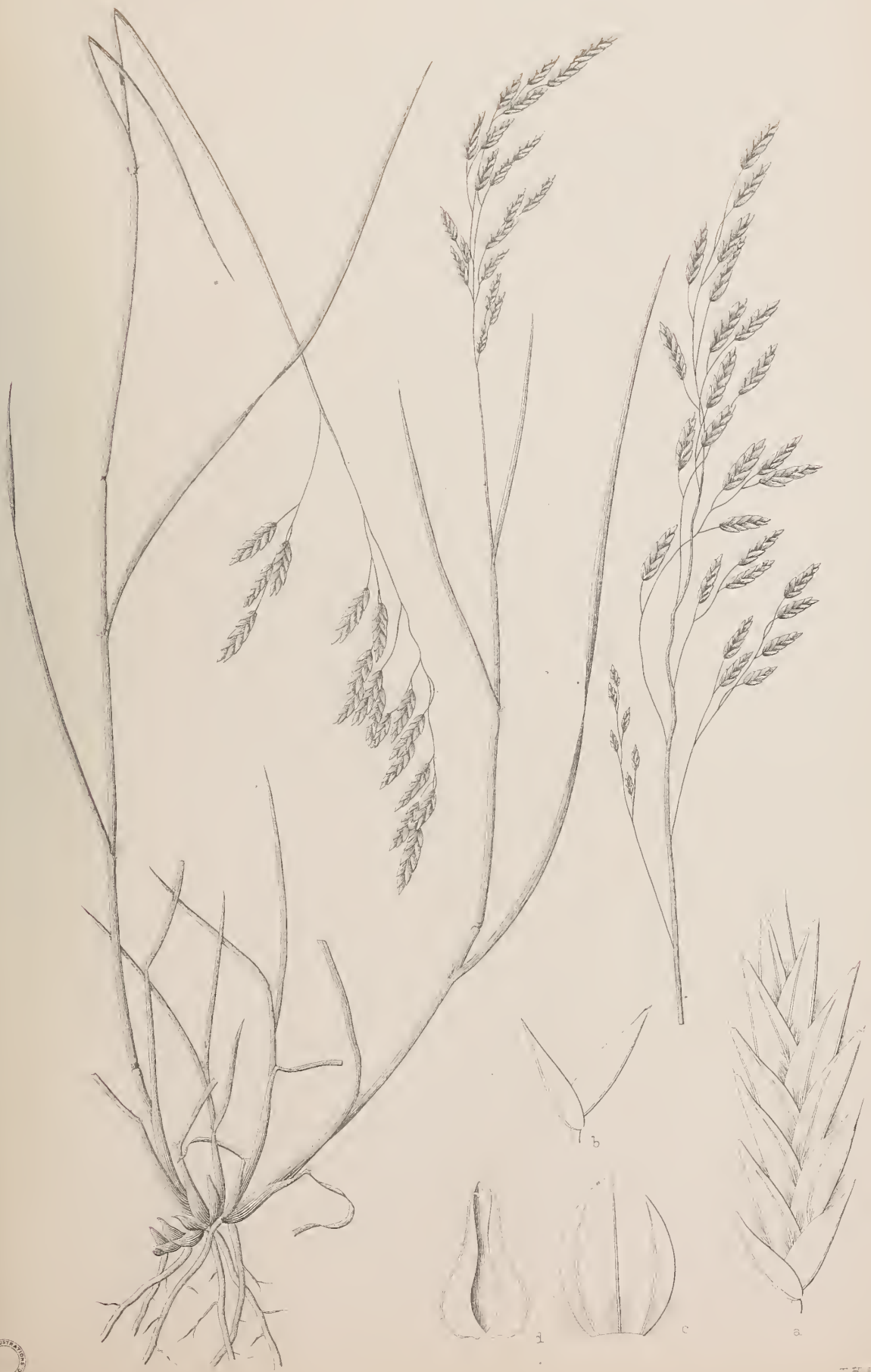
*Leaves*; radical numerous, with short, smooth sheaths and involute blades 3 to 6 inches long; of culm 3 or 4; sheaths usually exceeding internodes, close, nearly smooth; blades flat or becoming involute, slender, pointed, smooth or slightly pubescent, 2 or 3 lines wide, 6 to 10 inches long; ligule a minute fringe with longer hairs at the sides.

*Inflorescence* a loose, nodding or flexuous panicle, 3 to 5 inches long; branches mostly alternate and spreading, slender, smooth, 1 to 2 inches long, divided and bearing beyond the middle 3 to 5 or more pedicellate spikelets.

*Spikelets* large, oblong, somewhat compressed, purplish, 6- to 9-flowered, 3 to 5 lines long; first glume ovate-lanceolate, acute or irregularly toothed, carinate, hyaline, smooth, 1-nerved, 1 to  $1\frac{1}{2}$  lines long; second glume same but  $\frac{1}{4}$  line longer; internode of rachilla curved, glabrous, articulate above,  $\frac{1}{2}$  line long; floral glumes nearly orbicular, slightly lacerate above, membranaceous, pubescent toward the base of the 3 nerves, 2 lateral nerves not marginal, about 2 lines long; palet broad at base, narrowed above, obtuse, 2 keeled, smooth,  $1\frac{3}{4}$  lines long.

PLATE XXXIX; *a*, spikelet; *b*, empty glumes; *c*, floral glume; *d*, palet, ventral view.

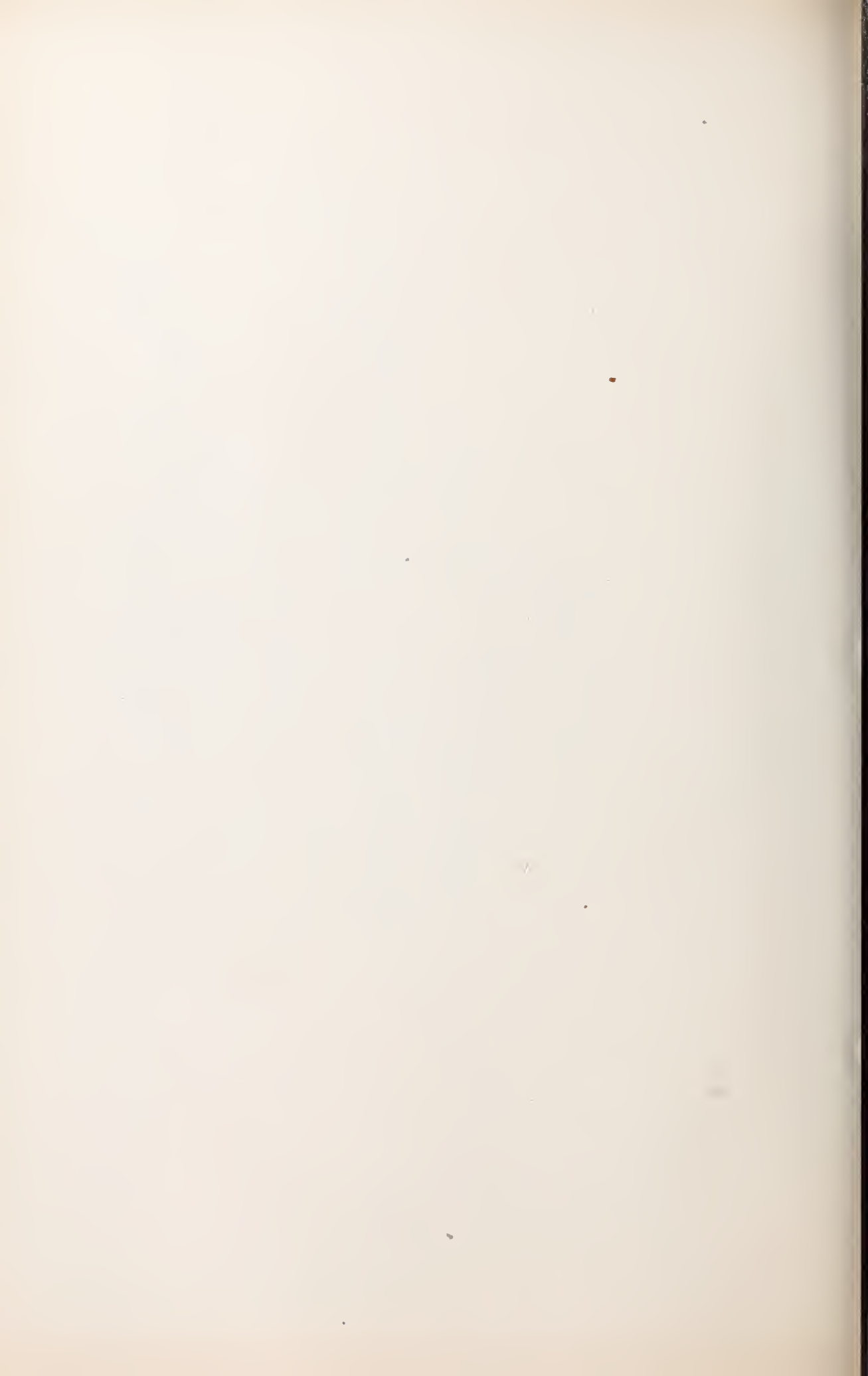
Louisiana to Texas, New Mexico and Mexico.



TRIODIA TEXANA. T. Watson


 The University of California Press  
 225 Spence Street, Berkeley, California  
 1914

T. H. S. G.





TRIODIA TRINERVIGLUMIS (Munro) (*Tricuspis trinerviglumis* Munro  
in Herb.)

*Plant* perennial, with slightly thickened tufted base.

*Culms* erect or geniculate below, rarely branching, terete, hispid, 2 to 3 feet tall.

*Leaves*; radical and of radical shoots numerous, with loose, pubescent sheaths and involute, hispid, often pubescent blades, 3 to 6 inches long; of culm 4 to 6; sheaths longer than internodes, open above, upper ones nearly smooth; blades like those of radical leaves; ligule an inconspicuous fringe.

*Inflorescence* a narrow, erect, spike-like panicle, 4 to 8 inches long; branches erect, simple, almost appressed,  $\frac{1}{2}$  to 2 inches long, or often reduced to single spikelets a little distant, or interrupted.

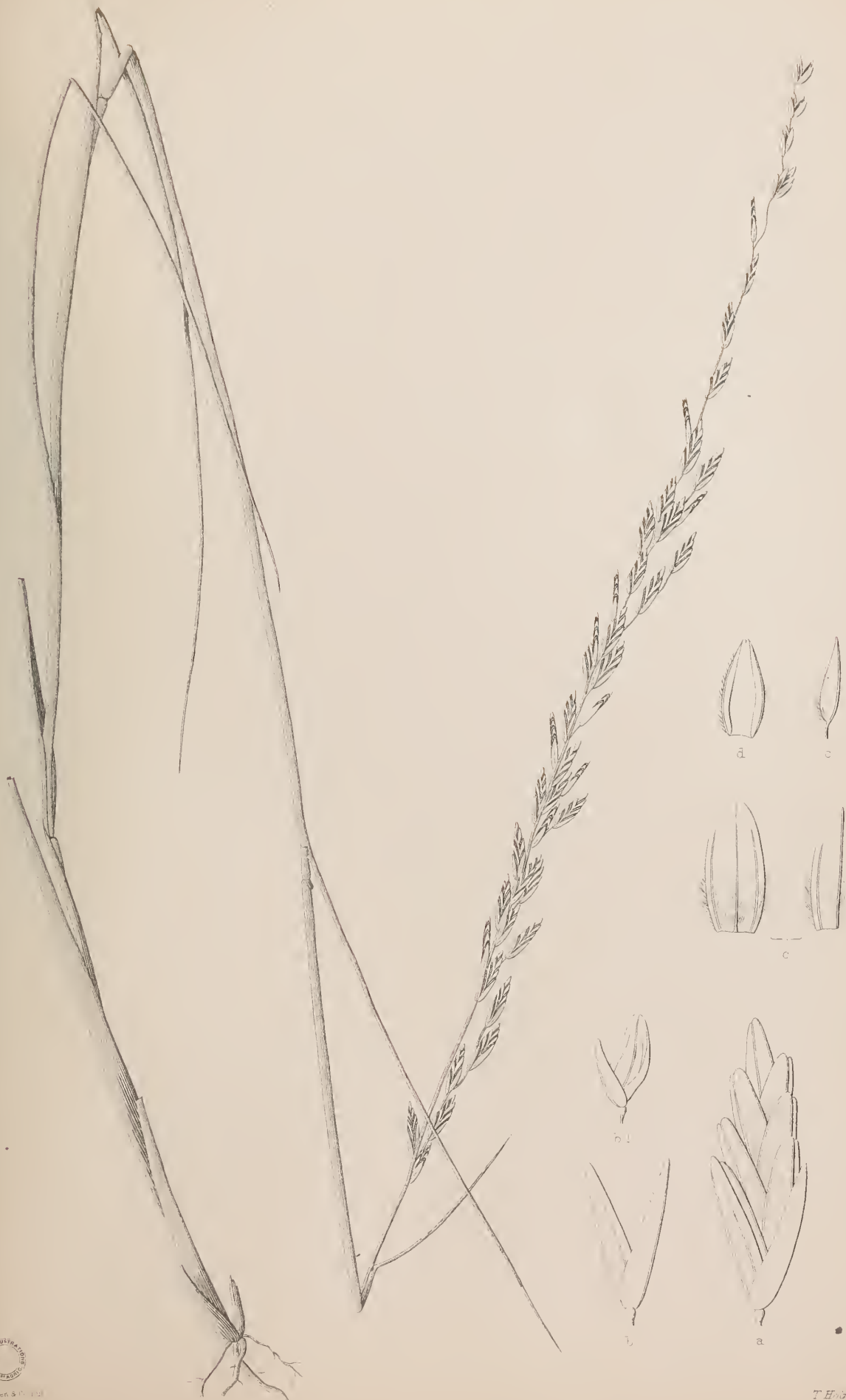
*Spikelets* oblong or oblanceolate, but little compressed, 7- to 9-flowered, 3 to 5 lines long; first glume lanceolate, obtuse or nearly acute, carinate, scarious, 7-nerved, 2 to 3 lines long; second glume lance-ovate, acute, carinate, scarious, scabrid, hispid on keel, 3-nerved,  $2\frac{1}{2}$  to  $3\frac{1}{2}$  lines long; internode of rachilla stout, pubescent, articulate above,  $\frac{1}{2}$  line long; floral glumes oblong-ovate, obtuse, emarginate, mucronate or entire at apex, 3-nerved, pubescent below, lateral nerves vanishing before reaching the margin, palet ovate, obtuse, pubescent on the 2 keels,  $1\frac{1}{2}$  lines long.

*Grain* ovate-conical, deeply hollow on one side, dark-brown, punctate,  $1\frac{1}{4}$  lines long.

PLATE XL; *a*, spikelet; *b*, and *b'*, empty glumes; *c*, floral glume dorsal and side views; *d*, and *e*, palet, ventral and side views.

Prevails throughout Texas, westward to Arizona, and northward to Colorado. Apparently not of great agricultural importance. *Tricuspis mutica* Torr. appears to be a smaller form, with shorter, interrupted panicle.





TRIODIA TRIMERIGLUMIS *Munro*



Printed by Messrs. J. & J. Mackenzie, Brisbane.

T. Hodg. del.





DIPLACHNE FASCICULARIS P. B. (*Leptochloa fascicularis* Gray.)

*Plant* annual, glaucous or light green, more or less purplish on the sheaths and inflorescence.

*Roots* numerous, coarse.

*Culms* few, loosely tufted at base, erect or decumbent, branching, striate, smooth, 2 to 3 feet tall.

*Leaves*; radical and from sterile culms with thin, smooth, striate, equitant sheaths and slender involute, slightly hispid blades, 1 line wide unrolled, 6 to 12 inches long; of stems 3 or 4; sheaths usually exceeding internodes, smooth; blade like that of radical leaves, upper one exceeding panicle and sheathing its base; ligule membranaceous, triangular, ovate, acute, entire, wider than blade,  $1\frac{1}{2}$  to 2 lines long.

*Inflorescence* a loose, narrow, spreading panicle, included at base in upper sheath, 6 to 8 inches long; of many linear, spike-like spreading branches, hispid, mostly alternate, 2 to 4 inches long, bearing 8 to 15 nearly sessile, appressed spikelets; general rachis angular, hispid.

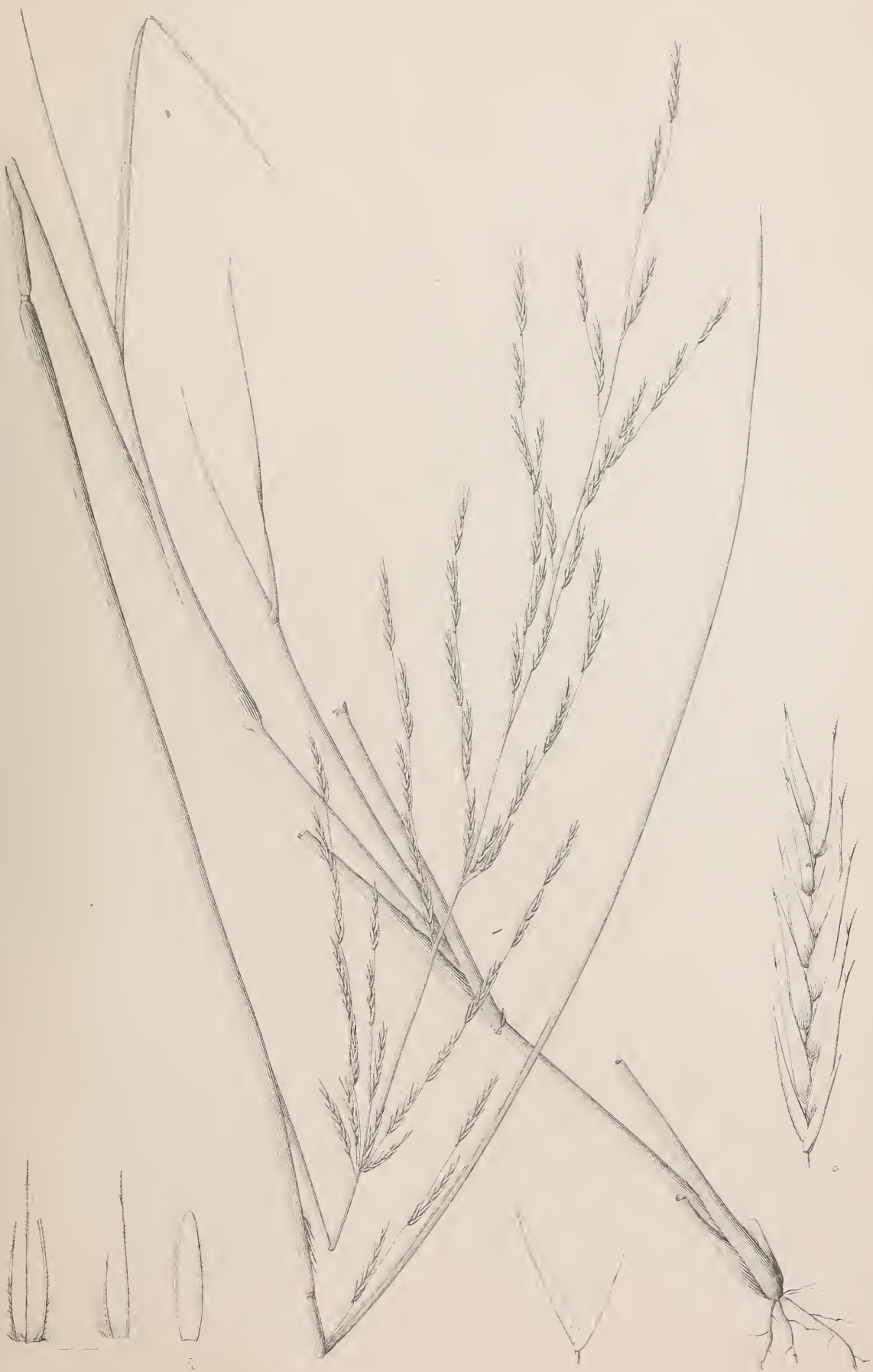
*Spikelets* linear-oblong, or lanceolate at maturity, flattened, 6- to 9-flowered,  $3\frac{1}{2}$  to 4 lines long; internodes of articulate rachilla,  $\frac{1}{2}$  line long; first glume varying from ovate-lanceolate to linear, barely acute, or acuminate, hispid on back, 1-nerved, 1 to  $1\frac{1}{2}$  lines long; second glume lanceolate to oblong, longer and often somewhat 3-toothed or lacerate at the apex; floral glumes linear-oblong, acute, ciliate on the lower third of the nerve, and pubescent at the base,  $1\frac{1}{2}$  to 2 lines long, 3-nerved, 2 lateral nerves marginal, ending in rather inconspicuous teeth, mid-nerve excurrent in a hispid awn nearly  $\frac{1}{2}$  line long; palea linear, with two prominent pubescent nerves, narrow, hyaline, infolded margins, and truncate or slightly rounded, minutely ciliate apex.

*Grain* surrounded with rather loose, hyaline pericarp; salmon pink with small garnet scar at base, flat, lanceolate, 1 line long; readily shelling out of flower as the spikelet falls.

PLATE XLI; *a*, spikelet; *b*, empty glumes; *c*, floral glume, dorsal and side view; *d*, palea.

This species presents considerable variation in the spikelets, forming probably several varieties.

It is extensively distributed over the country, both north and south, but becomes abundant in Texas and westward, also in Mexico.



Julius Bien & Co. lith.

TRIPLOD. PAS. KUNZ. F. S. P. B.

2500





DIPLACHNE IMBRICATA (Thurb.) Scrib. (*Leptochloa imbricata* Thurb.)

*Plant* annual or short-lived perennial from bulbous base, somewhat glaucous, purplish on the sheaths and with dark green panicle.

*Culms* tufted, erect, geniculate, branching, hollow, terete, smooth or minutely scabrid near base of panicle, 1 to 2 feet tall.

*Leaves*; radical and of radical shoots, numerous, with smooth, tapering, compressed sheaths and narrow, slender pointed, folded or involute, hispid blades, 4 to 8 inches long; of culm 3 or 4; sheaths striate, slightly roughened on upper part, open above, nearly equaling internode; blade like that of radical leaves but usually shorter; ligule membranaceous, ovate, acute, entire, wider than the blade, decurrent.

*Inflorescence* a rather close, narrowly-oblong panicle, 4 to 6 inches long, of numerous linear branches; rachis angular, hispid; branches hispid, slender, mostly alternate, slightly spreading,  $1\frac{1}{2}$  to 2 inches long, bearing on the lower side 12 to 16 nearly sessile, appressed, and imbricate spikelets.

*Spikelets* linear-oblong, 7- to 10-flowered,  $2\frac{1}{2}$  to 3 lines long less than 1 line wide; internodes of glabrous rachilla articulate,  $\frac{1}{3}$  line long; first glume ovate, acute, carinate, ciliate, hispid on back, 1-nerved,  $\frac{2}{3}$  line long; second glume elliptic-oblong, obtuse, often slightly mucronulate, 1 to  $1\frac{1}{4}$  lines long; floral glume oblong, truncate, with two short blunt teeth at the summit, the mid-nerve terminating in a short mucro, membranaceous, pubescent on the lower half of the lateral nerves, 1 line long; palea lance-oblong, with rounded ciliate apex, two prominent pubescent nerves and narrow infolded hyaline margin, 1 line long.

*Grain* light-brown, obovate, falling with flower but easily separated.

PLATE XLII; *a*, spikelet; *b*, empty glumes; *c*, floral glumes, dorsal and side view; *d*, palea.

Texas, New Mexico, Arizona, and southern California.

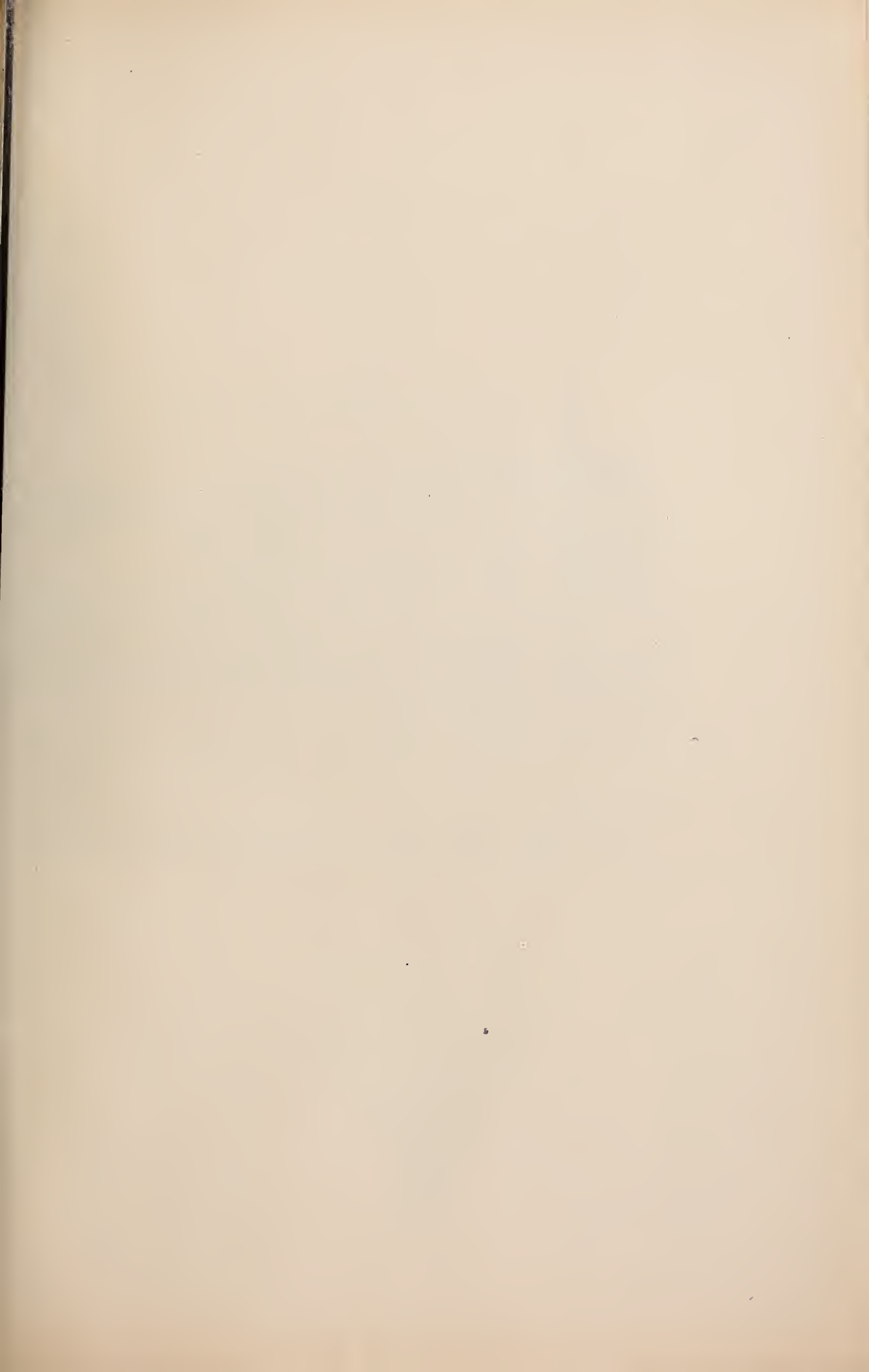




Julius Elen & Co lith

DIPLAZNE IMBRICATA. FROB.





DIPLACHNE REVERCHONI Vasey.

*Plant* a low tufted annual.

*Culms* erect, slender, not branched, 3 to 10 inches long.

*Leaves* at base, numerous, involute, setose, smooth, 1 to  $2\frac{1}{2}$  inches long; of culms 1 or 2 above base, mostly exceeded by radical leaves; sheaths striate, close, smooth; blade filiform, involute; ligule a minute, hairy fringe.

*Inflorescence* a spike-like panicle,  $1\frac{1}{2}$  to 3 inches long; the nearly sessile, appressed spikelets alternate along the striate slender rachis.

*Spikelets* lance-linear, 6- to 10-flowered, 3 to 4 lines long; internode of rachilla glabrous; first glume ovate, acute, carinate, membranaceous, 1-nerved, smooth, 1 line long; second glume oblong, obtuse or obscurely toothed  $\frac{1}{4}$  line longer; floral glumes  $1\frac{1}{4}$  lines long, ovate-lanceolate, membranaceous, 2 teeth at apex, 2 lateral nerves slightly pubescent at base, vanishing before reaching the margin, mid-nerve excurrent into a minute hispid awn  $\frac{1}{4}$  line long; palea linear-lanceolate, 2-keeled, cleft at apex, minutely ciliate,  $\frac{3}{4}$  line long.

*Grain* light amber color, narrowly conical, falling with flower but easily separated.

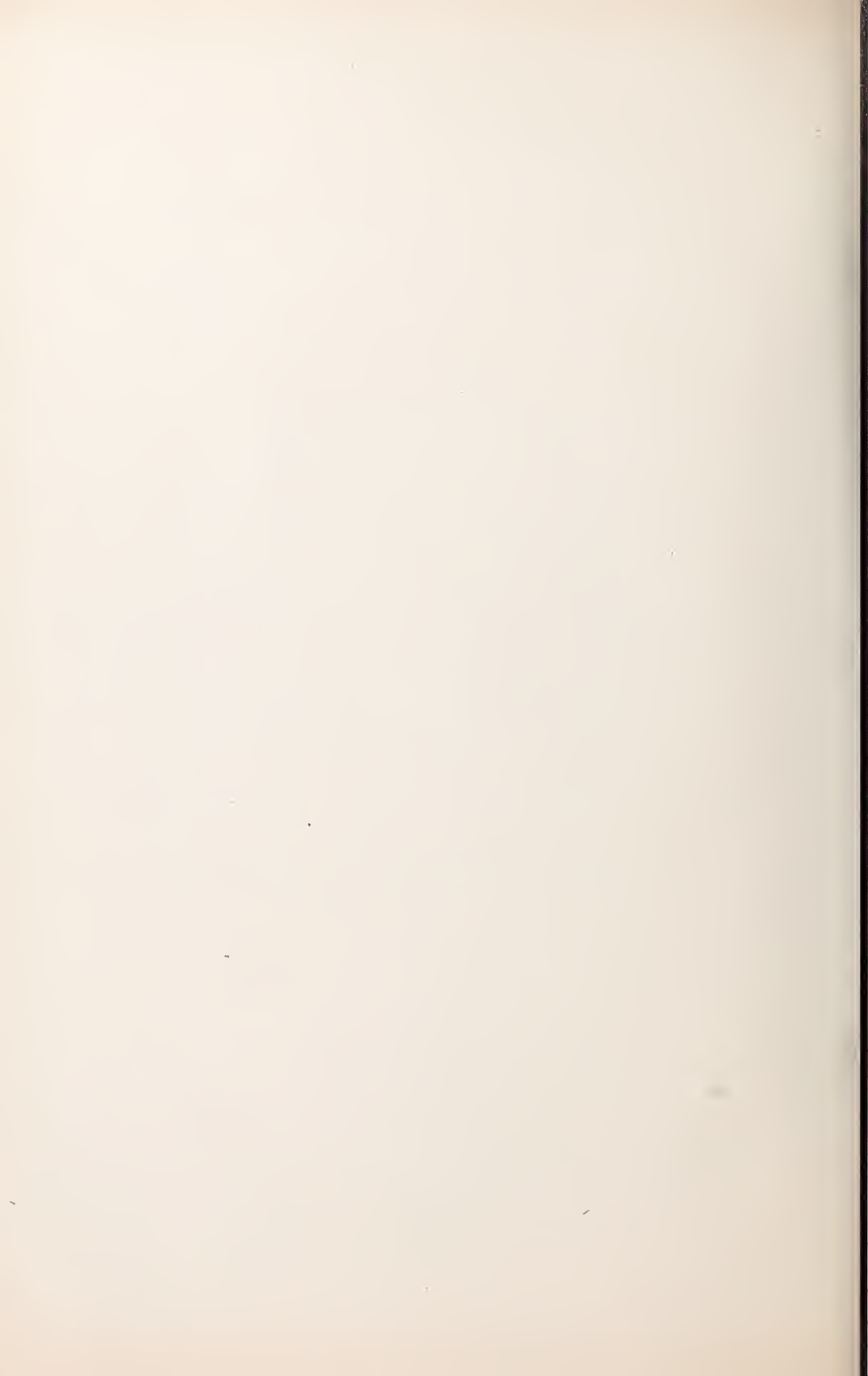
PLATE XLIII; *a*, spikelet; *b*, empty glumes; *c*, floral glumes, dorsal and side views; *d*, palea.

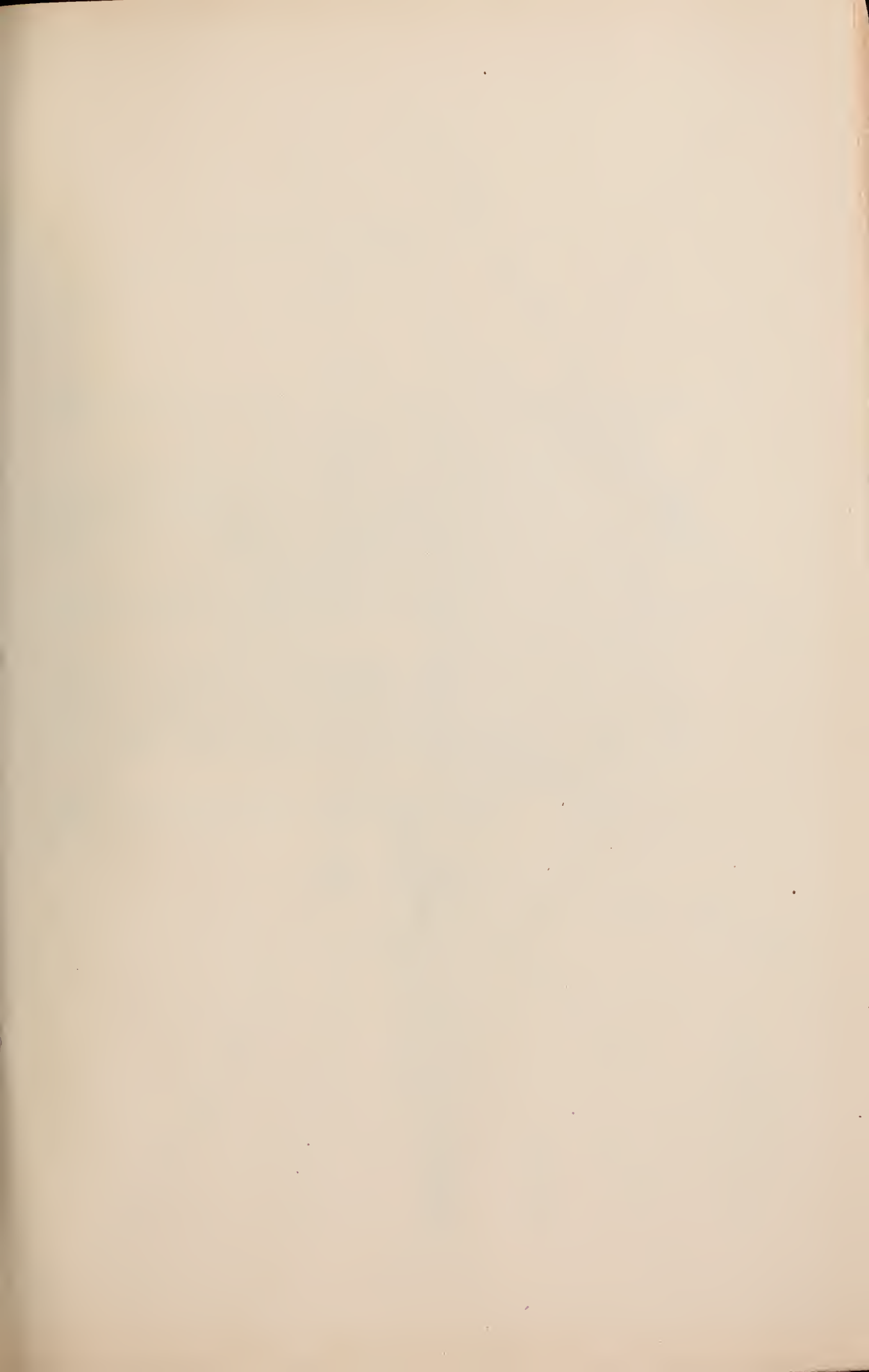
Texas to Mexico. First collected by J. Reverchon, Texas. It has been referred to *D. simplex* Doell, from which I think it differs.



H. H. ...

DIPLACHNE REVERSCHONI, Vasey





DIPLACHNE RIGIDA (Munro) Vasey. (*Leptochloa rigida* Munro, MSS.)

*Plant* perennial, from loosely tufted, bulbous base.

*Culms* erect, terete, smooth, not branching, 1 to 2 feet tall.

*Leaves*; radical and from radical shoots comparatively few, with short, loose, involute, tapering sheaths, and narrow, mostly filiform, involute, rigid, pointed blades, 2 to 6 inches long, pubescent, with few scattered hairs; of stem 2 or 3; sheaths longer than internodes, close, smooth, with blades like those of radical leaves; ligule a prominent tuft of spreading hairs 1 line long.

*Inflorescence* a loose, spreading panicle 6 to 12 inches long; rachis triangular, smooth; branches distant, alternate, spreading or horizontal, triangular, hispid on the angles, with tuft of hairs at the axis, 3 to 6 inches long, bearing 5 to 8 distant, sessile, appressed spikelets.

*Spikelets* oblanceolate, 5- to 9-flowered,  $3\frac{1}{2}$  to  $4\frac{1}{2}$  lines long; first glume lanceolate, acute, carinate, rigid, 1-nerved, hispid on keel,  $1\frac{1}{2}$  lines long; second glume lanceolate, acute, convex, 5-nerved, 2 lines long; floral glumes lanceolate, acute, barely, if at all, mucronate, rigid, 2 lines long, smooth, 2 lateral nerves vanishing before reaching the margin, palet oblong, obtuse, rigid, 2-keeled, ciliate,  $1\frac{1}{4}$  lines long, becoming strongly arched.

*Grain* oval, reddish brown.

PLATE XLIV; *a*, spikelet; *b*, empty glumes; *c*, floral glumes, dorsal and side view; *d*, palet.

Texas and New Mexico, northward to Kansas.





DIPLACHNE RIGIDA Vase.





DIPLACHNE VISCIDA Scrib.

*Plant* annual or short-lived perennial, light green or somewhat purplish on sheaths and inflorescence.

*Culms* erect, or low and spreading from a tufted base, branching freely, geniculate, hollow, terete, smooth, 6 to 15 inches tall.

*Leaves*; radical and from radical shoots, few and short; of stem 3 to 5; sheaths about equaling internode, compressed, open, smooth; blade flat or folded, with slightly involute margins, somewhat scabrous above and below, 2 to 4 inches long; ligule membranaceous, truncate, lacerate,  $\frac{3}{4}$  line long.

*Inflorescence* a rather compact, narrow, erect panicle, 2 to 3 inches long, included at the base; rachis angular, slightly hispid; branches slender, alternate, appressed or somewhat spreading at maturity,  $\frac{1}{2}$  to 1 inch long, bearing 6 to 10 appressed, nearly sessile spikelets on the flattened rachis.

*Spikelets* oblong, 4- to 6-flowered, 2 to  $2\frac{1}{2}$  lines long; internode of slender rachilla articulate below,  $\frac{1}{4}$  line long; first glume ovate, acute, hyaline, scabrous on the single nerve, 1 line long; second glume same, scarcely  $\frac{1}{4}$  line longer; floral glumes elliptical-oblong, 1 line long, 2 hyaline lobes or teeth at summit somewhat lacerate, lateral nerves nearly marginal, pubescent below, vanishing in the margin in very obscure teeth, mucronate awn of mid-nerve  $\frac{1}{2}$  line long; palet elliptic-oblong, hyaline, with 2 scabrous nerves and shallow cleft apex, minutely ciliate.

*Grain* light, opaque amber, with brown scar, elliptic, flattish,  $\frac{1}{2}$  line long, falling with flower or spikelet nearly complete.

PLATE XLV; *a*, spikelet; *b*, empty glumes; *c*, floral glumes, dorsal and side views; *d*, palet.

New Mexico, Arizona, and Mexico.

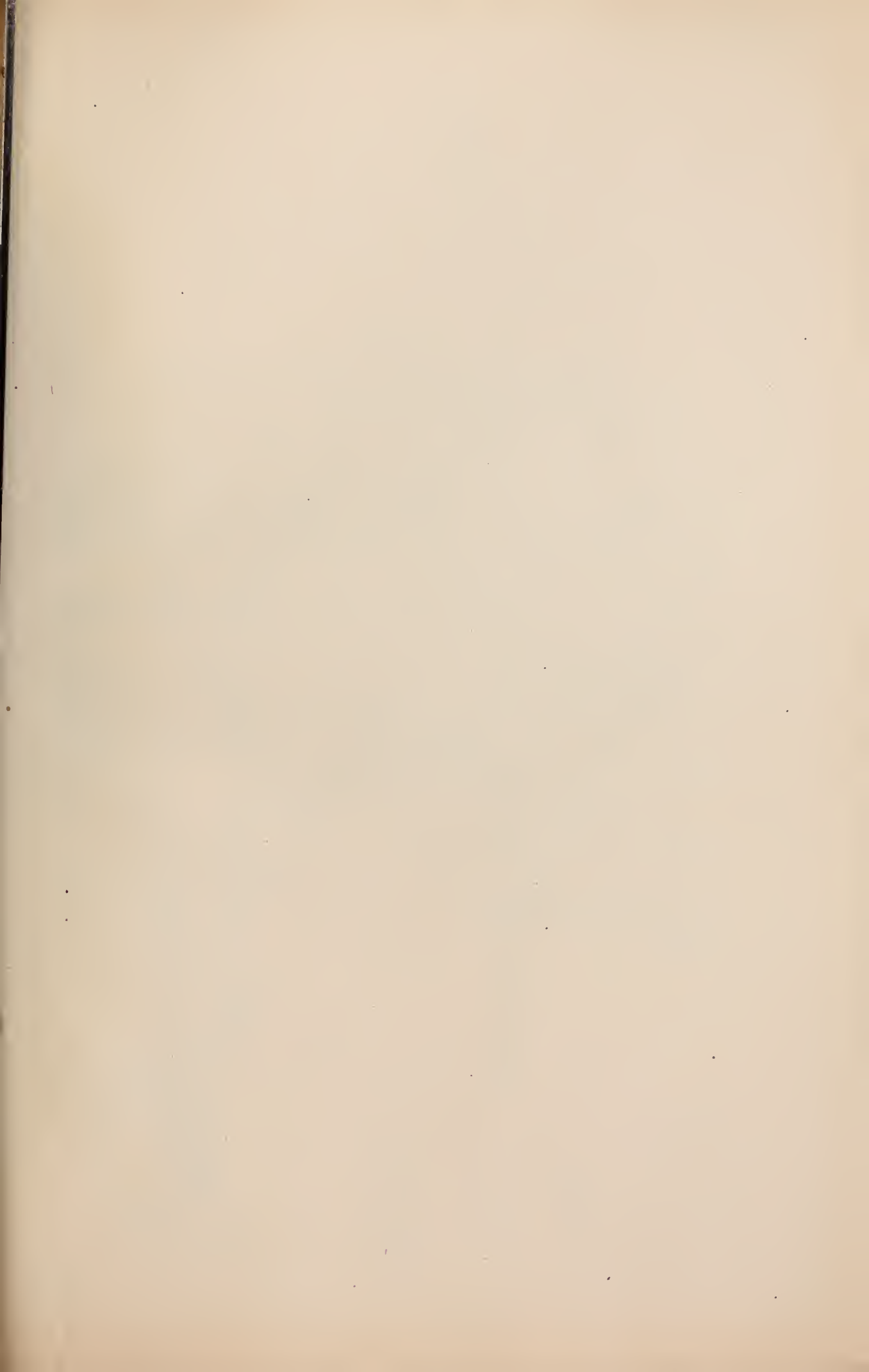


T.H. & det.

DELICATE







ERAGROSTIS CURTIPEDICELLATA Buckley.

*Plant* perennial, tufted with numerous abortive culms at bulbous base.

*Roots* coarse, with dense, tawny root hairs.

*Culms* stout, erect, rarely branching, terete, nearly solid, smooth, 1 to 2 feet tall.

*Leaves* of sterile culms rather numerous, with more or less involute blades 3 to 6 inches long; of stem 4 to 8; sheaths exceeding the internodes, open and rather loose above, smooth or with few scattered hairs along the exposed margins; blade involute toward the tapering point, 2 to  $2\frac{1}{2}$  lines wide, 4 to 6 inches long, smooth, rigid; ligule and throat, a row of fine hairs 2 to  $2\frac{1}{2}$  lines long; sheaths and lower sides of leaf often glandular viscid.

*Inflorescence* an oblong pyramidal erect panicle 8 to 12 inches long; spreading branches 3 to 5 inches long, much subdivided, mostly alternate, with tufts of white hairs in the axils, the solitary appressed spikelets borne mostly on strict, hispid lateral branchlets.

*Spikelets*, oblong-linear, less than 1 line wide, 2 to 3 lines long, often purplish, on hispid pedicels less than half their own length, internodes of the slightly zigzag rachilla  $\frac{1}{3}$  line long; first and second glumes ovate, acute, carinate, thin, herbaceous, 1-nerved, minutely hispid on keel above,  $\frac{1}{2}$  line long; floral glumes lanceolate, acute, prominently nerved,  $\frac{3}{4}$  line long; palet linear, curved so that its two pubescent nerves appear outside of the flowering glume.

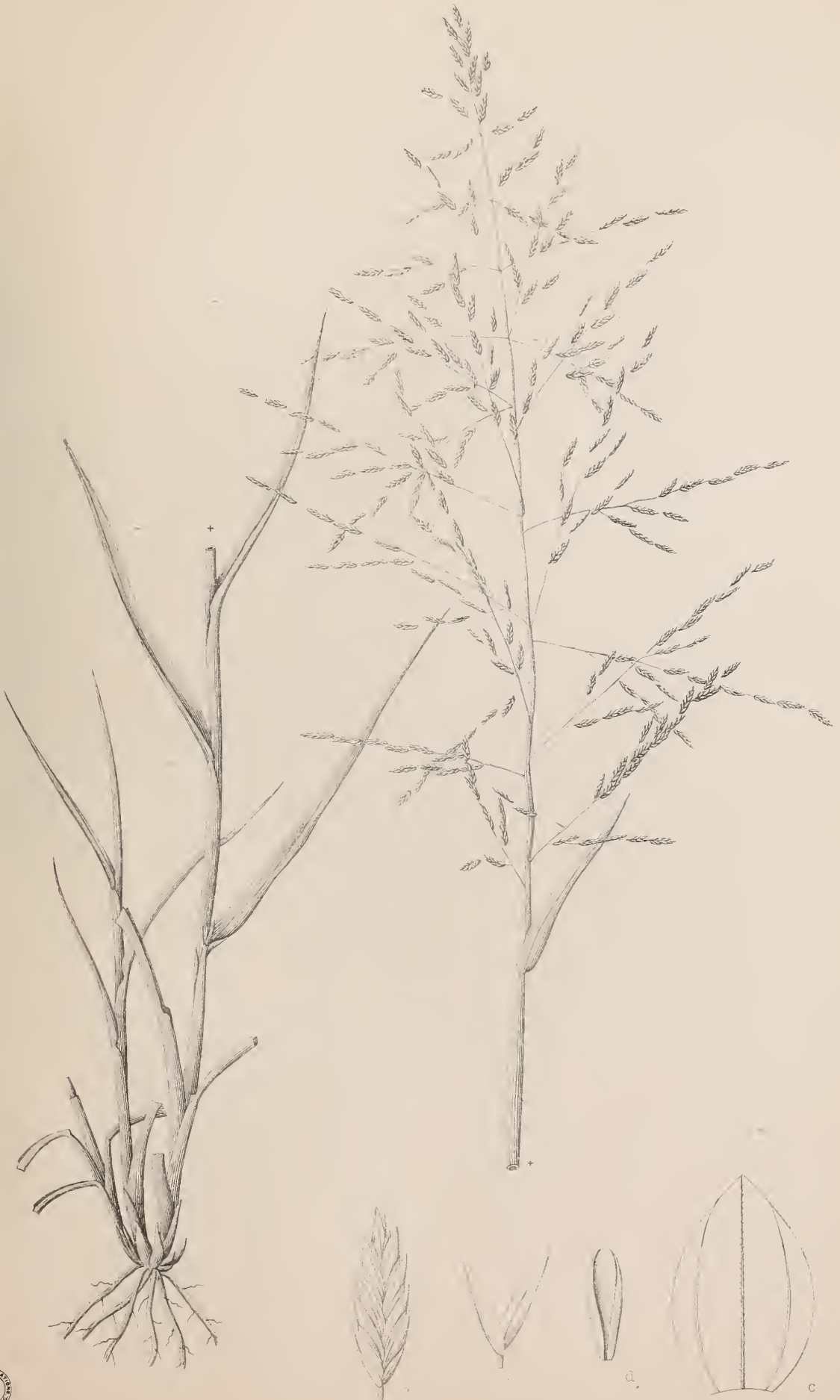
*Grain*, amber color, narrowly cylindrical,  $\frac{1}{4}$  line long.

PLATE XLVI; *a*, spikelet; *b*, empty glumes; *c*, floral glume; *d*, palet. The figure does not show the hairy ligule.

This species is closely related to *E. pectinacea*, being less diffuse, with shorter branches and larger spikelets.

It seems to be pretty closely confined to Texas and northward to southern Kansas.





ERAGROSTIS LONGIFLORA



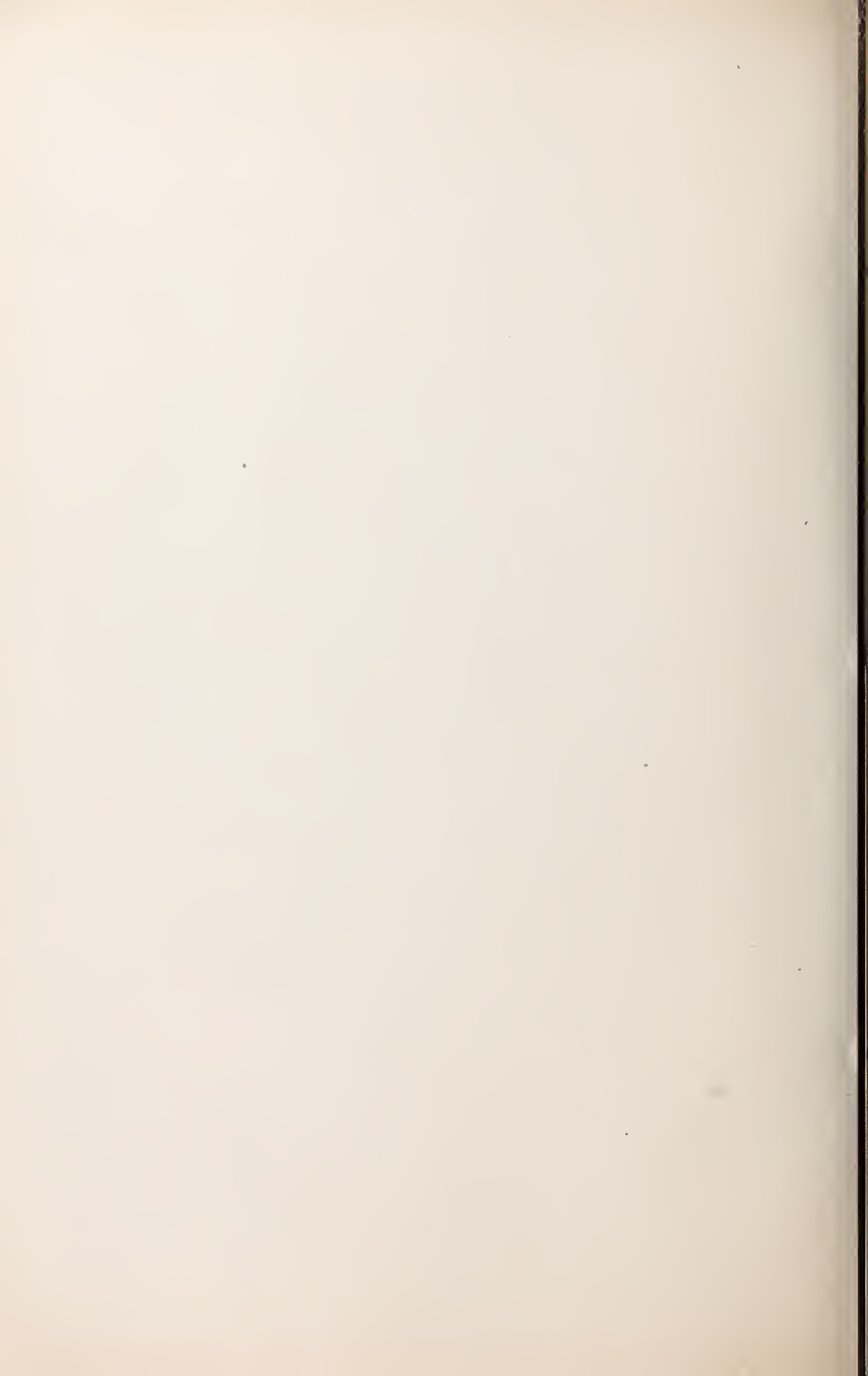


PLATE XVII: THE TEMPLE OF APOLLO AT DIDYMAEUM

Fig. 1. The temple from the north-west. The temple is a peripteral temple with a pronaos and a deep porch. The columns are of the Doric order. The temple is situated on a high platform.

Fig. 2. The temple from the north-east. The temple is a peripteral temple with a pronaos and a deep porch. The columns are of the Doric order. The temple is situated on a high platform.

Fig. 3. The temple from the south-west. The temple is a peripteral temple with a pronaos and a deep porch. The columns are of the Doric order. The temple is situated on a high platform.

Fig. 4. The temple from the south-east. The temple is a peripteral temple with a pronaos and a deep porch. The columns are of the Doric order. The temple is situated on a high platform.

PLATE XVIII: THE TEMPLE OF APOLLO AT DIDYMAEUM  
Fig. 5. The temple from the north-west. The temple is a peripteral temple with a pronaos and a deep porch. The columns are of the Doric order. The temple is situated on a high platform.

Fig. 6. The temple from the north-east. The temple is a peripteral temple with a pronaos and a deep porch. The columns are of the Doric order. The temple is situated on a high platform.

ERAGROSTIS LUGENS Nees. (*Eragrostis pilifera* Scheele?)

*Plant* perennial, from a slightly bulbous base.

*Roots* numerous, rather coarse, long, not branching, and with few fibrillæ.

*Culms* tufted, slender, erect, simple, solid, nearly terete, smooth,  $1\frac{1}{2}$  to 3 feet tall.

*Leaves*; the lower from abortive culms, with scarios sheaths, and slender, involute blades, 3 to 6 inches long; of stem 3 or 4; sheaths  $\frac{2}{3}$  length of internode, striate, loose, smooth; blade flat below, involute toward the long, tapering point, a few scattered hairs above the ligule, otherwise smooth, 3 to 6 inches long; ligule a prominent line of crowded, white hairs, 2 lines long.

*Inflorescence* a loose, erect, pyramidal panicle, 8 to 10 inches long, included at base in upper sheath when young, rachis grooved above each branch; branches capillary, mostly alternate, minutely scabrous toward the ends, and bearing a few white hairs at the axils, flexuous, lower ones 3 to 6 inches long, subdividing nearly to the base, bearing 15 to 20 spikelets on the long, filiform branchlets.

*Spikelets* linear-lanceolate, 4 to 5 lines long, on slender pedicels as long as themselves, or much longer, 5- to 11-flowered; internodes of rachilla  $\frac{1}{3}$  line long; first and second glumes nearly alike, scarios margined, broadly ovate, nearly acute, obscurely 1-nerved, 1 line long; floral glumes scarios above, broadly ovate, obscurely 3-nerved, smooth, 1 to  $1\frac{1}{4}$  lines long; palet linear, membranaceous, arched, smooth, 1 line long.

*Grain* reddish brown, rhomboidal,  $\frac{1}{3}$  line long.

PLATE XLVII; *a*, spikelet with pedicel; *b*, empty glumes; *c*, floral glume dorsal and side views; *d*, palet and stigmas. The plate does not represent the hairs of the ligule.

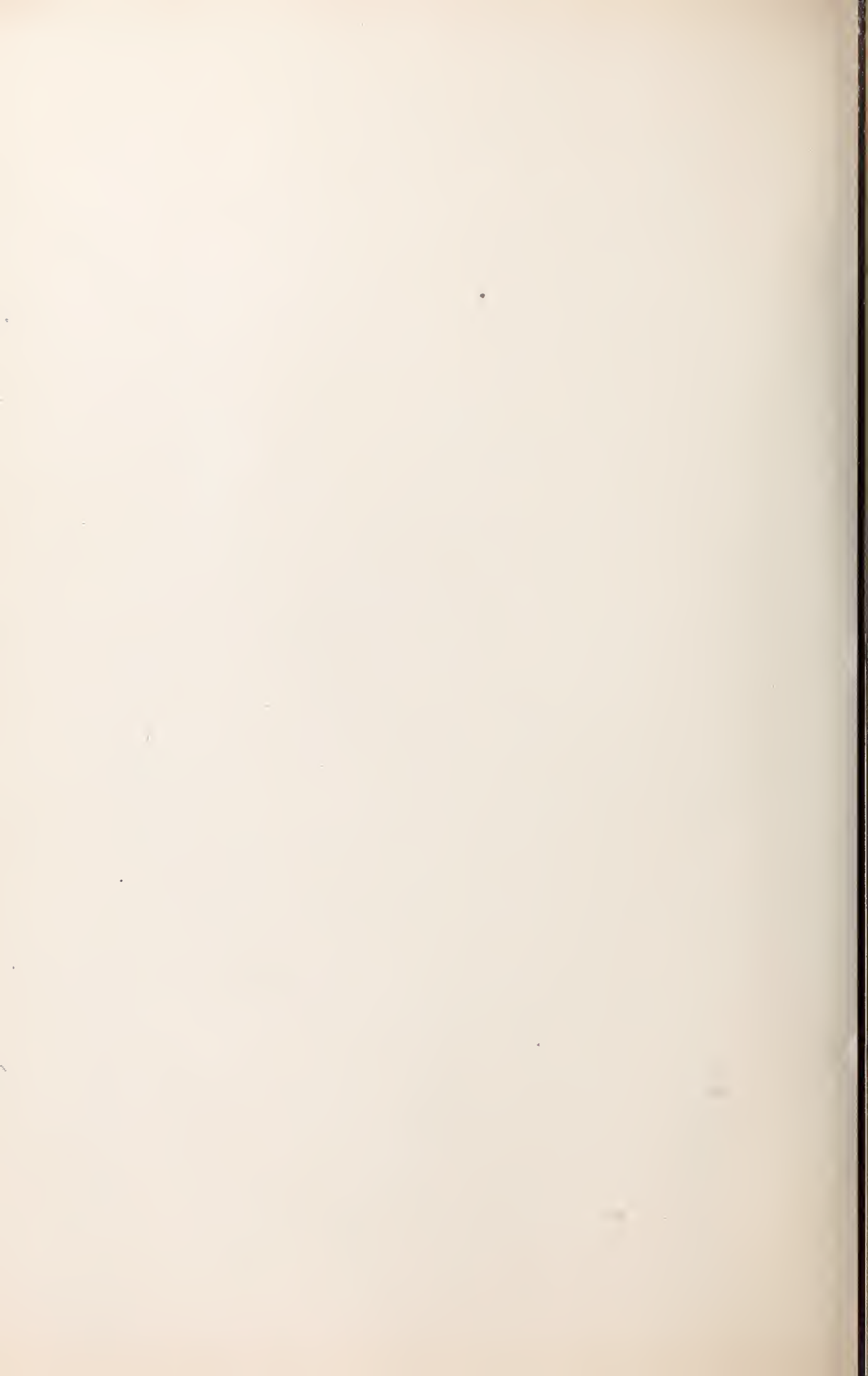
Texas and New Mexico.

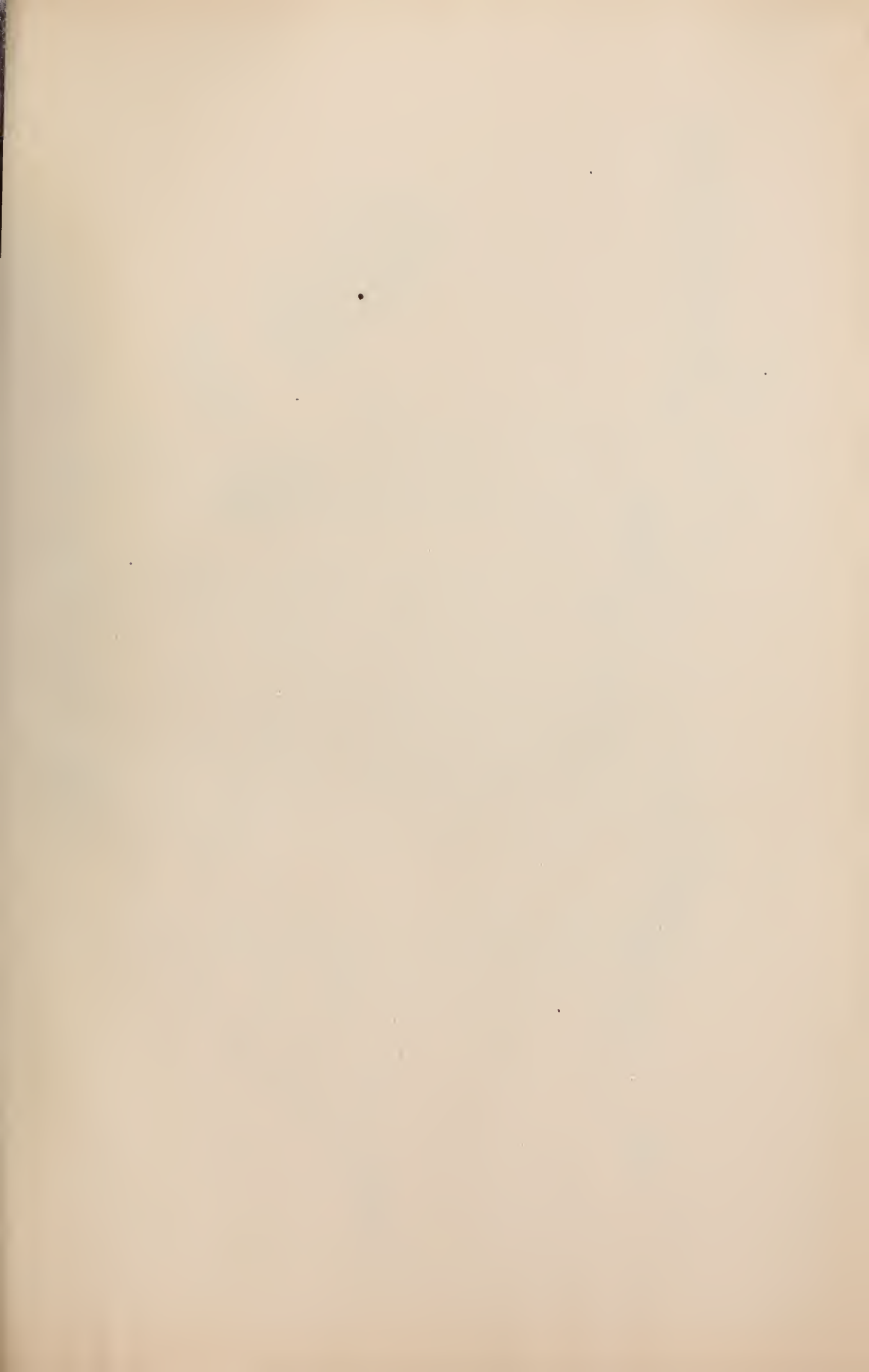
This species is very near our *E. capillaris*, and varies considerably in the length of leaves and size of panicle; it is also near *Eragrostis Mexicana* Link.



Julius Elen & Co lith

ERAGROSTIS LUGENS, N. S.





ERAGROSTIS OXYLEPIS Torr. (*Poa interrupta* Nutt.)

*Plant* annual or a short-lived perennial, from slightly enlarged base, light green, usually tinged with purple, especially in the inflorescence.

*Roots* with abundant coarse root hairs, sometimes branching.

*Culms* ascending, prominently geniculate, hollow, not branching, terete, smooth, 1 to 2 feet tall.

*Leaves* numerous; from abortive culms, involute, 8 to 12 inches long; of stem 2 or 3; sheaths nearly equaling or usually exceeding the lower internodes, smooth, open above but appressed to culm, blade involute with slender rigid point, 3 to 6 inches long; ligule a dense tuft of fine hairs 2 lines long.

*Inflorescence* an irregular, oblong panicle, of dense clusters of spikelets nearly sessile on the branches, which are short above, the lower sometimes 1 to 3 inches long, erect, and at irregular intervals on the rachis.

*Spikelets* oblong-lanceolate, compressed, 2 to 3 lines wide, 7 to 9 lines long, 20- to 30-flowered; internodes of zigzag rachilla  $\frac{1}{2}$  line long, with minute pubescence at each node; first glume narrowly ovate, acute, carinate, 1-nerved, hispid on the keel, scarcely 1 line long; second glume same as first but  $\frac{1}{2}$  line longer; floral glumes ovate, acute, carinate, hispid on keel above, 3-nerved,  $1\frac{1}{2}$  to 2 lines long; palet elliptical, cleft at apex, ciliate on the two reflexed arched marginal nerves, 1 to  $1\frac{1}{4}$  lines long.

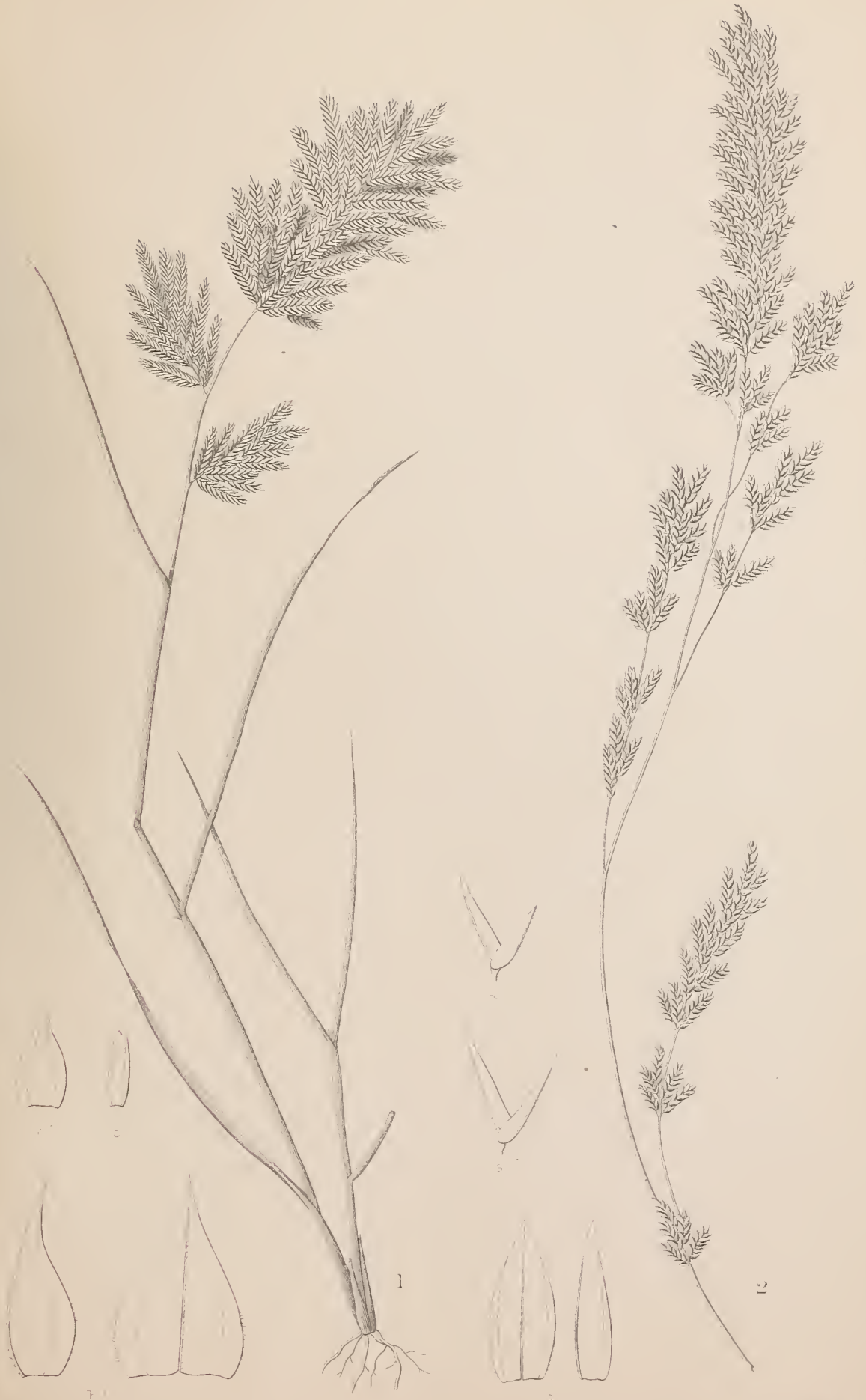
*Grains* not abundant, translucent amber color, narrowly conical, nearly  $\frac{1}{2}$  line long.

PLATE XLVIII, 1; *a*, empty glumes; *b*, floral glume dorsal and side views; *c*, palet.

PLATE XLVIII, 2; another form, with panicle more interrupted and branches longer; *a'*, empty glumes; *b'*, floral glume, dorsal and side views; *c'*, palet.

Gulf States, Texas, and northward to Kansas.

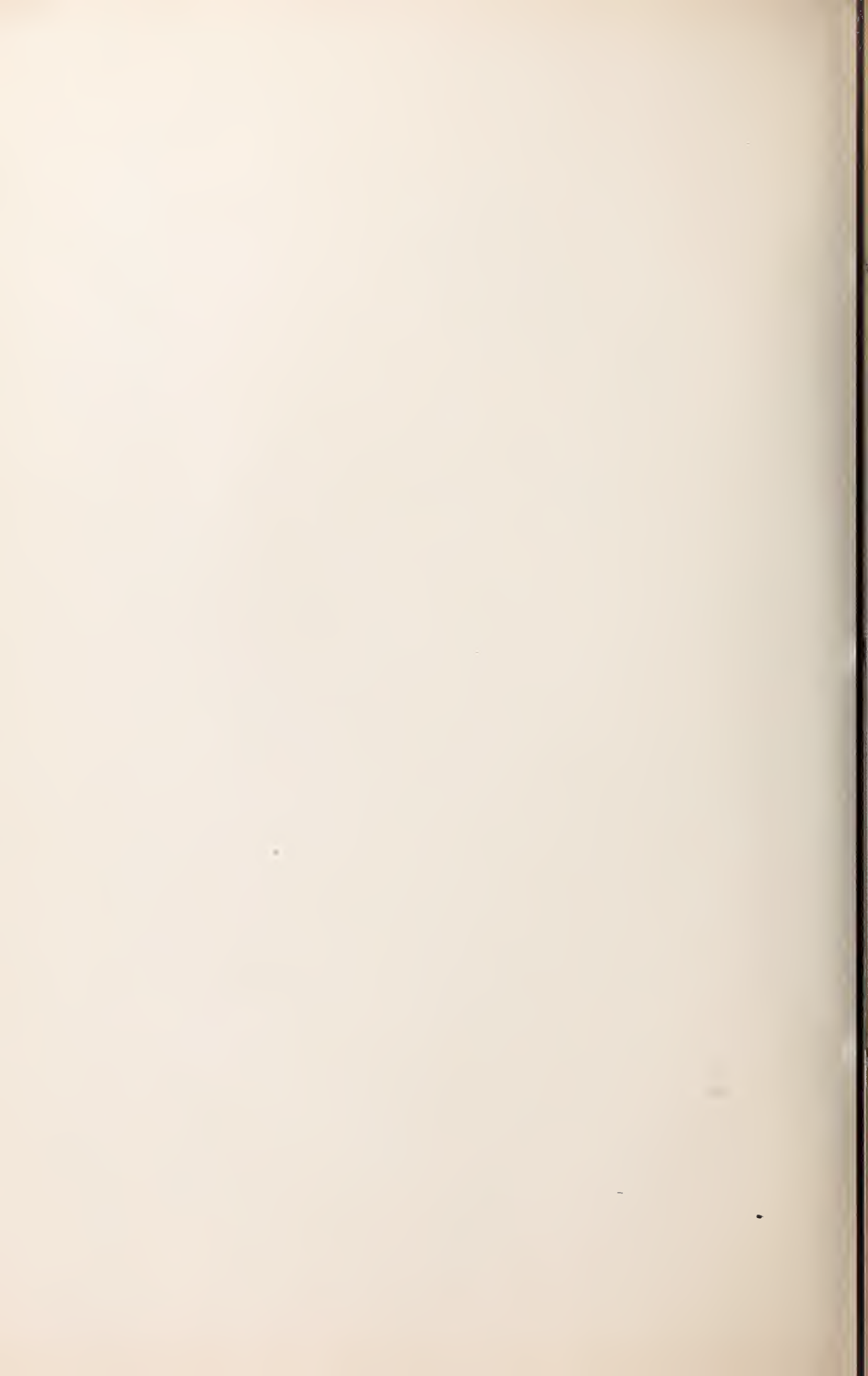


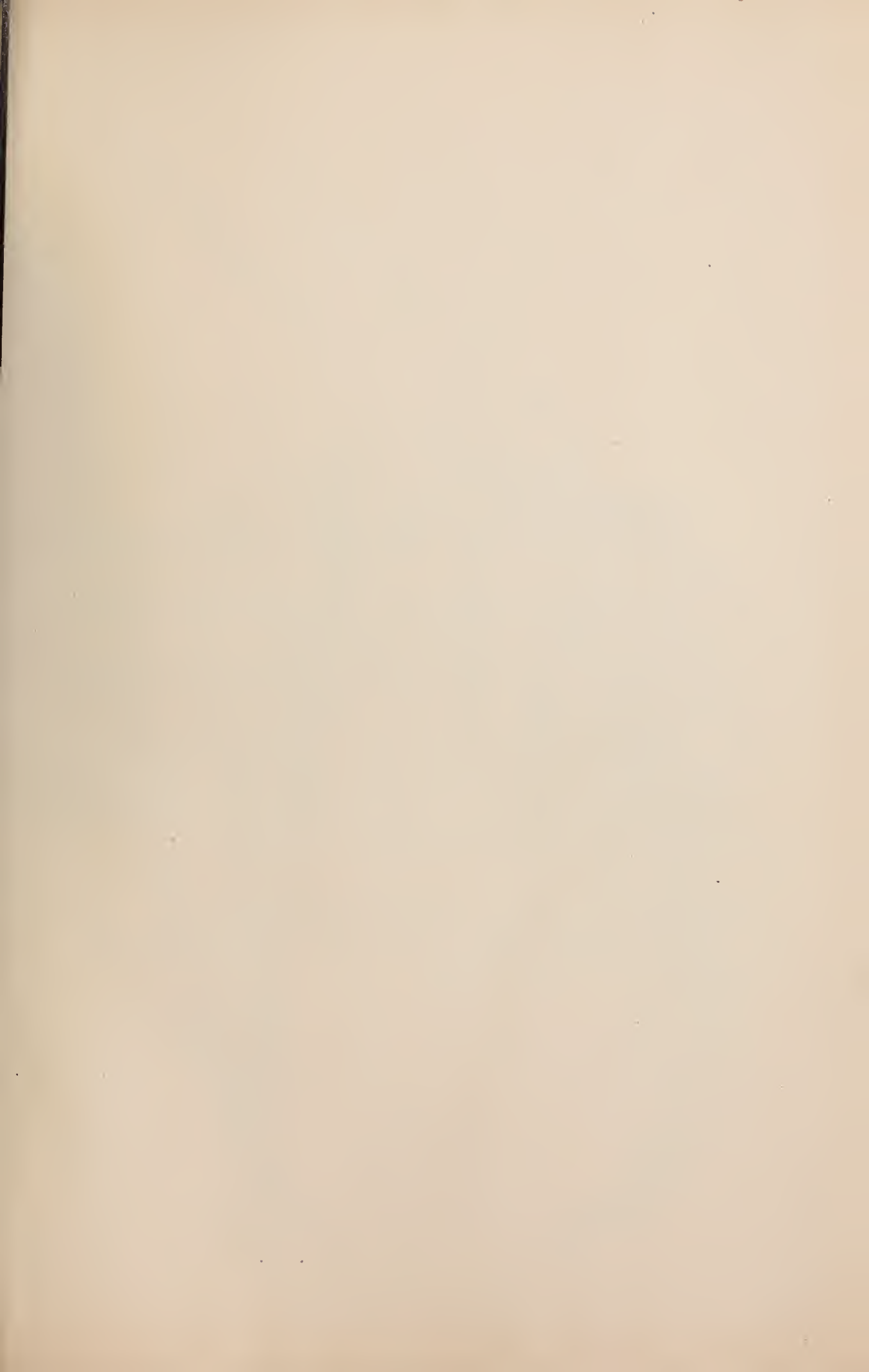


ERAGROSTIS CILIARIS Tuck.

E. ciliaris







No. 49.

ERAGROSTIS PURSHII Shrad.

*Plant* annual, diffuse, spreading from a tufted base.

*Roots* sometimes secondary from lower nodes, seldom branched.

*Culms* ascending, often prominently geniculate, slightly compressed, and grooved or flattened above each sheath, smooth, often branching below, 15 to 20 inches tall.

*Leaves* of sterile culms rather numerous, with flat or slightly involute blades 3 to 6 inches long; of stem 3 or 4; sheath 1 to 2 lines wide, 4 to 7 inches long; ligule a spreading tuft of fine white hairs  $1\frac{1}{2}$  lines long.

*Inflorescence* a rather loose, oblong panicle, 5 to 7 inches long; rachis angular, somewhat flexuous, branches 1, 2, or 3 in a place, 2 to 4 inches long, with few or no hairs at the axis, bearing 12 to 20 appressed spikelets on angular, twisted, hispid pedicels of varying lengths.

*Spikelets* linear-lanceolate, 5- to 10-flowered, 2 to  $3\frac{1}{2}$  lines long; internodes of slender rachilla  $\frac{1}{3}$  line long; first glume ovate, acute, minutely hispid on back above, 1-nerved,  $\frac{1}{3}$  line long; second glume same as first but nearly twice as large; floral glumes broadly ovate, acutish, convex, scarious, 3-nerved,  $\frac{2}{3}$  to nearly 1 line long; palet linear-oblong, minutely pubescent on the 2 nerves,  $\frac{2}{3}$  line long, arched, remaining on the rachilla after the seed falls with the floral glume.

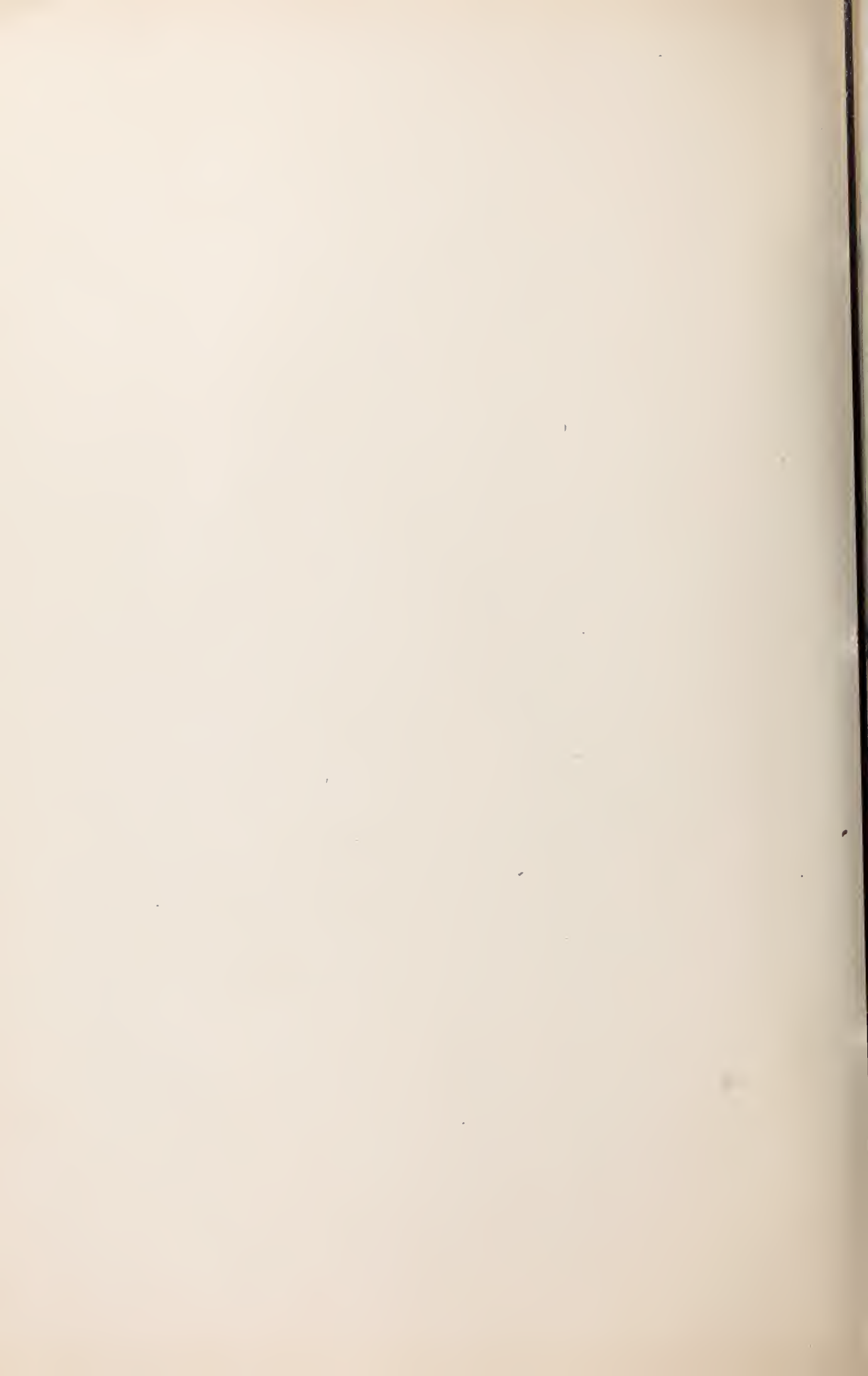
*Grain* amber colored, oblong,  $\frac{1}{3}$  line long.

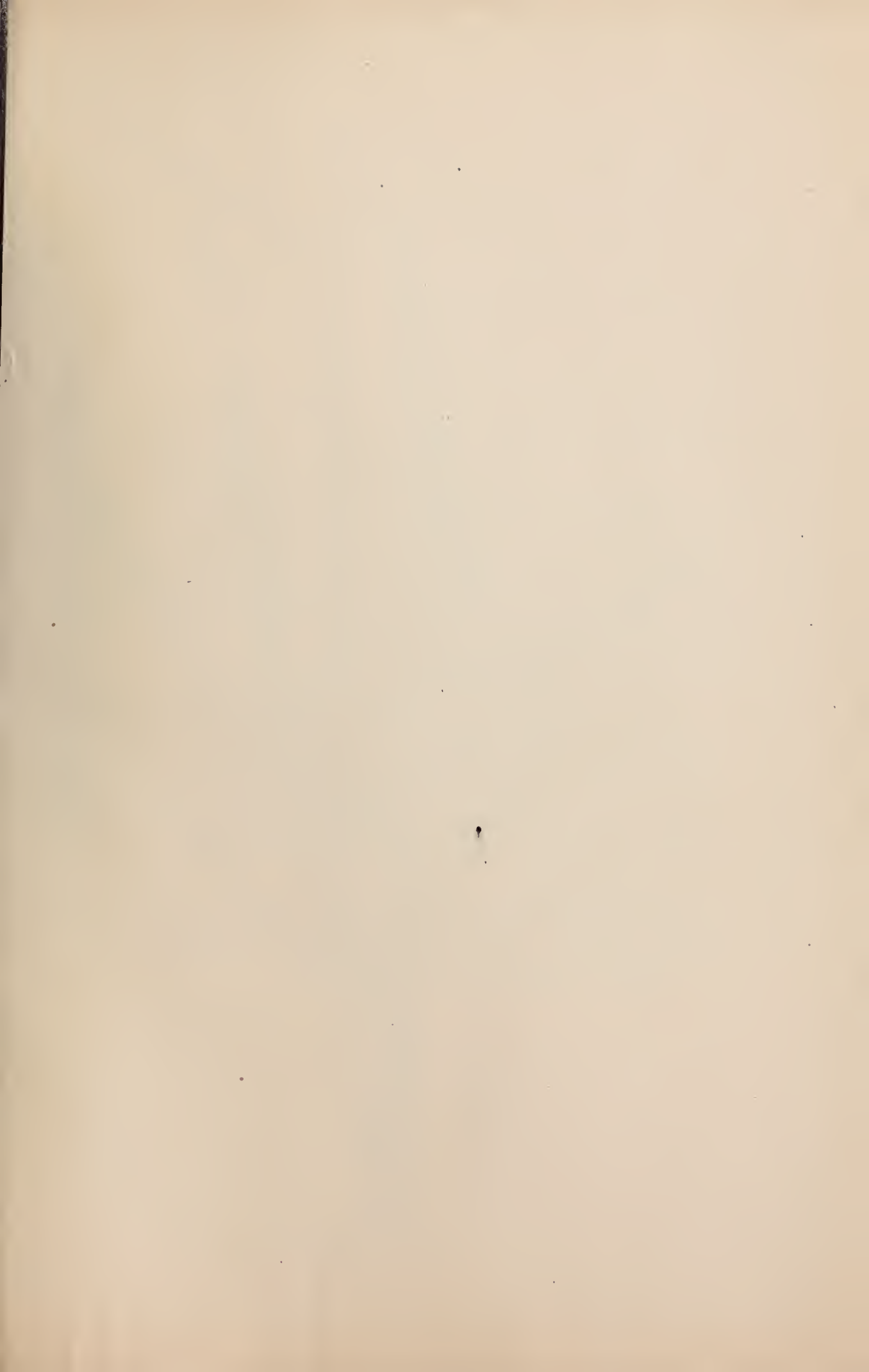
PLATE XLIX; *a*, spikelet with pedicel; *b*, empty glumes; *b'*, and *b''*, apexes of empty glumes; *c*, floral glume, dorsal and side view; *d*, palet.

Texas to Arizona and Mexico. In the Northern States this species seems to be confused with *Eragrostis pilosa*.



ERAGROSTIS PURSHII, *Pursh.*





ELYMUS SITANION Schultes. (*Sitanion elymoides* Raf. *Polyanthrix*  
*Hystrix* Nees.)

*Plant* annual, or short-lived perennial, from rather bulbous base.

*Culms* tufted at base with many radical shoots, erect, unbranched, terete, hollow, nearly smooth, 6 to 18 inches tall.

*Radical leaves* mostly membranaceous scales, or leafless sheaths, those from radical shoots numerous, striate, often pubescent, or nearly glabrous on sheaths and blades below; blade flat or slightly involute, rigid, hispid above,  $1\frac{1}{2}$  lines wide, 4 to 6 inches long; leaves of culm 3, rarely 4; sheaths longer than internodes; blades like those of radical shoots, ligule an inconspicuous, narrow, membranaceous line, often auriculate on one or both sides.

*Inflorescence* a rather loose spike 2 to 3 inches long; rachis articulate at base of each flattened internode, and easily separating.

*Spikelets* 2 at each node of the rachis, nearly sessile, lanceolate, 5 to 6 lines long, not including the awns, 1- to 5-flowered; upper flowers sterile; first and second glumes nearly equal, side by side in front of the spikelet, narrow, 2-nerved at base, terminating in a divergent hispid awn 2 to 4 inches long; floral glumes ovate-lanceolate, acute, round on back, enveloping seed and palet, finely scabrous, indistinctly 5-nerved, terminating in a hispid awn 2 to  $2\frac{1}{2}$  inches long, the upper imperfect glumes short-awned; palet lance-linear, obtuse, hispid on the two nerves, margins reflexed, flat, one-half line wide, folded. 4 to  $4\frac{1}{2}$  lines long.

*Grain* dull brown, linear, wrinkled lengthwise,  $2\frac{1}{2}$  lines long, adherent to palet and enveloping glume.

Extensively diffused over the arid and desert districts of the West, from the Missouri to the Pacific, and from Dakota to Texas, presenting great diversity of size and appearance. Sometimes the empty glumes are divided into three parts.

PLATE L; *a*, spikelet; *b*, floral glume; *c*, palet.





b

c

a



ELYMUS CITANION, Desf. fides



## CORRECTIONS AND EMENDATIONS.

### PART I.

No. 5. *Setaria caudata*, second line, Plant annual. The drawing represents a perennial form or species common in western Texas, Arizona, New Mexico, and northern Mexico. There is, however, a closely related form which is annual.

No. 11. *Hilaria mutica* Benth. It should be stated that this is *Pleuraphis mutica* Buckley. Mr. Bentham united the genus with *Hilaria*, and according to the views of some botanists Buckley's name should follow the species in parentheses; thus, *Hilaria mutica* (Buckley) Bentham.

No. 15. *Elionurus*, plate 15. The specific name at the bottom of the plate should be *barbiculmis*.

Plate 19. *Andropogon hirtiflorus* Kth. The figures *a* and *b* do not well represent the glumes of the species. It is probable that by mistake the drawings were made from spikelets of *A. scoparius*. The first empty glume should be represented as narrow and acuminate at apex, with the back scabrous-roughened and hairy.

Plate 23. *Aristida divaricata* H. B. K. This is *Aristida Humboldtiana* Trin. Trinius excludes *A. divaricata* as a mixed and uncertain species.

Plate 27. *Epicampes macroura* Kth. I was misled by the specimen in the United States Herbarium (No. 1973 C. Wright's New Mexican Coll.) in naming this species. Evidently it is not *E. macroura* Kth., which has a dense, cylindrical spicate panicle. It is *Epicampes ligulata* Scrib. Fournier in *Enumeratio Mexicanarum Plantarum* enumerates 13 Mexican species of *Epicampes*, of which we have too little representation to determine if our plant is among the number.

Plate 28. This is the *Cinna macroura* of Thurber in the *Botany of California*, but not of Kth.

Plate 29. *Chloris elegans* H. B. K. is believed to be a synonym.

Plate 32. This is *Eustachys glauca* Chap. That genus being now united to *Chloris*, it becomes *C. glauca* (Chap.) Vasey.

Plate 45. *Bouteloua stricta*. It should have been stated that this species was collected by G. C. Nealley in western Texas.

Plate 47. The figures 1 and 2 in the plate should be transposed, No. 1 being the female plant, No. 2 the male plant.

Plate 48. *Eremochloë*. This name, or one too close to it, viz, *Eremochloa* Buse, is one of earlier date for a different genus; and Professor Hackel has named our plant *Blepharidachne*.

## CORRECTIONS AND EMENDATIONS.

### PART II.

- Plate 2. Add after the name (Thurber).
- Plate 14. Transpose the numbers 1 and 2 of the plate.
- Plate 30. *Karwinskiana* should be *Karwinskianus*.
- Plate 33. *Albesceus* should be *albescens*.
- Plate 38. The name on the plate should read *Triodia stricta* (Torr.) Vasey; it was *Tricuspis stricta* Torr.
- Plate 40. The name should read *Triodia trinerviglumis* (Munro). It was *Tricuspis trinerviglumis* Munro, the genus being united to *Triodia* by Mr. Bentham.
- Plate 42. In like manner the name here should be *Diplachne imbricata* (Thurb.), as it was *Leptochloa imbricata* Thurb. in Bot. California.
- Plate 43. Strike out the letter *s* in *Reverschoni*.
- Plate 44. The name should read *Diplachne rigida* (Munro) Vasey. It was *Leptochloa rigida* Munro.
- Plate 46. Add Buckl. after the name.

U. S. DEPARTMENT OF AGRICULTURE.  
DIVISION OF BOTANY.

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ILLUSTRATIONS OF NORTH AMERICAN GRASSES.

VOL. I.

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GRASSES OF THE SOUTHWEST.

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PLATES AND DESCRIPTIONS

OF THE

GRASSES OF THE DESERT REGION OF WESTERN TEXAS, NEW MEXICO,  
ARIZONA, AND SOUTHERN CALIFORNIA.

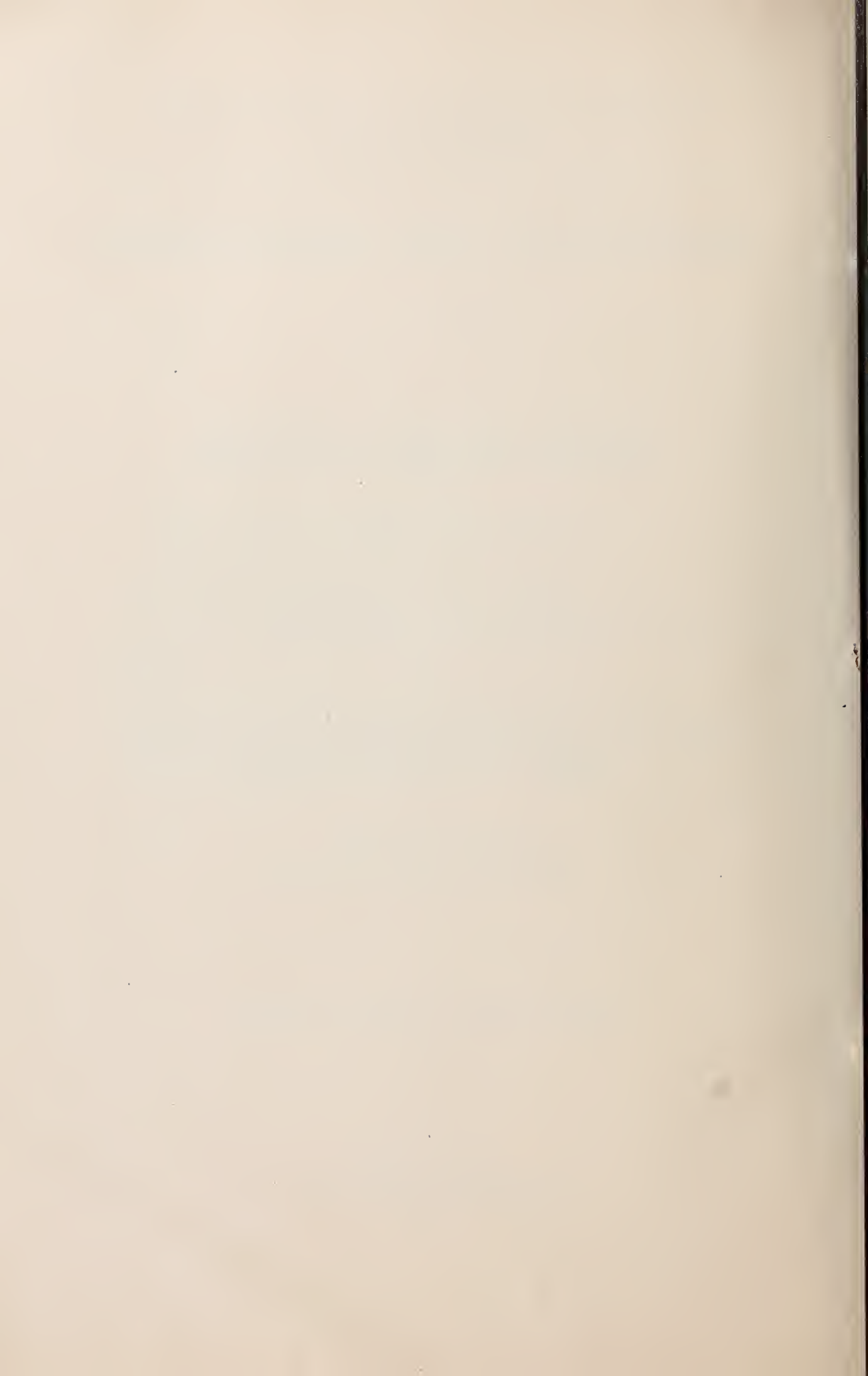
By DR. GEO. VASEY,  
BOTANIST, DEPARTMENT OF AGRICULTURE.

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WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1891.



## LETTER OF TRANSMITTAL.

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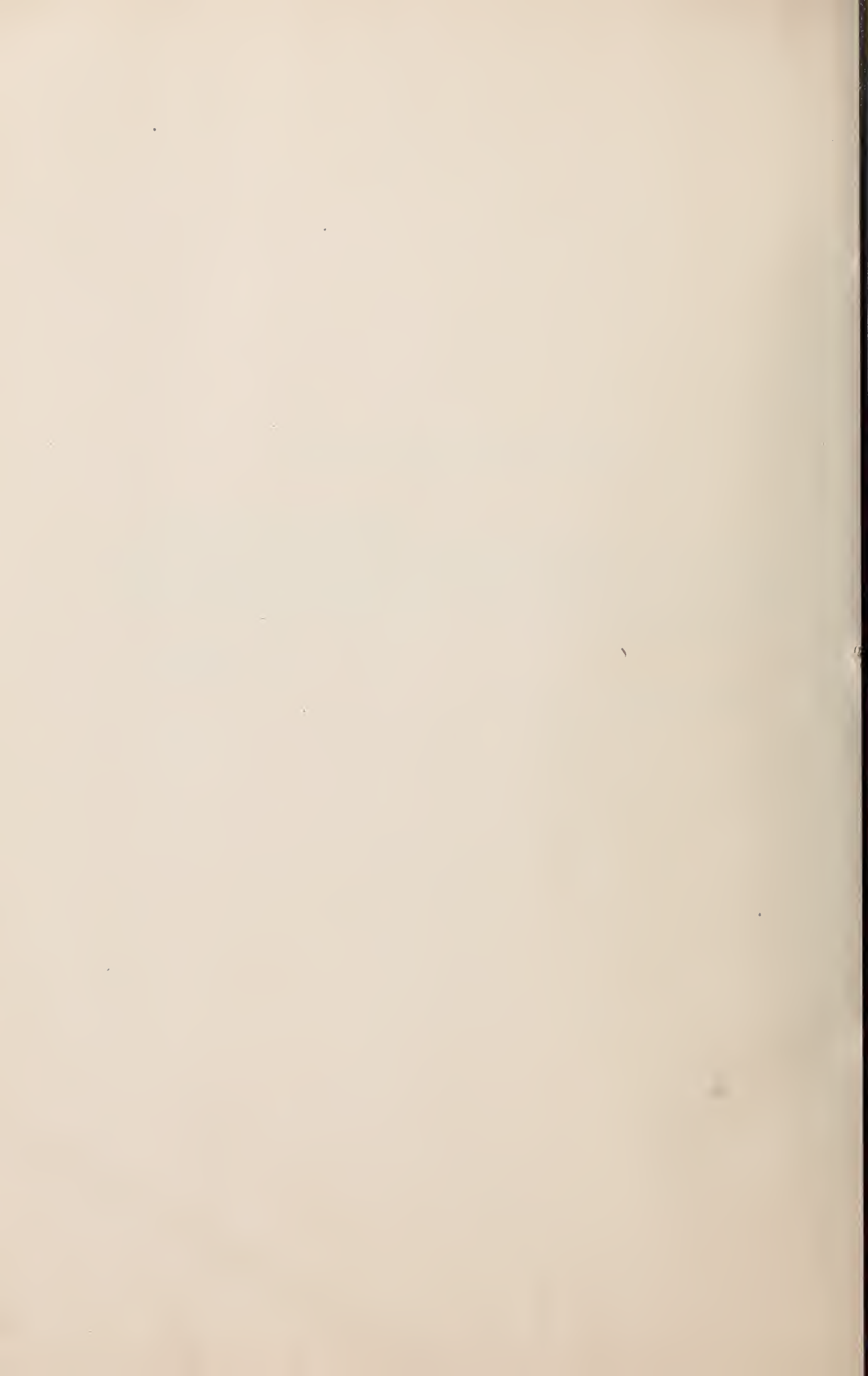
WASHINGTON, *September*, 1891.

SIR: I have the honor of presenting for publication the first volume of the proposed work called "Illustrations of North American Grasses," which have been issued as Bulletin No. 12, parts I and II: and it is proposed to follow this with a second volume of plates and descriptions of the "Grasses of the Pacific Coast."

Respectfully,

GEO. VASEY,  
*Botanist.*

Hon. J. M. RUSK,  
*Secretary of Agriculture.*





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