BOTANY.—*New grasses from Mexico.* Ernest R. Sohns, U. S. National Museum. (Communicated by Agnes Chase.)

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In the course of routine identification of miscellaneous collections of grasses from Mexico, six new taxa were discovered and the original descriptions of two species required emendation. The new entities and emendations are presented in this paper.

Panicum clivum Sohns, sp. nov.

Figs. 1–8

Gramen perenne; culmi 20–50 cm alti, decumbentes, graciles; vaginae internodiis breviores, inferiores striatae, papilloso-pilosae, superiores marginibus papilloso-pilosis; ligula circiter 1 mm longa; laminae 2–8.5 cm longae, 3–12 mm latae, omnes pubescentes, margines papilloso-pilosis; panicula 5–8 cm longa, 2–8 cm lata, ramis brevibus, inferiores 4.5 cm longi; spiculae 2.3–2.7 mm longae; gluma prima 0.5–0.9 mm longa, lata, rotundata, enervis; gluma secunda et lemma sterile subaequans; lemma fertile circiter 2–2.2 mm longum, 7-nervis; lemma sterile vacuum; lemma fertile 2.1–2.4 mm longum, 1.0–1.1 mm latum, glabrum, 5-nervis; palea lemma sterile aequans; staminia 3, antherae 0.4 mm longae; lodiculae 2, membranaceae, 0.2 mm longae; caryopsis circiter 1.5 mm longa, 1 mm lata.

Perennial; culms decumbent at first and/or second nodes, but not rooting, 20–50 cm tall, glabrous; sheaths shorter than the internodes, the lower loose, striate, papillose-pilose, upper sheaths papillose-pilose on the margin and sparingly pilose between the nerves, a dense ring of hairs on the collar across the back; ligule a fringe of hairs about 1 mm long; blades to 8.5 cm long, 3 to 12 mm or more wide, sometimes cordate-clasping, pubescent on both surfaces, papillose-pilose on the margins, especially near the base; inflorescence a narrow exserted panicle, 5–8 cm long, 2–8 cm wide, panicle branches mostly short, the lower sometimes 4.5 cm long, the axes and branches glabrous; spikelets 2.3–2.7 mm long, averaging 2.47 mm (measurements on 60 spikelets); first glume 0.5–0.9 mm long, broad, rounded, clasping base of spikelet, nerveless or sometimes with a faint median nerve; second glume and sterile lemma about 0.1 mm shorter than the fertile lemma; both 7-nerved, very sparingly short-pilose with scattered hairs; sterile lemma with a membranous palea about 1 mm long; fertile lemma 2.1–2.4 mm long, about 1–1.1 mm wide, smooth and shining, 5-nerved, the nerves visible as faint white lines; palea as long as the lemma; stamens 3, anthers 0.4 mm long; lodicules 2, membranous, spatulate, 0.2 mm long; caryopsis about 1.5 mm long and 1 mm wide.

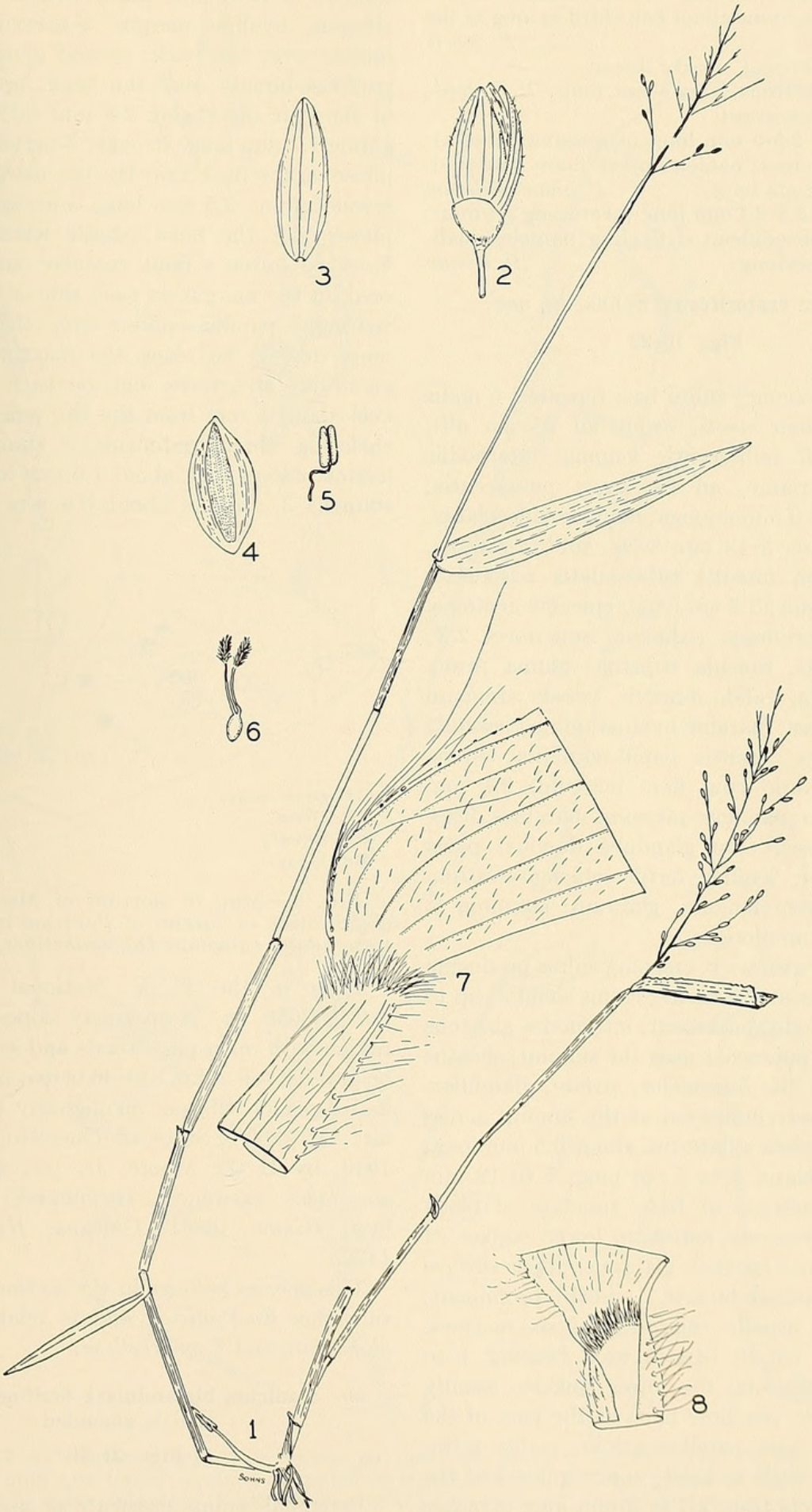
Type in the U. S. National Herbarium, no. 2041588, collected "on mossy limestone boulder; ravine slopes above Tepeoco, 3.5 miles from Zacualtipan on road to Tianguistengo," State of Hidalgo, altitude 2,100 meters, March 20, 1947, by H. E. Moore, Jr. (no. 2371). Additional specimens examined: Hidalgo: Palo Hueco, *Moore* 2694. México: Cañado de Nanchititla, *Matuda* 30818.

This species belongs in the subgenus *Dichanthelium*, section *Commutata*, and is related to *P. albomaculatum*, *P. hintonii*, and *P. joorii*. A key to the species of this section follows the discussion of *P. albomaculatum*. The distribution of the species in this section is shown in Fig. 9.

In the course of examining collections of *P. albomaculatum* Scribn. (U. S. Dept. Agr. Div. Agrost. Circ. **19:** 2. 1900) in the U. S. National Herbarium, including the type and the original description, it became apparent that the original description required emendation.

In his description Scribner stated that the spikelets are "2.5 mm long; . . ." Spikelets on the type specimen measured 2.5 to 3.0 mm in length (the average of 25 spikelets: 2.7 mm). No measurements were given for the length of the panicle which is found to vary from 12 to 18 cm. The branches of the panicle are relatively stiff and somewhat ascending. The blades are described as "scabrous on the nerves below, glabrous above, . . ." Seven collections of *P. albomaculatum* have sheaths and blades which are papillose-pilose in varying degrees of density. The spikelets of these pubescent specimens are in the same size range as the sparingly pubescent spikelets of the type. The average length of 100 spikelets is 2.66 mm.

The new species may be separated from other species in this section by the following key.



FIGS. 1–8.—*Panicum clivum* Sohns, sp. nov.: 1, Plant, × ½; 2, spikelet; 3, sterile lemma; 4, fertile lemma (palea visible); 5, stamen; 6, ovary; 7, junction of blade and sheath; 8, view of ligule. Figs. 2–6 and 8, × 8; fig. 7, × 16. Drawn from the type specimen.

Blades asymmetrical and falcate; culms decumbent; first glume about one-third as long as the spikelet ..... *P. joorii*
Blades symmetrical, nearly linear.
Spikelets glabrous, 2.2–2.4 mm. long. . *P. hintonii*
Spikelets pubescent.
Spikelets 2.5–3 mm long (averaging 2.7 mm); plants erect; panicles open, many-flowered, 12 to 18 cm long ..... *P. albomaculatum*
Spikelets 2.3–2.7 mm long (averaging 2.4 mm); plants decumbent-straggling; panicles small, 5 to 8 cm long ..... *P. clivum*

Panicum crateriferum Sohns, sp. nov.

Figs. 10–22

Gramen perenne; culmi basi repentes, e nodis radicantes, dein erecti, usque ad 35 cm alti, graciles, nodi pubescenti; vaginae internodiis breviores, striatae, ad os dense pubescentis; ligula circiter 0.5 mm longa; laminae lanceolatae, 2–5 cm longae, 5–12 mm latae, subtus glabrae, supra sparsim hirsutis tuberculatis adspersae; racemi 6, usque ad 2 cm longi; spiculae geminae, inferiores plerumque reductae, superiores 2.3–3 mm longae. Spicula superna: gluma prima 1.7 mm longa, valide 3-nervis, versus summam papilloso-pilosa, margine hyalina; gluma secunda 2.5 mm longa, 5-nervis, papilloso-pilosa; lemma sterile (interdum cum flore masculo) 2.7 mm longum, parce papillose-pilosum, margines dense papilloso-pilosis, cum glandulis duobus; palea membranacea; lemma fertile oblongo-ovatum, circiter 1.6 mm longum, glabrum; staminia 3, antherae 0.9 mm longae.

Perennial, with wiry, creeping culms producing upright culms at the nodes; culms slender, up to 35 cm tall, nodes pubescent, internodes glabrous or sparingly pubescent near the summit; sheaths shorter than the internodes, striate, glandular-spotted, densely pubescent at the summit across the back; ligule a ciliate rim about 0.5 mm long; blades lanceolate, 2 to 5 cm long, 5 to 12 mm wide, asymmetrical at base, junction of blade and sheath scarcely petiolate, lower surface of blade glandular spotted, glabrous, upper surface sparsely papillose-hirsute, midrib prominent; inflorescence usually consisting of six racemes, averaging 2 cm in length, each bearing 4 to 10 paired spikelets, the lower spikelet usually reduced, a few papillose hairs at the base of the raceme, the axis papillose-pilose; rachis terminated by a single spikelet; upper spikelet of the paired spikelets from 2.3 to 3 mm long (average length of 46 spikelets: 2.68 mm). Reduced lower spikelet of pair: first glume with a pronounced, clasping hyaline margin, 3-nerved, papillose-hirsute over the back; second glume 5-nerved, papillose-hirsute over the back; upper spikelet of the pair (averaging 2.6 mm in length): first glume 1.7 mm long, strongly 3-nerved, papillose-pilose on the back near the tip, margins hyaline; second glume 2.5 mm long, 5-nerved, papillose-pilose over the back; sterile lemma 2.7 mm, 5-nerved (often a faint vascular bundle may be seen on the margin on each side of the lemma), sparingly papillose-pilose over the back, but more densely so along the margins, with two gland-like structures, one on each side of the keel about 1 mm from the tip; palea very thin, enclosing three rudimentary stamens; fertile lemma oblong-oval, about 1.6 mm long, smooth; stamens 3, anthers about 0.9 mm long.

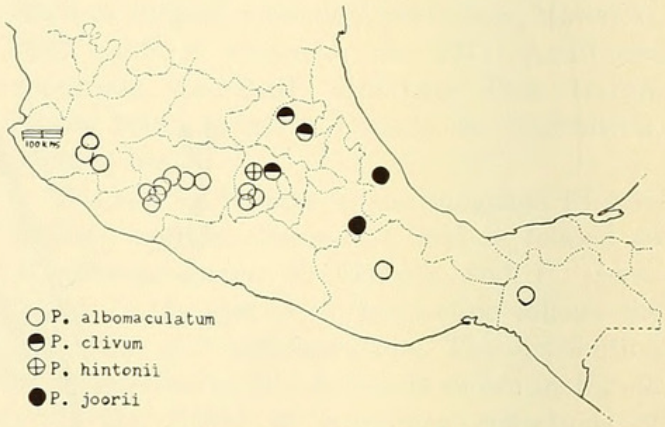


FIG. 9.—Map of portion of Mexico showing distribution of species of *Panicum* in the section *Commutata*, subgenus *Dichanthelium*.

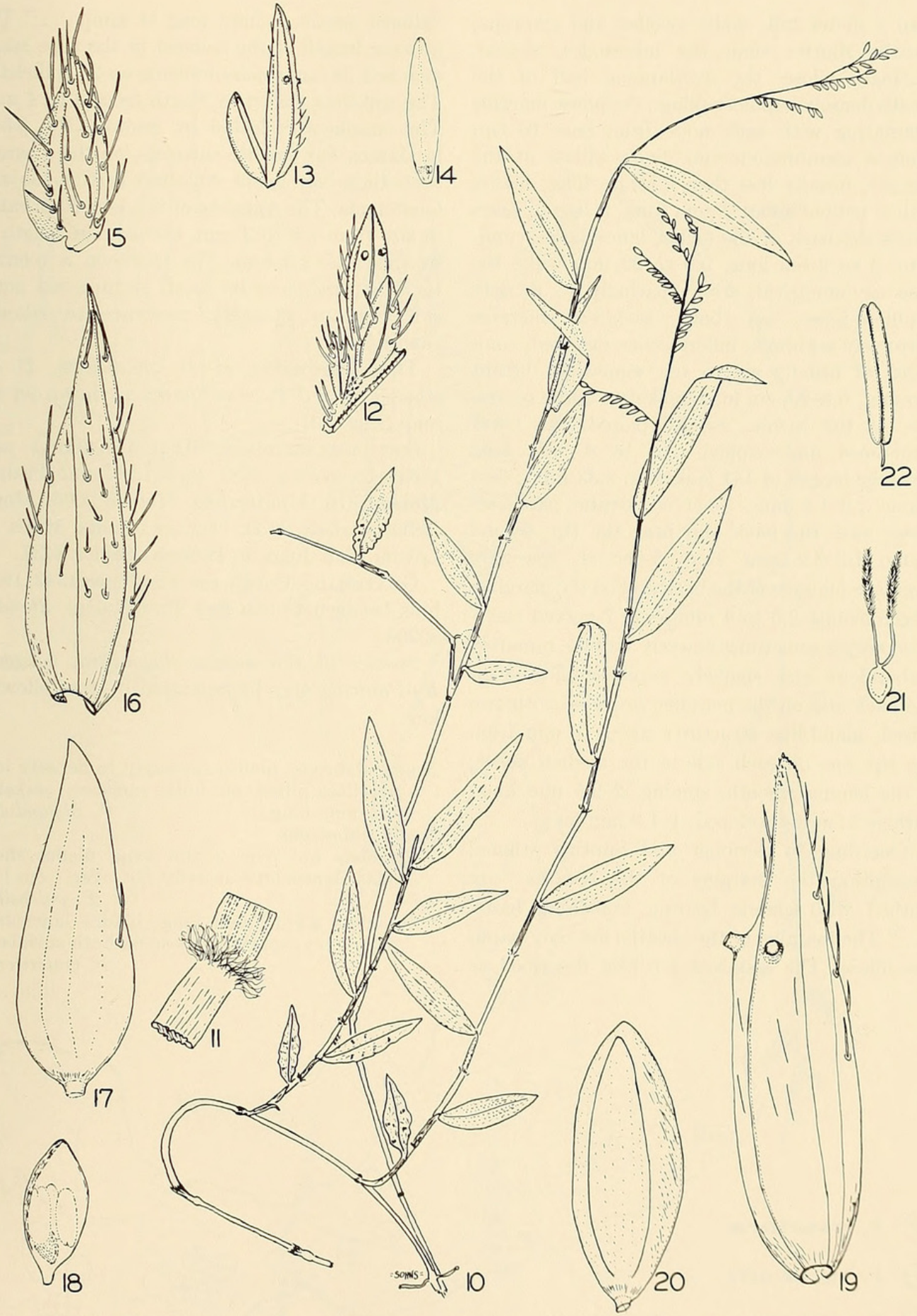
Type in the U. S. National Herbarium, no. 1983658, on "steep grassy slopes and narrow ravine with open pine woods and scattered oaks on granitic soil at km 339–40 between Acahinzotla and Agua de Obispo, on highway to Acapulco, alt. ca. 3000'" State of Guerrero, October 1, 1949, by H. E. Moore, Jr. (no. 5148). Other specimens examined: GUERRERO: Montes de Oca, *Hinton* 10801; Galeana, *Hinton* 14646, 14725.

This species belongs in the section *Stolonifera*, subgenus *Eu-Panicum* and is related to *P. biglandulare* and *P. pulchellum*.

Panicum biglandulare Scribner and Smith, emended

Figs. 24–31

Perennial, culms prostrate or ascending, producing branches from the nodes, 40 cm to more



FIGS. 10–22.—*Panicum crateriferum* Sohns, sp. nov.: 10, plant × ½; 11, node; 12, paired spikelets; 13, sterile lemma and fertile lemma; 14, palea of sterile lemma; 15, first glume of lower spikelet; 16, second glume of lower spikelet; 17, sterile lemma of lower spikelet; 18, fertile lemma of lower spikelet; 19, sterile lemma of upper spikelet; 20, fertile lemma of upper spikelet; 21, pistil and 22, anther. Figs. 11–14, × 8; all others × 16.

than 1 meter tall; nodes swollen and glabrous; sheaths shorter than the internodes, striate, sparingly pilose, the overlapping half of the sheath densely papillose-pilose, the pilose margins alternating with each node from base to tip; ligule a membranous rim, finely ciliate at the summit, usually less than 0.5 mm long; blades with a petiole about 1 mm long, a line of hairs across the back at the collar, lanceolate, acuminate, 3 to 9 cm long, 0.9 to 22 mm wide, the base asymmetrical, from sparingly to densely papillose-pilose on both surfaces, margins antrorsely scabrous; inflorescence exserted, composed of usually six to ten somewhat distant racemes, 0.6–2.5 cm long; spikelets borne on one side of the rachis, usually paired, the lower sometimes undeveloped, 2.5 to 4 mm long (average length of 147 spikelets: 3.33 mm); first glume 1.3–1.8 mm, 3-nerved, ovate, papillose-pilose over the back and near the tip; second glume 1.3–3.2 mm long, 5-nerved, sparingly papillose-pilose over the back and on the margins; sterile lemma 2.5 to 4 mm long, 7-nerved (marginal nerves sometimes scarcely visible), minutely scaberulous and sparsely papillose-pilose over the back and on the margins, provided with two raised, gland-like structures about 1 mm from the tip, one on each side of the median nerve; fertile lemma smooth, shining, 2–2.5 mm long; anthers 3, well developed, 1–1.3 mm long.

According to Scribner and Smith's original description the margins of the sheaths "are clothed with glands bearing branching hairs; . . . " The margins of the sheaths are only papillose-pilose. The spikelets are also described as "almost sessile, 2 lines long [4 mm]; . . . " The average length of the spikelet in the type specimen is 3.70 mm (measurements on 24 spikelets). The spikelets varied in length from 3 to 4 mm. The specimen collected by Santos (No. 3437) in Oaxaca has smaller spikelets, on the average, than those specimens collected in Chiapas and Guatemala. The spikelets of this collection range in size from 2.5 to 3 mm, the average length of 21 spikelets, 2.6 mm. The specimen is referred to *P. biglandulare*; its small stature and small spikelets are probably responses to edaphic conditions.

The distribution of *P. pulchellum*, *P. biglandulare* and *P. crateriferum* is shown on the map (Fig. 23).

Specimens examined: MÉXICO: CHIAPAS: near Piñabete, *Nelson* 3781 (type); Mount Pasitar, *Matuda* 316; Montecristo, *Matuda* 2006; Monte Bello, *Carlson* 2330. OAXACA: Santa María de Lovani, San Juan de Petlapa, *Santos* 3437.

GUATEMALA: Cobán, *von Türckheim* 1342, 1956; hills between Cobán and Tres Cruces, *Standley* 90263.

Species of the section *Stolonifera*, subgenus *Eu-Panicum* may be separated by the following key:

Nodes glabrous; blades sparingly to densely long papillose-pilose on both surfaces; spikelets 3–4 mm long ..... *P. biglandulare*

Nodes pubescent

Spikelets not over 2 mm long; blades short, ovate-lanceolate, usually not over 4 cm long *P. pulchellum*

Spikelets 2.3–3.0 mm long; blades lanceolate, pale green, sparsely pilose on both surfaces *P. crateriferum*

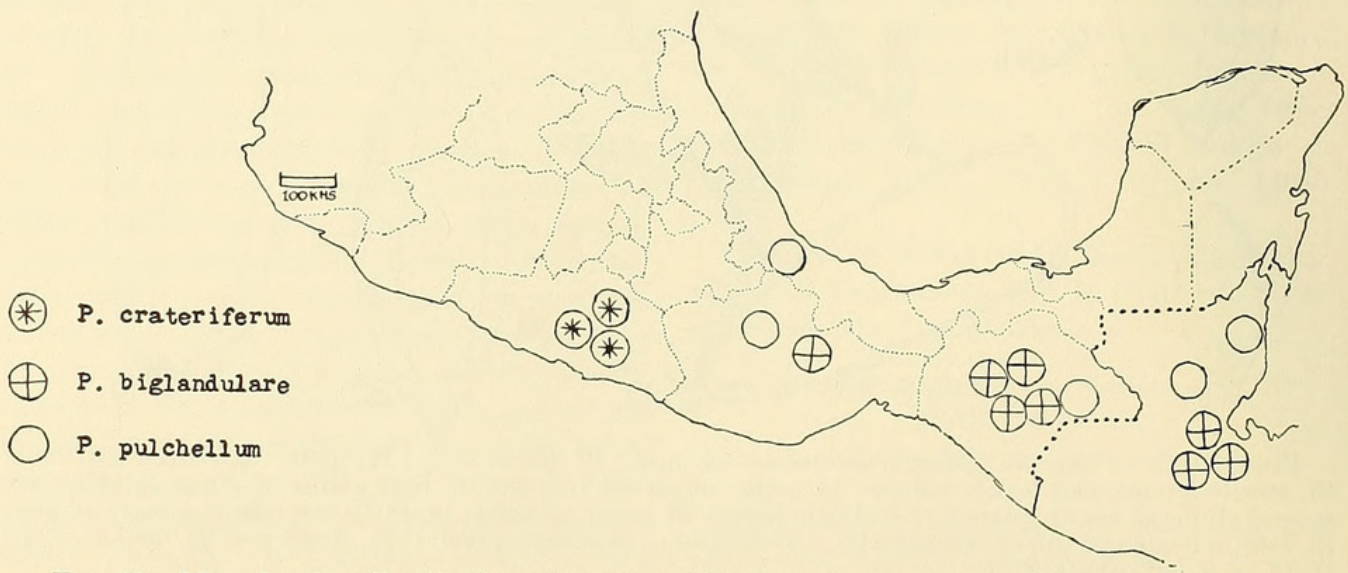
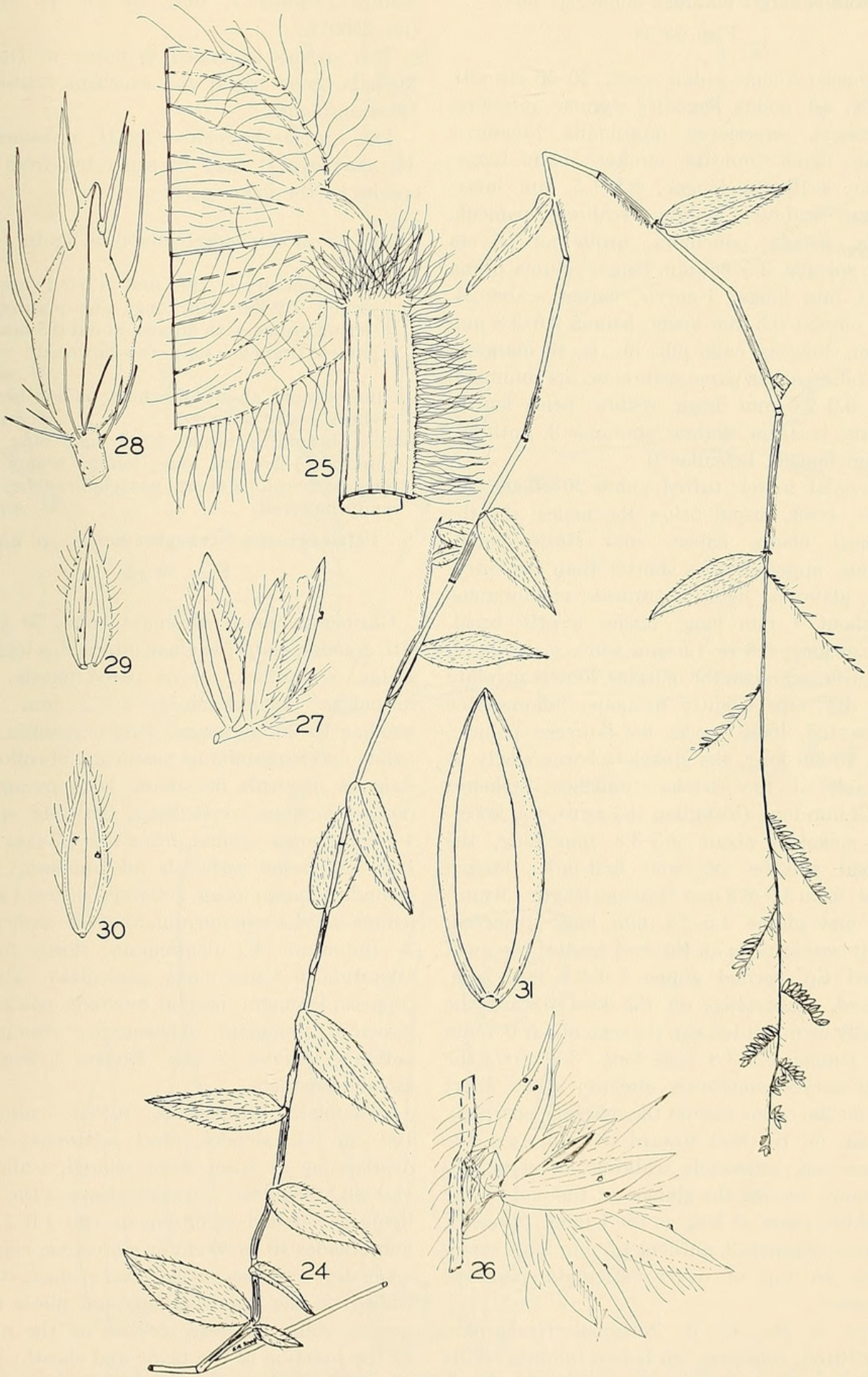


FIG. 23.—Map showing distribution of species of *Panicum* in the section *Stolonifera*, subgenus *Eu-Panicum*.



FIGS. 24–31.—*Panicum biglandulare*: 24, Plant, × ½; 25, junction of blade and sheath; 26, short raceme of spikelets with portion of rachis; 27, pair of spikelets; 28, first glume; 29, second glume; 30, sterile lemma; 31, fertile lemma. All figs. × 8, except 28 and 31, × 16. Drawn from *Türckheim* 1342.

Muhlenbergia matudae Sohns, sp. nov.

Figs. 32–38

Gramen perenne; culmi erecti, 20–50 cm alti, graciles, ad nodos hispidis, vaginae inferiores papyraceae, superiores internodiis breviores, glabrae; ligula truncata, circiter 1 mm longa; laminae 4–10 cm longae, 0.8–1.5 mm latae, utrinque scabrae, margine scabrae; panicula exserta, patula, pauciflora; usque ad 15 cm longa; spiculae 3.5–6.3 mm longae; gluma prima 1.5–2.1 mm longa, 1-nervis, carina scaberula, arista circiter 0.5 mm longa; lemma 2.6–3.8 mm longum, 3-nervis, callo pilis brevis, ad margines parce pilis, carinis parce scabris versus summam, arista 0.9–2.6 mm longa, scabra; palea lemma aequans, bicarina, glabra; staminia 3, antherae 1.5 mm longae; lodiculae 0.

Perennial; loosely tufted, culms 20–50 cm tall, slender, erect, hispid below the nodes; sheaths of basal blades papery and straw-colored, glabrous, upper sheaths shorter than the internodes, glabrous; ligule a truncate membranous rim about 1 mm long; blades mostly basal, 4–10 cm long, 0.8 to 1.5 mm wide, scabrous on both surfaces and on the margins, loosely involute when dry, tips slightly flexuous; inflorescence an exserted, loose, open, few-flowered panicle, up to 15 cm long, the spikelets borne singly at the ends of the slender branches; spikelets 3.5–6.3 mm long (including the awn), the lowermost spikelets about 3.5–3.8 mm long, the terminal spikelet of each first-order branch largest, from 3.9–6.3 mm (average length 4.9 mm) long; first glume 1.5–2.1 mm long, 1-nerved, slightly scaberulous on the keel toward the awn-pointed tip; second glume 1.9–2.8 mm long, 1-nerved, scaberulous on the keel toward the abruptly awn-pointed tip, the awn about 0.5 mm long; lemma 2.6–3.8 mm long, 3-nerved, the lateral nerves sometimes obscure, a few short hairs on the callus and on the margins, sparingly scabrous on the keel toward the tip, awn 0.9–2.6 mm long, antrorsely scabrous; floret readily deciduous, leaving the glumes at the end of the branchlet; palea as long as the lemma, 2-keeled, glabrous; stamens 3, anthers 1.5 mm long; styles 2, free to top of ovary; stigmata plumose; lodicules 0.

Type in the U. S. National Herbarium, no. 2079186, collected "en ladera húmeda, orilla de bosque mixto de pinos y oyamel, Lago de Zempoala, Edo. de Morelos" altitude 3,000 meters, October 7, 1951, by Dr. E. Matuda (no. 25601).

This species is named in honor of Dr. Eizi Matuda, good friend and excellent collector of Mexican plants.

This species is related to *M. arizonica* and *M. arenicola*. It may be separated from these species by the following key:

Blades flat or only loosely involute, ligules 1–2 mm long.
- Glumes subequal, the first 1.5–2.1 mm, the second 1.9–2.8 mm long, awn-pointed, the second glume with an awn about 0.5 mm long; panicle branches long, few-flowered ..... *M. matudae*
- Glumes equal, about 1 mm long; panicle branches short, many-flowered ..... *M. arizonica*

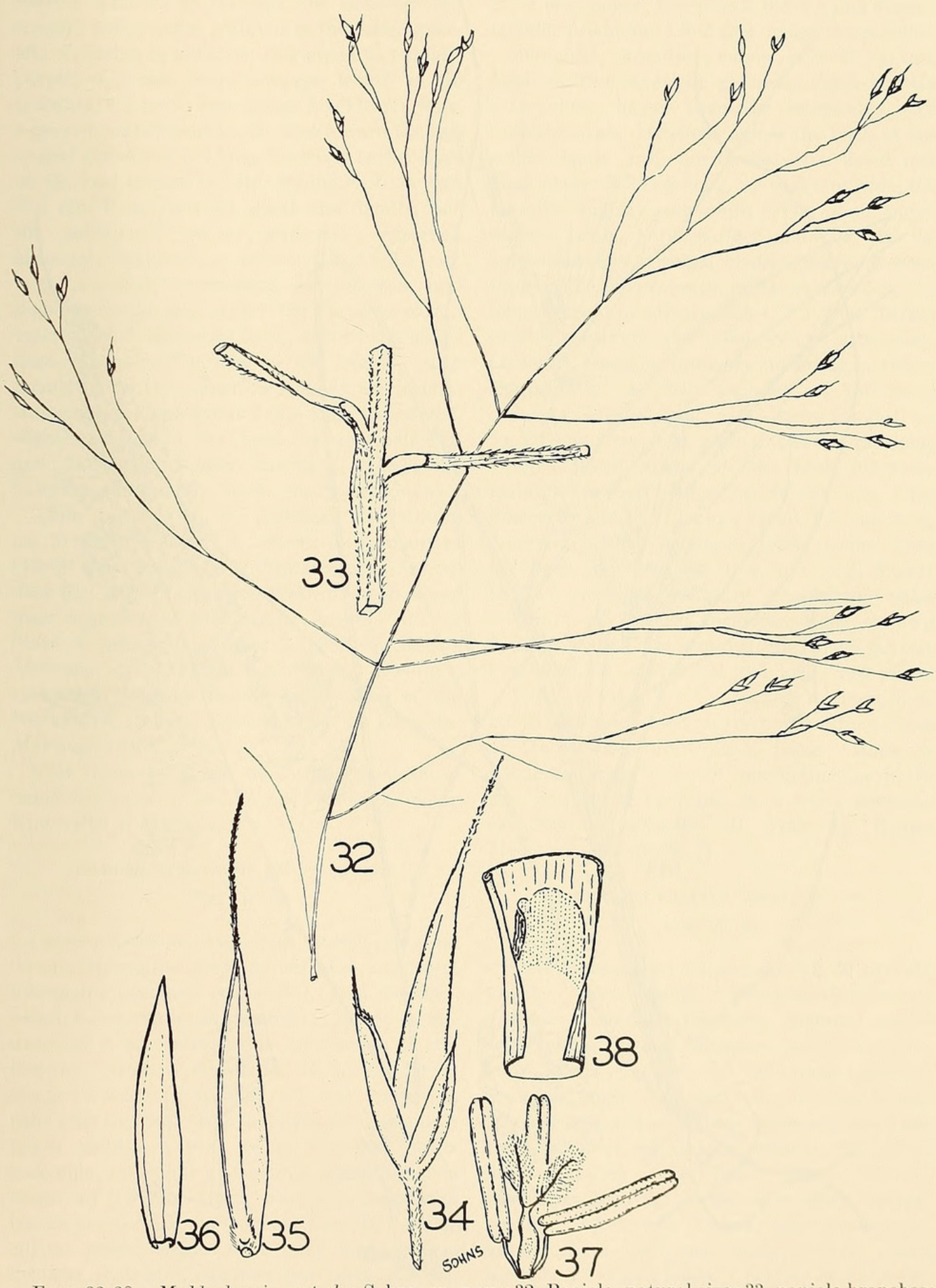
Blades involute; ligule 2.5–3 mm long, firm; glumes 2.3–2.5 mm long; lemma about 3 mm long, scaberulous at tip; panicle branches short, many-flowered ..... *M. arenicola*

Calamagrostis mcvaughei Sohns, sp. nov.

Figs. 39–46

Gramen perenne; rhizomate; culmi 50–100 cm alti, graciles, glabri; vaginae internodiis longiores, arctae, scaberulae, ad os parce pilosis; ligula rotundata, membranacea, 1–1.2 mm longa; laminae 10–30 cm longae, subtus scabrae, supra valide nervis prominulis percursae, in collo parce strigosis; panicula densiflora, laxa, pyramidata, ramis gracilibus, verticillatis, flexuosis; spiculae 4–5 mm longae; gluma prima 3.4–4.2 mm longa, 1-nervis, carina scaberula ad summam; gluma secunda 4–5 mm longa, ceteroqui primam similis; lemma 3.4–4.1 mm longum, 5-nervis, scaberulum, 2- (interdum 4-) denticulata, dorso medium aristatum, 6–8 mm longa, geniculata; callo pilis copiosis, lemmam dimidio breviore; palea membranacea, lemmam subaequans; staminia 3, antherae circiter 2 mm longae; lodiculae 2; rachilla producta.

Perennial, rhizomatous, tufted; culms 50–100 cm tall, slender, erect, glabrous; sheaths overlapping at base, straw-colored, scaberulous and slightly pilose, especially toward the collar; ligule a rounded membranous rim 1.0–1.2 mm long; blades 10 to 30 cm or more long, convolute when dry, scabrous on the lower surface, strongly ribbed on the upper surface and pilose on the nerves; collar sparsely strigose on the margins at the junction of the blade and sheath; panicle many-flowered, open, pyramidal, the branches slender, flexuous, verticillate, the lower branches



FIGS. 32–38.—*Muhlenbergia matudae* Sohns, sp. nov.: 32, Panicle, natural size; 33, panicle branches; 34, spikelet; 35, lemma; 36, palea; 37, essential organs; 38, ligule. All figures, except 32, × 16. Drawn from type specimen.

FIGS. 39–46.—*Calamagrostis mcvaughei* Sohns, sp. nov.: 39, Plant, × ½; 40, spikelet; 41, floret; 42, anther; 43, lodicule; 44, cross section of blade; 45, external view of collar at junction of sheath and blade; 46, inside view of ligule, one-half of blade, sheath and ligule removed. Figs. 42 and 44, × 16, all others, × 8. Drawn from the type specimen.

bearing spikelets at the tips, the branches antrorsely scaberulous, glabrous in the axils; spikelets spreading in anthesis, pale-green to reddish-purple, 4–5 mm long (average length of 15 spikelets: 4.4 mm); first glume 3.4–4.2 mm long, 1-nerved, scaberulous on the keel toward the tip; second glume 4–5 mm long, 1-nerved, scaberulous on the keel toward the tip; lemma with an awn 6–8 mm long, inserted about the middle, one (or indistinctly twice) geniculate, exserted, antrorsely scaberulous, the lemma 3.4–5.1 mm long, 5-nerved, scaberulous on the back and scabrous on the keel toward the tip, apex with 2 (sometimes 5) setaceous teeth, callus hairs abundant, about half as long as the lemma; palea membranous, thin, about as long as the lemma; stamens 3, anthers about 2 mm long; lodicules 2, slightly swollen at the base, terminal half thin and flattened; rachilla prolonged, pilose, the hairs extending to the tip of the second glume.

Type in the U. S. National Herbarium, no. 2118496, collected in "Sierra de Manantlan (15–20 miles southeast of Autlan), near Aserradero El Cuartón, elevation 2500 m; steep slopes near summits, in pine-oak-fir forests," in the State of Jalisco, November 2, 1952, by Rogers McVaugh (No. 13853). Additional specimen examined: JALISCO: northeastern slopes of the Nevado de Colima, below Cañoa de Leoncito, *McVaugh* 13468.

This taxon is related to *C. tolucensis* and is named in honor of Dr. Rogers McVaugh, of the University of Michigan.

Calamagrostis valida Sohns, sp. nov.

Figs. 47–55

Gramen perenne; caespitose, culmi usque ad 65 cm alti; vaginae inferiores efoliatae, superiores internodiis longiores, scaberulis; ligula membranacea, 2.5–3 mm longa; laminae 8–20 cm longae, usque ad 8 mm latae, supra pilosis, subtus glaberrimis; panicula densiflora, 15–25 cm longa, ramis verticillatis; spiculae 5–6 mm longae, in callo pilis copiosis, usque ad 4 mm longis; gluma prima circiter 4 mm longa, 1-nervis, carina scaberula, ceteroqui glaberrima; gluma secunda usque ad 5.5 mm longa, 3-nervis, glaberrima; lemma circiter 4.5 mm longum, 5-nervis, 2-denticulata, arista usque ad 6 mm longa, dorso medium aristatum, columna laxe torta, exserta, leviter geniculata; palea 3.8–5 mm longa, bicarinata, bifida, membranacea; staminia 3, antherae 3.5–4 mm longae; lodiculae 2, 0.5–0.8 mm longae; rachilla producta, 1.8–2 mm longa, longe-pilosi.

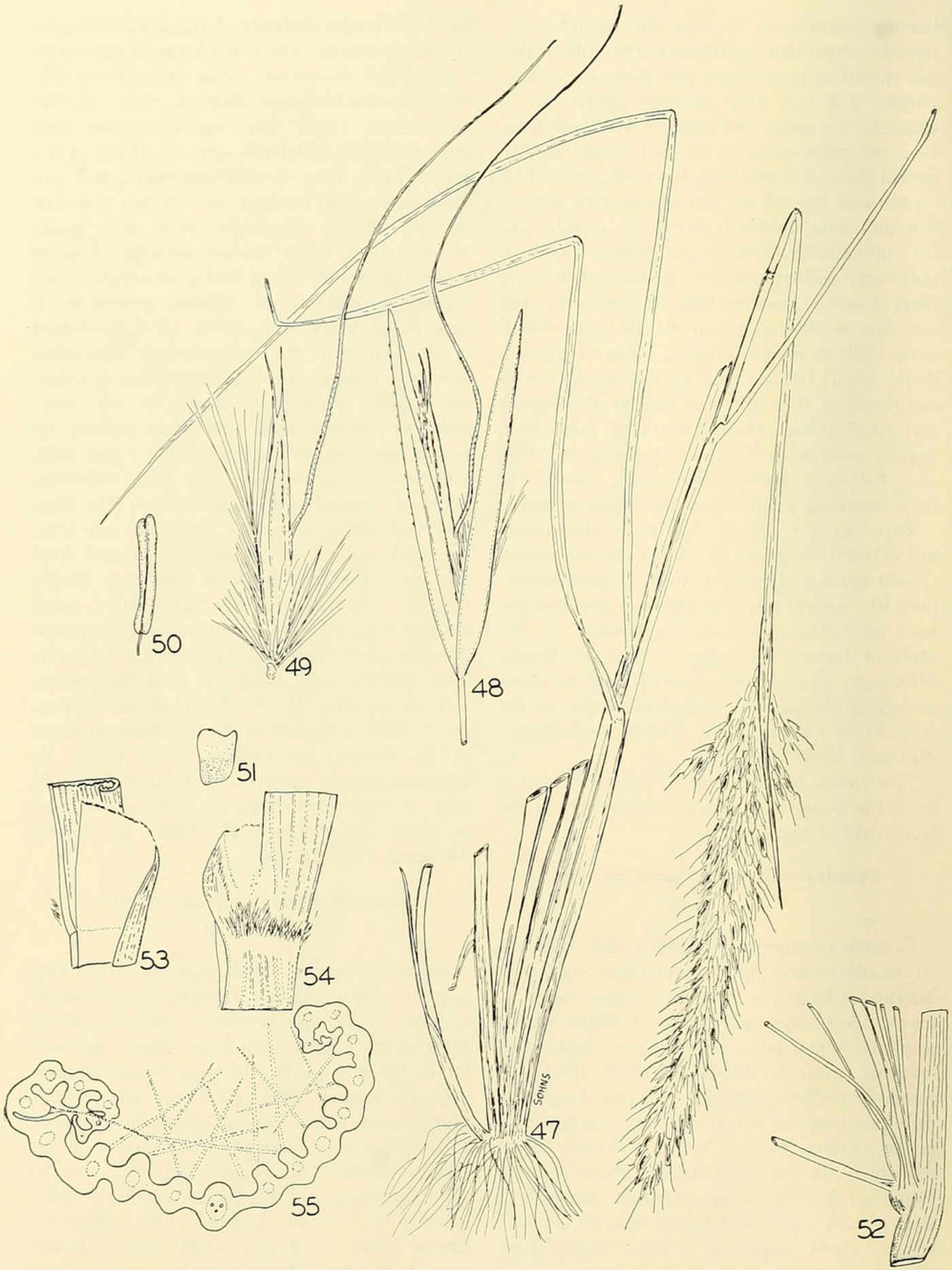
Perennial; caespitose, culms up to 65 cm tall; basal sheaths bladeless, glabrous, upper sheaths scaberulous, longer than the internodes, pale pinkish-purple, hirtellous across the back at the collar; ligule firm, membranaceous, 2.5–3 mm long, blades 8–20 cm long, up to 8 mm wide, the margins slightly convolute when dry, upper surface pilose, lower surface glabrous, the tip long-attenuate; terminal blades sometimes overtopping the inflorescence; inflorescence 15–25 cm long, dense, branches fascicled, 1.5–2 cm distant in the center of the inflorescence, alternately arranged, branches probably spreading in anthesis, slightly purplish, included at the base; spikelets 5–6 mm long; callus hairs copious, up to 2.4 mm long; first glume about 4 mm long, 1-nerved, scaberulous on the keel, otherwise glabrous; second glume up to 5.5 mm long, 3-nerved, glabrous; lemma about 4.5 mm long, 5-nerved, with 2 setaceous teeth, awned from the back, the awn up to 6 mm long, loosely twisted, exserted, slightly geniculate; palea 3.8 mm long, 2-keeled, membranaceous; stamens 3, anthers 3.8–4 mm long; lodicules 2, 0.5–0.8 mm long; rachilla joint 1.8–2 mm long, long-pilose.

Type in the U. S. National Herbarium, no. 2118491, collected on the northeastern slopes of the Nevado de Colima, below Cañoa de Leoncito; steep cut-over mountainsides in fir zone at head of Barranca de la Rosa, elevation ca. 2800 m, October 10, 1952, by Rogers McVaugh (no. 13410).

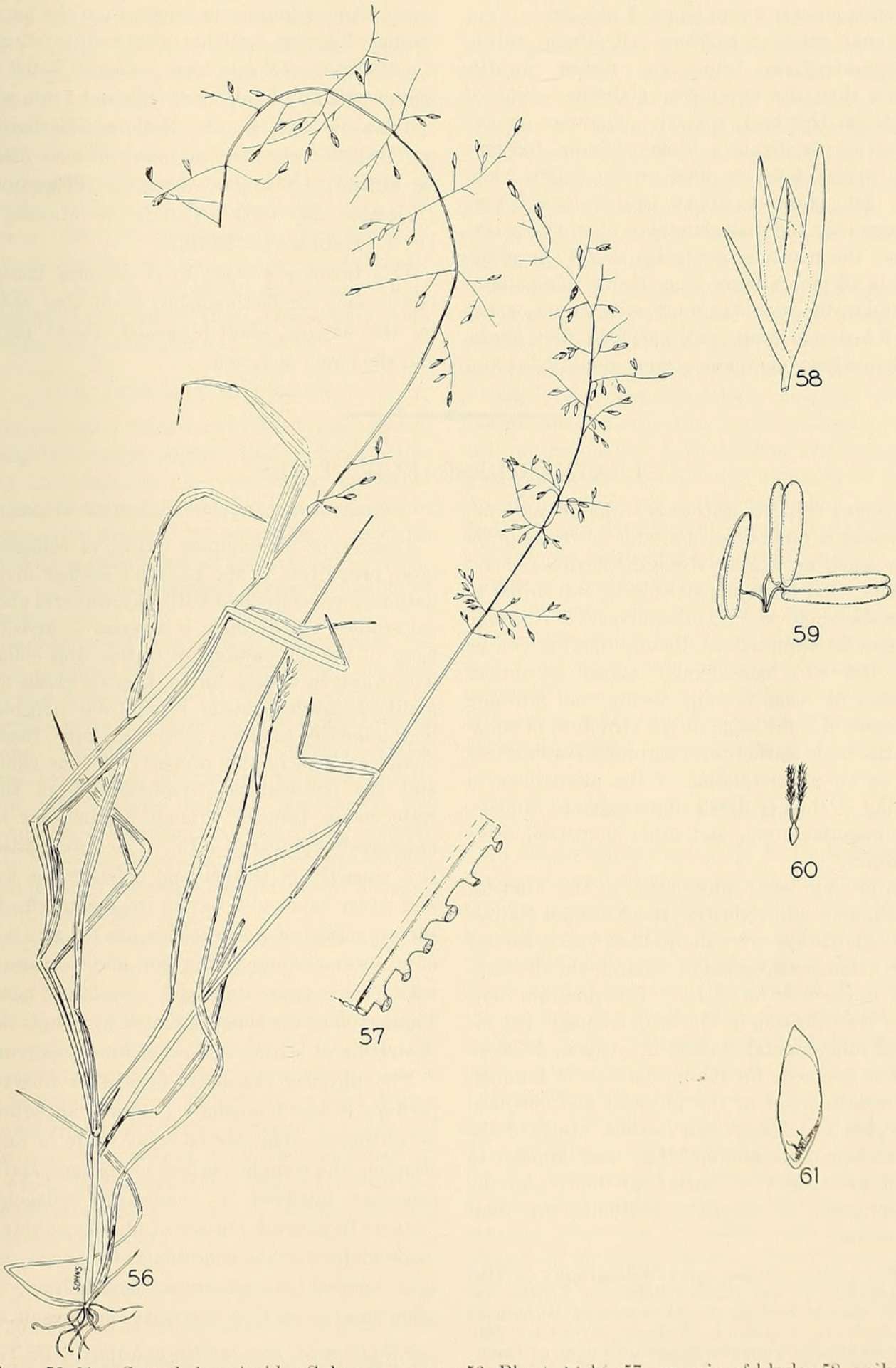
Sporobolus viscidus Sohns, sp. nov.

Figs. 56–61

Gramen annuum; culmi usque ad 50 cm alti, graciles, infra nodos crateriformi-tuberculati; vaginae internodiis breviores, glabrae, carinis tuberculatae, nervi culmorum sparse tuberculatae; ligula ciliolata, 0.5 mm longa; laminae 4–20 cm longae, usque ad 6 mm lata, tenuis, plana, supra glabra, subtus scaberula, margines tuberculatis et scaberrimis; panicula 15 cm vel longior, rachis tuberculata, glabra, viscida; ramis brevibus, rigidis, sparse ramosis, viscidis; spiculae 3.5–4 mm longae, pallido-purpurea; gluma prima 1.9–3 mm longa, enerve; gluma secunda 2.5–4 mm longa, 1-nervis; lemma usque ad 4 mm longum, 1-nerve; palea lemma aequans vel longior, valide bicarina; staminia 3, antherae



FIGS. 47–55.—*Calamagrostis valida* Sohns, sp. nov.: 47, Plant, × ½; 48, spikelet; 49, floret; 50, anther; 51, lodicule; 52, node on the axis of the raceme; 53, ligule, median adaxial view; 54, collar at junction of the blade and sheath; 55, cross-section of blade. Figs. 48–50, 52–55, × 8; 51, × 20. Drawn from the type specimen.



FIGS. 56–61.—*Sporobolus viscidus* Sohns, sp. nov.: 56, Plant, × ½; 57, margin of blade; 58, spikelet; 59, stamens; 60, ovary; 61, caryopsis (pericarp free at tip and base). All figures, except 56, × 8. Drawn from the type specimen.

1.8–2.2 mm longae; lodiculae 2, 0.2 mm longae; caryopsis circiter 3 mm longa, 1 mm lata.

Annual; culms up to 50 cm tall, slender, tuberculate-crateriform below the nodes; sheaths shorter than the internodes, glabrous, a line of glands on the keel, sparsely glandular on the lateral nerves; ligule a fringe of hairs, 0.5 mm long; blades 4–20 cm long, up to 6 mm wide, thin, flat, glabrous above, scaberulous below, margins near the base glandular, otherwise short-ciliate, the margins of the tip slightly inrolled; panicle 15 cm or more long, rachis tuberculate-glandular, the branches short, stiff, viscid; spikelets 3.5–4 mm long, pale-purplish; first glume 1.9–3 mm long, nerveless; second glume 2.5–4 mm long, 1-nerved; lemma up to 4 mm long, 1-nerved; palea firm, as long as or longer than the lemma, strongly 2-keeled, splitting when mature; stamens 3, anthers 1.8–2.2 mm long; lodicules 2, 0.2 mm long; caryopsis about 3 mm long and 1 mm wide.

Type in the U. S. National Herbarium, no. 2181966, collected "en matorral seco, 550 m. de altitud, La Junta, cerca de Tingambato, Diciembre 20, 1953," Estado de Mexico, by Dr. E. Matuda (no. 29813).

This taxon is related to *S. hintonii* Hartley, but it may be distinguished from that species by the narrow, short-branched, viscid panicle and the larger spikelets.

LEATHER RESEARCH AT NBS

In many respects leather is a unique material, possessing a number of desirable physical properties, such as tearing strength, flexibility, and porosity, that make it particularly well suited to use in shoes, gloves, and other articles of clothing. For specific applications, these properties can be controlled to a considerable extent by proper selection of skins, tanning agents, and finishing processes. A knowledge of the structure of collagen, the basic leather forming protein of hides, as well as an understanding of the mechanism of tanning, is thus of direct importance to tanners, shoe manufacturers, and other industrial users of leather.

To provide basic information of this kind for Government and industry, the National Bureau of Standards has, over the past 40 years, carried on an extensive program of research and development in the field of leather.[1] This program, now under the direction of Dr. J. R. Kanagy, has included fundamental studies of collagen, development of concepts for the mechanism of tanning, and measurement of the physical and chemical properties of collagen and leather. Much of the information thus obtained has been applied to the improvement of leather products and the development of standard methods for their evaluation.

[1] For further details and a bibliography of NBS publications in the leather field see, *Leather research and technology at the National Bureau of Standards*, by Everett L. Wallace, NBS Circ. 560. 1955. Available from the Superintendent of Documents, U. S. Government Printing Office, 15 cents.

FUNDAMENTAL PHYSICOCHEMICAL STUDIES

Because of the complex nature of collagen, a large proportion of the Bureau's leather investigations have combined both physical and chemical studies. An example is a series of investigations of the interactions of leather and collagen with water in various forms. Leather excels in its ability to transfer water vapor from a region of high humidity to one of lower humidity. Because of the relation of this property to shoe comfort and the removal of perspiration from shoes, water-vapor transfer through leather has been extensively studied at NBS.[2] The strong adsorptive capacity of leather and collagen for water and water vapor also has an important effect on the properties of leather. This has led to a series of studies on water adsorption and its variation with temperature, tannage, and other factors. These studies are being extended to include heats of wetting of leather and other fibrous polymers.

The physical constants of leather fibers are perhaps of less immediate practical importance. Nevertheless, they are of great value in understanding the complex nature of collagen and the processes involved in converting collagen to leather. In general, studies of fiber constants are made under varying conditions of tannage, moisture content, temperature, composition, and other factors, so that extensive data result.

[2] *Water vapor permeability of leather*, NBS Technical News Bull. 34: 163. Nov. 1950.