

ORYZA SATIVA, CULTIVATED RICE

76. LEERSIA Swartz (lē-ēr'sī-à)

(Homalocenhrus Mieg.)

Spikelets 1-flowered, strongly compressed laterally, disarticulating from the pedicel; **Glumes** wanting; **Lemma** chartaceous, broad, oblong, boat-shaped, usually 5-nerved, the lateral pair of nerves close to the margins, these and the keel often hispid-ciliate, the intermediate nerves sometimes faint; **Palea** as long as the lemma, much narrower, usually 3-nerved, the keel usually hispid-ciliate, the lateral nerves close to the margins, the margins firmly held by the margins of the lemma; **Stamens** six or fewer.

Perennial grasses, usually with creeping rhizomes, with flat scabrous blades and open panicles, the spikelets nearly sessile along one side of the branchlets. Species ten, tropical and temperate regions; five species in the United States, all in Texas, mostly swamp grasses.

All of our species have open panicles, commonly rough blades and sheaths, those of *L. oryzoides* being very prickly and adhesive; all have creeping rhizomes and prickly spikelets except *L. monandra*.

L. monandra, a densely tufted grass, thrives in dry open lands or in rich woodlands, mostly near the coast; *L. virginica*, with culms often straggling and entangled, and *L. lenticularis*, with broadly oval spikelets, are usually found in damp open woods, marshes and borders of streams; *L. oryzoides* and *L. hexandra* commonly grow in water along ditches, ponds and streams.

SPIKELETS ORBICULAR, glabrous, 2 mm. long or less; stamen 1.

1. *L. monandra*

SPIKELETS BROADLY oval, bristly, 4-4.5 mm. long; stamens 2.

2. *L. lenticularis*

SPIKELETS OBLONG, their width less than half their length, bristly on the keels. PANICLE branches singly disposed, few.

Panicle branches elongated, each with a long naked base; spikelets 3 mm. long; stamens 2.

3. *L. virginica*

Panicle branches short, spikelet-bearing to or nearly to the base; spikelet 4-4.5 mm. long; stamens 6.

4. *L. hexandra*

PANICLE branches, at least the lower whorled, numerous; spikelets 5 mm. long; stamens 3.

5. *L. oryzoides*

1. *L. MONANDRA* Swartz (mō-nān'drà); *Homalocenhrus monandrus* (Swartz) Kuntze.

Culms 1-2 feet tall, densely tufted, erect, slender; **Blades** usually 4-6' long, 2-5 mm. wide, rather stiffly erect, flat, acuminate, rough; **Sheaths** usually shorter than the internodes; **Ligule** membranaceous, about 3 mm. long; **Panicle** exserted, open, 4-7' long, branches about 4-6, single, spreading, slender, spikelet-bearing towards the ends, as much as 4' long, spikelets arranged along one side of the narrow short branchlets; **Spikelets** about 1.6 mm. (1.5-2) long, 1-1.2 mm. wide, nearly sessile, irregularly ovate, flattened, pale-green; **Glumes** wanting; **Lemma** 5-nerved, sub-indurate, minutely roughened; **Palea** smaller, and almost inclosed by lemma, 3-nerved.

In dry land, open or rich woodlands, along the Gulf coast, Texas to Florida. (Rocky woodlands above Landa Park, New Braunfels, Texas.) Spring.

2. *L. LENTICULARIS* Michx. (lěn-tík-ū-lā'rīs); *Homalocenhrus lenticularis* (Michx.) Kuntze; CATCH-FLY GRASS.

Culms 2-4 feet tall, usually simple, often puberulent at, below and

flat, narrowed toward the base, margins rough, surface smooth to rough; **Sheaths** slightly shorter than the internodes, slightly rough to smooth, often sparsely to densely pubescent at the summit of the sheaths, the pubescence extending up the midrib of the blade on the under side; **Ligule** membranaceous, about 1 mm. long, fringed; **Panicle** finally exserted, 4-8' long, ovate to pyramidal, its branches lax, naked below, at first erect, later spreading, commonly 1-3' long, the spikelets closely imbricate; **Spikelets** about 4-6 mm. long, 3-3.3 mm. wide, flat, broadly oval; **Glumes** wanting; **Lemma** broad, bristly-ciliate on the keel and margins; **Palea** bristly-ciliate (aculeate) on the keel, the body of the lemma and palea glabrous or sparsely hispidulous.

In marshes and wet lands from Virginia to Minnesota, south to Florida and Texas. (In marsh at Orange, Texas.) Fall.

3. *L. VIRGINICA* Willd. (vēr-jīn'ī-kā); *Homalocenchrus virginicus* (Willd.) Britton; VIRGINIA CUT-GRASS OR WHITE-GRASS.

Culms 1-3 feet long, sometimes longer, slender, flattened, weak, freely branching, straggling and much tangled, the swollen nodes pubescent, from a perennial rootstock covered with closely imbricated scales; **Blades** 1-7' mostly 3-5' long, 2-13 mm. wide, flat, narrowed toward the base, thin, easily torn, often sparsely hispid-ciliate on the margins, rough, sometimes hispidulous; **Sheaths** mostly shorter than the internodes, flattened, smooth to rough; **Ligule** membranaceous, about 2 mm. long; **Panicles** at first included, finally long-exserted, 2.5-11' long, the axillary panicles smaller, and usually more or less included and *cleistogamous*, its branches solitary, commonly 1-4' sometimes 6' long, spreading and naked from below the middle, slender, with a few short-appressed branchlets commonly less than 1' long; **Spikelets** about 3 mm. long, 1-1.3 mm. wide, flattened, oblong, slightly imbricate, appressed, with short, scabrous pedicels; **Glumes** wanting; **Lemma** flattened, boat-shaped, curving to one side becoming concave next to the axis to which it is closely appressed, hispid on the keels and margins, otherwise hispidulous or smooth; **Palea** hispid on the keel, narrow; **Stamens** 2.

In damp open woods, swamps and along streams. Eastern United States to Florida and Texas. (Along San Antonio River, Brackenridge Park, San Antonio, Texas.) Fall.

4. *L. HEXANDRA* Swartz (hēks-ān'drā); *Homalocenchrus hexandrus* (Swartz) Kuntze.

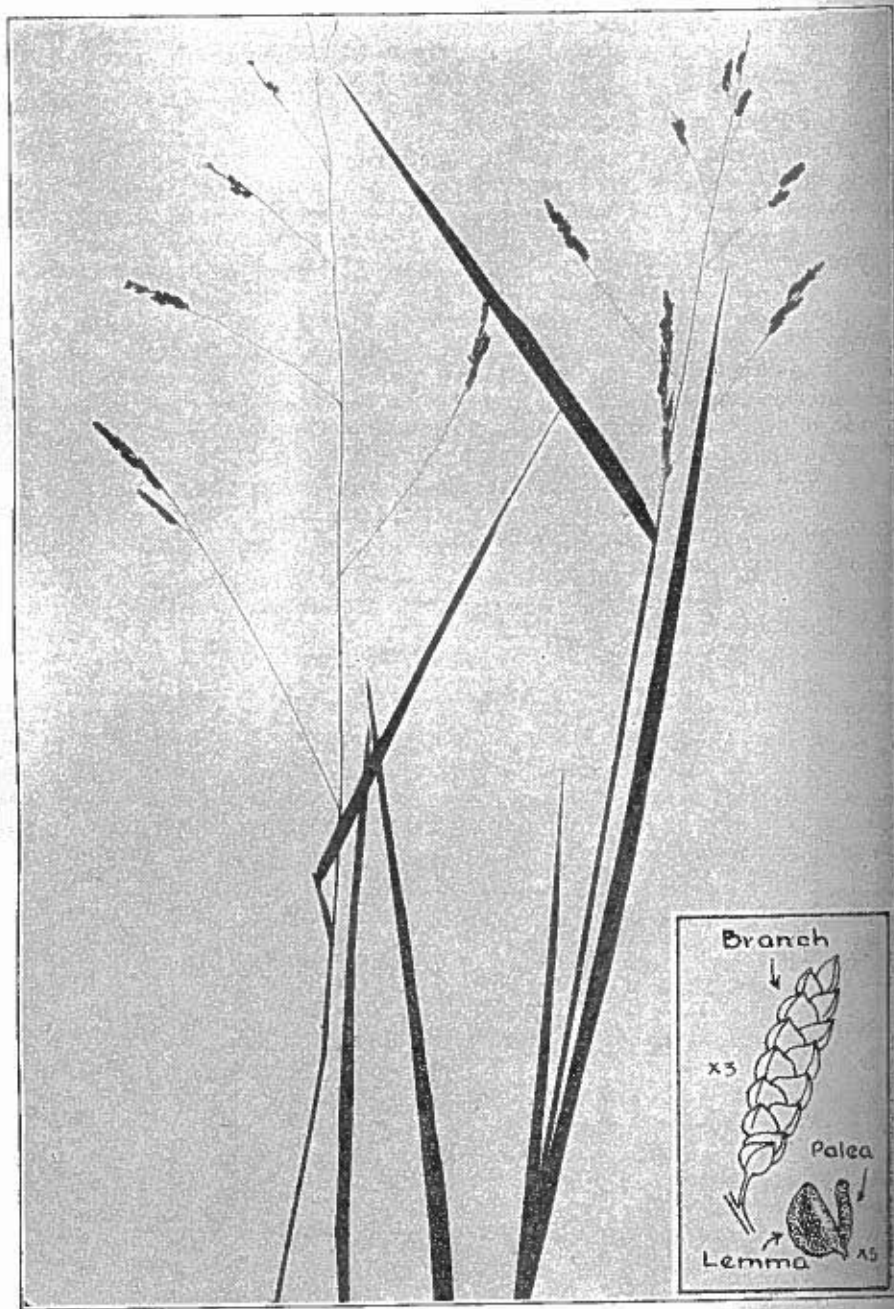
Culms 1-3 feet tall, rather slender and weak, erect or ascending from a decumbent base, rooting at the lower nodes, nodes pubescent, otherwise glabrous; **Blades** 1.5-6.5' long, 3-6 mm. wide, flat, erect, narrowed toward the base, rough; **Sheaths** shorter than the internodes, hispid, the hairs pointing downward; **Ligule** membranaceous, 3-5 mm. long; **Panicle** finally exserted, 2-4' long, narrow, erect, the erect or ascending branches singly disposed, few in number, 12-40 mm. long, spikelet-bearing to or nearly to the base, pubescent at the axils, the appressed spikelets overlapping, sessile or on pedicels less than 1 mm. long; **Spikelets** 4-4.5 mm. long, laterally flattened, about 1.2 mm. wide, lanceolate-oblong; **Glumes** wanting; **Lemma** 5-nerved, the lateral pair close to the margins, boat-shaped, the keel and margins bristly-ciliate, the hairs longer toward the apex, otherwise sparsely hispidulous; **Palea** 3-nerved, the keel bristly-ciliate, the hairs longer toward the apex, the lateral nerves also close to the margins.

Wet places, in water or along the edges of ditches and ponds. South Atlantic states to Texas, mostly near the coast. Spring-fall.

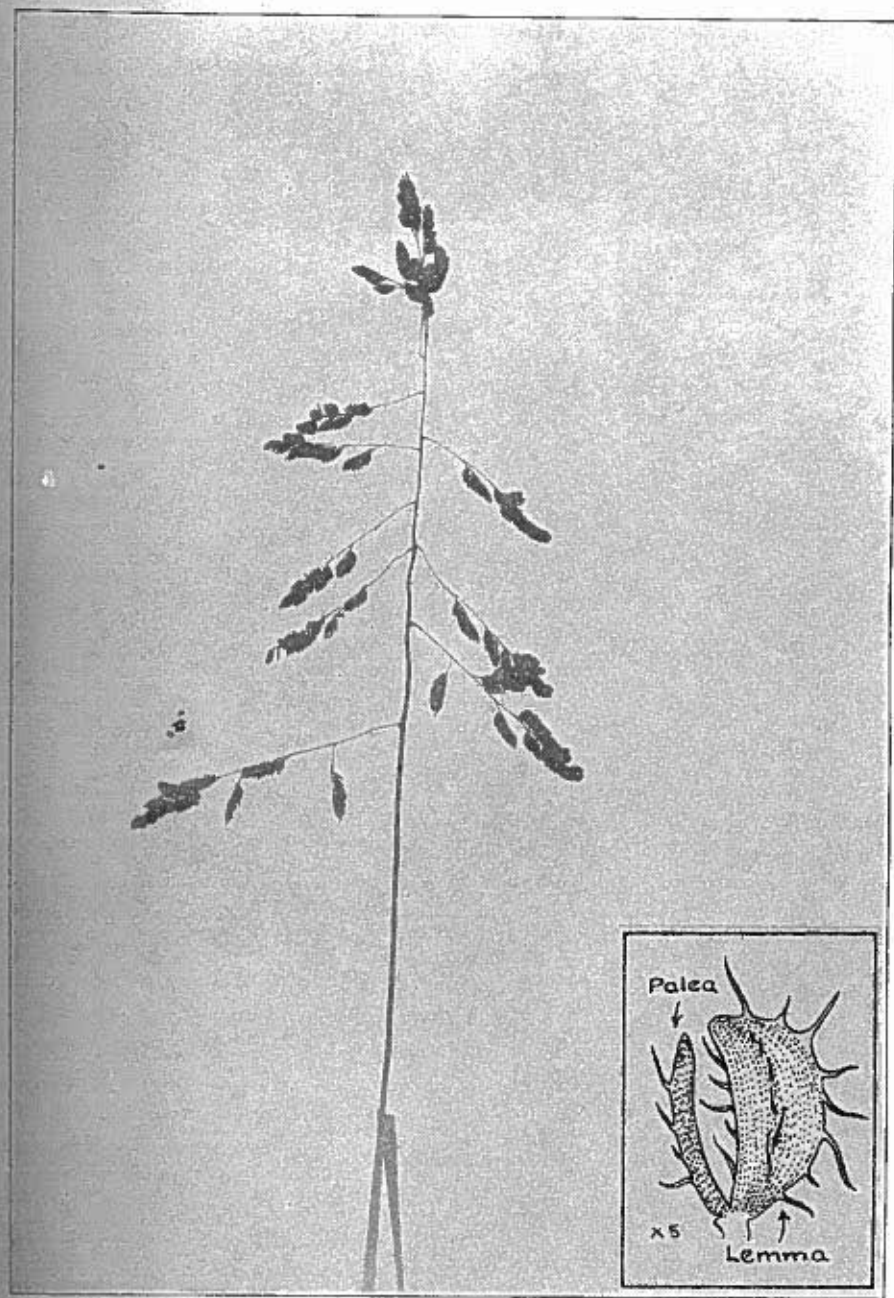
5. *L. ORYZOIDES* (L.) Swartz (ō-rī-zoi'dēz); *Homalocenchrus oryzoides* (L.) Poll.; RICE CUT-GRASS.

Culms 2-5 feet tall, growing in tufts or colonies in water or mud along the banks of streams and lakes, erect or ascending, mostly from a decumbent base, rooting at the lower nodes, the rootstocks narrow with internodes about an inch long, barbed at the nodes, otherwise glabrous; **Blades** 3-8' long, 5-15 mm. wide, flat, narrowed toward the base, lanceolate, very rough with recurved prickles on the margins, sometimes a few hairs on upper surface near the base; **Sheaths** shorter than the internodes, very rough with recurved prickles; **Ligule** membranaceous, truncate, about 1 mm. long; **Panicle** finally exserted, 5-8' long, pyramidal, axis scabrous, the lateral panicles included or slightly exserted, branches scabrous, single, or whorled below, naked at the base, 4' long or less, at first erect, finally spreading, the branchlets short, with short scabrous peduncles, with a few appressed imbricated spikelets; **Spikelets** about 5 mm. long, 1.5 mm. wide, flattened; **Glumes** wanting; **Lemma** and **Palea** about equal, hispidulous, hispid-ciliate on the keels and margins, beset with diminutive prickles toward the apex.

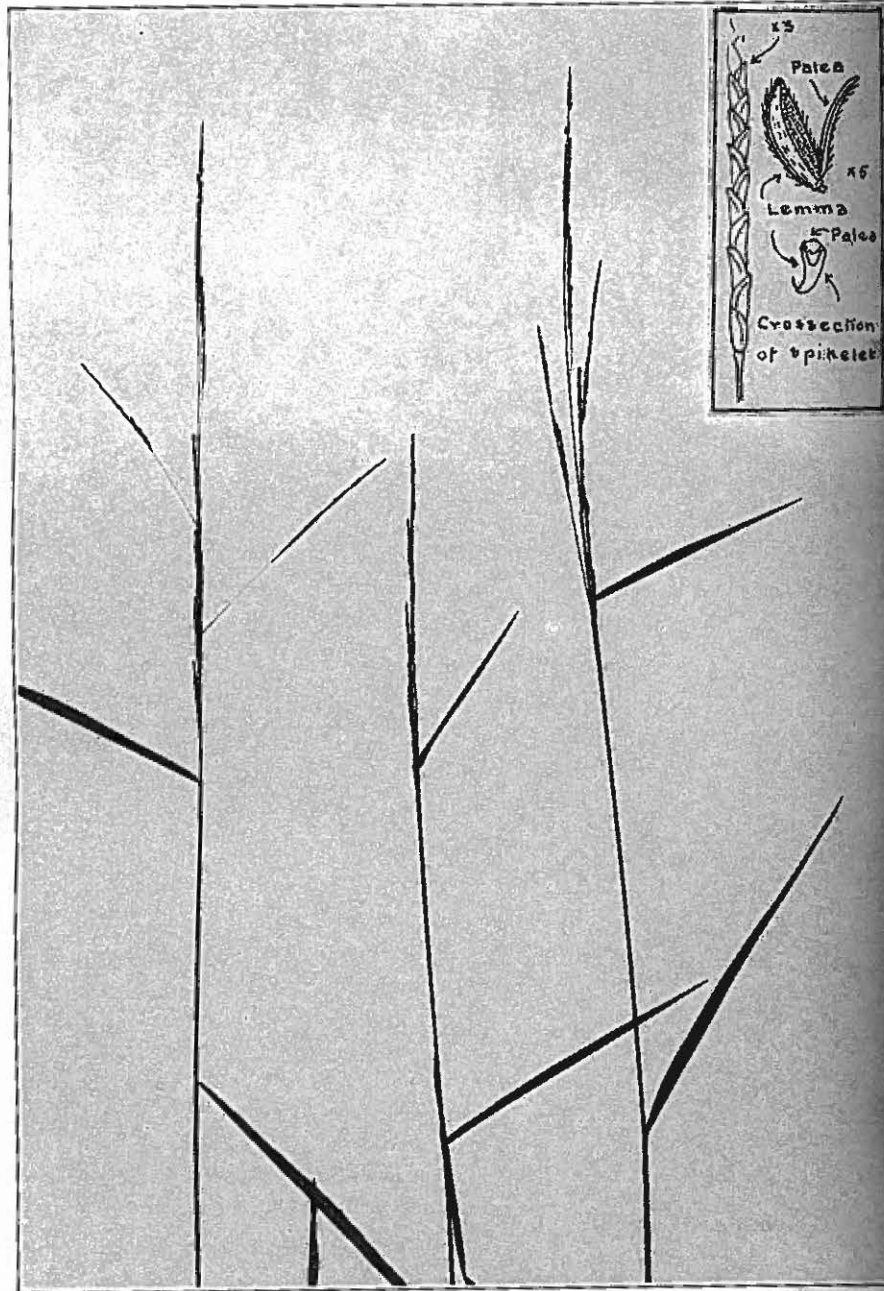
Wet ground or in water. Virginia to Minnesota, south to Florida and Texas. July to October.



LEERSIA MONANDRA



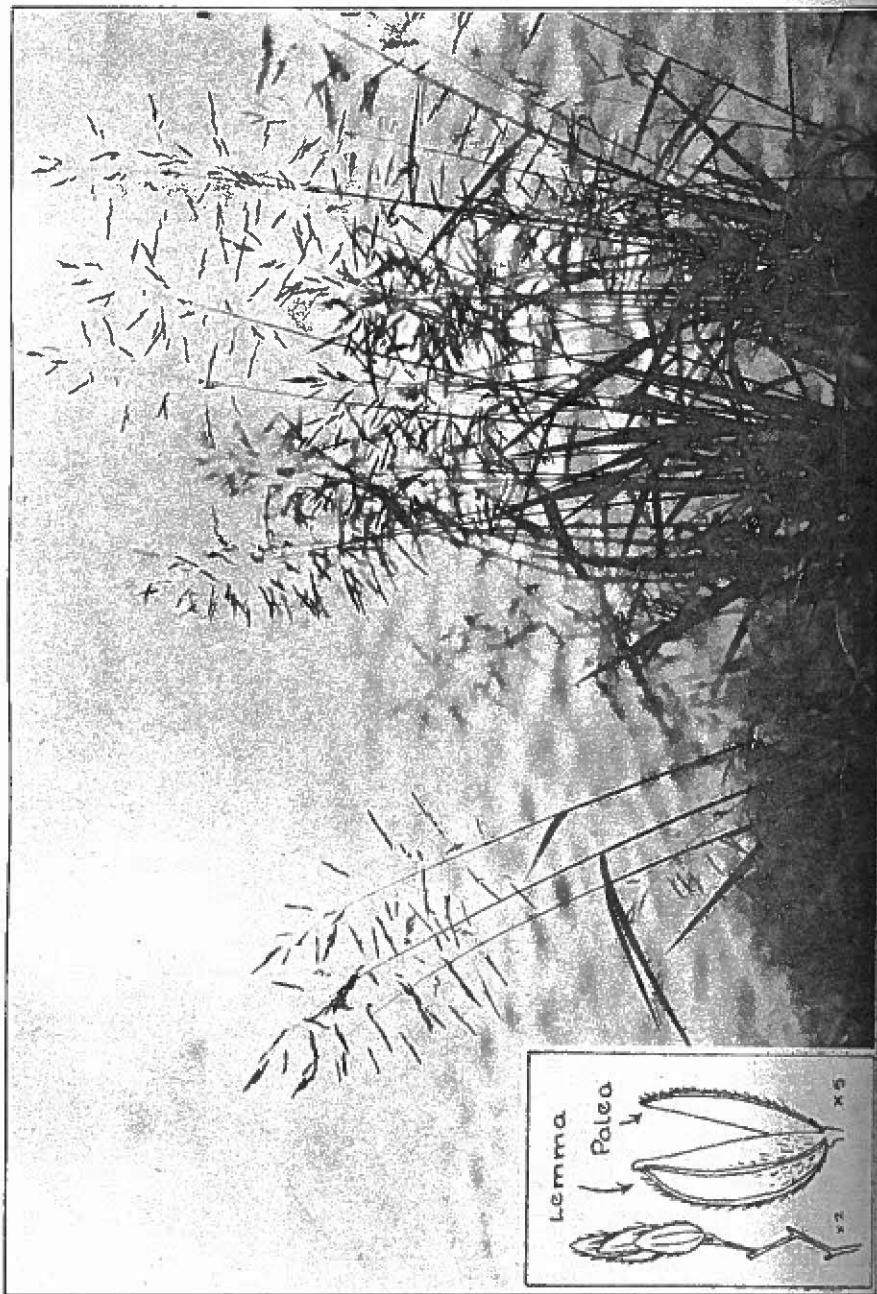
LEERSIA LENTICULARIS



LEERSIA VIRGINICA, VIRGINIA CUT-GRASS



LEERSIA HEXANDRA



LEERSIA ORYZOIDES, RICE CUT-GRASS

X. ZIZANIEAE, THE INDIAN-RICE TRIBE

AQUATIC OR SUBAQUATIC TRIBE

77. ZIZANIOPSIS Doell & Aschers. (zī-zā-nī-ōp'sis)

Spikelets unisexual, 1-flowered, disarticulating from the pedicel, mixed on the same branches of the panicle, the staminate below; **First Glume** wanting; **Second Glume** 7-nerved, short-awned in the pistillate spikelets; **Lemma** 3-nerved; **Palea** wanting; **Stamens** six; **Styles** rather long, united; **Caryopsis** obovate, free, coriaceous, smooth and shining, beaked with the persistent style.

Robust *perennial* marsh grasses, with stout creeping rhizomes, broad, flat blades, and large open panicles. One species in the United States.

This grass, in large bunches or colonies, grows along the margins of streams and ponds, attaining a height of 4-10 feet. It is conspicuous for its large purple panicles, at first gracefully drooping but finally erect and spreading.

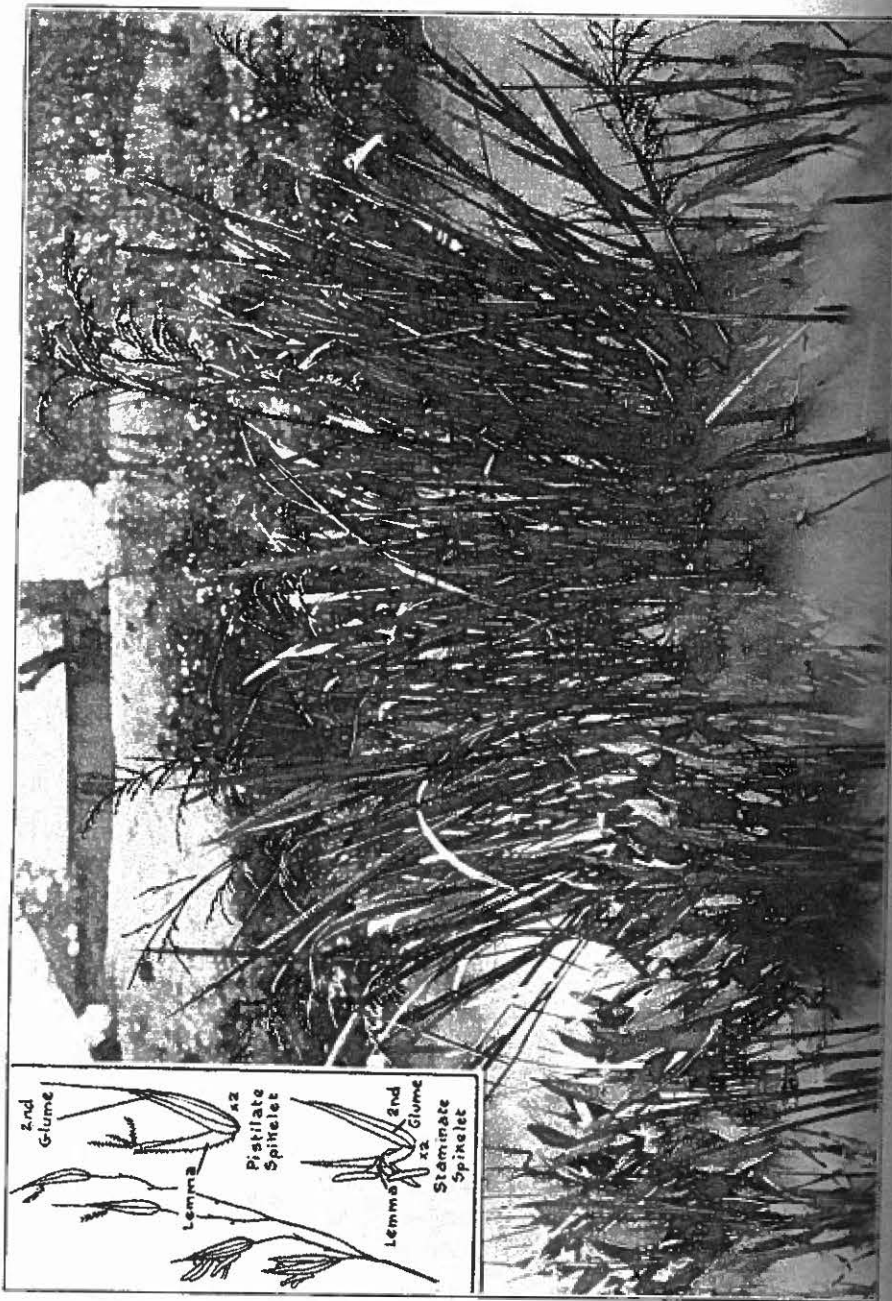
It is of no economic value except as food or shelter for birds. It is common along the San Antonio River, especially at San Antonio, Texas.

Growing along the banks of streams and ponds may be found giant reed-grass, *Arundo donax*, taller and woody, with erect and very large pale or purplish densely hairy panicles, the rachilla naked; and also a smaller reed grass, *Phragmites communis*, with densely hairy, usually purplish, drooping panicles, the rachilla hairy.

Z. MILLACEA (Michx.) Doell & Aschers. (mīl-ī-ā'sō-à); MARSH MILLET, WATER MILLET.

Glumes 4-10 feet tall, robust in large clumps, usually in colonies, in the water or along the margins of streams, ponds and lakes, from long creeping rootstocks; **Blades** 1-5 feet long, those of the base 10-40 mm. wide, flat above, narrowed to a long folded thickened pithy base, the margins very scabrous with a razor-like edge; **Sheaths**, the lower longer than the internodes, flattened, thick and pithy; **Ligule** membranaceous, 6-15 mm. long; **Panicle** 10-24' long, finally exserted, purple, pyramidal, at first nodding, finally erect and spreading, its long branches solitary or whorled, the lower as long as 12', naked at the base; **Spikelets** purplish, **Unisexual**, the pistillate (female) borne at the end of the branches, and the staminate (male) below or sometimes mixed with the pistillate; **Glumes**, the first wanting, the second and the **Lemma** about equal, the glume 5-7-nerved, the lemma 3-nerved; **Palea** none; **Pistillate Spikelet** exclusive of the awn 5-6 mm. long, the glume with an awn 2-6 mm. long; **Staminate Spikelet** 7-8 mm. long, the glume acute, sometimes with a short awn; **Stamens** 6.

In swamps, in water and along the margins of streams, ponds and lakes. Texas to Florida and Virginia, Ohio and Georgia. Spring-summer.



ZIZANIOPSIS MILIACEA, WATER MILLET

78. *ZIZANIA* L. (zī-zā'nī-á)

Spikelets unisexual, 1-flowered, disarticulating from the pedicel; **Staminate Spikelet** soft, the first glume wanting, the second 5-nerved, membranaceous, linear, acuminate or awn-pointed; **Lemma** about as long as the glume, 3-nerved; **Palea** wanting; **Stamens** 6; **Pistillate Spikelet** terete, angled at maturity; **Glumes** wanting; **Lemma** chartaceous, 3-nerved, tapering into a long slender awn; **Palea** 2-nerved, closely clasped by the lemma; **Grain** cylindric, as much as 20 mm. long.

Tall *annual* or *perennial* aquatic grasses, with flat blades and large terminal panicles, the lower branches spreading, bearing the pendulous staminate spikelets, the upper branches ascending, at maturity erect, bearing appressed pistillate spikelets, the staminate spikelets early deciduous, the pistillate spikelets tardily deciduous. Four species: one in eastern Asia, two in North America, one in Texas.

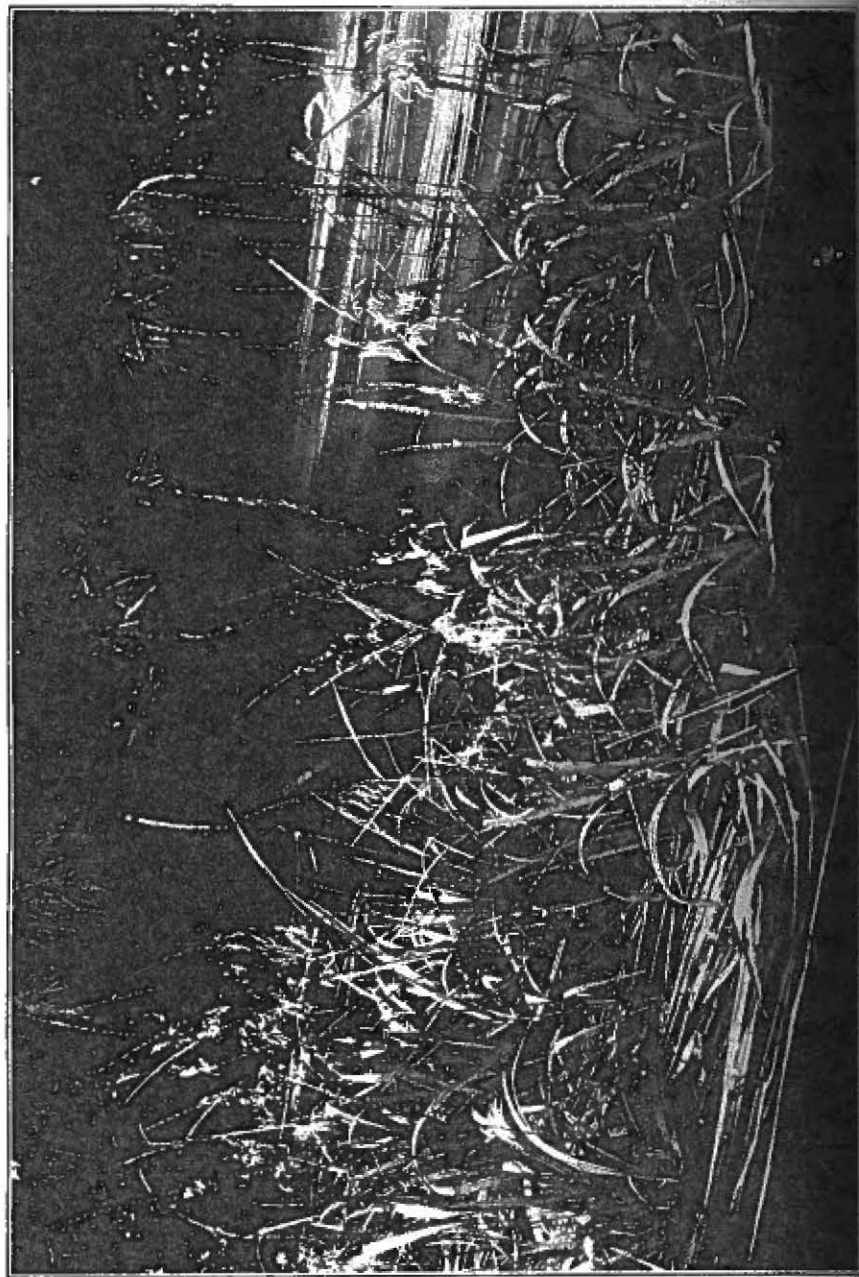
Indian or wild rice, *Z. aquatica* L. (erroneously determined as *Z. palustris* L.), growing here and there over the eastern and northern states, sometimes covering extensive areas, is an erect annual. It is not confined to water but thrives in marshes as well.

Z. texana, which seems to be confined to the artificial lake at the head of the San Marcos River and the irrigation ditches and river some distance below the town of San Marcos, differs from the above mainly in its habit of growth, being a *floating perennial*, rooting and geniculate at the nodes. It grows in water from 1-7 feet deep, often in swiftly running currents, the long blades and culms at first floating on or some distance below the surface of the water as shown by the light streak at the right of the photograph. The culms, sometimes 15 feet long, finally bend upward near the surface of the water, the erect or ascending portion 1-3 feet long, bearing a beautiful panicle similar to that of *Z. aquatica*. Although this grass was collected some years ago at the above location the material was so scant that its distinguishing characteristics were overlooked, and it was classed as *Z. aquatica*. However, the author noticed the difference in habit and called attention to this fact, whereupon the plant was given the rank of a species.

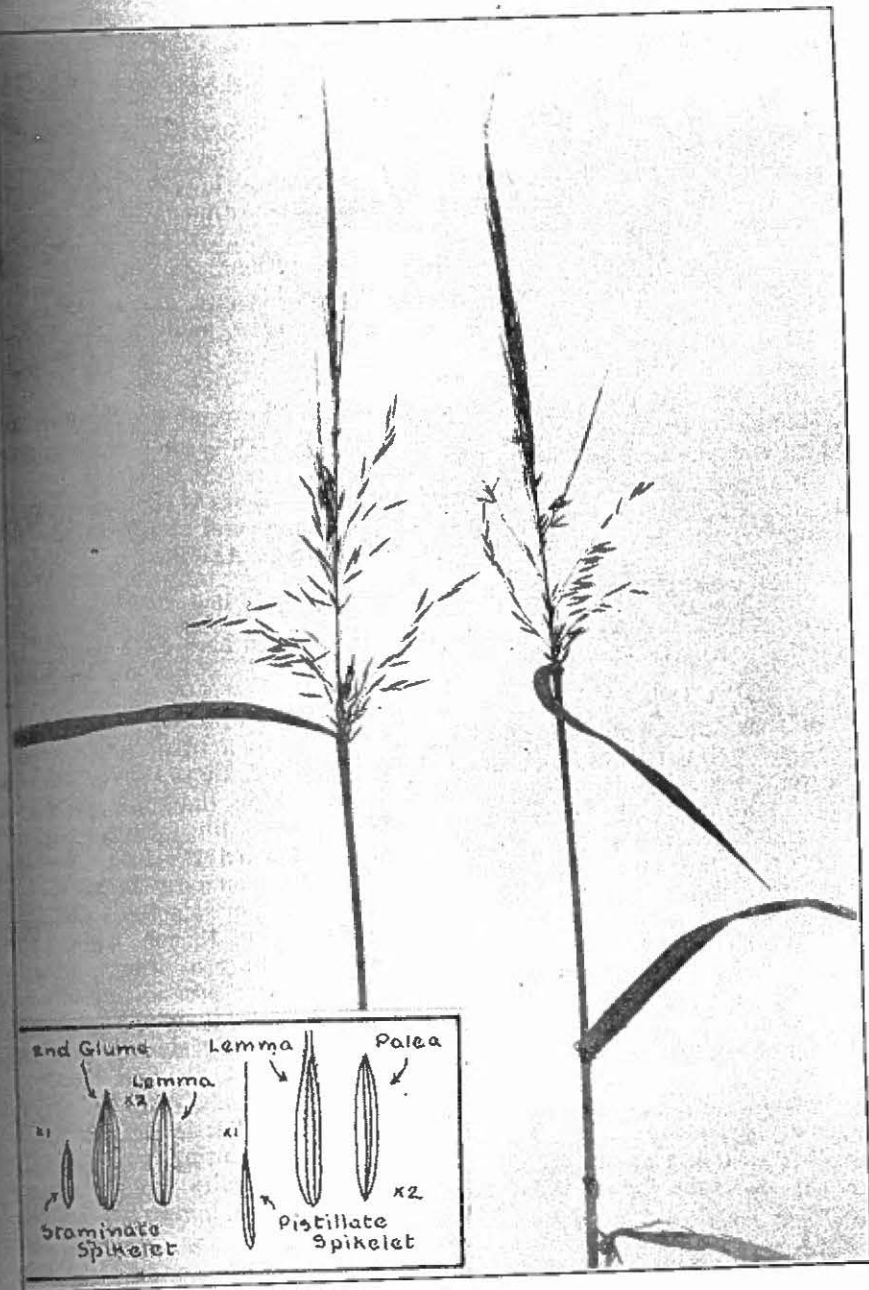
The superintendent of the pumping plant at San Marcos informed the author that this grass blossoms most of the year, and that the growth is so luxuriant that the irrigation company has great difficulty in keeping the artificial lake and ditches clean.

Z. TEXANA Hitchc. (tēks-ā'nā).

Plants perennial; **Monoecious**; **Culms** 3-10 feet long, with thin transverse sections, simple or freely branching, geniculate, rooting at the nodes and floating on or under the water, the culms succulent; **Blades** 6-60' long, 8-25 mm. wide, those above the water mostly 6-16' long and more or less roughened, flat, narrowed toward the base, midrib large; **Sheaths** longer than the internodes; **Ligule** membranaceous, 6-10 mm. long, acute; **Panicles** often somewhat included at the base, 10-15' long, the branches slender, 2-4' long, single or in whorls, the spikelets solitary or in pairs, one pedicel of the pair much longer than the other, enlarged at the apex; **Staminate Spikelets** 6-8 mm. long, oblong; **Glumes**, the first wanting, the second and lemma about equal, acute or awn-pointed; **Palea** wanting; **Pistillate Spikelets** exclusive of the awns 8-12 mm. long, linear; **Glumes** wanting; **Lemma** exclusive of awns 8-12 mm. long, the scabrous awn 10-20 mm. long; **Palea** nearly equal to the lemma; **Grain** not developed. (See two photographs.) In water, often floating, San Marcos River at and below San Marcos, Texas. Spring to fall.



ZIZANIA TEXANA



ZIZANIA TEXANA

XI. PANICEAE, THE MILLET TRIBE

79. ANTHAENANTIA Beauv. (än-thē-nän'tī-ä)

Spikelets obovoid; **First Glume** wanting; **Second Glume** and **Sterile Lemma** about equal in length, broad, 5-nerved, villous, the sterile lemma with a small palea and sometimes with a staminate flower; **Fertile Lemma** cartilaginous, boat-shaped, 3-nerved, subacute, chestnut-brown, as long as the glume, the pale margins very narrow, infolding the palea its entire length (lemma and palea called fruit in descriptions).

Perennial erect grass with short creeping rhizomes, narrow, firm, flat blades, the uppermost much reduced, and narrow panicles, the slender branches ascending or appressed. Two species on the coastal plain of southern United States.

The well developed fruits of these two species are plump, being convex on both sides, but the author found many of the fruits undeveloped, being flat on one side and narrow.

An outstanding characteristic of these two species is the four more or less distinct vertical rows of hairs on the glume and sterile lemma, the hairs longer and more numerous on *A. rufa* than on *A. villosa*.

PANICLE usually purplish. The blades long and nearly linear, the lower mostly 3-5 mm. wide. 1. *A. rufa*

PANICLE usually green. The blades shorter, narrowed toward the summit, the lower mostly 5-10 mm. wide. 2. *A. villosa*

1. *A. RUF*A (EIL.) Schult. (rōō'fä).

Culms 1.5-4 feet tall, usually a few culms to a tuft, simple, erect; **Blades** from less than an inch to 6.5' long, sometimes those at the base and on the innovations as much as 15' long, 3-7 mm. wide, the upper short and distant, flat, or conduplicate toward the base, almost linear, upper surface more or less papillose and hairy, especially toward the base; **Sheaths** shorter than the internodes, sometimes ciliate at the summit; **Ligule** a ring of hairs less than 1 mm. long; **Panicle** long-exserted, or sometimes included at the base, ovate or linear-oblong, mostly less than 18 mm. wide, 2.5-5' (3-8) long, erect, the branches mostly about 2' long or less, gradually shorter above, the lower often interrupted, erect or ascending, solitary, naked at the base, the short branchlets with a few spikelets, single or in pairs, the pedicel enlarged at the summit, one usually shorter than the other of the pair, as long as or longer than the spikelet; the axis, branches, pedicels and spikelets commonly purplish; **Spikelets** about 3 mm. (3.5-4) long; **Glumes**, the first wanting, the second and **Sterile Lemma** about equal, broad, the marginal nerves often faint or wanting, covered with purplish or white hairs less than 1 mm. long, the hairs usually in four vertical rows between the nerves; **Fruit** 2.5-3 mm. long, minutely papillose-striate, sparsely-ciliate toward and at the apex.

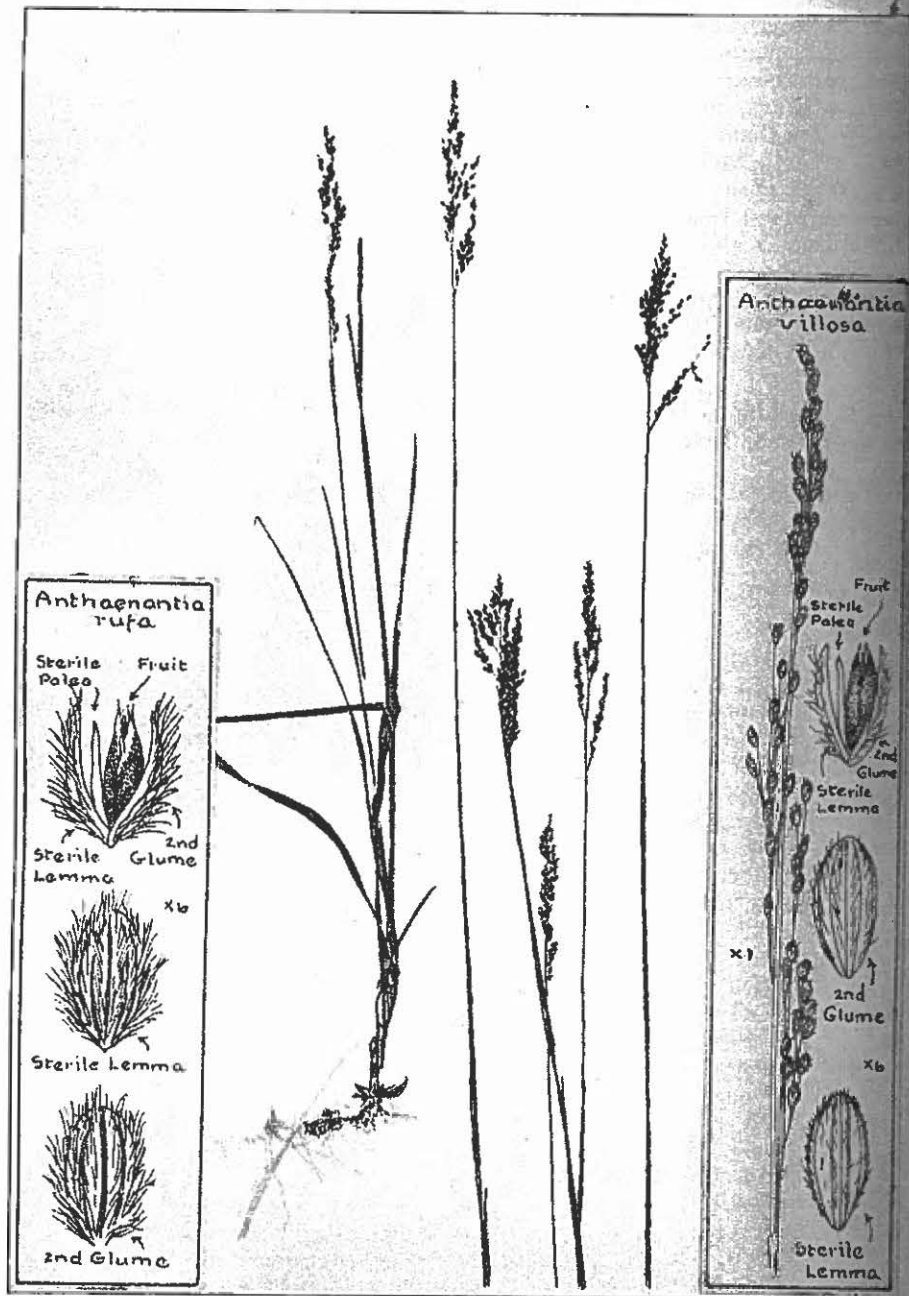
In moist sandy land, especially pine lands, east Texas to Florida and South Carolina. (Three miles south of Buna, Texas, open pine land, and about 20 miles north of Victoria in sandy open land.) Fall.

2. *A. VILLOSA* (Michx.) Beauv. (vil-ō'sä).

Culms 1-4.5 feet tall, erect, solitary or in small tufts, slender, leafy at the base; **Blades** 1-11' long, 4-10 mm. wide, the upper reduced and erect, the lower spreading, flat, acuminate, narrowed toward base and tip, scabrous on the margin, sometimes ciliate at the base; **Sheaths** shorter

than the internodes, the lowermost crowded and overlapping; **Ligule** a very short membrane, minutely-ciliate; **Panicle** pale-green, long-exserted, erect, rather narrow, loose, 4-7' long, 7-18 mm. wide, the few branches mostly solitary, branching nearly to the base, appressed or ascending, usually less than 3' long, naked at the base, the pedicels much enlarged at the summit; **Spikelets** about 3 mm. (3-4) long, about 1.5 mm. wide, pale-green, solitary or in pairs, the pedicel of one about as long as spikelet, the other about twice as long; **Glumes**, the first wanting, the second and **Sterile Lemma** about equal, or the glume somewhat shorter, each more or less covered with stiff hairs about 0.5 mm. long, mostly confined to four vertical rows along the internodes, the hairs fewer and shorter than in *A. rufa*; **Sterile Palea** about three-fourths as long as the sterile lemma; **Fruit** about 2.5 mm. long, 1.3 mm. wide, rather convex on both face and back.

In pine lands, eastern Texas to Florida. (Open pine lands 3 miles south of Buna, Texas.) Fall.



ANTHAENANTIA RUFa and drawings of ANTHAENANTIA VILLOSA

80. TRICHACHNE Nees (tri-käk'nē)
(Valota Adans., inadequately published)

Spikelets lanceolate, in pairs, short-pediceled, in two rows along one side of a narrow rachis; **First Glume** minute, glabrous; **Second Glume** and **Sterile Lemma** about as long as the fruit, 3-7-nerved, copiously silky; **Fertile Lemma** cartilaginous, lanceolate, acuminate, usually brown, the flat white hyaline margins broad.

Perennial grasses, the slender racemes erect or ascending, aggregate along the upper part of the main axis forming a white or brownish woolly panicle. Species about 12, in the warmer parts of America and in Australia; 4 species in southern United States, all in Texas.

Trichachne is closely related to *Digitaria* and *Panicum*, differing chiefly from the first in the acuminate fruit and silky spikelets, and from the latter by the cartilaginous fruit, being chartaceous-indurate in *Panicum*.

T. insularis, growing here and there over southern and western Texas, has long-acuminate fruits 4 mm. long, the remaining species having fruits about 3 mm. long; *T. californica*, rather plentiful in central, southern and western Texas, has a slightly obovate fruit, abruptly narrowed into a long slender point; *T. patens*, with an open panicle, the branches being rather loosely-flowered, so far as known limited to southern and western Texas, has an oblong-lanceolate acute fruit; *T. hitchcockii*, a rather rare species collected in southern and western Texas and in Mexico, has a narrowly lanceolate fruit similar to that of *T. patens*.

The first three species have spikelets long-silky, the sterile lemma being glabrous up the middle, and the last with the internerves pubescent up the middle, the hairs less than 1 mm. long.

All of these species have been collected near Mitchell Lake (about 12 miles south of San Antonio) to Natalia, Texas.

BLADES NOT OVER 3' long; spikelets 2.5-3 mm. long, the hairs less than 1 mm. long; sterile lemma pubescent on the internerves up the middle.

1. *T. hitchcockii*

BLADES 4-12' LONG; spikelets silky-villous, the hairs on the spikelet more than 1 mm. long; sterile lemma glabrous up the middle.

HAIRS on the spikelet 2.5-4 mm. long;

Panicle tawny-white; fruit long-acuminate, 4 mm. long.

2. *T. insularis*

Panicle silvery-white; fruit 3 mm. long, slightly obovate, abruptly narrowed to a long slender point.

3. *T. californica*

HAIRS on the spikelets less than 2 mm. long; panicle open, silky-white, the spikelets rather distant on the ascending or spreading branches; fruit 3 mm. long, oblong-lanceolate.

4. *T. patens*

1. *T. HITCHCOCKII* (Chase) Chase (hich-kök'ī-ī); *Valota hitchcockii* Chase.

Culms 1-2.5 feet tall, usually densely-tufted, branching and leafy at or near the base, sometimes a few long hairs at or near the nodes; **Blades** 0.5-2.5' long, the upper short, 1.5-3.5 mm. wide, flat, glabrous or softly puberulent especially on the upper surface, often very sparsely long-pilose on the margins and upper surface at or near the base; **Sheaths** mostly longer than the internodes, loose, glabrous, puberulent or sparingly pilose, the lower usually softly and densely-pubescent, sometimes sparsely-papillose; **Ligule** membranaceous, fringed or ciliate, less than 1 mm. long; **Panicles** on the larger culms finally long-exserted, erect, the axis 1-6' mostly less than 3' long, those of the branches shorter, the 3-8 slender

scabrous branches 1-2' rarely 3' long, appressed or finally ascending, rarely spreading, spikelet-bearing or naked toward the base, sometimes with short branchlets, the spikelets usually in pairs, solitary or in threes, on unequal scabrous pedicels, when in pairs the pedicels of the shorter one about 2 mm. long, of the other about 3.5 mm. long, and of the third, if present, longer; **Spikelets** 2.5-3 mm. long, nearly 1 mm. wide, lanceolate, silky-pubescent, the hairs usually less than 1 mm. long; **Glumes**, the first minute usually less than 0.5 mm. long, triangular, the second 5-nerved, the nerves glabrous or nearly so, the internerves silky-pubescent, usually nearly equal to the 7-nerved **Sterile Lemma**, which equals or slightly exceeds the fruit, the nerves glabrous or nearly so, the internerves silky-pubescent; **Fruit** light to dark-brown, 2-2.5 mm. long, 0.6-0.8 mm. wide, narrowly lanceolate-acuminate, minutely papillose-striate, often a minute tuft of stiffish hairs at the apex.

Dry prairies and rocky mountain sides, southwest Texas to Mexico. (South of San Antonio, and 20 miles east of Marathon, Texas.) Spring to fall.

2. *T. INSULARIS* (L.) Nees (in-sū-lār'is); *Valota insularis* (L.) Chase; *Panicum lanatum* Rottb.; *Panicum leucophaeum* H. B. K.; SOGR-GRASS.

Culms 2-4 feet tall, tufted, erect or spreading, branching from a swollen base; **Blades** 3-12' long, 4-10 mm. (4-20) wide, flat, rough; **Sheaths** longer than the internodes, glabrous or the lowermost pubescent; **Ligule** membranaceous, ciliate, decurrent, about 2 mm. long; **Panicle** exserted, 4-10' long, narrow, erect or nodding, silky tawny-white or purplish-tinged, shining, the appressed or ascending branches 1.5-4' long, often drooping, the spikelets usually in pairs, the pedicels 1-4 mm. long, one longer than the other, arranged along a narrow 3-angled scabrous rachis; **Spikelets** about 4 mm. (4-5) long, including the hairs 6-7 mm. long, acuminate, clothed with numerous soft light tawny to purplish hairs 2-4 mm. long; **Glumes**, the first minute, acute or truncate, the second and **Sterile Lemma** about equal, acuminate, the second glume 3-nerved, hairy over the back and along the margins, the sterile lemma 5-7-nerved, often slightly longer than the second glume, the middle portion being sparsely-hairy and the margins hairy as on the second glume, the hairs being 2.5-4 mm. long, much exceeding the spikelets, less copious than in *T. californica*; **Fruit** brown, about 4 mm. long, about 1 mm. wide, lanceolate-acuminate, striate-roughened.

In dry sandy or rocky soil, southwestern and west Texas, south to Mexico; also Florida; tropical and subtropical countries. (South of San Antonio, and several places in the mountains of west Texas.) Spring and fall.

3. *T. CALIFORNICA* (Benth.) Chase (kāl-i-fōr'nī-kā); *T. saccharata* (Buckl.) Nash; *Valota saccharata* (Buckl.) Chase; *Panicum saccharatum* Buckl.; *P. lachnanthum* Torr.

Culms 1-2.5 feet tall, tufted, erect or ascending, rather slender, freely branching; **Blades** 1.5-9' commonly 3-5' long, the upper shorter, 2-5 mm. wide, flat, soon becoming involute, rough above, glabrous or a few scattered hairs on the upper surface; **Sheaths** longer than the internodes, flattened, the upper glabrous or sparingly hairy, or quite hairy at or near the nodes, the lowermost densely soft-villous, more or less papillose; **Ligule** membranaceous, about 4 mm. long, fringed at the apex; **Panicles** exserted, 4-8' long, narrow, erect or finally nodding, silvery-white or some-

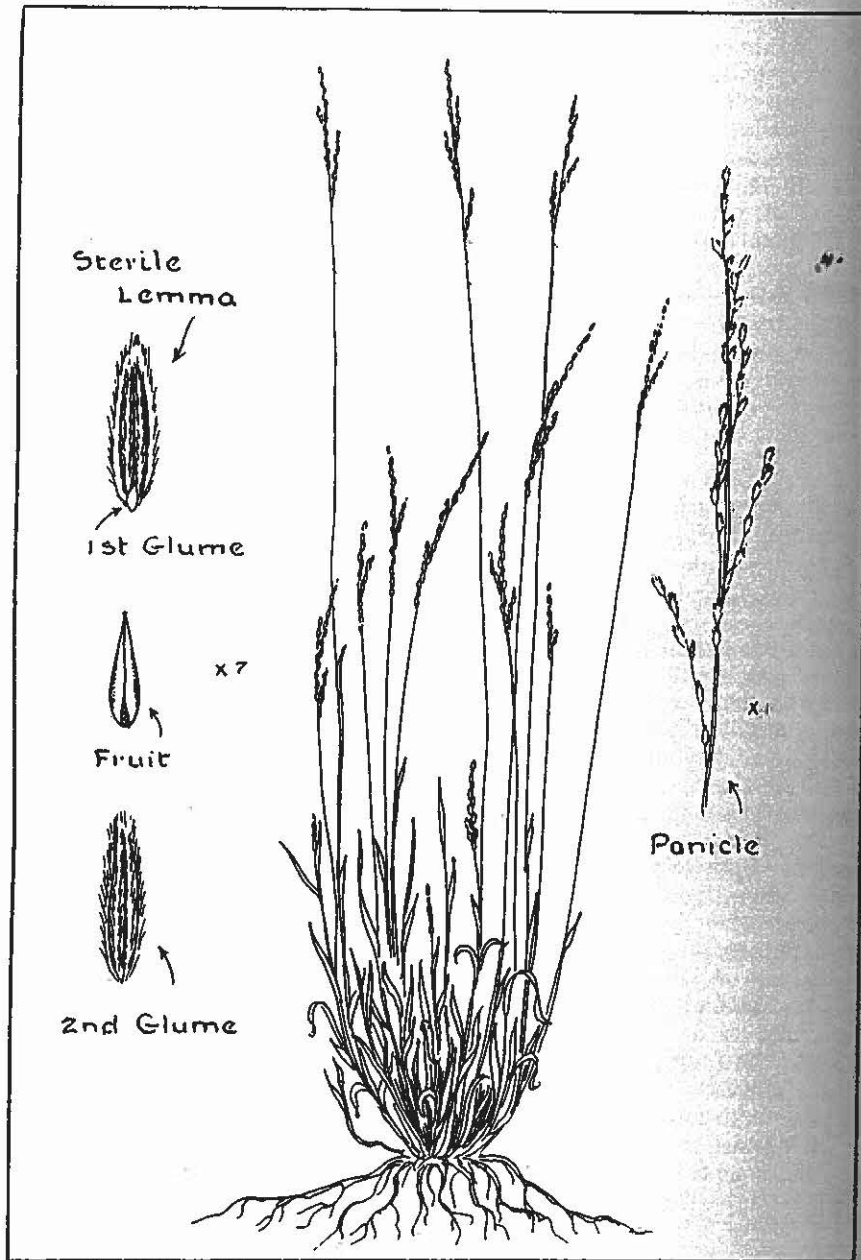
times purplish-tinged, with 6-9 appressed or narrowly ascending branches 1-2' long, the triangular rachis scabrous on the margins, the spikelets usually in pairs, the pedicels 1-3 mm. long, one shorter than the other; **Spikelets** 3-4 mm. long, including the hairs 5-6 mm. long, 1.2 mm. wide, copiously silky with silvery-white or purplish-tinged hairs 2.5-3 mm. long, much exceeding the spikelet; **Glumes**, the first minute, usually less than 0.7 mm. long, sometimes obsolete, the second glume 3-nerved, about equal to the fruit, copiously hairy, the **Sterile Lemma** slightly longer than the second glume, 5-nerved, almost glabrous along the middle portion and long-villous at or near the margins; **Fruit** brown, 2.5-3.5 mm. long, 1 mm. wide, slightly obovate, abruptly narrowed to the longer scarcely indurate point, minutely-striate roughened.

Dry soil, well drained sandy or rocky soil, prairies or hillsides, southern and central Texas, north to Colorado, south to central Mexico, and west to Arizona. (Plentiful over central, western and southwest Texas.) Spring to fall.

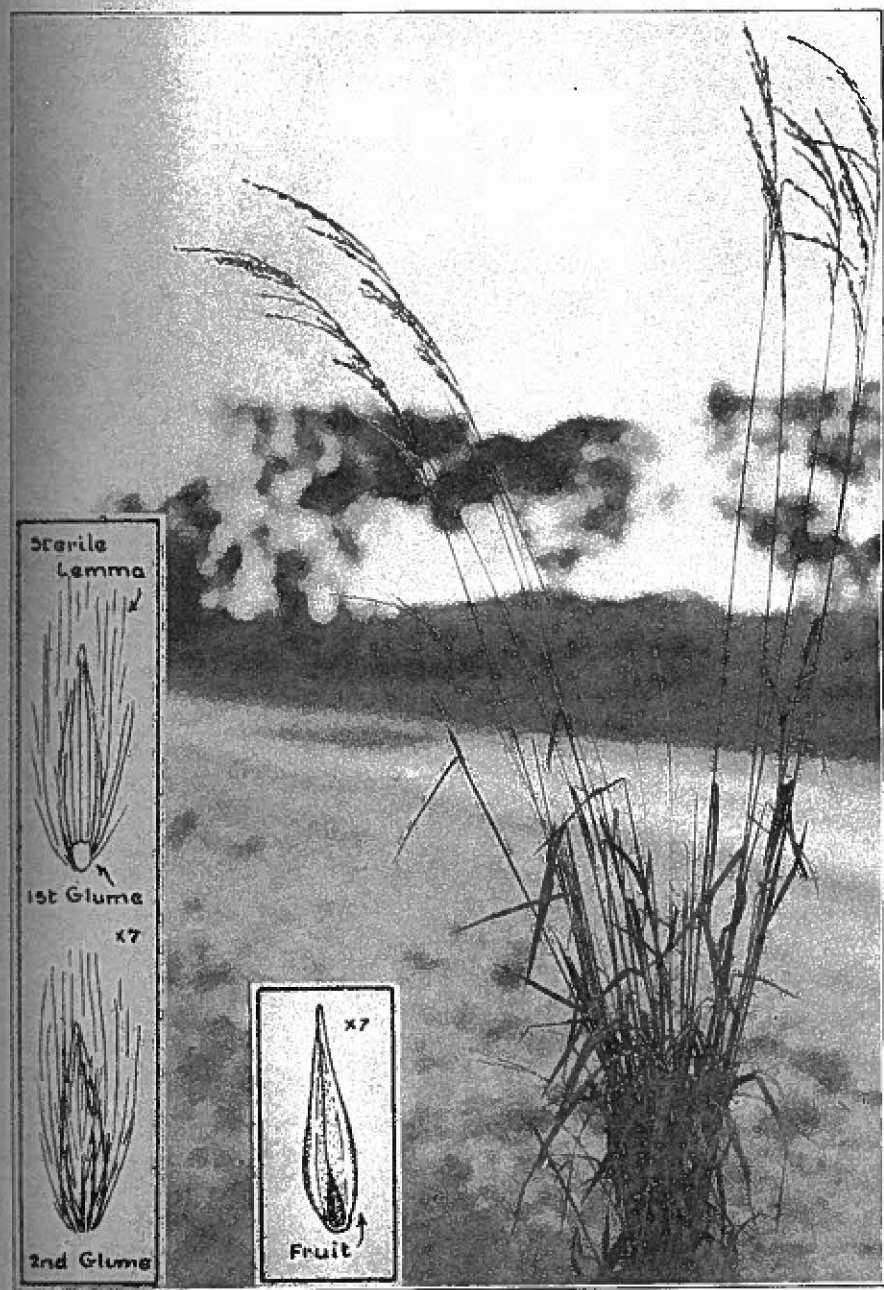
4. *T. PATENS* Swallen (pā'tēns). Formerly referred to *T. saccharata* (Buckl.) Nash.

Culms 1-3 feet tall, tufted, erect or spreading, sometimes geniculate at the lower nodes, branching at or near the base, the upper nodes often with a few long hairs, the lowermost almost woolly, otherwise glabrous or the lower internodes sparsely-hairy; **Blades** 1-6' usually 2-4' long, the upper one very short, 1-4 mm. wide, commonly about 2 mm. wide, flat, slightly rough, margins rough, often sparsely pilose, especially near the base; **Sheaths** mostly longer than the internodes, sparsely to rather densely papillose-pilose with spreading or retrorse hairs, the lowermost densely velvety-pubescent; **Ligule** 2.5-4 mm. long, membranaceous, fringed at the apex; **Panicles** 4-7' long, ovate to ovate-pyramidal, long-exserted, the slender scabrous branches stiffly ascending when young, spreading when mature, usually solitary, 2-3.5' long, comparatively few-flowered; **Spikelets** densely-white, silky, 3-3.5 mm. long, including the hairs 4-5 mm. long (hairs 1.5 mm. long), distant, early deciduous, single or paired, when in pairs, one pedicel 1-2 mm. long, the other 3-7 mm. long; **Glumes**, the first minute, commonly not over 0.5 mm. long, acute or obtuse, narrow, the second glume and **Sterile Lemma** about 3 mm. long, equaling the fruit, the glume narrow, 3-nerved, exposing the fruit, hairy on the nerves and internerves, the **Sterile Lemma** broader, 5-nerved, covering the fruit, the middle portion glabrous, otherwise villous; **Fruit** about 3 mm. long, 0.7-0.8 mm. wide, oblong-lanceolate, acute, minutely striate-roughened.

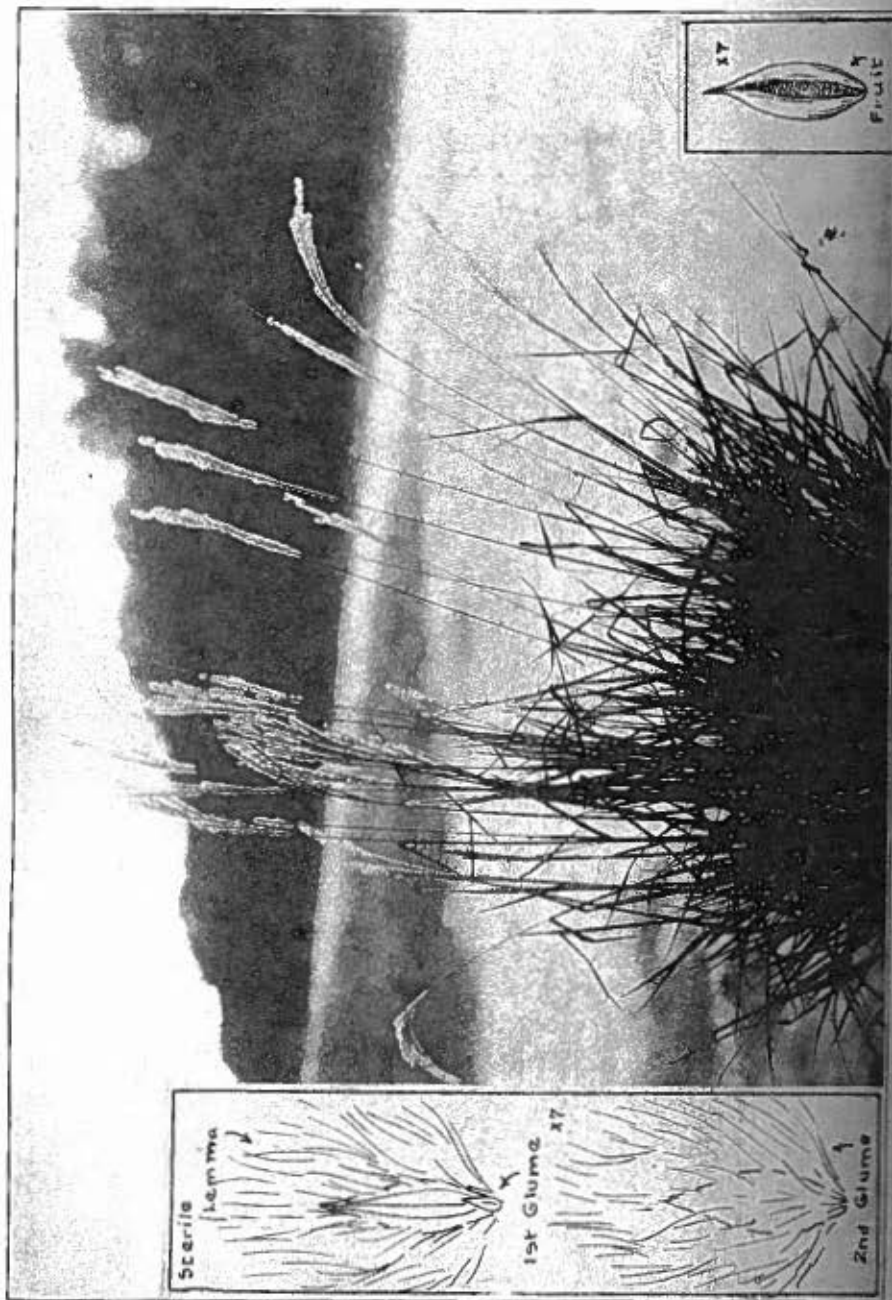
Roadsides and fields on dry, well-drained sandy or slightly gravelly soil, south-central and southwestern Texas. (Plentiful south of San Antonio on the Devine and Frio roads.) Spring and summer



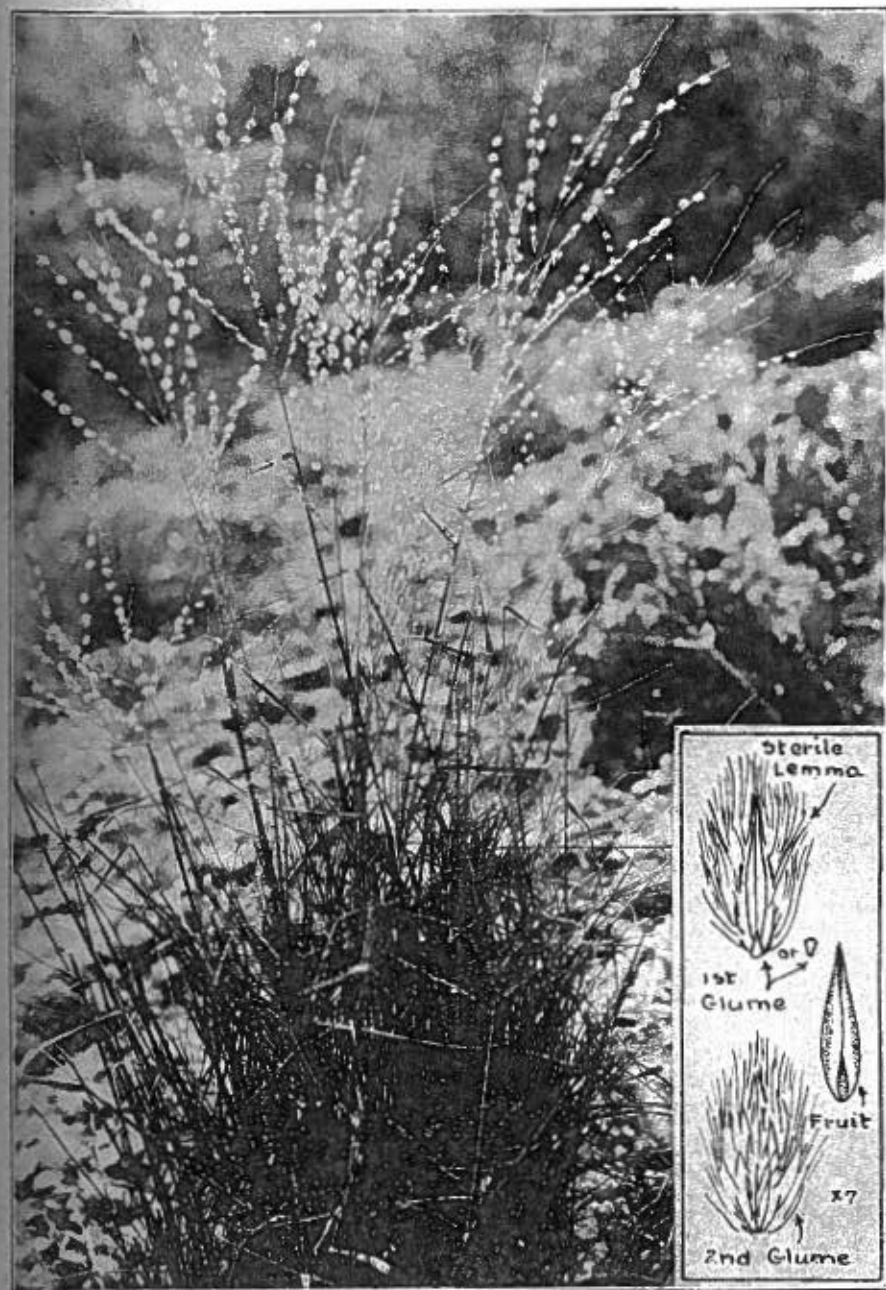
TRICHACHNE HITCHCOCKII



TRICHACHNE INSULARIS, SOUR-GRASS



TRICHACHNE CALIFORNICA



TRICHACHNE PATENS

81. DIGITARIA Hall. not Heist. (dĭj-ĭ-tā'ri-à)

(*Syntherisma* Walt.) The Crab-grasses

Spikelets solitary or in twos or threes, subsessile or short-pedicel, alternate in two rows on one side of a three-angled winged or wingless rachis; spikelets lanceolate or elliptic, plano-convex; **First Glume** minute or wanting; **Second Glume** equaling the sterile lemma or shorter; **Fertile Lemma** cartilaginous, the hyaline margins pale.

Annual or sometimes perennial, erect or prostrate grasses, the slender racemes digitate or somewhat scattered, but aggregate along the upper part of the culms. Species about 60, in the warmer parts of the world; 12 in the United States, 6 in Texas.

In *Digitaria*, *Trichachne* and *Anthraenantia* the fruit is cartilaginous and the lemma with rather prominent hyaline margins, these not inrolled, instead of like the fruit and inrolled margins of *Panicum* and *Paspalum*. In *Digitaria* the spikelets, either glabrous or pubescent, are arranged in slender racemes; in *Anthraenantia* the villous spikelets are arranged in racemes, these paniced. *Trichachne* differs chiefly from *Digitaria* in the silky spikelets and the acuminate fruit.

All of our Texas species are *annuals*, and all except *D. sanguinalis* seem to be confined to sandy land.

D. villosa and *D. filiformis*, erect plants, have the first glume commonly wanting, the first with the racemes usually more than 4' long, the second with the racemes usually less than 4' long. *D. filiformis* is rather rare in Texas.

D. violascens, a Brazilian and West Indies grass, was collected by the author for the first time in the United States near Buna, Texas, appearing a little later in Arkansas.

D. runyoni and *D. texana*, both south Texas plants, are found in sandy land, the first often with a creeping or prostrate culm, many-noded, and with spikelets larger than those of *D. texana*.

FIRST GLUME MINUTE. SECOND GLUME HALF TO TWO-THIRDS AS LONG as the spikelet; plants spreading or prostrate at the base; racemes 5-10, 2-6' long, the rachis winged.

FIRST GLUME WANTING OR RUDIMENTARY.

RACHIS WINGED. Plants about 16' tall, spreading; racemes 1-5, 1-3' long; spikelets 1.4 mm. long, the hairs minutely glandular tipped.

RACHIS NOT winged. Second glume pubescent to nearly glabrous.

RACEMES 5-12, 2-6' long.

Plants often prostrate, freely branching, many-noded; spikelets 2.5-3.5 mm. long.

Plants erect or decumbent at base; spikelets 2-2.5 mm. long.

RACEMES 2-8, 1-5.5' long. Plants erect, simple or sparingly branched at the base; spikelets pubescent with glandular tipped hairs.

Racemes short, 1-4' long; spikelets 1.8 mm. long.

Racemes exceeding 4' long, rarely shorter; spikelets 2.5 mm. long.

1. *D. SANGUINALIS* (L.) Scop. (sǎn-gwĭ-nā'lis); *Syntherisma sanguinalis* (L.) Dulac.; **LARGE CRAB-GRASS.**

Culms 1-3 feet tall, erect or prostrate at the base, often rooting at the lower nodes, freely branching, nodes from slightly pubescent to hispid, often slightly rough and puberulent; **Blades** 2-6' long, 4-10 mm. wide, flat, scabrous, often short-pubescent to papillose-hirsute at the base; **Sheaths** shorter than the internodes, loose, the upper sparsely-hispid and lower

often densely papillose-hirsute; **Ligule** membranaceous, 2-3 mm. long; **Racemes** 3-13 usually 5-6 rarely 2-3, 2-6' long, slender, erect or spreading, crowded or approximate, on a short axis, commonly less than 1' long, at the end of a long peduncle; **Rachis** about 1 mm. wide, flexuous, winged, with spikelets in pairs, one subsessile, the other reaching half its own length above the lower, the pedicel strongly hispidulous, sharply 3-angled; **Spikelets** 2.5-3 mm. long, acute, oblong-lanceolate; **Glumes**, the first minute, glabrous, the second about half to two-thirds as long as the spikelet, 3-5-nerved, pubescent; **Sterile Lemma** 7-nerved, the nerves glabrous or partially hispidulous, the internerves and margins appressed-pubescent (finally erect or spreading), or glabrous or partially pubescent from midnerve to second nerve on each side; **Fruit** cartilaginous with pale hyaline margins, lanceolate, acutely apiculate with age.

Common in waste places and cultivated soil throughout eastern and southern United States. Spring to fall.

2. *D. VIOLASCENS* Link (vĭ-ō-lās'ēns).

Culms 6-24' tall, tufted, usually geniculate at the base and spreading, branching and leafy below; **Blades** 10-50 mm. long, 2-6 mm. wide, the upper short and narrow, flat, lanceolate, margin cartilaginous, glabrous or a few rather long and stiff hairs on the margins and upper surface near the base; **Sheaths**, the upper shorter than the internodes, the lower crowded, short, glabrous or slightly ciliate at or near the summit and at the throat; **Ligule** membranaceous, 1-1.5 mm. long; **Racemes** 1-5, 1-3' long, ascending or somewhat spreading, aggregate or scattered, the axis as much as 8 mm. long, the racemes of the branches usually shorter; **Rachis** flattened, winged, scabrous on the margin, about 0.8 mm. wide; **Spikelets** 1.2-1.5 mm. long, about 0.6 mm. wide, usually in pairs, rarely solitary or in threes, the pedicel of one short, less than 1 mm. long, the other about twice as long; **Glumes**, the first wanting, the second about three-fourths as long as the spikelet, 3-nerved, mostly obtuse, the internerves densely silky-hairy, the **Sterile Lemma** as long as or slightly longer than the fruit, 5-nerved, almost glabrous to densely silky-hairy on the internerves, often irregularly hairy, the hairs on both often minutely glandular tipped; **Fruit** slightly shorter and narrower than the spikelet, dark-purple or brown, striate, the flat margins pale. Sandy land, east Texas, Arkansas, Brazil and West Indies. (About 3 miles south of Buna, Texas.) Fall.

3. *D. RUNYONI* Hitchc. (rŭn'yŭn-ĭ).

Culms 1-3 feet tall, erect or from a decumbent base, or ascending from a prostrate or creeping base 2-3 feet long, taking root at the nodes, many-noded, nodes pubescent to hirsute; **Blades** 3-5' long, 3-6 mm. wide, flat, rough, the upper sparingly pilose or glabrous, the lower from densely-pubescent to hirsute on the upper surface at the base or papillose-ciliate; **Sheaths** mostly longer than the internodes, upper glabrous or ciliate, the lower from densely-pubescent to hirsute; **Ligule** membranaceous, 2-3 mm. long; **Racemes** 5-12, 3-6' long, sometimes naked at the base, the axis about 2' long, scabrous, the racemes sometimes with branches 1-2' long, the rachis slender, triangular in cross-section, hispid on the angles, spikelets in twos or threes; **Spikelets** 2.5-3.5 mm. long, lanceolate, narrow, acute; **Glumes**, the first wanting or minute, the second and **Sterile Lemma** about equal, the glume 3-5-nerved, and the sterile lemma 7-nerved, densely-villous on the internerves, the lemma glabrous on the middle internerves,

or both nearly glabrous; **Fruit** about as long as the sterile lemma, lanceolate.

Sandy land (and sand dunes) along the coast, southern Texas (Corpus Christi, Aransas Pass, Padre Island.) Fall.

4. *D. TEXANA* Hitchc. (tĕks-ā'nā).

Differs from *D. runyonii* in being erect, not from a creeping base, not so many-noded, slenderer racemes, and spikelets 2-2.5 mm. long. (No drawings.) Sandy oak woods and sandy prairies, southern Texas.

5. *D. FILIFORMIS* (L.) Koel. (fil-ī-fōr'mīs); *Syntherisma filiforme* (L.) Nash; SLENDER FINGER-GRASS.

Culms 8-28' tall sometimes taller, tufted, erect, slender, leafy and branching at and near the base; **Blades** 2-7' long, 2-4 mm. wide, flat, scabrous on the upper surface, papillose-hirsute on the upper surface at the base, glabrous or sparsely-hirsute on the lower surface; **Sheaths** hirsute or papillose-hirsute, or the upper glabrous; **Racemes** 2-5, usually unequal, 1-4' long, erect or ascending, slender, the axis of the inflorescence 7-30 mm. long; **Rachis** 3-angled, scabrous on the angles, not winged, flexuous; the spikelets mostly in pairs or threes, the pedicels scabrous, the shorter about 1 mm. long, the second scarcely as long as the spikelet, the third usually slightly longer than the spikelet, appressed; **Spikelets** 1.7-1.8 mm. long, about 0.8 mm. wide, elliptic, acute; **Glumes**, the first wanting, the second 3-nerved, three-fourths to as long as the 7-nerved **Sterile Lemma** which is slightly shorter or equals the fruit, both of them densely to sparsely-pubescent between the nerves, the hairs glandular tipped; **Fruit** about as long as the spikelet, chestnut-brown, acute, striate.

Sandy or sterile soil, Texas to Florida, Oklahoma, North Carolina north to New Hampshire and Michigan. Summer and fall.

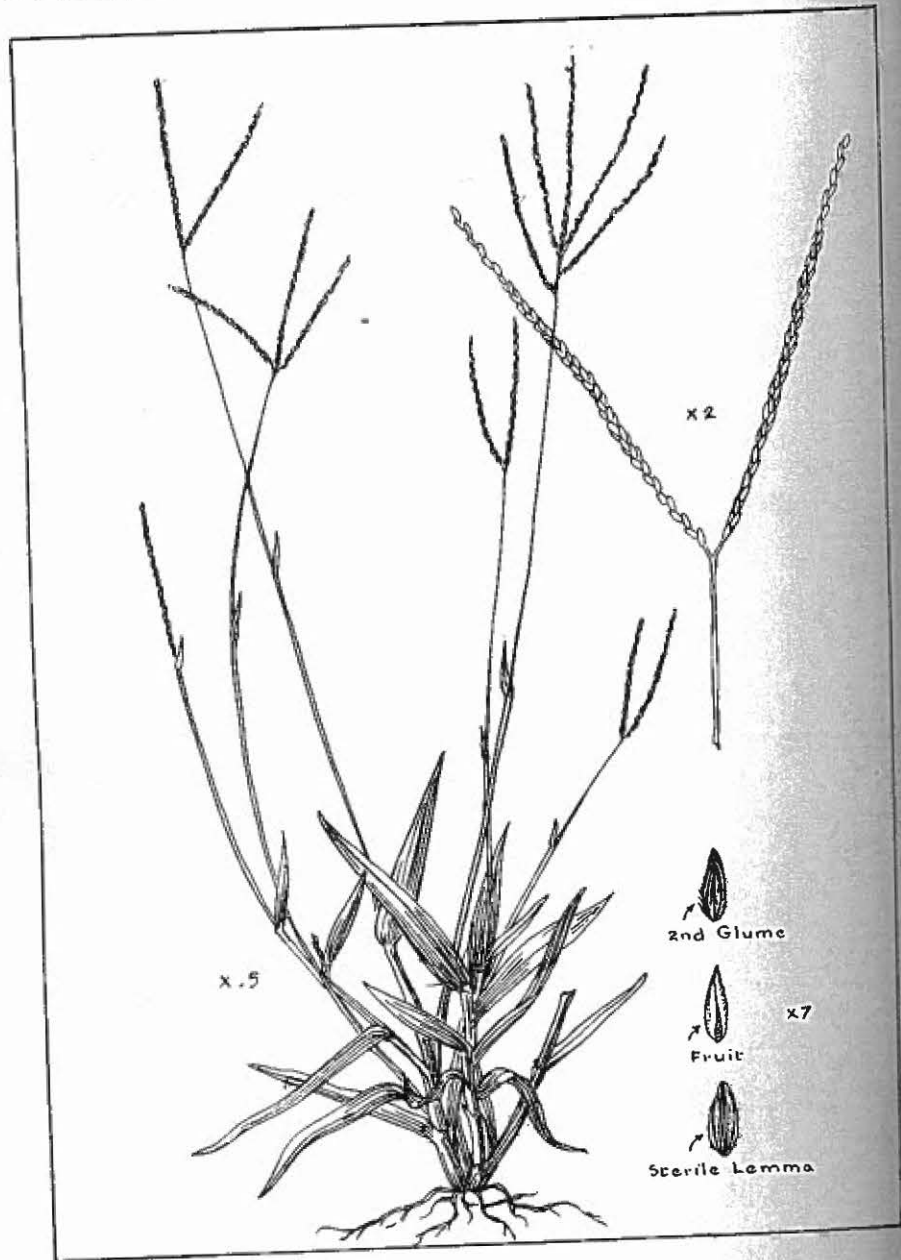
6. *D. VILLOSA* (Walt.) Pers. (vil-ō'sā); *Syntherisma villosum* Walt.; SOUTHERN SLENDER FINGER-GRASS.

Culms 2-6 feet tall, tufted, erect, branching below, the nodes pubescent to hirsute; **Blades** 4-18' long, 3-5 mm. wide, flat, somewhat rough above, the blades from sparsely to densely papillose-hirsute, especially on the upper surface near the base, or the uppermost glabrous; **Sheaths** shorter than the internodes, papillose-hirsute or the uppermost glabrous; **Ligule** membranaceous, about 1 mm. long, ciliate; **Racemes** 2-8 commonly 5-8, with axis 3.5' long or less, distant as much as 30 mm., erect or ascending, commonly over 4' often 6-8' long, slender, much interrupted below, the angles of rachis scabrous, wingless, the clusters rather distant, often not overlapping, in ones to threes, the pedicel of one about as long as the spikelet, the others shorter; **Spikelets** 2.5 mm. long, 0.8 mm. wide, elliptic, acute at both ends; **Glumes**, the first wanting, the second obtuse, 3-nerved, a little shorter than the 7-nerved sterile lemma, both densely matted-villous between the nerves with glandular tipped hairs; **Fruit** slightly exceeding the sterile lemma, deep chestnut-brown, papillose-striate, apiculate.

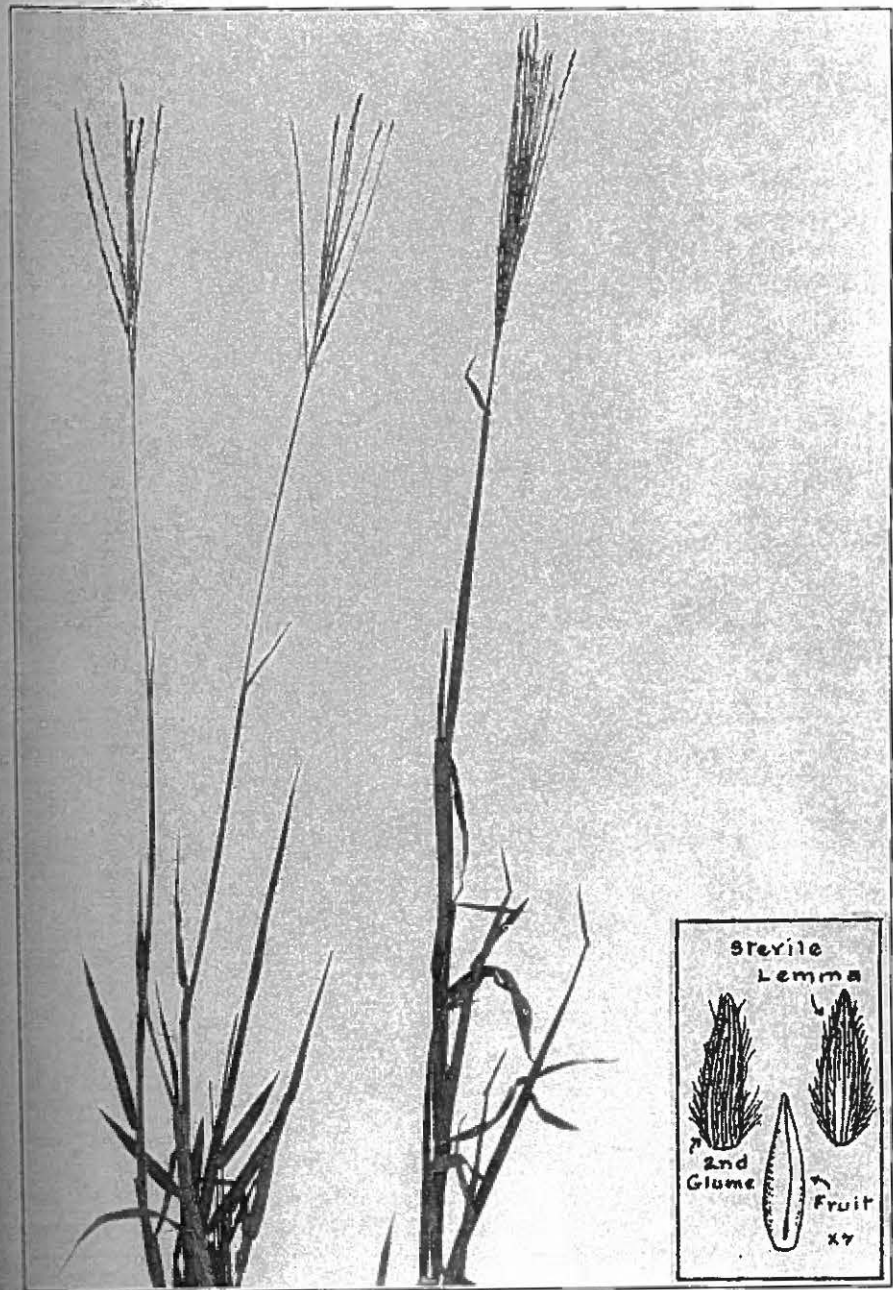
In sandy soil, southern states north to Oklahoma and Missouri. Summer-fall.



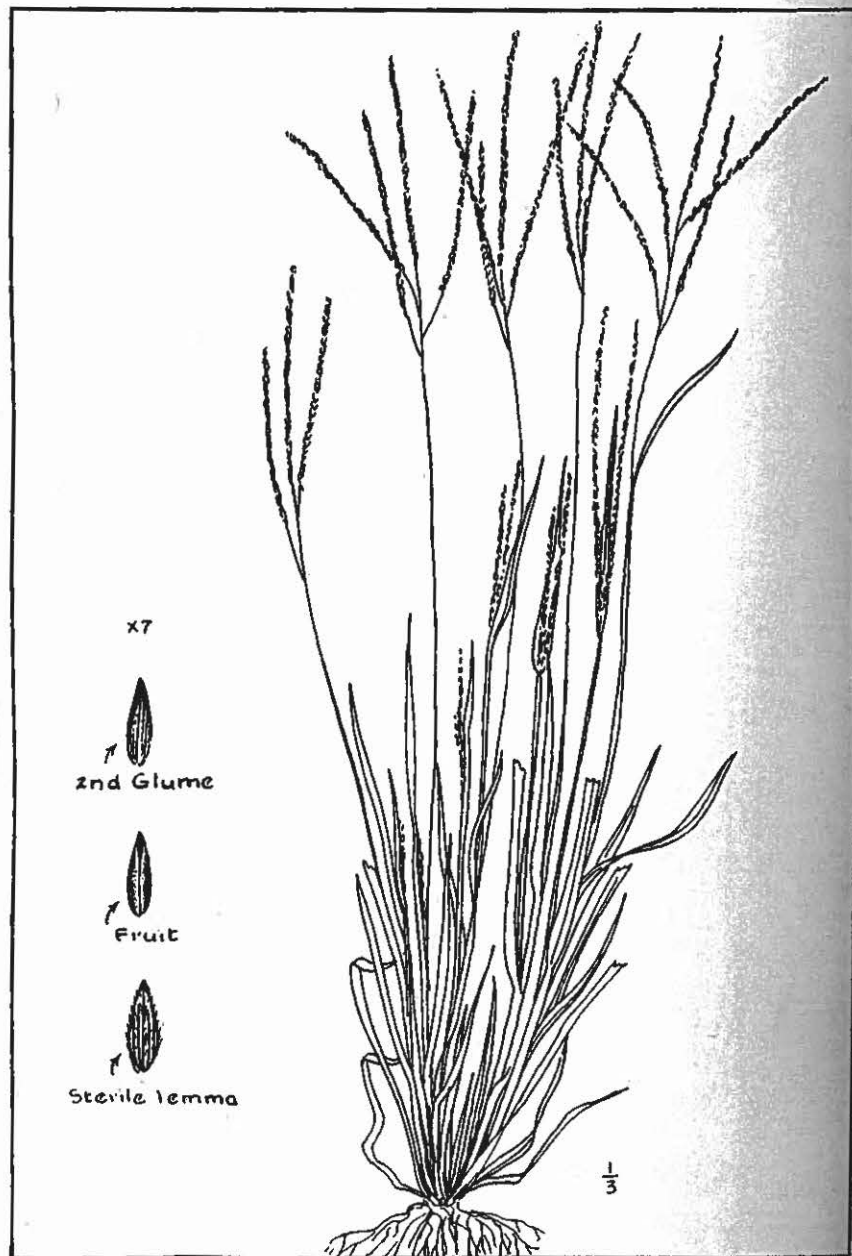
DIGITARIA SANGUINALIS, LARGE CRAB-GRASS



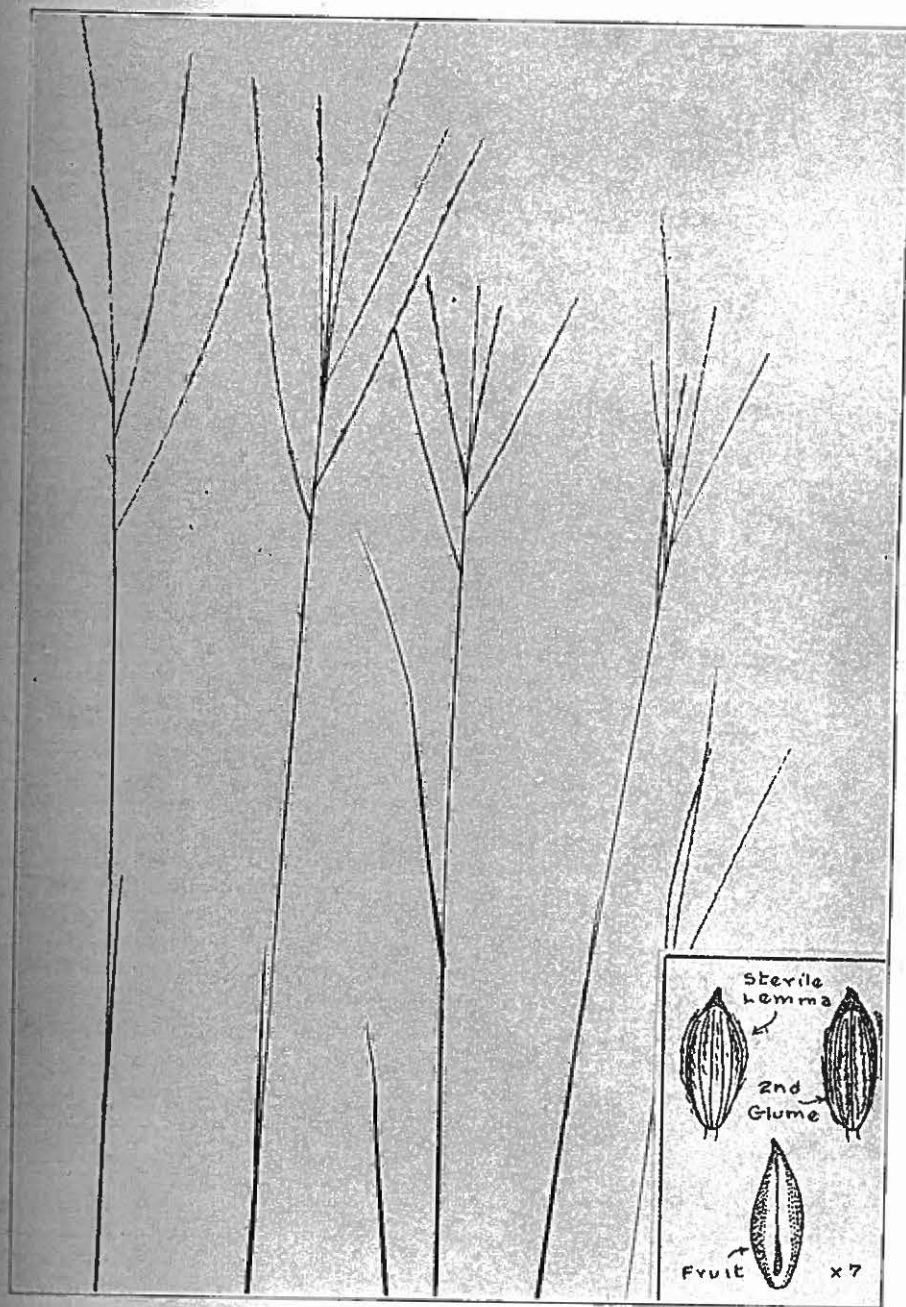
DIGITARIA VIOLASCENS



DIGITARIA RUNYONI



DIGITARIA FILIFORMIS



DIGITARIA VILLOSA, SOUTHERN SLENDER FINGER-GRASS

82. **LEPTOLOMA** Chase (lěp-tō-lō'mā)

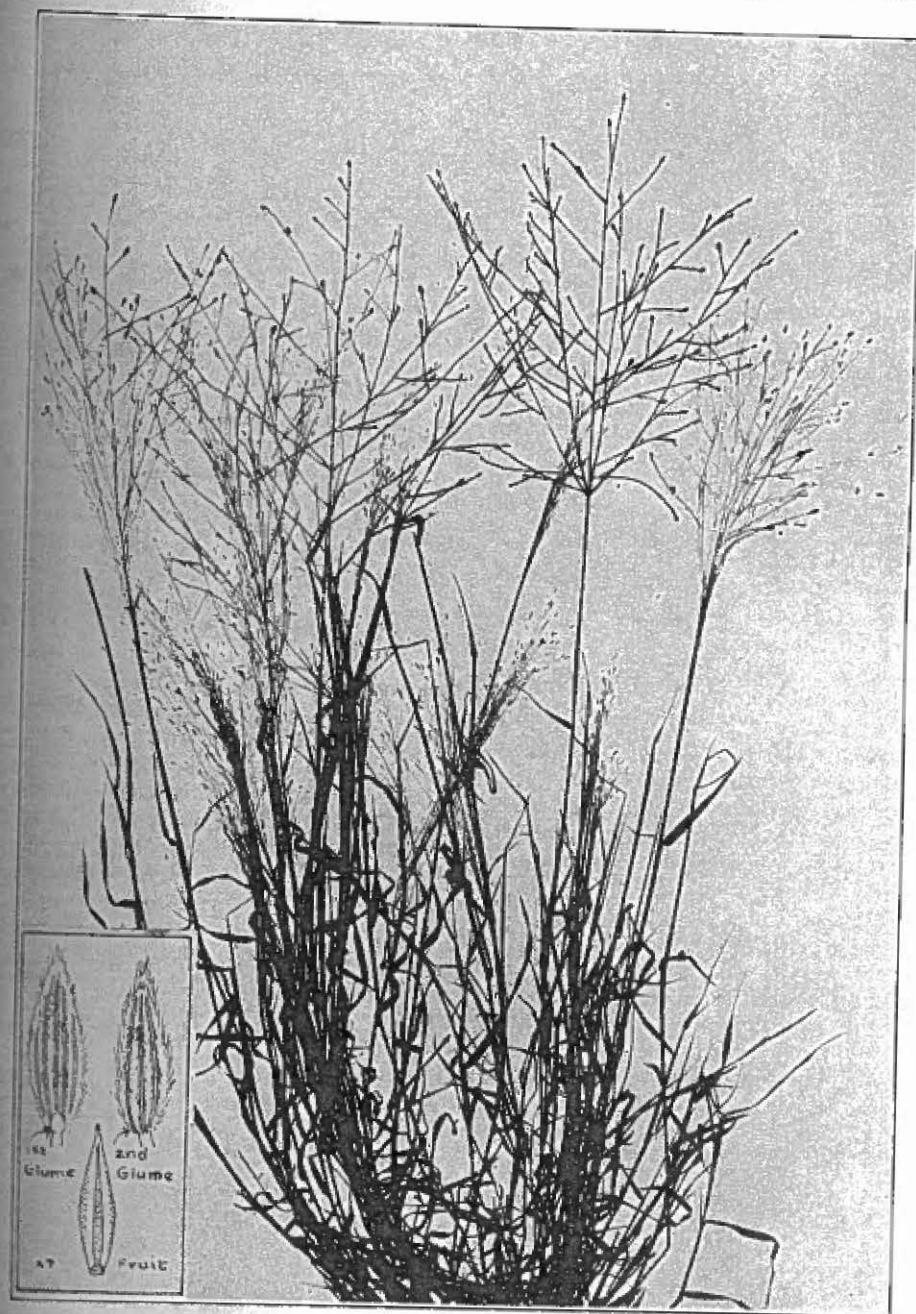
Spikelets on slender pedicels; **First Glume** minute or obsolete; **Second Glume** 3-nerved, nearly as long as the 5-7-nerved **Sterile Lemma**, a more or less prominent stripe of appressed silky hairs down the internerves and margins of each, the sterile lemma empty or inclosing a minute nerveless rudimentary palea; **Fertile Lemma** cartilaginous, elliptic, acute, brown, the delicate hyaline margins inclosing the palea.

Perennial branching grasses, with brittle culms, felty pubescent at base, flat blades, and open or diffuse panicles, these breaking away at maturity becoming tumbleweeds. One species in the United States. It differs chiefly from *Digitaria* in the form of the inflorescence, being an open loose panicle of long-pedicelled spikelets rather than an aggregation of slender racemes of rather short-pedicelled spikelets.

L. **COGNATUM** (Schult.) Chase (kög-nā'tüm); *Panicum autumnale* Bosc; *P. divergens* Muhl.; **DIFFUSE CRAB-GRASS, FALL WITCH-GRASS.**

Culms 1-2.5 feet tall, tufted, freely branching below, at first erect but finally geniculate, prostrate or spreading, slender, very brittle, glabrous or pubescent toward the base; **Blades** 1.5-4' long, 2-5 mm. wide, flat, rather rigid, margins scabrous, white and often wavy, upper surface rough, the lower glabrous, or with a few hairs on upper surface near the base; **Sheaths** shorter than the internodes, upper glabrous or with a few long hairs, the lower thinly to felty pubescent; **Ligule** membranaceous, about 1 mm. long; **Panicle** 5-12' long, commonly one-third to half as long as the culm, often broader than long, finally exserted and diffuse, axis scabrous, the lower axils sparsely-pilose, the capillary branches long, the lower 4-8' long, at first erect, finally widely spreading at maturity, naked at the base, the short divergent branchlets and pedicels bearing single spikelets at their extremities, the branches, branchlets and long pedicels scabrous, the pedicels 10-35 mm. long; **Spikelets** about 3 mm. long; **Glumes**, the first minute or wanting, thin, glabrous, the second 3-nerved, nearly equal to the 5-7-nerved **Sterile Lemma**, the nerves green and prominent, each with an appressed silky-pubescent stripe down the internerves and on the margins, both ciliate near the apex, the hairs finally becoming loose and spreading or erect; **Fruit** about 2.5 mm. long, acuminate, brown, the hyaline margins inclosing the palea, flat not inrolled.

In dry rocky or sandy soil over much of the United States including Texas. (San Antonio.) Spring to fall.



LEPTOLOMA COGNATUM, DIFFUSE CRAB-GRASS, FALL WITCH-GRASS

83. *STENOTAPHRUM* Trin. (stĕn-ō-tăf'rŭm)

Spikelets embedded in one side of an enlarged and flattened corky rachis disarticulating at maturity, the spikelets remaining attached; **First Glume** small; **Second Glume** and **Sterile Lemma** about equal, the latter with a palea or staminate flower; **Fertile Lemma** chartaceous.

Creeping *stoloniferous perennials*, with short flowering stems, rather broad and short obtuse blades, and terminal and axillary spikes. Species about five; islands of the Pacific; one in southern United States.

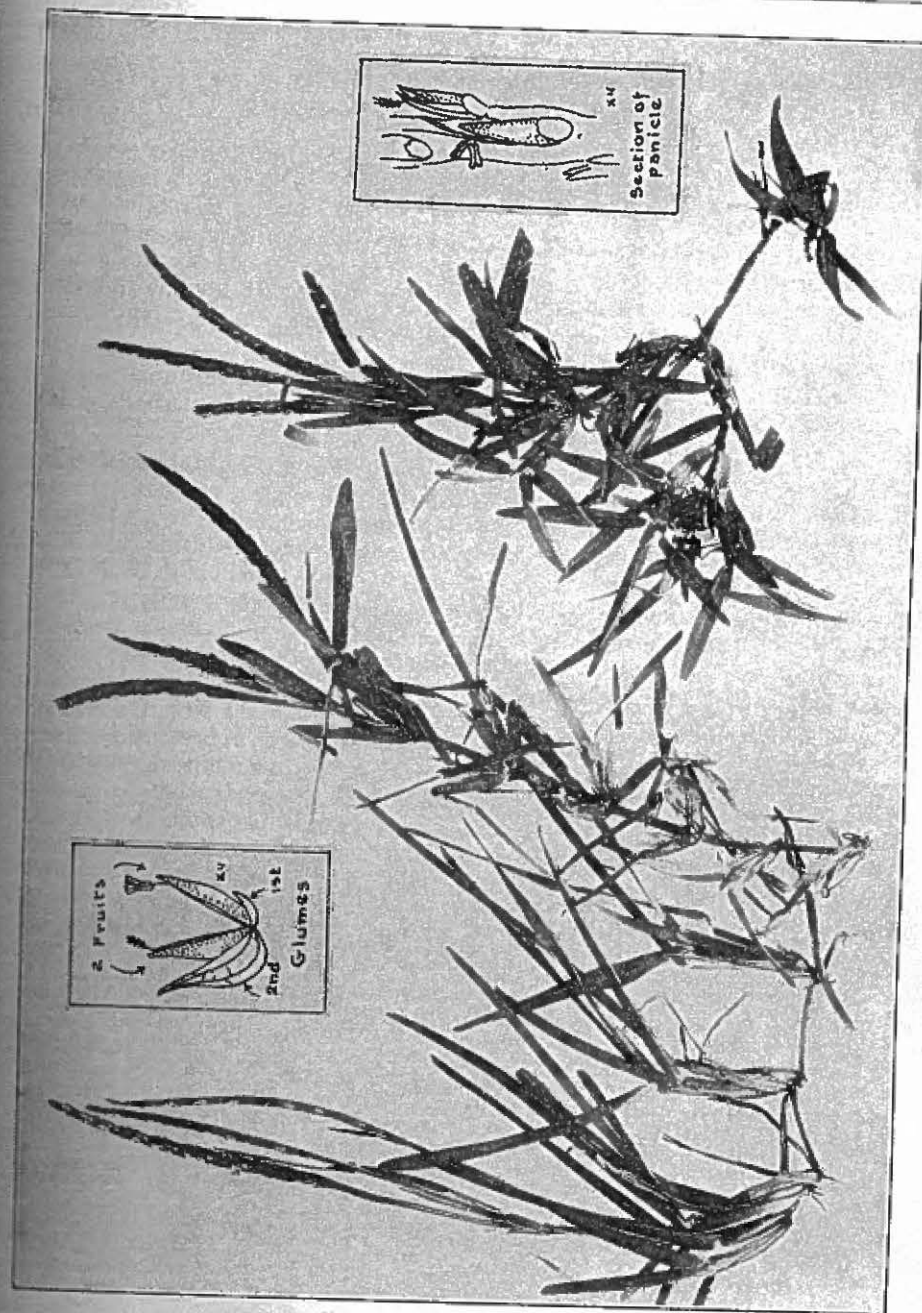
St. Augustine grass is a creeping stoloniferous perennial, the stolons sometimes 2-3 feet long, with short internodes and swollen nodes, a fascicle of leaves or branches at each node, mostly short obtuse blades, the short culms erect or ascending bearing terminal and axillary racemes commonly called spikes 2-4' long.

It thrives in sandy, alluvial or mucky soil, and is often used as a lawn grass in the coastal cities and towns of the South. It is easily propagated by setting out cuttings or pieces of stolons bearing shoots. The objections to its coarse texture is overcome by the fact that it thrives in shady places.

S. SECUNDATUM (Walt.) Kuntze (sĕ-kŭn-dă'tŭm); *S. americanum* Schrank; **ST. AUGUSTINE GRASS, SHORE-GRASS.**

Culms 4-12' tall, erect or ascending from creeping stolons, the stolons often more than 2 feet long, with short internodes, taking root at the swollen nodes, each node with a fascicle of leaves or branched, sometimes the branches over a foot long, smooth throughout; **Blades** commonly 3-6' or longer on the upright culms, but only about an inch or two long on the stolons, 4-10 mm. wide, flat or folded on drying, rounded at the apex, usually pale-green; **Sheaths** flattened, loose, slightly ciliate on the margins toward the apex; **Ligule** a ciliate ring of short hairs; **Spikes** terminal and axillary, 2-4' long, about 4 mm. wide, usually sheathed, the spikelets sunken in one side of a flat, thick, corky rachis, sessile, or with 1 or 2 additional short-pedicelated ones in alternate notches of each joint; **Spikelets** about 4 mm. long, lanceolate-ovate; **Glumes** membranaceous, the first small but sometimes nearly half as long as the spikelet, obtuse, nerveless, the second as long as the spikelet, ovate, acute, about 7-nerved; **Sterile Lemma** 5-nerved, somewhat coriaceous, subtending a staminate flower; **Fruit** slightly shorter and more coriaceous than the sterile lemma.

In alluvial or mucky soil, Texas to Florida and North Carolina. (Brownsville, Eagle Pass, Texas.)



STENOTAPHRUM SECUNDATUM, St. AUGUSTINE GRASS

84. **ERIOCHLOA H. B. K.** (ēr-ī-ōk'lō-ā)

Spikelets dorsally compressed, more or less pubescent, solitary or sometimes in pairs, short-pedicel or subsessile, in two rows on one side of a narrow usually hairy rachis, the pedicels often clothed with long, stiff hairs, the back of the fertile lemma turned from the rachis; lower **Rachilla** joint thickened, forming a more or less ringlike usually dark-colored callus below the second glume, the **First Glume** reduced to a minute sheath about this and adnate to it; **Second Glume** and **Sterile Lemma** about equal, acute or acuminate, the lemma usually inclosing a hyaline palea or sometimes a staminate flower; **Fertile Lemma** indurate, minutely papillose-rugose, mucronate or awned, the awn often readily deciduous, the margins slightly inrolled.

Annual or *perennial*, often branching, grasses, with terminal panicles consisting of several or many spreading or appressed racemes, usually rather closely arranged along the main axis.

This genus is distinguished by the dorsally compressed pubescent spikelets, and the ringlike, usually dark-colored callus just below the second glume, the first glume reduced to a minute sheath about this and adnate to it. Our four species grow in rather large tufts, inhabiting cultivated land, meadows and waste places. *E. sericea* is an erect plant with blades usually less than 5 mm. wide, and a long narrow panicle of usually appressed racemes, the very short pedicels of the spikelets being villous, the hairs more than half the length of the spikelet. The other species have rather weak culms, the spreading plants being more or less decumbent at the base, with blades usually more than 5 mm. wide. *E. gracilis*, a west Texas plant, has the pedicels and rachis hispidulous and sparsely-pubescent, the fruit being apiculate, and *E. contracta*, the pedicels and rachis hispidulous, the fruit with an awn 0.5-1.5 mm. long. Both of these plants often have a few hairs at the apex of the pedicels. *E. punctata*, with scabrous pedicels and rachis, has fruit with an awn 0.5-1.5 mm. long. *E. contracta* is common in south Texas, and *E. punctata* in the Rio Grande Valley.

SPIKELETS HAIRY; FRUIT ACUTE, APICULATE OR SHORT-AWNED.
Panicles narrow, with several appressed or spreading racemes; spikelets usually in pairs.

PLANTS PERENNIAL.

PEDICELS very short, villous, the hairs more than half as long as the spikelet; spikelets solitary; fruit acute or apiculate; plant erect; blades 2-5 mm. wide.

PEDICELS and rachis scabrous only; awn of the fruit 0.5-1.5 mm. long; plant weak and spreading; blades 3-12 mm. wide.

PLANTS ANNUAL. Culms stout, but weak and spreading; blades 5-9 mm. wide; usually a few hairs at the apex of the pedicels.

PEDICELS and rachis hispidulous; fruit with an awn 0.5-1.5 mm. long.

PEDICELS and rachis pubescent; fruit apiculate.

Spikelet acuminate; fruit shorter than the glume and sterile lemma.

Spikelet less acuminate; fruit about as long as the glume and sterile lemma.

4a. *E. gracilis* var. *minor*

1. *E. SERICEA* (Scheele) Munro (sē-rī-sē'ā).

Culms 12-45' tall, rather large tufts with many sterile shoots and leaves below, slender, simple, erect, pubescent below the panicle and with scattered hairs where not covered by sheath, short-villous at nodes; **Blades** 2.5-12' long, 2-4 mm. wide, flat or convolute, pubescent at the collar, otherwise more or less minutely pubescent; **Sheaths** mostly shorter

than the internodes, striate, pubescent at apex, otherwise glabrous or a few scattering hairs; **Ligule** a dense ring of straight hairs; **Panicle** mostly exserted, 4-8' long, simple, racemose with 4-10 appressed secund racemes, as much as 30 mm. long at base, shorter above, the lower racemes distant more than their own length, upper overlapping, the axis pubescent; **Spikelets** 3-4.5 mm. long, 1.5 mm. wide, solitary, flattened, elliptical-oblong, the triangular rachis pubescent, the very short pedicels villous, the hairs more than half as long as the spikelet; **Glumes**, the first reduced to a minute sheath folded about the ring-like callus, second glume and **Sterile Lemma** about equal, acute, membranaceous, as long as and inclosing the rest of the spikelet, oblong-elliptical, 5-nerved, villous; **Fruit** 3-3.2 mm. long, 1.2 mm. wide, acute or apiculate, minutely papillose-rugose.

In dry soil, Texas, New Mexico and Oklahoma. Summer.

2. *E. PUNCTATA* (L.) Desv. (pūnk-tā'tā); EVERLASTING GRASS.

Culms 1-3.5 feet tall, flattened, often densely-tufted, erect, or spreading or erect from a decumbent base, finally freely branching, short-pubescent at nodes and below the panicle; **Blades** 1-12' long, 3-9 mm. mostly 4-6 mm. wide, flat; **Sheaths** shorter or longer than the internodes, thin, loose, collar densely-puberulent, otherwise glabrous; **Ligule** a dense ring of hairs about 0.7 mm. long; **Panicle** exserted or included at the base, 3-6' long, the common axis triangular, short-pubescent with ascending hairs, commonly with 5-19 racemes racemose along the common axis, appressed or ascending, overlapping, the lower as much as 2' long, progressively shorter above, green or purplish, the scabrous rachis triangular, the spikelets single or in pairs, on unequal short scabrous pedicels; **Spikelets** 4-5 mm. long, 1 mm. wide, lanceolate, acuminate; **Glumes**, the first reduced to a minute sheath about and adnate to the callus-like ring below the second glume, the second and sterile lemma subequal, awn-pointed or minutely 2-toothed, the **Sterile Lemma** about 0.5 mm. shorter, acuminate, awn-pointed, both 5-nerved, scabrous toward the apex, pubescent on the lower half to two-thirds, with appressed silky hairs; **Fruit** about 2.5 mm. long and 0.9 mm. wide, obtuse, narrowly oval, papillose-rugose with a scabrous straight or crooked awn as much as 1.5 mm. long.

On plains and prairies, Texas to Louisiana. Summer-fall.

3. *E. CONTRACTA* Hitchc. (kōn-trāk'tā).

Culms 1.5-3 feet tall, densely-tufted, decumbent at base, spreading, freely branching above, pubescent below the panicle, pubescent to puberulent at the nodes; **Blades** commonly 5-8' long, 5-8 mm. wide, flat, soon becoming conduplicate when drying, pubescent to glabrous, flaccid; **Sheaths** shorter or longer than the internodes, glabrous to short pubescent, especially near the nodes; **Ligule** a ciliate ring of soft white hairs about 1 mm. long; **Panicle** mostly 3-6' sometimes longer, exserted or partly included, narrow, axis and rachis hispidulous, racemes erect or appressed, commonly 0.5-1.5' long, as many as 15-20, the spikelets mostly in pairs, pedicels 1-3 mm. long, hispidulous, often with a few long hairs at the apex of the pedicels; **Spikelets** 4-4.5 mm. long, acuminate, lanceolate; **Glumes**, the first reduced to a minute sheath about the callus below the second glume; the second glume and **Sterile Lemma** 5-nerved, about equal, acuminate, lanceolate, pubescent; the **Sterile Lemma** slightly shorter than the second glume; **Fruit** about 2.2 mm. long, with short scabrous awn

0.5-1.5 mm. long, rounded at the apex, narrowly oval, minutely papillose-rugose.

In cultivated soil, south Texas. Summer.

4. *E. GRACILIS* (Fourn.) Hitchc. (grās'i-līs). This species has been confused with *E. acuminata* (Presl) Kunth and *E. polystachya* H. B. K.

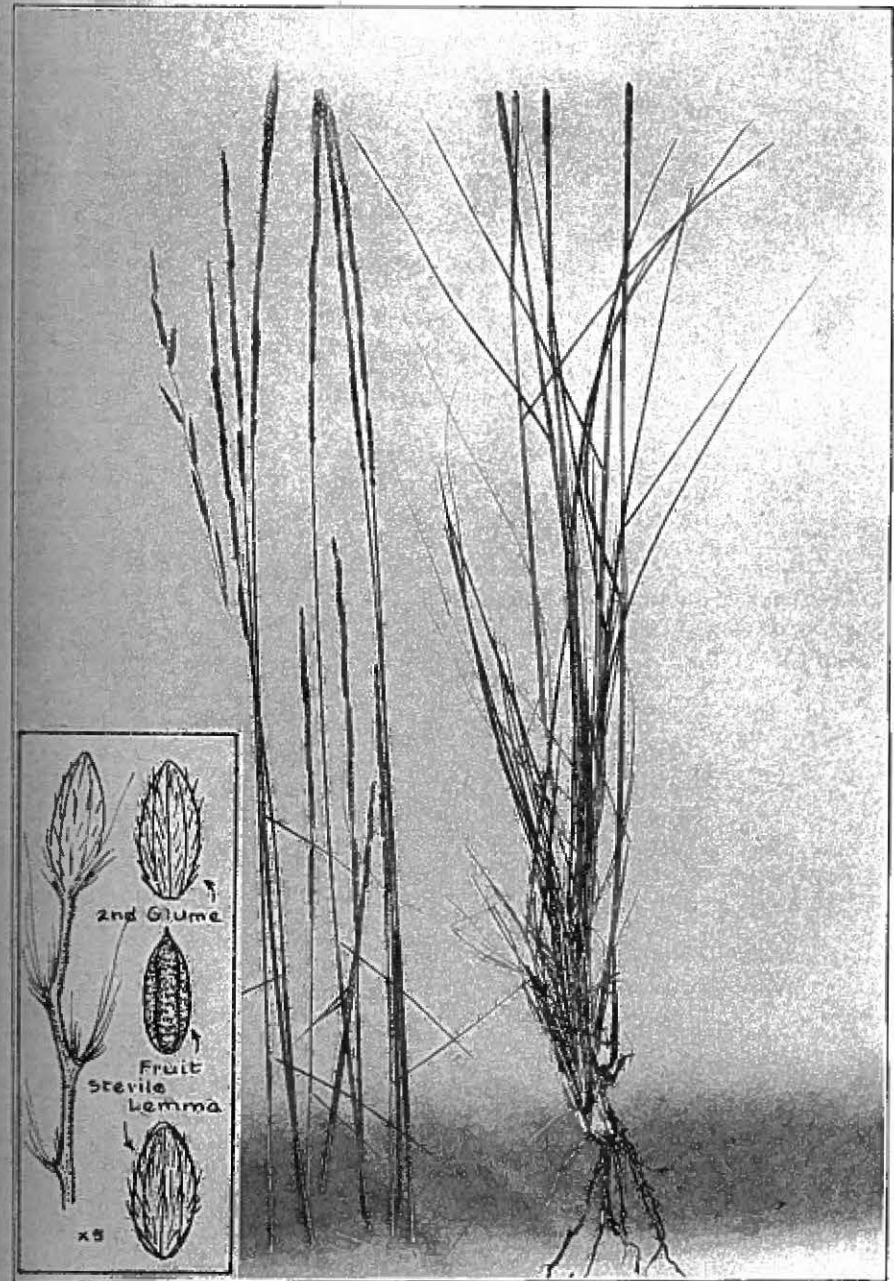
Culms 2-3 feet tall, tufted, ascending or spreading from a decumbent base, branched, pubescent below the panicles; **Blades** 4-7' long, 5-9 mm. wide, slightly rough and puberulent on upper surface, margins rough; **Sheaths** shorter than the internodes; **Ligule** a dense ciliate ring of hairs about 1 mm. long; **Panicle** 4-6' long, long-exserted; **Racemes** numerous, usually about 12-18, 1-1.5' long, appressed, ascending or spreading, in ones or twos, main axis, rachis and pedicels pubescent, often a few longer hairs at or near the apex of pedicels; spikelets in pairs, the pedicels 1.5-2 mm. long; **Spikelets** 3.5-5 mm. long, ovate-lanceolate, acuminate; **Glumes**, the first reduced to a minute sheath, the second and **Sterile Lemma** 3-nerved, with appressed hairs covering entire surface, the second glume somewhat more hairy than the slightly shorter sterile lemma; **Fruit** shorter than the glumes, about 3 mm. long, oblong-elliptical, obtuse, minutely papillose-rugose, minutely pubescent, the apex apiculate.

Cultivated soil, Texas to Kansas and west to California. (Ft. Davis, Texas.) Summer and fall.

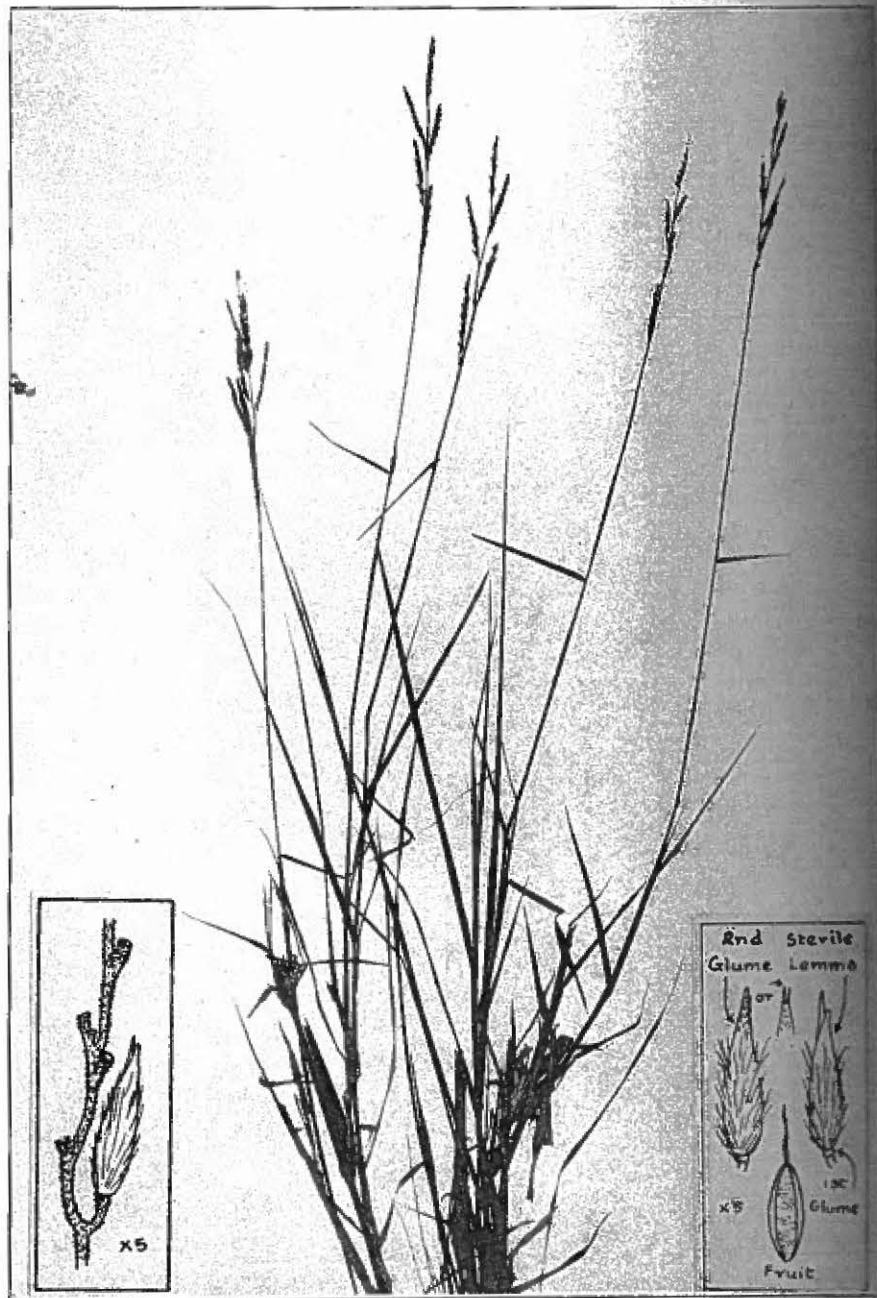
4a. *E. GRACILIS* var. *MINOR* (Vasey) Hitchc. (mī'nēr).

Mostly smaller than the species and with more crowded less acuminate spikelets; **Fruit** about as long as the glume and sterile lemma (excluding the short point), obtuse, slightly apiculate.

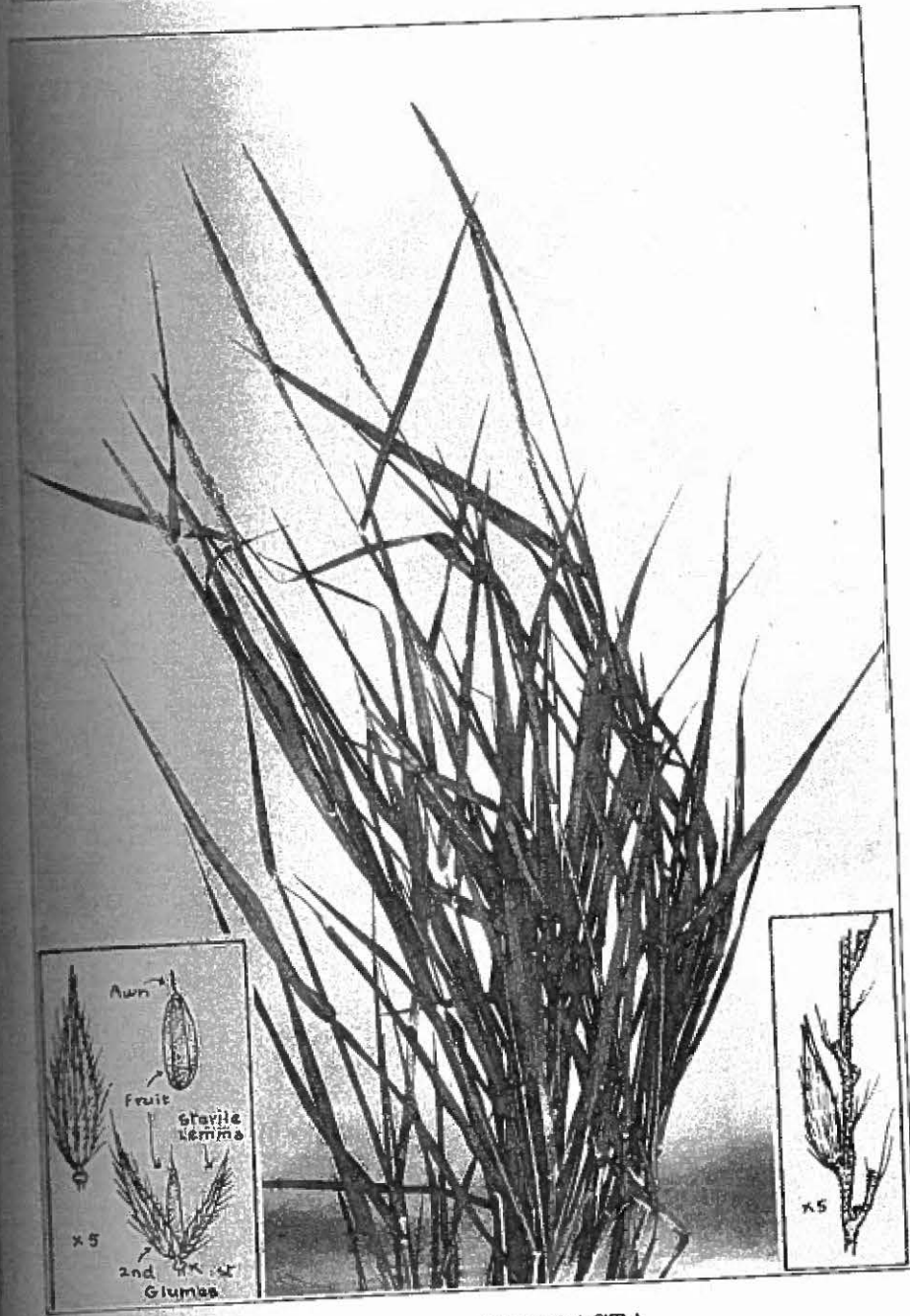
Open ground, Texas. (El Paso.)



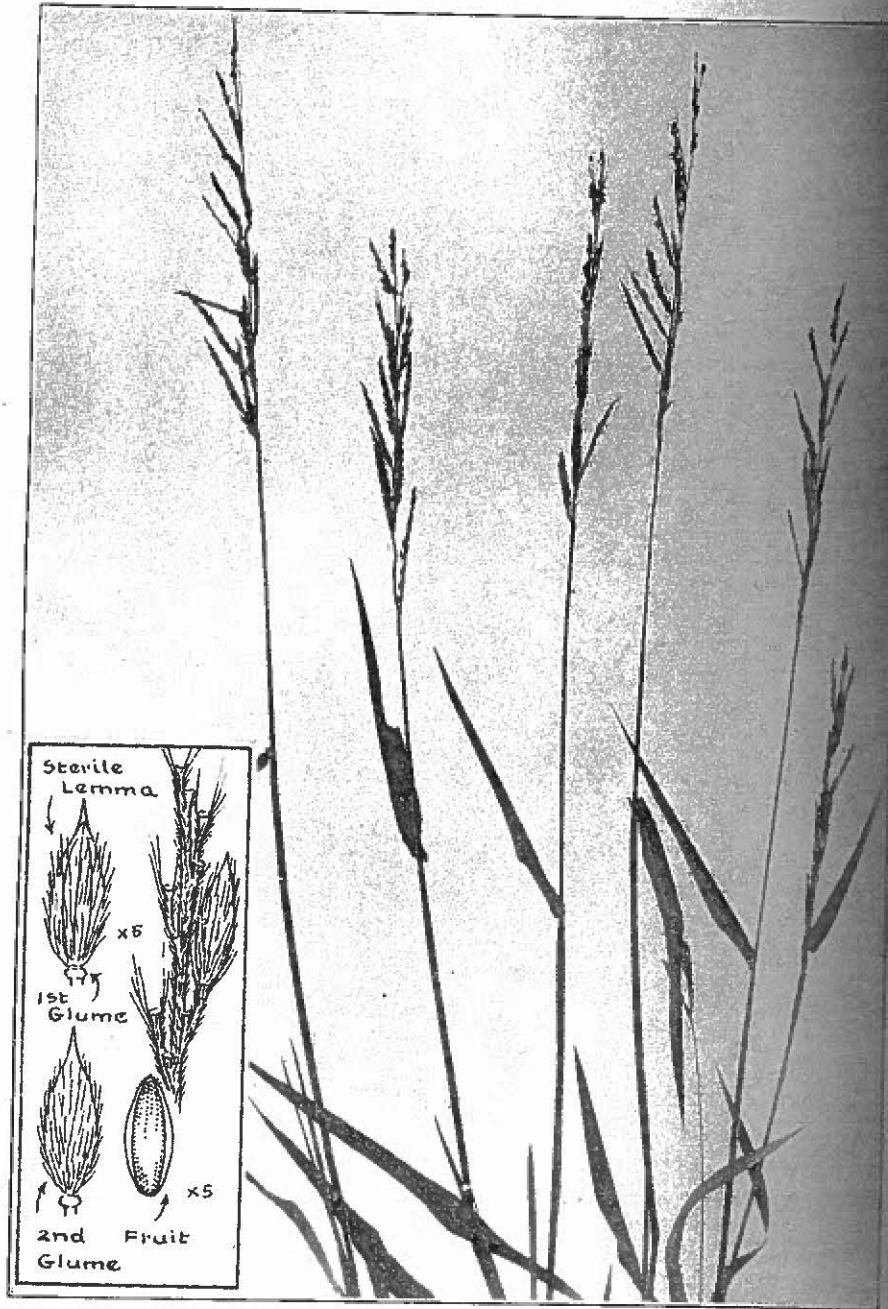
ERIOCHLOA SERICEA



ERIOCHLOA PUNCTATA, EVERLASTING GRASS



ERIOCHLOA CONTRACTA



ERIOCHLOA GRACILIS

85. BRACHIARIA (Trin.) Griseb. (brāk-i-ā'rī-ā)

Spikelets dorsally compressed, solitary, rarely in pairs, subsessile, in two rows on one side of a 3-angled sometimes narrowly-winged rachis, the first glume turned toward the axis; **First Glume** short or nearly as long as the spikelet; **Second Glume** and **Sterile Lemma** about equal, 5-7-nerved, the lemma inclosing a hyaline palea and sometimes a staminate flower; **Fertile Lemma** indurate, usually papillose-rugose, the margins inrolled, the apex rarely mucronate or bearing a short awn.

Annual or perennial, branching and spreading, grasses, with linear blades and terminal inflorescence consisting of several spreading or appressed racemes along a common axis. Three species in the United States, two in the southern states, both in Texas.

From the species of *Panicum* with spikelets in one-sided spike-like racemes this genus differs in having the spikelets in the reverse position relative to the rachis, that is, with the first glume toward the rachis.

B. extensa, a decumbent annual, commonly about 2 feet tall, has 2-8 racemes about 1.5-2' long, usually ascending or spreading, the spikelets glabrous; *B. ciliatissima*, a stoloniferous perennial, usually about a foot tall, the stolons often over a foot long, has silky pubescent spikelets on short branches of a narrow short panicle. The former is usually found in rather low sandy loam, while the latter usually thrives in very sandy land. Both have awnless fruits.

SPIKELETS SILKY PUBESCENT, 3.5-4 mm. long, the pubescence conspicuously uneven; plants perennial; panicle narrow, less than 2' long, the racemes short.

1. *B. ciliatissima*

SPIKELETS GLABROUS, 4-4.5 mm. long, flat-beaked beyond the fruit; plants annual; panicle more than 4' long, the racemes usually more than 2' long.

2. *B. extensa*

1. *B. CILIATISSIMA* (Buckl.) Chase (sil-i-ā-tīs'i-mā); *Panicum ciliatissimum* Buckl.

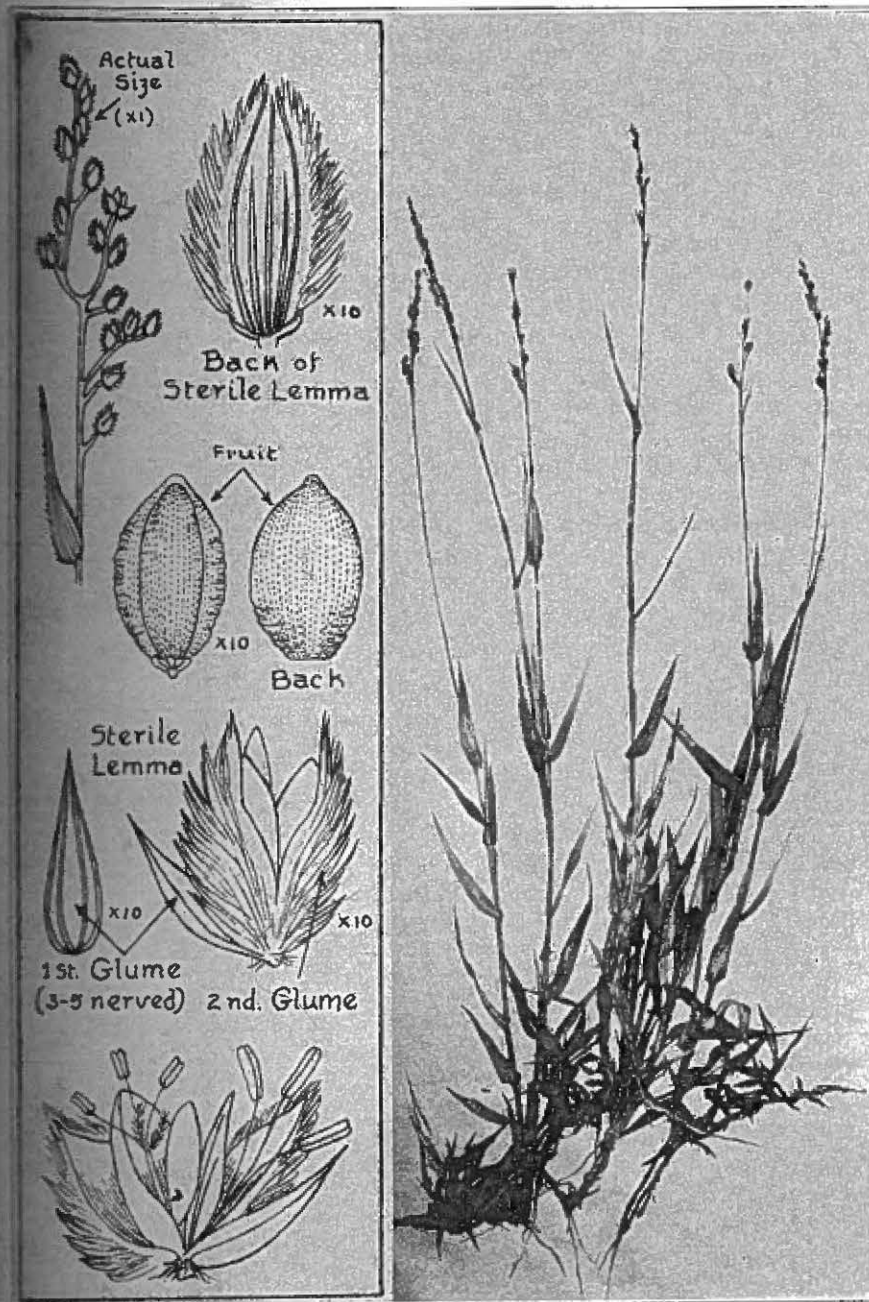
Flowering Culms 6-24' tall, erect or ascending, sparingly branched, with long leafy stolons, glabrous except the bearded nodes; **Blades** 1-2.8' usually about 1.5' long, 3-5 mm. wide, flat, tapering from a rounded base to a sharp point, more or less pubescent, sparsely papillose-pilose on the margins near the base; **Sheaths** commonly shorter than the internodes, usually densely-pilose; **Ligule** a ring of short hairs; **Panicle** usually long-exserted, 1-2.5' long, the few branches erect or ascending, usually less than an inch long, with a few spikelets alternate in two rows on a slender, angled, puberulent rachis, not regularly arranged as in other species; **Spikelets** 3.5-4 mm. long, nearly 2 mm. wide, pointed, distant about half their length; **Glumes**, the first about three-fourths the length of the spikelet, lanceolate, acuminate, 3-5 obscure nerves, smooth and glabrous except a few hairs at the very base, the second and **Sterile Lemma** subequal, exceeding the fruit, about 11-nerved (look inside), with a dense row of silky hairs on each side running lengthwise midway between the margins and the three central nerves, with shorter pubescence on the balance of the glume; **Sterile Lemma** inrolled inclosing a hyaline palea about its own length 5-7-nerved, with two rows of hairs as on the second glume, but the outer surface of same either sparingly short-pubescent or nearly glabrous; **Fruit** 3 mm. long, about 1.5 mm. wide, ellipsoid, apiculate, minutely transverse-rugose.

In open sandy soil, Texas to Arkansas. Spring to summer.

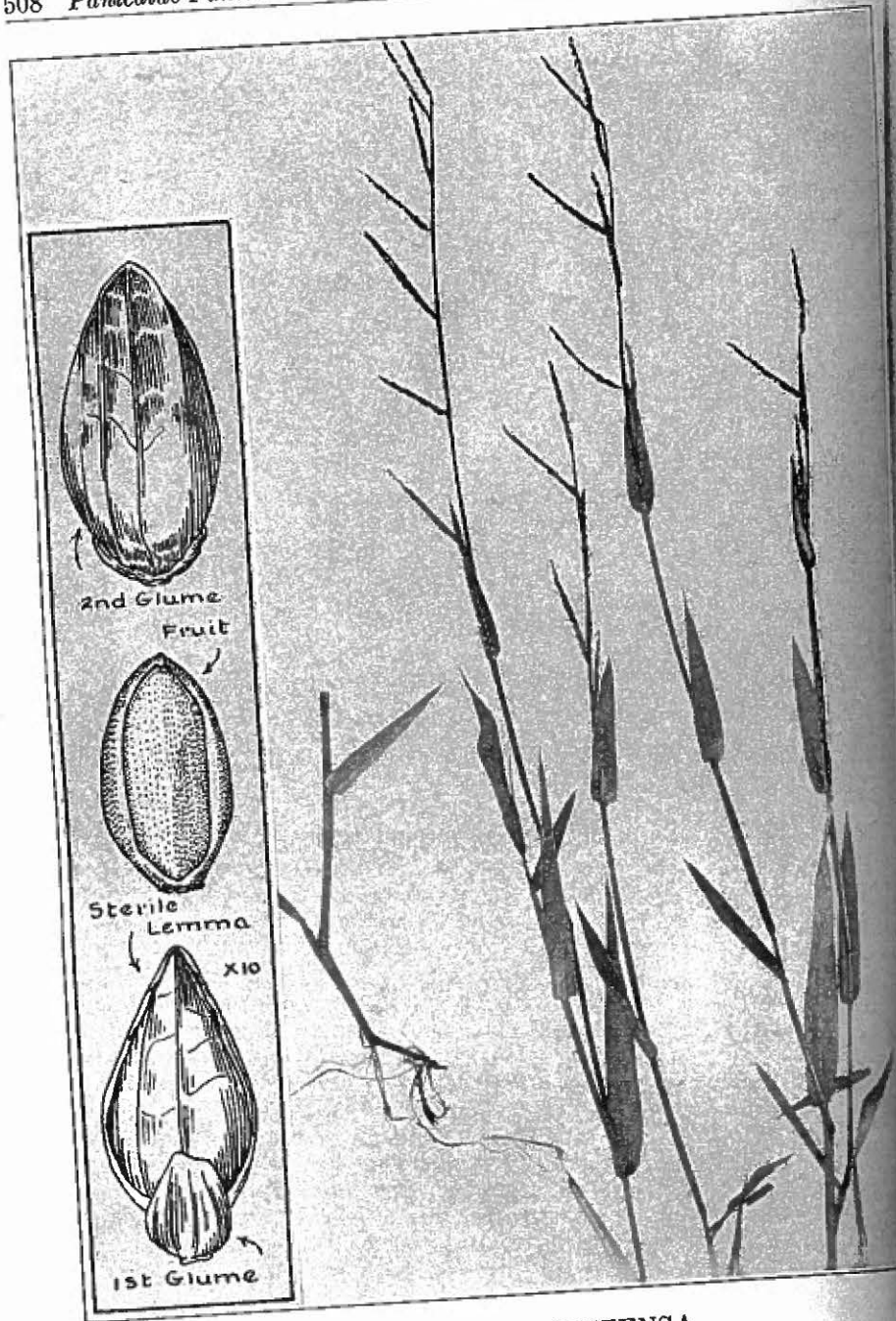
2. *B. EXTENSA* Chase (ěks-těn'sà); *B. platyphylla* (Griseb.) Nash.

Culms 20-32' tall, tufted, at first erect, finally decumbent at the base, rooting and commonly branched at the lower nodes, the flowering branches ascending, rather coarse, flattened; **Blades** pale-green, 1.5-5' long, rarely longer, flat, broad at the base, lanceolate, glabrous except at the rounded margins at the base; **Sheaths** usually overlapping, loose, sparsely-pilose at least along the margins and toward the summit; **Ligule** a ring of hairs less than 1 mm. long; **Racemes** 2-8, commonly distant nearly or quite their own length, the common axis flat, exserted or the lower included at the base, 1.5-2.5' long, the lowermost sometimes longer, ascending or spreading, often curved, rachis villous at the base, about 2 mm. wide, slightly scabrous on the intumed margins; **Spikelets** 4-5 mm. long, about 2 mm. wide, ovate, flattened toward the apex, usually barely overlapping, glabrous; **Glumes** broad, 3-5-nerved, the first about one-third the length of the spikelet, blunt, the second glume and sterile lemma equal, exceeding the fruit, 3-5-nerved, with faint transverse wrinkles between the nerves toward the summit; **Fruit** 2.5-3 mm. long, 1.8 mm. wide, elliptic, turgid, papillose-rugose, roughened.

In low sandy soil, Texas and Louisiana. Summer-fall.



BRACHIARIA CILIATISSIMA



BRACHIARIA EXTENSA

86. **AXONOPUS** Beauv. (äks-ön'ō-pūs)
(Anastrophus Schlecht.)

Spikelets depressed biconvex, not turgid, oblong, usually obtuse, solitary, sessile and alternate, in two rows on one side of a 3-angled rachis, the back of the fertile lemma turned from the axis; **First Glume** wanting; **Second Glume** and **Sterile Lemma** equal, the lemma without a palea; **Fertile Lemma** and **Palea** indurate, the lemma oblong-elliptic, usually obtuse, the margins slightly inrolled.

Stoloniferous or *tufted* perennials, rarely annuals, with usually flat or folded, abruptly rounded or somewhat pointed blades, and few or numerous slender spike-like racemes, digitate or racemose along the main axis. Two species in the United States confined to near the coast in the southern states.

Our two species, carpet-grass and flat crab-grass are *stoloniferous perennials* with flattened culms and sheaths, obtuse blades, and flowering culms long and filiform. In this genus the first glume is wanting, and the back of the fruit is turned from the axis. Carpet-grass has pubescent spikelets about 2 mm. long, and flat crab-grass, glabrous spikelets 4-6 mm. long with the racemes thicker and longer.

Carpet-grass becomes dominant in alluvial or mucky soil, on open ground in the lowlands near the coast from eastern Texas to Florida. It does not thrive in sandy soil on the uplands. It is often used as a lawn grass. Flat crab-grass is infrequent, but has about the same range as carpet-grass.

SPIKELETS not over 2.5 mm. long, sparsely pubescent.
SPIKELETS 4-6 mm. long, glabrous.

1. *A. compressus*
2. *A. furcatus*

1. **A. COMPRESSUS** (Swartz) Beauv. (kõm-prës'üs); *Anastrophus compressus* (Swartz) Schlecht.; **CARPET-GRASS** OR **FLAT JOINT-GRASS**.

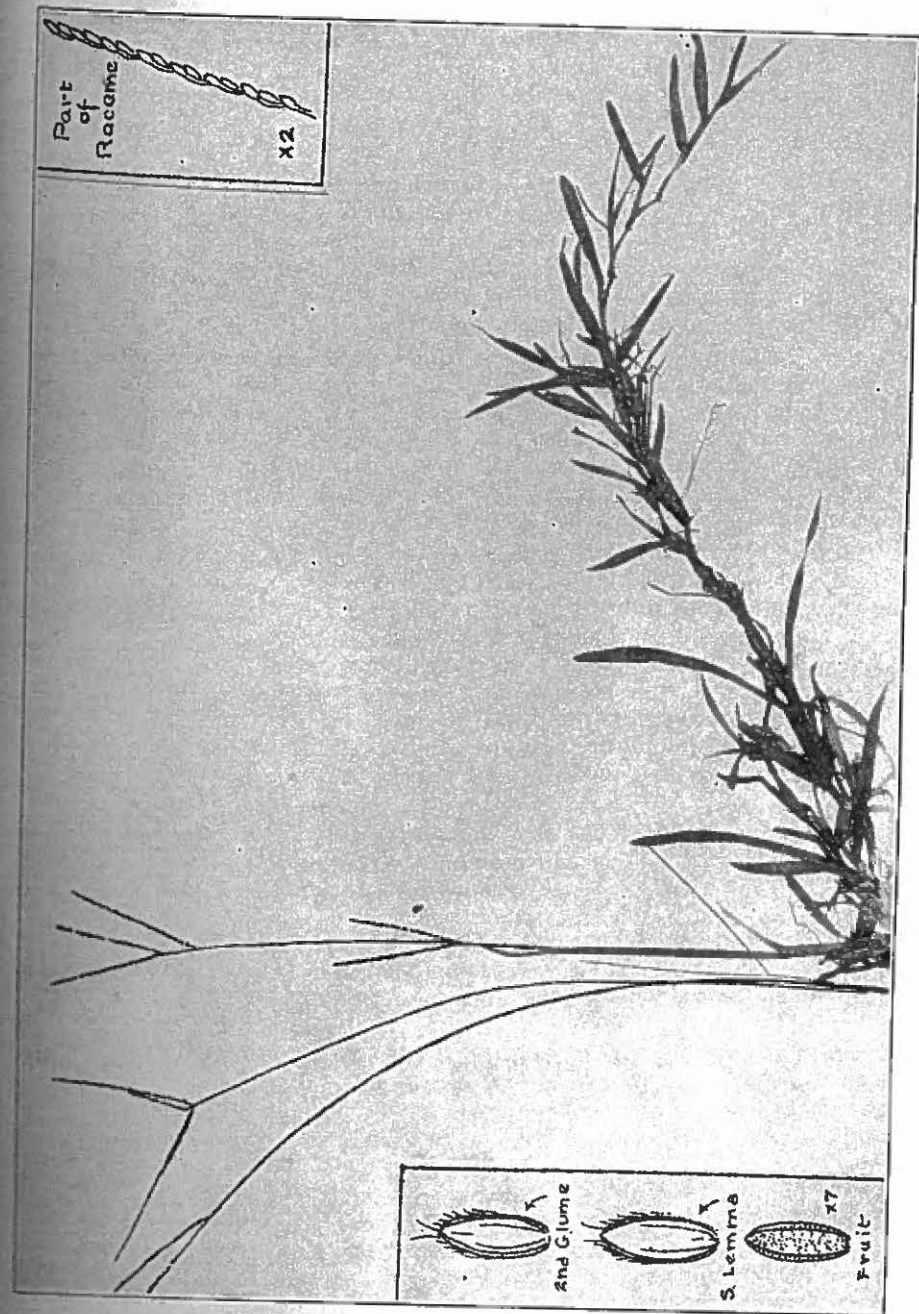
Culms 1-2.5 feet tall, slender, flattened, branching, the stolons numerous and creeping, sometimes as much as 2 feet long, leafy; **Blades** 1-12' long, those of the stolons as short as 1' and 2-4 mm. wide, the upper culm blades mostly 2-4' long and the basal as much as 12' long and 8 mm. wide, flat or folded at the base, narrowly linear, obtuse, scabrous on the margins toward the apex, sometimes sparsely-ciliate on the margins at the base; **Sheaths** crowded below, flattened, often sparsely-pilose at the throat, otherwise glabrous or with a few soft hairs; **Ligule** short-membranaceous, short-ciliate; **Racemes** terminal and axillary, much exerted on long filiform upper portion of culm, in pairs, or an additional 1-2 below, subdigitate, 1.5-4' long, slender, the appressed spikelets about equal to the internodes or slightly overlapping, spikelet-bearing to the base, the back of the fertile lemma turned from the rachis; **Spikelets** about 2 mm. long, about 0.8 mm. wide, somewhat flattened, oblong-elliptic, obtuse or subacute; **Glumes**, the first wanting, the second (outer one) and the **Sterile Lemma** equal and slightly longer than the fruit, sparsely-pubescent, 5-nerved, or by the suppression of the midnerve 4-nerved, the two lateral nerves on each side close together and near the margins, the sterile lemma depressed along the middle and without a palea; **Fruit** oblong-elliptic, minutely rugose, with a few hairs at the obtuse apex.

Moist soil, fields, roadsides and woods, Texas to Florida and north to Virginia. Common from Bay City east to Orange and some distance north. Summer and fall.

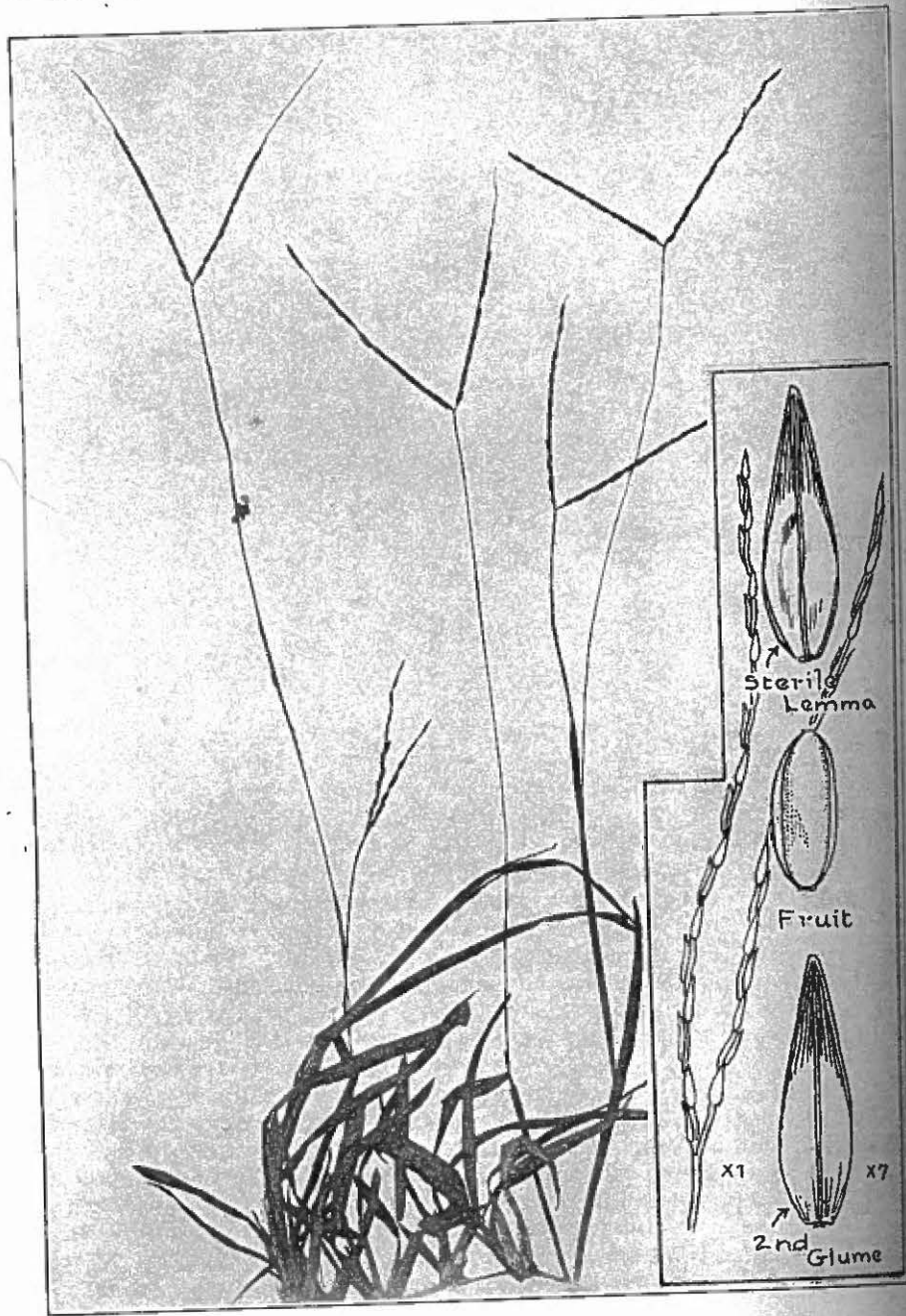
2. A. FURCATUS (Flügge) Hitchc. (fûr-kä'tûs); *Anastrophus furcatus* (Flügge) Nash; FLAT CRAB-GRASS.

Culms 1-3.5 feet tall, erect or spreading, strongly compressed-keeled, leafy at the base, with long leafy stolons, branching, glabrous or sometimes pubescent; **Blades** 2-15' long, the upper short, 6-15 mm. wide, flat, or folded at the base, linear, blunt-pointed, glabrous, or ciliate on the margin, or pubescent; **Sheaths** longer than the internodes, strongly-keeled, glabrous or pubescent; **Ligule** about 0.5 mm. long, minutely ciliate; **Racemes** spikelike, exserted, or those of the axillary peduncles included at the base, commonly in pairs, sometimes an additional one a short distance below, rarely one, ascending, 1.5-5.5' long, the spikelets usually slightly overlapping; **Spikelets** 4-6 mm. long, about 1.6 mm. wide, lanceolate, acuminate, not strongly biconvex, glabrous; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, the second 5-7-nerved, the midnerve evident; **Fruit** half to two-thirds the length of the second glume and sterile lemma, about 1.5 mm. wide, not strongly biconvex, oblong-elliptic or slightly oblong-obovate, obtuse, minutely striate.

In rather moist sandy soil, fields and woods, Texas to Florida and north to Virginia. (Beaumont and Experimental Station at Angleton, Texas.) Spring to fall.



AXONOPUS COMPRESSUS, CARPET-GRASS



AXONOPUS FURCATUS, FLAT CRAB-GRASS

87. *PASPALUM* L. (päs'pä-lüm)

Spikelets plano-convex, usually obtuse, subsessile, solitary or in pairs, in two rows on one side of a narrow or dilated rachis, *the back of the fertile lemma toward it*; **First Glume** usually wanting; **Second Glume** and **Sterile Lemma** commonly about equal, the former rarely wanting; **Fertile Lemma** usually obtuse, chartaceous-indurate, the margins inrolled. Mostly **Perennials**, with one to many spike-like racemes, these single or paired at the summit of the culms or racemously arranged along the main axis. Species numerous, probably as many as 200, widely distributed in the warmer parts of both hemispheres; about 50 species in the United States, mostly in the southeastern states. All the Texas species except *P. scrobiculatum* are **perennials**.

Paspalum differs chiefly from *Panicum*, a closely related genus, by its racemose inflorescence and the plano-convex spikelets in which the first glume is typically wanting. The first glume is regularly present in one group and in a few other species, occasionally developed in a few others, or in many species an occasional spikelet may be found with the first glume developed. In some species the first glume is developed unequally, being small to almost obsolete on the upper and primary spikelet of a pair and large on the secondary spikelet.

While the spikelets of the genus are always in two rows on one side of the rachis, the species are often described as having spikelets in two, three or four rows. They appear to be in three or four rows in a great many species because the pedicel is actually a branchlet bearing a primary spikelet at the summit and a secondary spikelet on a short branchlet or pedicel below. When branching and crowded they appear to be in four rows, when not so densely crowded and with one of the pair turned toward the center of the raceme they appear to be in three rows.

The author, unable to collect all of the species of *Paspalum* in Texas, has drawn liberally upon *the North American Species of Paspalum* (Bul. U. S. Nat. Herb.) by Agnes Chase. The groupings and their order of arrangement have been used, and many of the illustrations and descriptions copied. In the above work the species of *Paspalum* have been divided into minor groups, the names of which are the plurals of the characteristic species of the group. *Setacea* is used as the group name for the closely related species, *P. setaceum*, *P. debile*, *P. ciliatifolium*, and others.

Our species are divided into two main subdivisions, those with a foliaceous rachis, and those without. In the former there are only three species and one group, *Dissecta*; in the latter, all the remaining species, in several groups.

Dissecta (dī-sĕk'tā): Plants with foliaceous rachis. Here we have three straggling plants, *P. dissectum*, *P. acuminatum* and *P. repens*, all aquatic or subaquatic—plants of ditch borders and moist places.

Disticha (dis'tī-kā): Plants with creeping wiry culms and stolons or rhizomes, usually with two racemes. Our two species are *P. distichum*, which has a wide range and grows in very moist places, and *P. vaginatum* which is confined to the sea coasts and brackish sands.

Livida (liv'ī-dā): This group has three species with compressed culms and flat blades usually growing in moist meadows or fields. *P. lividum*, often with long creeping culms, has glabrous spikelets 2-2.5 mm. long, while *P. hartwegianum* has depressed plano-convex spikelets about 3 mm. long. *P. subflavum*, the spikelets pubescent, and *P. subflavum* var.

glabrum, the spikelets glabrous, have turgidly plano-convex spikelets about 3 mm. long.

Notata (nō-tā'tā): Plants with compressed culms, leafy at the base; racemes 2; spikelets solitary. *P. notatum* and *P. minus*, with stout horizontal rhizomes, form a tough sod, while *P. alnum*, a recently described species collected at Beaumont, is a densely-tufted grass.

Setacea (sē-tā'sē-ā): Plants with compressed culms from very short rhizomes, racemes usually few; ligule with a dense row of long white hairs back of it. The first glume is developed in occasional specimens, more frequently so than in most groups of the genus, other than *Decumbentes*. Most of the species of this group are poorly defined and appear to intergrade. Pubescence is extremely variable in amount and position, and the spikelets vary in size and shape. We have six species: *P. setaceum*, *P. debile*, *P. stramineum*, *P. pubescens*, *P. ciliatifolium*, and *P. rigidifolium*.

Decumbentes (dē-kūm-bēn'tēz): Racemes 1 to several, spikelets in pairs, the first glume commonly developed in at least one of the pair, that of the primary spikelet (the upper one of the pair) in most species minute or obsolete, that of the secondary spikelet (the lower of the pair) well-developed, long-pointed and turned to one side of the spikelet. Our two species, usually with 1 raceme, are *P. unispicatum*, with wide flat blades and *P. monostachyum*, with blades narrow and folded at the base, the margins adnate above, and one, *P. langeti*, usually with about 5 racemes, the spikelets hairy.

Conjugata (kōn-jū-gā'tā): Plants creeping, stoloniferous, with flat lax blades, and two slender yellow racemes, usually paired, the spikelets ciliate with long hairs. *P. conjugatum*, our only species, is found at the mouth of the Rio Grande River near Brownsville.

Dilatata (dī-lā-tā'tā): Rather stout, robust plants, in leafy clumps; blades flat; racemes few to numerous; spikelets in pairs, flat, conspicuously silky-ciliate. *P. dilatatum*, Dallis grass, usually has 3-5 racemes, ascending to drooping, and *P. urvillei* has numerous usually appressed or ascending racemes.

Laevia (lē-vī-ā): Culms rather tall, from very short rhizomes, compressed; racemes few to several; spikelets large, glabrous. *P. laevis*, *P. longipilum* and *P. circulare* have spikelets solitary on the racemes, the spikelets 3-3.2 mm. long; *P. praecox*, spikelets 2.2-2.8 mm. long, and *P. lentiferum*, spikelets 2.7-3.4 mm. long, have spikelets solitary and paired in the same racemes.

Floridana (flō-rī-dā'nā): Culms robust, simple, blades flat, with heavy racemes of large turgid glabrous spikelets. *P. floridanum* has sheaths and blades hirsute, while *P. floridanum* var. *glabratum* has blades and sheaths glabrous or nearly so.

Virgata (vēr-gā'tā): Tall robust plants with sharp-cutting edges on the firm blades; panicles with a few to several racemes. Our only species, *P. virgatum*, has spikelets pubescent, especially towards the summit, the fruit brown at maturity. Plants of tropical or subtropical America.

Plicatula (plī-kāt'ū-lā): Plants with purplish compressed culms and sheaths; racemes rather heavy; spikelets at first drab turning brown or dark olivaceous; fruit dark brown, shining. We have two species, *P. plicatulum*, with turgid obovate spikelets, the sterile lemma wrinkled just within the margin, and *P. scrobiculatum*, our only annual with scrobicular

P. Bifidum (bī'fī-dūm): Ungrouped, as it is not closely related to any known species either *Paspalum* or *Panicum*. It has irregular racemes of biconvex spikelets with 5-7-nerved second glume and sterile lemma.

RACHIS MEMBRANACEOUS OR FOLIACEOUS, INCLOSING THE BASE OF the spikelets, green. Spikelets glabrous (minutely pubescent in *P. repens*), straggling, branching, mostly aquatic or subaquatic; fruits pale.

RACEMES PERSISTENT on the axis; rachis with a spikelet at the apex; second glume developed.

SPIKELETS 2 mm. long, obovate-oval; racemes 2-4. 1. *P. dissectum*

SPIKELETS 3.5 mm. long, pointed; racemes mostly 3-5; blades more than 8 mm. wide. 2. *P. acuminatum*

RACEMES FALLING entire from the axis, rachis extending beyond the uppermost spikelet; racemes numerous; spikelets 1.4-2 mm. long, about 0.8 mm. wide, whitish. 3. *P. repens*

RACHIS NOT MEMBRANACEOUS, FOLIACEOUS OR WINGED (slightly winged in a few species, but if so, spikelets not silky).

RACEMES 2, CONJUGATE, or nearly so at the summit of the culm, rarely a third below.

SPIKELETS elliptic or narrowly ovate, somewhat pointed. Plants with creeping rhizomes or stolons, wiry-compressed.

Second glume pubescent; midnerve of second glume and sterile lemma relatively prominent; spikelets solitary or occasionally in pairs, turgid.

Second glume and sterile lemma glabrous; midnerve usually suppressed; sterile lemma transversely wrinkled or undulate; spikelets solitary, flattened. 4. *P. vaginatum*

SPIKELETS suborbicular, broadly ovate or obovate.

Spikelets **concavo-convex**, sparsely long-silky around margin; racemes yellow, 2, sometimes a third below, rarely more than 5' long; plants stoloniferous. 21. *P. conjugatum*

Spikelets **plano-convex**, not silky-margined. Plants not stoloniferous; leafy at the base; culms compressed; racemes 2, sometimes 3 in *P. alnum*; spikelets green, solitary, in two rows.

Rhizomes present; stout, forming mats or a tough sod. 9. *P. notatum*

Spikelets 2.5-3.5 mm. long. 10. *P. minus*

Spikelets 2-2.5 mm. long. Rhizomes not present; plants densely-tufted; spikelets 3 mm. long. 11. *P. alnum*

RACEMES 1 TO MANY, racemose or fascicled on the axis, not conjugate.

FIRST glume usually developed on at least one of the pair of spikelets. Spikelets turgidly biconvex. 33. *P. bifidum*

Spikelets **plano-convex**. Culms mostly solitary with stout scaly rhizomes; the first glume often obsolete.

Blades flat; 8-15 mm. wide. 18. *P. unispicatum*

Blades folded at the base, margins adnate above, not more than 2 mm. wide. 19. *P. monostachyum*

Culms more or less tufted, without rhizomes. First glume developed in both spikelets; spikelets glandular, speckled, sparsely-pubescent, at least on the second glume; spikelet 2.2-2.6 mm. long. 20. *P. langeti*

FIRST glume normally wanting (rarely developed in occasional spikelet); plants from a knotted base or very short rhizomes.

Racemes **terminal and axillary**, the axillary sometimes hidden in the sheaths; terminal 1-3 rarely 6 racemes; ligule a minute membrane with a dense row of hairs back of it.

Spikelets usually 1.5-1.7 mm. long, or sometimes 1.9 in *P. debile* or *P. ciliatifolium*; blades and sheaths conspicuously pubescent throughout.

Culms slender, erect or suberect; foliage not aggregate at the base; blades suberect, usually not more than 5 mm. wide.

Culms stouter, mostly spreading; foliage more or less aggregate at the base; blades spreading, usually more than 5 mm. wide. 12. *P. setaceum*

- Spikelets 2-2.5 mm. long (or 1.8-1.9 in *P. ciliatifolium*).
 Foliage except margins glabrous as a whole, or nearly so (sparsely-pubescent in exceptional *P. ciliatifolium* and the lower sheaths usually pubescent in *P. rigidifolium*).
 Blades stiff, usually not more than 6 mm. wide; spikelets mostly 2.2-2.4 mm. long. 17. *P. rigidifolium*
 Blades from lax to rather firm, if firm more than 6 mm. wide, spikelets mostly 2 mm. long, rounded at the summit; blades mostly more than 8 mm. wide. 16. *P. ciliatifolium*
 Foliage conspicuously pubescent or sparsely so in exceptional specimens of *P. pubescens*; culms erect or nearly so.
 Blades from sparsely to rather densely-pilose, rather thin. 15. *P. pubescens*
 Blades puberulent on both surfaces with long hairs intermixed or the lower surface nearly or quite glabrous except for a few long hairs along midrib and margin, usually rather firm. 14. *P. stramineum*
- Racemes terminal on the primary culms or leafy branches, no truly axillary racemes. A flower branch, with a leaf reduced to the sheath sometimes found in *P. laeve* and others, simulates an axillary raceme; racemes 2-to-many.
 Spikelets conspicuously silky-ciliate around the margins, the hairs as long as the spikelet or longer, flat, in pairs; plants in stout leafy clumps, blades flat.
 Racemes commonly 3-5; culms geniculate at the base. 22. *P. dilatatum*
 Racemes commonly 12-18, culms erect. 23. *P. urvillei*
 Spikelets not conspicuously ciliate.
 Fruit dark-brown, shining; sterile lemma wrinkled; racemes heavy, commonly 3-10, 1-4' long, arcuate, spreading.
 Plant perennial; spikelets obovate, turgid; sterile lemma wrinkled just within the margin. 31. *P. plicatum*
 Plants annual, stout; spikelets suborbicular; sterile lemma loose and wrinkled. 32. *P. scrobiculatum*
 Fruit pale to yellowish (brown but not shining in *P. virgatum*).
 PLANTS ROBUST, TALL, MORE THAN 3 FEET. Culms simple or with a few simple branches.
 BLADES FIRM with sharp cutting edges, flat racemes 10-16, 2-4' long; spikelets obovate-obtuse, 2-2 rarely 3 mm. long, pubescent at summit. 30. *P. virgatum*
 BLADES RELATIVELY lax, the edges not cutting; racemes rarely more than 5; spikelets glabrous. 29. *P. floridanum*
 Sheaths and blades hirsute.
 Sheaths and blades glabrous or nearly so. 29a. *P. floridanum* var. *glabratum*
- PLANTS NOT ROBUST, IF MORE THAN 3 FEET TALL culms relatively slender.
 SPIKELETS SUBORBICULAR, or broadly obovate or broadly oval, glabrous; plants with short rhizomes. Spikelets depressed plano-convex or lenticular 2.2-3.4 mm. long.
 SPIKELETS solitary; glume and sterile lemma firm.
 Spikelets orbicular, 3-3.2 mm. long, scarcely one-third as thick; blades usually equaling the base of the panicle or overtopping it. 26. *P. circulare*
 Spikelets longer than broad, more than one-third as thick; panicle usually much exceeding the blades.
 Sheaths and blades pilose, mostly conspicuously so. 25. *P. longipilum*
 Sheaths and blades glabrous or nearly so to sparsely-pilose. 24. *P. laeve*
 SPIKELETS solitary and paired in the same raceme (rarely all solitary or all paired). Lower sheaths strongly compressed-keeled; spikelets suborbicular; glume and sterile lemma thin, the cells visible.
 Spikelets 2.2-2.5 mm. (rarely 2.8) long, foliage not conspicuously pilose. 27. *P. praecox*

Spikelets 2.7-3.4 mm. long; lower sheaths and blades mostly conspicuously villous, at least at the base. 28. *P. lentiferum*
 SPIKELETS ELLIPTIC to oval or obovate; culms decumbent at the base, rooting at the lower nodes, compressed, branching.

SPIKELETS turgidly plano-convex 3-3.2 mm. long; culms rather stout.

Spikelets pubescent.

6. *P. pubiflorum*

Spikelets glabrous.

6a. *P. pubiflorum* var. *glabrum*

SPIKELETS depressed plano-convex or slightly concavo-convex.

Spikelet and rachis pale; spikelets pointed, at least the glume pubescent; spikelets 3 mm. long. 8. *P. hartwegianum*

Spikelets and usually the rachis stained with lurid purple or bronze; panicle very slender, flexuous; spikelets 2-2.5 mm. long, usually minutely apiculate. 7. *P. lividum*

1. *P. DISSECTUM* (L.) L. (dī-sĕk'tŭm); *P. membranaceum* Walt.; *P. walterianum* Schult.

Culms 8-24' tall, ascending, compressed, the nodes usually swollen, the plant olive-green, creeping, freely branching, rooting at the nodes, subaquatic; **Blades** 30-60 mm. long, rarely longer, 4-5 mm. wide, flat, scarcely narrowed at the base, rather abruptly acute, thin; **Sheaths** commonly divergent, often flat and bladelike, the prophyllum visible, soft, loose; **Ligule** about 2 mm. long, hyaline, lacerate, extending down the sheath margins; **Inflorescence** terminal and axillary, short-exserted, of 2-4 usually erect racemes, distant half to one-third their own length, on a slender, narrowly winged axis; **Racemes** usually 20-30 mm. long, the rachis membranaceous, 2-3 mm. wide, abruptly pointed, and terminating at the base of the uppermost spikelet, the minutely scabrous margins inflexed, covering the base of the spikelet; **Spikelets** solitary, 2 mm. long, 1.4 mm. wide, obovate, subacute, pale; **Glumes**, the first wanting, the second and **Sterile Lemma** thin, 3-5-nerved, slightly exceeding the fruit, in the terminal spikelet usually a little longer, forming a short point; **Fruit** 1.8 mm. long, 1.3 mm. wide, obtuse, minutely papillose-roughened.

On muddy or sandy banks of ponds and ditches or in shallow water, east Texas to Florida, north to Missouri and New Jersey. (Houston.) Late summer and fall.

2. *P. ACUMINATUM* Raddi (ā-kū-mī-nā'tŭm).

Culms 12-40' tall, in clumps of few to several culms, extensively creeping, erect or ascending from a decumbent base, sparingly branched, rather fleshy, compressed, the nodes dark-brown, aquatic or subaquatic; **Blades** 1.5-5' long, 5-12 mm. wide, rounded at the base, abruptly acuminate, flat, soft, ascending; **Sheaths** overlapping toward the summit of the culms, loose, soft; **Ligule** 2 mm. long, hyaline, slightly erose; **Racemes** 3-5 rarely 2, distant about one-fourth their length, along a narrowly winged rachis, erect or ascending, 1.5-2.5' long; **Rachis** membranaceous, 3-3.5 mm. wide, the margins inflexed over the base of the spikelets, minutely hispidulous, terminating at the base of the uppermost spikelet; **Spikelets** solitary in two rows, 3.5 mm. long, 1.6 mm. wide, elliptic; **Glumes**, the first wanting, the second and **Sterile Lemma** thin, abruptly pointed beyond the fruit; **Fruit** 2.9 mm. long, 1.5 mm. wide, obovate-elliptic, faintly 3-5-nerved, minutely papillose-roughened, the obtuse apex with a minute tuft of short thick hairs.

In shallow water or wet open ground, Texas to Louisiana, and in Argentina (Balfouria, Texas).

3. *P. REPENS* Bergius (rē'pēns); *P. mucronatum* Muhl.; *P. fluviatilis* Kunth; WATER PASPALUM.

Culms submerged, sometimes as much as 6.5 feet long, with tufts of long roots at the nodes and numerous floating branches, soft and spongy, an aquatic rarely terrestrial plant, the nodes dark, sometimes hispid; **Blades** 4-8' long, 12-15 mm. wide, sometimes as much as 11' long and 25 mm. wide, tapering to both ends, flat, thin, scabrous, often ciliate toward the base, the collar dark-colored, usually strigose; **Sheaths** commonly overlapping on the branches, those of the floating branches inflated, flask-shaped, papery, often purple-spotted, those of the aerial branches loose, thin, smooth or scabrous above, glabrous to sparsely papillose-hispid, in all a prominent erect auricle on either side of the summit; **Ligule** rather firm, erose, strigose, extending up the inner margin of the auricle; **Panicles** short-exserted, usually 4-6' long, 1.5-4' wide, sometimes as much as 8' long, of numerous ascending, spreading or recurved rather lax racemes, solitary or in fascicles of 2 or 3 along a slender scabrous axis; **Racemes** tardily falling entire, usually 30-50 mm. rarely 90 mm. long, the rachis about 1.5 mm. wide, scabrous, often flexuous, naked at the narrowed base and acuminate tip; **Spikelets** solitary, whitish, 1.4-2 mm. long, about 0.8 mm. wide, elliptic; **Glumes**, the first wanting, the second and **Sterile Lemma** very thin, more or less exceeding the fruit and pointed beyond it, 2-nerved, the nerves near the margins, the mid-nerve suppressed, pubescent with soft spreading hairs to glabrous, the lemma commonly with a v-shaped pinkish stain at base; **Fruit** 1.4-1.7 mm. long, 0.6 mm. wide, elliptic, smooth and shining.

At maturity the numerous racemes are often curled back, the panicle suggesting an ostrich feather.

Terrestrial plants are usually much dwarfed, the base creeping, rooting at the nodes, flowering branches 4-8' tall.

Most of the specimens from the United States have pubescent, even glandular pubescent, spikelets. In those of the Tropics the spikelets are either pubescent or glabrous. It has been reported from Arkansas as causing much trouble by its dense growth in drainage canals.

Floating in sluggish streams or standing water or creeping in wet places, Texas to Florida, north to South Carolina, Indiana and Kansas. (Humble, Houston, Columbia, Texas.) Late summer and fall.

4. *P. VAGINATUM* Swartz (vāj-i-nā'tūm); SAND KNOT-GRASS.

Flowering Culms 5-24' tall, the upturned stolons sometimes flowering, simple or branching, the branches sometimes aggregate, ascending or erect, usually the greater number on any plant sterile with conspicuously distichous stiffly ascending blades, forming dense tufts of stiff foliage, from horizontal rhizomes, pale, glabrous as a whole, the stolons sometimes slender and wiry, sometimes stout and almost succulent, extensively creeping, often 3 feet long or more, flattened and often grooved, internodes short, the sheaths short, broad and usually overlapping (or sometimes slightly shorter) sheaths, sometimes bladeless or with short reflexed blades, often forming extensive colonies; **Blades** distichous, 1-6' long, 3-5 mm. (3-8) wide at the base, narrower than the summit of the sheath, tapering from an abruptly narrowed base to an involute tip, usually firm, commonly ascending at a uniform angle, those of the stolons usually short and often reflexed; **Sheaths** commonly overlapping, short, broad, loose, usually keeled, the summit with small auricles; **Ligule** membranaceous, about 0.5 mm. long, commonly with a ring of weak hairs back of it, some-

times 5 mm. long; **Racemes** short-exserted, or included at the base, commonly 2 sometimes 3 rarely 1 or as many as 5, conjugate or closely approximate, at first erect and closely appressed together, finally spreading or reflexed at maturity, often somewhat falcate, commonly 0.6-3' long; **Rachis** naked at the base, 1-1.5 mm. (1-2.5) wide, triangular, minutely scabrous on the margins; **Spikelets** in two rows, solitary, imbricate, except the lower ones, 3-4.5 mm. (commonly 3.5-4) long, 1.5-1.8 mm. (1.2-1.5) wide, ovate-lanceolate or slightly obovate, acute, pale, stramineous; **Glumes**, the first wanting, rarely developed, the second and **Sterile Lemma** equal, thin in texture, 5-nerved, the nerves often obscure, the midnerve of the glume or both usually suppressed, the lateral nerves approximate at the margin, the sterile lemma often transversely undulate, sometimes conspicuously so; **Fruit** 2.5-3 mm. long, about 1.5 mm. wide, narrowly obovate, subacute, slightly concavo-convex.

Sea coasts and brackish sands, often forming a pure stand. Texas to Florida and North Carolina, and southward. (At very mouth of the Rio Grande River, Galveston, Capano Bay.) Summer and fall.

5. *P. DISTICHUM* L. (dis'tī-kūm); KNOT-GRASS, JOINT-GRASS.

Culms 1-2 feet tall, erect or ascending, sometimes branched, the long creeping somewhat flattened stolons as much as 2-3 feet long, often forming loose mats or rather close sod, taking root at the nodes, the dark nodes often with a few hairs; **Blades** 1.5-5' usually 2-3' long, 2-6 mm. wide, flat, soon becoming involute, tapering toward the apex, relatively soft, few ciliate hairs at the very base, often puberulent on upper surface; **Sheaths** usually shorter than the internodes, loose, flattened, pilose at the throat; **Ligule** membranaceous, truncate, lacerate, about 0.5-1 mm. long; **Racemes** usually in pairs, rarely 3-4, on short or included peduncles, usually incurved, sometimes reflexed, commonly 1-2.5' long, the lower one raised on a short internode of the axis, usually with a few long white hairs in the axils, rachis about 1.5 mm. wide, margins minutely scabrous; **Spikelets** 2.5-3.5 rarely 4 mm. long, 1.3-1.5 mm. wide, elliptic, acute, pale-green, flattened, solitary (rarely in pairs at middle of raceme), sessile, crowded; **Glumes**, the first wanting, occasionally minutely developed, the second and **Sterile Lemma** equal, 3-5-nerved, the midnerve prominent, the glume minutely appressed-pubescent, sometimes obscurely so; **Fruit** nearly as long as the spikelet, 1.2 mm. wide, glabrous or with a few short bristly hairs at the apex.

Ditches, creeks and low wet places, often in water. In southern United States, extending north to New Jersey and west to California and along coast to Washington, also extending south into Mexico and South America. Spring and summer.

6. *P. PUBIFLORUM* Rupr. (pū-bī-flō'rūm).

Culms 1-3 feet tall, flowering stalks erect or ascending from a decumbent base, taking root at the swollen nodes, the internodes of the decumbent part short, robust, flattened, smooth and glabrous except the dark nodes, the lower pilose and upper sparingly-pubescent or pilose; **Blades** 2-9' usually 4-6' long, upper reduced, 6-14 mm. wide, flat, acuminate, the margins scabrous, sparsely papillose-pilose on margins at the rounded base, and often appressed-pubescent just above the ligule; **Sheaths** mostly shorter than the internodes, loose, the margins brown, the lower sparsely papillose-pilose; **Ligule** membranaceous, 1-3 mm. long; **Racemes** mostly 3-5 (2-8) usually about a half inch apart, lower somewhat

distant, 1-4' long, rather thick, erect or horizontally spreading, with tufts of long hairs at the axils; **Rachis** flat, up to 2 mm. wide, green, scabrous on the margins, lowest often naked at the base; **Spikelets** 2.8-3.2 mm. long, 2 mm. wide, usually in pairs in two rows, having appearance of four rows, plano-convex, turgid, slightly obovate, yellowish-green, crowded; **Glumes**, the first wanting, the second and **Sterile Lemma** subequal, 3-5-nerved, the second glume pubescent with spreading hairs, and sterile lemma minutely appressed-pubescent, the margins inclosing the fruit; **Fruit** pale, 3 mm. long, 1.9 mm. wide, minutely striate, roughened.

Moist open ground, banks, low woods, along streams and ditches, especially in alkaline soil; Texas, Louisiana and Mexico. (San Antonio.) Spring to fall.

6a. *P. PUBIFLORUM* var. *GLABRUM* Vasey (glā'brūm); *P. geminum* Nash; *P. laeviglume* Scribn.

Plants of the same habit as *P. pubiflorum*, on the average more robust, in rich ground the culms sometimes 6.5 feet long, the sheaths less pilose, the blades a little wider (occasionally 20 mm. wide) and tapering toward the base, the racemes commonly longer and oftener more than five; **Spikelets** glabrous. In a few specimens the spikelets are obscurely pubescent on the glume. It is a palatable pasture grass and very drought-resistant.

Moist low open ground, woods and ditch banks, Texas to Florida, north to North Carolina and Kentucky and Kansas. Spring-fall.

7. *P. LIVIDUM* Trin. (līv'i-dūm); LONG TOM, "Pull-and-be-damned".

Culms 1-3 feet tall, solitary or a few culms to a tuft, or in more favorable locations a thick mass of stolons and culms, simple or bearing a few sterile branches, erect or ascending, the lower part often decumbent, often rooting at the nodes, compressed; **Blades** 3-10' long, 2-6 mm. wide, usually conduplicate at the base, narrower at the base than the summit of the sheath, often pubescent above near the base, margins ciliate, somewhat rough near the apex; **Sheaths** loose, keeled, usually overlapping (said to be sometimes pilose, especially near the summit); **Ligule** 1-2 mm. long, membranaceous, lacinate; **Racemes** commonly about 4-8, distant about half their own length, on a very slender flexuous axis, 1-2' long, thick and densely-flowered, usually ascending and flexuous, rachis about 2 mm. wide, green to purple, often a few long hairs along the margins and in the axils of racemes; **Spikelets** usually in pairs in two rows, 2-2.5 mm. long, 1.3-1.5 mm. wide, obovate; **Glumes**, the first wanting, the second glume and **Sterile Lemma** equal, often minutely apiculate, yellowish-green or blotched with livid purple, 3-nerved; **Fruit** slightly smaller, 2-2.3 mm. long, about 1.2 mm. wide, elliptic, very minutely striate-roughened.

Low ground along streams and ditches and in moist cultivated fields, Texas to Mexico. This grass is plentiful at and near Port Lavaca. Spring and summer.

8. *P. HARTWEGIANUM* Fourn. (hārt-wēg-i-ā'nūm); *P. buckleyanum* Vasey.

Culms 2-4 commonly about 3.5 feet tall, solitary or in hard clumps, ascending from a decumbent base, occasionally creeping, branching from the lower nodes, flattened; **Blades** 5-14' long, the upper much reduced, 4-6 mm. wide, the margins very scabrous, often with a few hairs at the base, the midnerve prominent on the lower surface; **Sheaths** overlapping, the

lower rather papery, loose; **Ligule** membranaceous, 2-4 mm. long; **Racemes** commonly 4-7 (3-13), ascending, distant about half their own length, on a slender glabrous axis, pale yellowish-green about 1-3' long, with a few long hairs in the axils, rachis 1-1.5 mm. wide, minutely scabrous; **Spikelets** in pairs, imbricate, 2.6-3 mm. long, 1.5 mm. wide, elliptic, apiculate, slightly plano-convex; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, 3-5-nerved, softly pubescent, the lemma often sparsely so; **Fruit** about 2.5 mm. long, 1.3 mm. wide, elliptic, minutely striate-roughened.

Wet prairies, alkaline meadows and along ditches, sometimes in water. Texas to Mexico. Spring and summer.

9. *P. NOTATUM* Flügge (nō-tā'tūm); BAHIA GRASS.

Culms 6-28' tall, ascending from stout, woody and comparatively short horizontal rhizomes, the roots on the rhizomes numerous and rather coarse, the rhizomes covered with the firm persistent bases of old sheaths, simple, flattened, the nodes dark; **Blades** crowded at the base, 1-12' long, the upper reduced to a mere point, 3-8 mm. wide, flat or folded at the base, commonly ciliate toward the base; **Sheaths** overlapping, crowded at the base, short, and reaching to a common height, flattened, keeled, ciliate toward the summit, or rarely pubescent throughout; **Ligule** membranaceous, very short, with a dense row of hairs about 1 mm. long back of it; **Racemes** 2 rarely 3, subconjugate, commonly 1.5-3' (1-5') long, recurved-ascending; **Rachis** flat, about 1 mm. wide, flexuous toward the summit; **Spikelets** solitary, about 3.2 mm. (2.5-3.8) long, 2.3 mm. (2-2.8) wide, ovate to obovate, green; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, green, smooth and shining, firm, thin, 5-nerved, the intermediate often obscure; **Fruit** 3 mm. (2.5-3.5) long, 2.2 mm. (1.8-2.5) wide, oval, margins thick, the back very convex. The spikelets seem to vary much in size.

Sandy or clayey soil, open ground. Rare in the United States; introduced; author found it in cultivation at Angleton, Texas, and wild at Port Arthur, Texas. Fall.

10. *P. MINUS* Fourn. (mī'nūs).

Similar to P. notatum, commonly in denser mats, on the average smaller, the culms rarely more than 12' tall; **Blades** 2-6' long; **Sheaths** and blades commonly ciliate, sometimes conspicuously so; **Racemes** more slender, fewer, rarely 3; **Spikelets** 2-2.5 mm. long, 1.5-1.6 mm. wide, oval, less shining than those of *P. notatum*. (No drawings.)

Open slopes and savannas from sea level to 5,000 feet, coast of Texas to Mexico. (Galveston Bay.)

11. *P. ALMUM* Chase (ā'l'mūm); COMBS' PASPALUM.

Culms 12-20' tall, densely-tufted, ascending to spreading, simple, flattened, the leaves crowded toward the base; **Blades** 2-6' long, the uppermost reduced, 2-3 mm. wide, flat, rather firm, long-hirsute on the upper surface at the base, papillose-hirsute on the lower surface toward the tip, usually with a few hairs on the upper surface, the margins stiffly ciliate toward the base; **Sheaths**, the lower overlapping, keeled; **Ligule** membranaceous, about 1.5 mm. long, pale; **Racemes** commonly 2 sometimes 3, approximate, the common axis 5-20 mm. long, ascending, often somewhat recurved, 2-4' long; **Rachis** flexuous, 1 mm. wide, with a narrow pale-winged margin, the margins and midnerve scabrous above, the pedicels

minute, flat; **Spikelets** solitary, scarcely imbricate, 3 mm. long, 2 mm. wide, obovate-elliptic; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, 5-nerved, the lemma slightly concave and sometimes faintly fluted; **Fruit** slightly smaller than the spikelet, smooth and shining. This grass was first collected by J. F. Combs of Beaumont, Texas. It is an excellent forage grass. (Fine sandy and silty clay soil, near Beaumont, Texas.) Late summer and fall.

12. *P. SETACEUM* Michx. (sē-tā'sē-ŭm).

Plants olivaceous; **Culms** 10-28' tall, tufted, few to several culms, with numerous leafy shoots with long suberect leaves at the base, erect or suberect or in very large tufts spreading, bearing 1-2 slender peduncles at the middle and upper nodes; **Blades** 2-7' commonly 4-5' long, 2-6 mm. wide, rather firm, erect or nearly so, linear, *densely pilose* on both surfaces and papillose-ciliate on the margin, the upper sometimes short-pubescent only; **Sheaths** pilose, the upper often nearly glabrous except on the margin; **Ligule** a minute membrane, with a dense row of hairs 2-3 mm. long back of it; **Racemes** on very slender peduncles, solitary or sometimes 2, slender, arching commonly 2-3' long, the rachis pubescent at the base, sometimes obscurely so; **Spikelets** in pairs on slender flat pedicels, the lower of the pair slightly winged at the base, crowded, 1.4-1.7 mm. long, 1-1.3 mm. wide, elliptic-obovate, turgid at maturity, pale; **Glumes** the first wanting, the second and **Sterile Lemma** equal, barely covering the fruit at maturity, the glume 3-nerved, the lemma 2-nerved, or the midnerve rarely developed, both glabrous, or the glume especially more commonly minutely pubescent, with minutely capitate hairs, often speckled with minute pale brown depressions; **Fruit** about the size and shape of the spikelet, smooth and shining.

Sandy soil, or rocky banks, mostly in open woods, Texas to Florida and New York, Coastal Plain. (Concan, Texas.) Spring to fall.

13. *P. DEBILE* Michx. (dēb'īl-ē); *P. villosissimum* Nash.

Culms 2-3 feet tall, tufted, weak, ascending or spreading, with numerous leafy shoots at base, bearing 1 or 2 slender peduncles at nodes; **Blades** 4-7' long, about 5-7 mm. wide, acuminate, rounded at the base, papillose-ciliate on the margins, sometimes pilose along midvein below, and above near the base, otherwise more or less short-pubescent; **Sheaths** shorter than the internodes, villous at throat and margins, otherwise glabrous to pubescent; **Ligule** membranaceous, very short, with dense rows of hairs 1-3 mm. long just back of it; **Racemes**, the terminal exserted, usually 2-3 sometimes 4, and axillary racemes mostly 1 or 2 sometimes 3, exserted or sometimes included at the base, commonly less than 20 mm. distant, 1.5-2.5' long; **Spikelets** solitary, 1.5-1.8 mm. long, 1.2 mm. wide, elliptic to slightly obovate, in pairs on short subequal pedicels, the lower slightly winged at base, rachis winged; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, the glume 3-nerved, pubescent with minutely capitate hairs, the lemma 2-nerved, the midnerve usually not developed, glabrous to sparsely-pubescent with hairs also capitate, commonly speckled with small brown spots, often numerous; **Fruit** nearly as long and as wide as the spikelet, smooth and shining. *P. setaceum* and *P. debile*, closely related plants, are both variable and appear to intergrade. Some of the specimens from Texas are less villous than usual.

Dry sandy soil, barren and flat woods. Texas to Mexico, Florida, New York. Spring and summer.

14. *P. STRAMINEUM* Nash (strā-mīn'ē-ŭm); *P. bushii* Nash.

Plants yellowish-green; **Culms** 1.5-3.5 feet tall, few to several culms to a tuft, ascending or spreading, slender, flattened, more or less purplish toward the base, nodes appressed-pubescent, especially the lower ones, or glabrous; **Blades** 1-8' rarely 12' long, the upper short, 4-13 mm. rarely 20 mm. wide, flat, rounded at the base, puberulent on both surfaces, rarely obscurely so, sparsely-pilose, or conspicuously so on the upper surface, the long hairs intermixed with the short ones, or the lower surface nearly or quite glabrous except for a few hairs along the midrib, the margins commonly papillose-ciliate; **Sheaths** shorter than or about as long as the internodes, flattened, rather broad, pubescent along the margins, especially toward the summit, villous at the throat and sometimes on the collar, or the lower pubescent or puberulent; **Ligule** membranaceous, about 1 mm. long, the white hairs back of it about 2-3 mm. long; **Racemes** 2-3 rarely 4-6, when 3 the terminal reduced, 2.5-5.5' long, slender, arching, the terminal exserted on a slender peduncle, the axillary on short peduncles, wholly or partly included in the sheaths, or one partly included and the other exserted, often borne in the basal sheaths; **Rachis** about 1 mm. wide, slightly winged, with a few long hairs at the base, the spikelets in pairs, crowded or relatively loose on short pedicels; **Spikelets** 1.9-2.2 mm. long, 1.5-1.9 mm. wide, suborbicular, pale or whitish; **Glumes**, the first wanting (sometimes present on an occasional plant), the second and **Sterile Lemma** about equal, at maturity the summit of the fruit exposed making the glume seem shorter, both 3-nerved, the midnerve of the lemma often suppressed, the glume from sparsely to rather densely-pubescent with minutely capitate hairs, or glabrous, the sterile lemma glabrous or sparsely-pubescent; **Fruit** about the size and shape of the spikelet, pale, shining.

The spikelets seem to vary much as to size and shape; those of the axillary racemes are *cleistogamous*.

Sandy, often in very sandy, soil, in open ground or open woods, Texas to Florida, north to Oklahoma and Vermont; Arizona and north-western Mexico. Summer and fall.

15. *P. PUBESCENS* Muhl. (pū-bēs'ēns); *P. muhlenbergii* Nash.

Plants rather yellowish-green to olivaceous; **Culms** 22-36' tall, erect or ascending to spreading, in dense tufts, slender, strongly compressed; **Blades** commonly 3-9' sometimes 12' long, 2-10 mm. rarely 15 mm. wide, flat, mostly linear, slightly narrowed to the base, scarcely wider than the sheath, or the upper rounded at the base, from sparsely to conspicuously pilose on both surfaces, sometimes minutely puberulent beneath the long hairs on the upper surface; **Sheaths** keeled, pilose toward the summit, at least on the keel and along the margins; **Ligule** a minute membrane with a dense row of white hairs 3-4 mm. long back of it; **Racemes** 1-3, more commonly solitary, mostly arching, 1.5-6' rarely 7' long, the peduncles slender, flat, finally elongate, often pilose toward the summit, the axillary 1 or 2 from upper and middle nodes; **Rachis** long-pilose at the base, with spikelets crowded, in pairs, on short pedicels, the lower often winged at the base; **Spikelets** 1.9-2.1 mm. long, 1.7-1.9 mm. wide, suborbicular to broadly obovate; **Glumes**, the first wanting, the second and **Sterile Lemma** subequal, 3-nerved, or the glume rarely 4-5-nerved, or the midnerve of the lemma suppressed, glabrous, the glume rarely sparsely-pubescent; **Fruit** about the size and shape of the spikelet.

The species varies in the amount of pubescence. The spikelets are more uniform in shape and size than in most species of this group.

Dry or moist open ground or open woods, more common in sandy regions, Texas to Florida, north to Oklahoma, Michigan and Vermont. Summer and fall.

16. *P. CILIATIFOLIUM* Michx. (sil-i-ät-i-fö'li-üm). (Includes *P. eggertii* Nash and *P. epile* Nash.)

Culms 16-26' tall, tufted, erect or spreading, dark-brown or purplish toward the base, slender, the nodes glabrous; **Blades** ascending or spreading, 2-8' rarely 18' long, 7-12 mm. rarely 25 mm. wide, flat, rounded to subcordate at the base, or narrowed to the width of the sheath, typically strongly ciliate, or papillose-ciliate, along the minutely undulate cartilaginous margins, or sometimes ciliate at the base only, otherwise glabrous, or pilose along the midnerve or minutely pubescent toward the apex, rarely throughout; **Sheaths**, the upper shorter than the internodes, keeled, glabrous or hirsute at the throat, glabrous or sparsely-hirsute on the collar, glabrous or ciliate along the margins, or the lower from puberulent to appressed-pubescent; **Ligule** membranaceous, short, the hairs back of it 1-3 mm. long, commonly produced into an erect auricle 0.5-1 mm. long, on one or both margins; **Racemes** 1-3 rarely 4, the terminal 1-3 peduncles, one long-exserted, the others shorter, the axillary short-exserted or included at the base, slender, the racemes arching, slender, 1.5-4' commonly 3-4' long, the slender rachis with a tuft of hairs at the base; **Spikelets** crowded, in pairs, 1.9-2.1 mm. long, 1.5-1.9 mm. wide, elliptic-obovate or suborbicular, strongly plano-convex; **Glumes**, the first wanting, the second slightly shorter than the sterile lemma, at maturity exposing the fruit, both 3-nerved, or the midnerve of the lemma suppressed, glabrous, or especially the glume minutely pubescent with obscurely capitate hairs, commonly minutely speckled; **Fruit** about the size and shape of the spikelet, pale, smooth and shining.

This is a polymorphic species. Study of a great amount of material has made it impossible to recognize as distinct the groups segregated by Nash. Pubescence on foliage and spikelets varies in a single plant. Rather stout, somewhat paler seacoast plants, with firmer blades scarcely ciliate, are the form described as *P. eggertii*.

Open ground and woods, mostly sandy land, Texas to Florida, north to New Jersey and Arkansas. (Bellville, Texas.) Spring-fall.

17. *P. RIGIDIFOLIUM* Nash (rij-i-dī-fö'li-üm).

Culms 10-30' tall, in tufts, from short scaly rhizomes, slender, relatively stiff, often purplish, erect or somewhat spreading; **Blades** 3-11' commonly 4-6' long, 2-5 mm. rarely 8 mm. wide, usually not wider at the base than the summit of the sheath, flat, firm, erect or ascending, linear, the scabrous margins usually sparsely-ciliate toward the base, otherwise glabrous or minutely puberulent on both surfaces; **Sheaths** short and overlapping, the lower usually softly grayish-pubescent, the upper pubescent along the margins, otherwise glabrous; **Ligule** a minute membrane with a dense row of hairs 3-4 mm. long back of it; **Racemes** on very slender peduncles, solitary or 2, straight or arching, 3-6' long, the rachis with a few long hairs at the base; **Spikelets** in pairs on minute nearly glabrous pedicels, crowded, 2-2.5 mm. commonly 2.2-2.4 mm. long, 1.5-1.8 mm. wide, obovate-elliptic, pale or purplish; **Glumes**, the first wanting, the second and Sterile Lemma subequal, scarcely covering the

fruit at maturity, 3-nerved, or the glume sometimes 5-nerved, both glabrous or the glume obscurely-pubescent, sometimes minutely speckled; **Fruit** about the size and shape of the spikelet, pale, shining.

This species is distinguished by its stiff habit and large spikelets. Sand barrens and high pine lands, Texas to Florida. (Waller county, Texas.) Spring.

18. *P. UNISPICATUM* (Scribn. & Merr.) Nash (ū-nī-spī-kā'tūm).

Plants rather pale-green, with horizontal scaly rhizomes; **Culms** 20-36' tall, solitary or a few together, simple or with a single erect leafy branch from the lower nodes, terete to subcompressed; **Blades** 4-12' long, 3-15 mm. wide, rather stiff, suberect to spreading, the uppermost reduced, rounded at the base, attenuate at the apex, stiffly papillose-ciliate on the margins, very sparsely or rarely rather copiously papillose-hirsute on both surfaces to scaberulous only, the midnerve deeply impressed, the large cells of the upper epidermis easily visible under a lens; **Sheaths** mostly overlapping, papillose-hirsute along the margins, otherwise very sparsely so to glabrous, commonly with a narrow lacerate membranaceous fringe on the collar; **Ligule** membranaceous, 2-3 mm. long, with a ring of long hairs back of it; **Racemes** 1 or 2, usually 1, rather stiffly suberect to slightly arcuate, 2.5-8' long, the nearly straight rachis sometimes with a few long stiff hairs at base, otherwise glabrous, the peduncles slender, commonly 2 from the upper sheath, the second one often wholly or partly included (no axillary ones found in other sheaths); **Spikelets** in pairs, rather crowded, 3-3.5 mm. long (mostly 3.2), about 1.6 mm. wide, elliptic, somewhat unsymmetrical, especially the lower of the pair, pale, glabrous; **Glumes**, the first commonly minute and nerveless on the primary spikelet, 1-nerved, keeled, acuminate and half to three-fourths as long as the spikelet on the secondary, but exceedingly variable in both, sometimes obsolete; **Second and Sterile Lemma** 5-nerved (occasionally 7-nerved), rather firm in texture, the glume especially in the lower spikelet a little shorter than the sterile lemma, the lemma inclosing a palea of nearly equal length, hyaline in the middle and firm on the 2 keels, and often a well developed staminate flower, rarely a perfect but infertile one; **Fruit** about 2.8 mm. long, pale, minutely papillose-striate.

In a single raceme the glumes vary from obsolete to more than half the length of the spikelet on the primary, and from minute and nerveless to three-fourths as long as spikelet on the secondary.

Meadows, savannas, open slopes and banks, southern Texas, south through Mexico. (Kingsville, Texas.)

19. *P. MONOSTACHYUM* Vasey (mō-nō-stāk'i-üm); *P. solitarium* Nash.

Culms 1.5-4 feet tall, with stout horizontal scaly rootstocks, single or a few culms to a tuft, in open or dense colonies, simple, erect, subterete, somewhat rigid; **Blades** 12-28' long, the upper sometimes shorter, often equaling or exceeding the racemes, 1.5-2 mm. wide when folded, the margins slightly open below and grown together above, erect at the base, the junction with the sheath obscure, rigid, long-acuminate, villous on upper surface close to ligule; **Sheaths** longer than or equal to the internodes, often villous on the slightly auricled summit and margins; **Ligule** membranaceous, about 2 mm. long; **Peduncles** slender, elongate, mostly 1 sometimes 2, the secondary one from the uppermost sheath only, none included; **Racemes** 1-3, in rather dry sandy situations mostly with 1, and in rather low moist situations mostly with 2, in either case rarely 3, the lower

distant 20-25 mm., 4-8' long, slightly arcuate, stiffly erect or ascending, the rather slender nearly straight rachis rounded on the back, about 1 mm. wide, ciliate on the winged margins, the spikelets in two rows, mostly in pairs, or solitary toward the summit, those in linear rank almost touching each other, on short nearly equal pubescent pedicels; **Spikelets** 3-3.5 mm. long, 1.5 mm. wide, subobovate-elliptic, pale, glabrous; **Glumes**, the first wanting, or sometimes present on the primary spikelet, from minute to two-thirds the length of the spikelet, triangular, the second equal or nearly equal to the fruit, 3-5-nerved; **Sterile Lemma** 3-nerved, equal to the fruit; **Fruit** 2.5-3 mm. long, elliptic, obtuse, pale, minutely papillose-striate.

Moist places or flat woods or coastal dunes; Texas to Florida. (Texarkana; Harris, Bee, Galveston and Nueces counties.) Fall.

20. *P. LANGEI* (Fourn.) Nash (läng'ë-i).

Plants olivaceous; **Culms** 1-3 feet tall, in small or large tufts, decumbent at the base, ascending, slender, leafy, usually simple, or occasionally with a single leafy branch, flattened; **Blades** 3-16' long, 6-15 mm. wide, thin, flat, narrowed toward the base or the upper rounder at the base, margins scabrous, commonly nearly glabrous, or appressed papillose-pubescent on the upper surface with a few long hairs toward the base, or sparsely-pubescent below; **Sheaths** flattened, pubescent along the margins and often on the collar, otherwise glabrous to sparsely papillose-pubescent; **Ligule** membranaceous, about 1 mm. long; **Racemes** 2-5, sometimes as many as 7, the slender peduncles 1-3, exerted or partly included from the upper sheaths, the axillary ones usually appearing late and often borne in the middle sheaths, partly or wholly included, the racemes flexuous and arched, ascending to spreading, 1.5-4' long, usually rather distant on a slender channeled axis 3-5' long, the rachis usually with a few long hairs at the base; **Spikelets** in pairs 2-2.6 mm. (2-2.8) long, 1.3-1.4 mm. wide, elliptic-obovate, olive-green turning brown at maturity; **Glumes**, the first minute on the primary spikelet, with a ciliate brownish margin, on the secondary usually acuminate and one-fourth to one-third as long as the spikelet, or sometimes alike on both spikelets, the second glume and **Sterile Lemma** 5-nerved, pubescent and more or less speckled with brown glandular spots, the glume slightly shorter than the sterile lemma; **Fruit** 2.1-2.3 mm. long, pale, minutely papillose-striate, the summit exposed at maturity.

Moist woods and shaded banks, sometimes in open ground; low altitudes, Texas to Florida. (San Antonio.)

21. *P. CONJUGATUM* Bergius (kõn-jū-gā'tüm); SOUR-GRASS.

Plants extensively creeping with long leafy stolons, the flowering culms suberect to ascending, frequently purplish below, commonly forming a dense cover or colony of tangled culms and stolons; **Culms** 6 feet long or less, rooting at the nodes, the internodes less than an inch to six inches long, flattened, wiry, nodes glabrous or pubescent, those of the stolons usually conspicuously pilose, the flowering culms commonly 3-24' tall, sometimes taller, simple or sparingly branching; **Blades** 1.5-8' mostly 3-5' long, 5-12 mm. wide, those of the stolons short, spreading, slightly narrowed to the base, thin, the white margins scabrous or short-ciliate, usually a tuft of rather long stiff hairs at the base close to the ligule, otherwise glabrous to sparsely papillose-pubescent on the upper or both surfaces; **Sheaths** usually shorter than the internodes, loose, flattened,

those of the stolons short and broad, often ciliate toward the summit, commonly with a ring of short or long hairs on the collar; **Ligule** membranaceous, 1-1.5 mm. long; **Racemes** 2, paired or nearly so, sometimes with a third below, rarely axillary, soon turning yellow, widely divaricate, often curved, slender, 1.5-6' commonly 3-5' long; **Rachis** narrowly winged, about 0.8 mm. wide, densely-pubescent at the base, the hairs rather long and soft, the spikelets solitary, imbricate, those of each row about 1 mm. distant; **Spikelets** about 1.5 mm. (1.4-1.8) long, 1-1.2 mm. wide, on short flat pedicels, flattened, concavo-convex, ovate, subacute to abruptly apiculate; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, very thin, closely appressed to the fruit, the two nerves marginal, the midnerves suppressed, the nerves of the glume papillose-ciliate with long lax hairs forming a delicately fringed margin, otherwise glabrous; **Fruit** about 1.5 mm. long, pale, not strongly indurate.

A tropical weed growing in cultivated and waste ground along ditches and roadsides, extending into the most southern parts of the United States, Texas to Florida. (Brownsville, Texas.) Spring and summer.

22. *P. DELATATUM* Poir. (dī-lá-tā'tüm); DALLIS GRASS, PASPALUM GRASS.

Culms 1-4 feet tall, erect, ascending, or widely spreading from a decumbent base, arising from short knotted rhizomes, rather flattened, nodes swollen, usually dark, the lower sometimes sparsely-pubescent, often bearing leafy shoots at or near the base; **Blades** usually 4-6' long (uppermost sometimes about 1.5' the lower sometimes as much as 12' long), 3-15 mm. wide, flat, narrowed and rounded at the base, midrib large, tufts of long and rather stiff hairs on upper surface near the base, the margins scabrous and ciliate near the base; **Sheaths** shorter than the internodes in the larger plants and longer in the smaller ones, flattened, mostly glabrous above, the lower with rather stiff appressed, short or long hairs; **Ligule** membranaceous, 1-5 mm. long; **Panicle** erect or nodding, commonly 3-6 (2-11) ascending or drooping racemes, commonly 2-4.5' long, usually distant 1-2.5', the rachis about 1.4 mm. wide, with hairs as much as 10 mm. long in the axils; **Spikelets** in two rows, in pairs, with pedicels 1-2 mm. long, overlapping, making it seem to have four rows, 3-3.5 mm. long, 2 mm. wide, ovate, pointed, depressed plano-convex; **Glumes**, the first wanting, the second slightly longer than the sterile lemma, the second glume and sterile lemma pointed beyond the fruit, 5-9-nerved, sparsely covered with silky hairs on the surface, the glume in addition bearing on the marginal internerves a fringe of long white silky hairs, from rather scant to copious and woolly; the **Sterile Lemma** often sparingly ciliate with short hairs; **Fruit** about 2.5 mm. long, broadly elliptic, minutely papillose-striate.

In low ground, from rather dry prairies to marshy meadows, Texas and Arkansas to Florida and Tennessee, north to New Jersey. Spring-fall.

23. *P. URVILLEI* Steud. (ûr-vil'ë-i); *P. vaseyana* Scribn.; *P. virgatum* var. *pubiflorum* Vasey; *P. larranagae* Arech.; VASEY GRASS.

Culms usually 2-4 feet sometimes as much as six feet tall, few to many culms to a tuft, purplish below, stout, erect, simple or branching from middle down, somewhat flattened, nodes dark, glabrous; **Blades** 3-15' long, sometimes longer, 3-14 mm. wide, the uppermost reduced, flat, ascending, somewhat narrowed from middle down, upper surface long-pilose at the very base, margins slightly scabrous; **Sheaths** keeled toward

the summit, about as long as the internodes, the lower loose, the lowermost sheaths often hirsute, margin often ciliate; **Ligule** usually 3-5 mm. long, membranaceous; **Panicle** 4-9' long, sometimes longer, erect or slightly nodding with usually about 10-15 (6-25) slender, flexuous, ascending or slightly nodding racemes, usually 2-3' long, upper gradually shorter, the common axis glabrous and angled; **Rachis** flat, winged, nearly 1 mm. wide, edges slightly scabrous, few long hairs at the base, spikelet-bearing nearly to the base, one with pedicel about as long as spikelet and the other shorter, in pairs appearing in four rows; **Spikelets** excluding the hairs about 2.5 mm. (2-3) long, about 1.5 mm. wide, ovate, abruptly pointed, depressed plano-convex; **Glumes**, the first wanting, the second and **Sterile Lemma** 3-nerved, about equal, extending slightly beyond the fruit, acute, both with many long silky white hairs along the margins, the **Glume** sparsely clothed throughout with appressed silky hairs, the **Sterile Lemma** glabrous or nearly so in the middle, both often with brownish glands at the base of the hairs; **Fruit** about 1.9 mm. long, elliptic.

Mostly in rather moist soil, in the drier portions of Texas, along ditches and streams, in southeastern portion in open fields. Texas to Florida and North Carolina, and California. Spring to fall.

24. *P. LAEVE* Michx. (lě'vě); *P. angustifolium* Le Conte; *P. australe* Nash.

Culms 16-40' tall, erect or ascending, tufted, commonly with numerous erect or ascending leafy shoots at the base, simple or rarely with concealed or short-exserted raceme-bearing branches in the lower sheaths, compressed; **Blades** 2-12' long, rarely longer, 3-10 mm. rarely 12 mm. wide, the uppermost reduced, usually folded at the base, flat or folded above, rather firm, erect or nearly so, sometimes glaucous, glabrous to ciliate or sparsely-pilose on the upper surface, or sometimes toward the base beneath; **Sheaths** compressed-keeled, usually crowded at the base, glabrous or pilose on the margins or sometimes on the back toward the summit; **Ligule** brown, 2-3 mm. long; **Racemes** 2-4 commonly 3-4 rarely 6-8, spreading or ascending, 1-4' long, rarely longer, the common axis glabrous; **Rachis** about 1 mm. wide, with a tuft of long hairs at the base; **Spikelets** not crowded, 2.5-3 mm. long, 2-2.5 mm. wide, broadly oval to suborbicular; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, toward maturity the tip of the fruit usually exposed, 5-nerved, the middle of the lemma commonly russet-brownish; **Fruit** nearly the size and form of the spikelet.

Forms of this exceedingly variable species have been regarded as distinct species or varieties. The forms have been differentiated as follows: plants with elongated blades and racemes, the blades glabrous or pilose near the margins, as *P. angustifolium*; those with the blades (usually short) sparsely-pilose above and sheaths pilose on the margins, as *P. australe*; and those with short, glabrous leaves mostly crowded toward the base, as *P. laeve* proper. If we try to segregate the specimens into these groups, however, the intermediate specimens are more numerous than those referable to definite forms, and the material so segregated appears scarcely more homogeneous than does the intermediate material.

Fields, meadows, open woods and waste ground, especially common in red clay soil, eastern Texas to Florida, north to New Jersey and Pennsylvania. (Industry, Beckville, Texarkana, Hempstead.) Spring-fall.

25. *P. LONGIPILUM* Nash (lōn-jī-pī'lūm); *P. laeve* var. *pilosum* Scribn.; *P. plenipilum* Nash.

Similar to P. laeve, the **Culms** usually ascending or spreading, the leafy shoots at base mostly fewer, a raceme-bearing branch often borne (usually hidden) in next to the lowest sheath; **Blades** usually flat, pilose on both surfaces, or glabrous or nearly so beneath, commonly less erect than in *P. laeve*; **Sheaths** pilose with long hairs, often conspicuously so, but sometimes very sparsely so; **Racemes** 2-6 commonly 2-3, on the average more lax and spreading than in *P. laeve*; **Spikelets** 2.5-2.8 mm. long, rarely to 3 mm. long, 2-2.4 mm. wide; **Fruit** usually covered at maturity, the sterile lemma often tinged with russet.

This species is fairly distinct from *P. laeve*, but a few specimens grade into the form represented by the type *P. australe*. A few others, with spikelets 2.8-3 mm. long, are scarcely distinguishable from *P. circulare*, but the spikelets are less rounded and the glumes and sterile lemma rather thicker.

Damp mostly sandy soil, savannas, open woods and wet pine barrens, east Texas to Florida, north to Tennessee and New York. (Waller county, Texas.) Summer.

26. *P. CIRCULARE* Nash (sēr-kū-lā'rē).

Culms 2-3 rarely 4 feet tall, densely-tufted, usually with conspicuous erect or ascending leafy shoots at the base, compressed, often with branches bearing one leaf and a single raceme more or less concealed in the middle sheaths, rarely with a longer branch from a lower node; **Blades** 2-12' rarely 18' long, 3-12 mm. wide, the uppermost short, flat, erect or suberect, rather thin, scarcely narrowed toward the base, often equaling or exceeding the inflorescence, sometimes reaching only to the base, or the inflorescence short-exserted, glabrous to sparsely-pilose on the upper surface, at least toward the base, or sometimes toward the base on the under surface; **Sheaths** longer than the internodes, elongated and crowded at the base, flattened, thin, loose, the upper glabrous or nearly so, the lower from sparsely to densely-pilose or glabrous; **Ligule** membranaceous, brown, 2-3 mm. long; **Racemes** 2-7 commonly 3-4, mostly suberect, or the lower spreading, 2-5.5' long, the common axis slender, as much as 2' distant, glabrous; **Rachis** about 1 mm. wide, long-pilose at the base; **Spikelets** approximate, 2.8-3.2 mm. long, nearly orbicular; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, covering the fruit, 5-nerved, rather thin, the cells showing more plainly than in *P. laeve* and *P. longipilum*, the lemma often with an oval brownish spot; **Fruit** nearly the size and shape of the spikelet.

Fields and meadows and open waste ground, east Texas, Kansas, Mississippi, North Carolina to Connecticut. (Low ground near Hempstead.) Summer-fall.

27. *P. PRAECOX* Walt. (prē'kōks).

Culms 20-40' tall, in small tufts of 1 rarely 2 or 3 flowering culms and, in spring, 1-to-several leafy shoots arising from short scaly rhizomes, these shoots flowering in the late summer and autumn producing few to several short rhizomes with loose overlapping scales, slender, erect, simple, compressed; **Blades** 4-12' commonly 6-10' long, 3-7 mm. wide, the uppermost reduced, folded at the base, flat above, rather firm, ascending, glabrous or sometimes pilose on the upper surface toward the base; **Sheaths**, the lower overlapping, compressed-keeled, commonly purplish, glabrous, or the lower, especially of the young shoots, silky villous, rarely

the others pilose at the summit; **Ligule** brown, 3 mm. long; **Racemes** 2-8 commonly 4-6, narrowly ascending to arcuate-spreading, 20-70 mm. long, the common axis very slender; **Rachis** about 1.5 mm. wide, purplish, pilose at the narrowed base; **Spikelets** solitary or in pairs, commonly both in the same raceme, usually crowded, strongly flattened, 2.2-2.8 mm. long, 2.2-3 mm. wide, suborbicular, glabrous, yellowish-green or purple-tinged; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, 5-nerved (lateral nerve obscure), thin and fragile, under a lens minutely papillose-striate; **Fruit** nearly the size and form of the spikelet, under a lens strongly papillose.

Wet pine barrens, borders of cypress swamps, moist places in flatwoods and wet savannas in the coastal plain, east Texas along the Gulf to Florida, north to North Carolina. (Hempstead.) Spring-fall.

28. *P. LENTIFERUM* Lam. (lĕn-tif'ĕ-rŭm); *P. tardum* Nash; *P. kearneyi* Nash.

Culms erect, as much as 5 feet tall, of the same habit as *P. praecox* but the culms less slender, sometimes robust, the rhizomes on the average more numerous; **Blades** 6-20' long, 3-10 mm. wide, the uppermost reduced, firm, flat above or folded throughout, pilose, often conspicuously so, on both surfaces, or glabrous beneath, occasionally glabrate on the upper surface except at the base; **Sheaths** usually not so strongly keeled as in *P. praecox*, from densely silky-villous, especially the lower ones, to glabrate; **Ligule** brown, about 3 mm. long; **Racemes** 2-9 commonly 4 or 5, usually spreading at maturity, 1-4' long; **Rachis** 1.5-1.7 mm. wide, pilose at the narrowed base; **Spikelets** solitary, or more commonly in pairs, usually crowded, 2.7-3.4 mm. long, broadly oval to orbicular, the glume and lemma in color, texture and nerving like those of *P. praecox*.

This variable species intergrades with *P. praecox*, from which it is here delimited by the more robust culms, pilose foliage and larger spikelets, but these three characters are not always found in the same specimens.

Moist pine barrens, borders of flatwoods and cypress swamps, on the coastal plain, Texas, along the Gulf to Florida and north to North Carolina. (Houston.) Summer.

29. *P. FLORIDANUM* Michx. (flō-rĭ-dā'nŭm).

Culms 2.5-5 rarely 6 feet tall, erect, solitary or a few culms to a tuft, usually stout, simple, compressed, from short stout scaly rootstocks; **Blades** mostly ascending, or spreading at the summit, firm, 5-20' long, the upper reduced, 4-10 mm. wide, usually folded at the base and flat above, sometimes folded or subinvolute throughout, rough, pilose to densely hirsute on the upper surface like the sheaths, and usually hirsute or nearly glabrous beneath, more or less papillose; **Sheaths** keeled, overlapping especially below, or the upper shorter than the internodes, strongly nerved, rough, from nearly to quite glabrous to densely rather harshly tawny-hirsute, more or less papillose; **Ligule** firm, 2-3 mm. long; **Racemes** commonly 2-4 rarely solitary or 5 or 6, 1.5-5' long, suberect or ascending, or the heavy racemes slightly nodding, the common axis slender; **Rachis** usually strongly zigzag, 1-1.5 mm. wide, scabrous, pilose at the base, and sometimes sparsely long-ciliate throughout; **Spikelets** in pairs (one of the pair sometimes rudimentary), crowded, 3.6-4 mm. long, 2.8-3.1 mm. wide, commonly 4 mm. long and 3 mm. wide, oval, pale; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, scarcely covering the fruit at maturity, firm and papery, slightly inflated, irregularly wrinkled, 5-

nerved; **Fruit** about 3-3.5 mm. long, 2.5 mm. wide, oval to slightly obovate, light brown, minutely papillose-striate.

Low moist sandy land, pine woods, flat woods and low prairies, in the coastal plain from Texas to Florida and north to Virginia. (Near Groveton, Fort Worth to Gonzales and east.) Summer and fall.

29a. *P. FLORIDANUM* var. *GLABRATUM* Engelm. (glā-brā'tŭm); *P. glabratum* (Engelm.) Mohr.

Culms 2-3.5 feet tall, solitary or a few culms together, leafy throughout, erect or ascending from a decumbent base, the rootstocks stout and rather short, flattened, sometimes branched and with racemes included or slightly exerted from one of the middle sheaths; **Blades** 5-9' long, the upper reduced, 10-12 mm. wide, mostly flat, margins rough, slightly rough toward the apex, sparsely-hirsute above at the base, otherwise glabrous; **Sheaths** about as long as the internodes, mostly shorter, flattened, smooth, the short lowermost sheaths sometimes pilose, otherwise glabrous; **Ligule** membranaceous, truncate, about 2 mm. long; **Racemes** thick, 1-5 commonly 2-3, distant mostly 1.5-2', usually 3-4' (3-5.5') long, the slender common axis 2-4' long, erect or ascending, or sometimes slightly nodding, the rachis about 1.5 mm. wide, zigzag, spikelets single or mostly in pairs, in two rows, one of the pairs sometimes rudimentary, sometimes an axillary raceme is hidden or slightly exerted in one of the middle sheaths; **Spikelets** 3.5-5 mm. long, about 3 mm. wide, almost oval, pale; **Glumes**, the first wanting, the **Second** and the **Sterile Lemma** 5-nerved, about equal, slightly longer than the fruit, obtuse, slightly inflated and wrinkled; **Fruit** about 3.2-3.5 mm. long, about 2.6 mm. wide, oval, light-brown, minutely papillose-striate.

Brackish marshes and low sandy land; Texas to Florida and north to New Jersey and Kansas. Summer and fall.

30. *P. VIRGATUM* L. (vĕr-gā'tŭm).

Culms 3-5 feet tall, in large dense clumps, robust, purplish below, simple, erect or the outer curved at the base, subcompressed; **Blades** 12-30' long, 10-25 mm. rarely 30 mm. wide, the uppermost much reduced, flat, ascending-recurved, slightly rounded at the base, long-hirsute at the very base on the upper surface, and often on the margins toward the base, the margins serrulate; **Sheaths** overlapping, elongate, usually papillose-hirsute along the margins and on the collar, occasionally on the keel toward the summit, rarely pilose throughout, the lower spongy and succulent, reticulate in drying; **Ligule** 1.5-2 mm. long; **Panicle** slightly nodding, 5-16' commonly 6-10' long, 3-29 commonly 10-16 ascending to drooping thick racemes, the lower 2-6', rarely 8' long, the upper gradually shorter, the common axis angled, occasionally scabrous on the angles; **Rachis** purplish, 1-1.5 mm. wide, with copious long hairs at the base, the margins very scabrous and commonly with scattered long quill-like hairs; **Spikelets** in pairs on angled pedicels, crowded, 2.2 mm. rarely 3 mm. long, 1.8-2.3 mm. wide, obovate, grayish, drying yellowish to rusty or purplish-brown; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, rather loose, 5-nerved, one or both often minutely apiculate, the glume pubescent with silky hairs along the margins, at least toward the summit, the sterile palea occasionally developed; **Fruit** 2-2.2 mm. long, chestnut-brown at maturity, papillose-striate.

Most of the specimens from continental North America have spikelets 2.5-3 mm. long, commonly puberulent to finely pubescent.

Open mostly moist or swampy ground, southern Texas, Mexico, and the West Indies to Brazil, at rather low altitudes. (Brownsville.)

31. *P. PLICATULUM* Michx. (plī-kāt'ū-lūm).

Culms 1.5-3 feet tall, tufted with numerous leafy shoots at the base, ascending, or erect from a slightly decumbent base, simple or branched below, the lower nodes sometimes appressed-pubescent; **Blades** 3-18' long, 3-8 mm. wide, folded at base, flat or folded above, the uppermost much reduced, often papillose-pilose on upper surface toward the base, sometimes hirsute on both surfaces, margins scabrous; **Sheaths** flattened, shorter than the internodes, sometimes longer, the lower crowded, rather papery, glabrous or papillose-pilose along the margins and keel or rarely hirsute throughout; **Ligule** membranaceous, brown, 2-3 mm. long; **Racemes** commonly 3-8 (2-19), 1-4' long, spreading, the common axis slender, rachis about 1 mm. wide, sparingly pilose at the base; **Spikelets** about 2.5 mm. (2.1-3) long, 1.4-2 mm. wide, in pairs (one of the pairs sometimes undeveloped), obovate-oval, turning brown at maturity; **Glumes**, the first wanting, the second and **Sterile Lemma** equal, thin, 5-nerved, glabrous or the glume often appressed-pubescent, the lemma at maturity with short transverse wrinkles next to the slightly raised margins, rarely sparsely appressed-pubescent; **Fruit** nearly as large and same shape as spikelet, dark-brown and shining.

Open ground or wet wood borders mostly in moist sandy or clay soil. Texas east to Georgia and Florida. Spring and fall.

32. *P. SCROBICULATUM* L. (skrō-bīk-ū-lā'tūm).

Annual; glabrous as a whole; **Culms** 1.5-3 feet tall, rather succulent, branching, ascending; **Blades** 6-15' long, 5-12 mm. wide, flat; **Sheaths** flattened, often overlapping; **Ligule** membranaceous, brown, about 2 mm. long; **Racemes** mostly 3-5, 2-3.5' long, ascending, the rachis 2-3 mm. wide, firm; **Spikelets** solitary, crowded, 3 mm. long, obovate, turgid; **Glume** and **Sterile Lemma** equal, 7-nerved, the latter loose and more or less wrinkled (scrobiculate). (No drawings.)

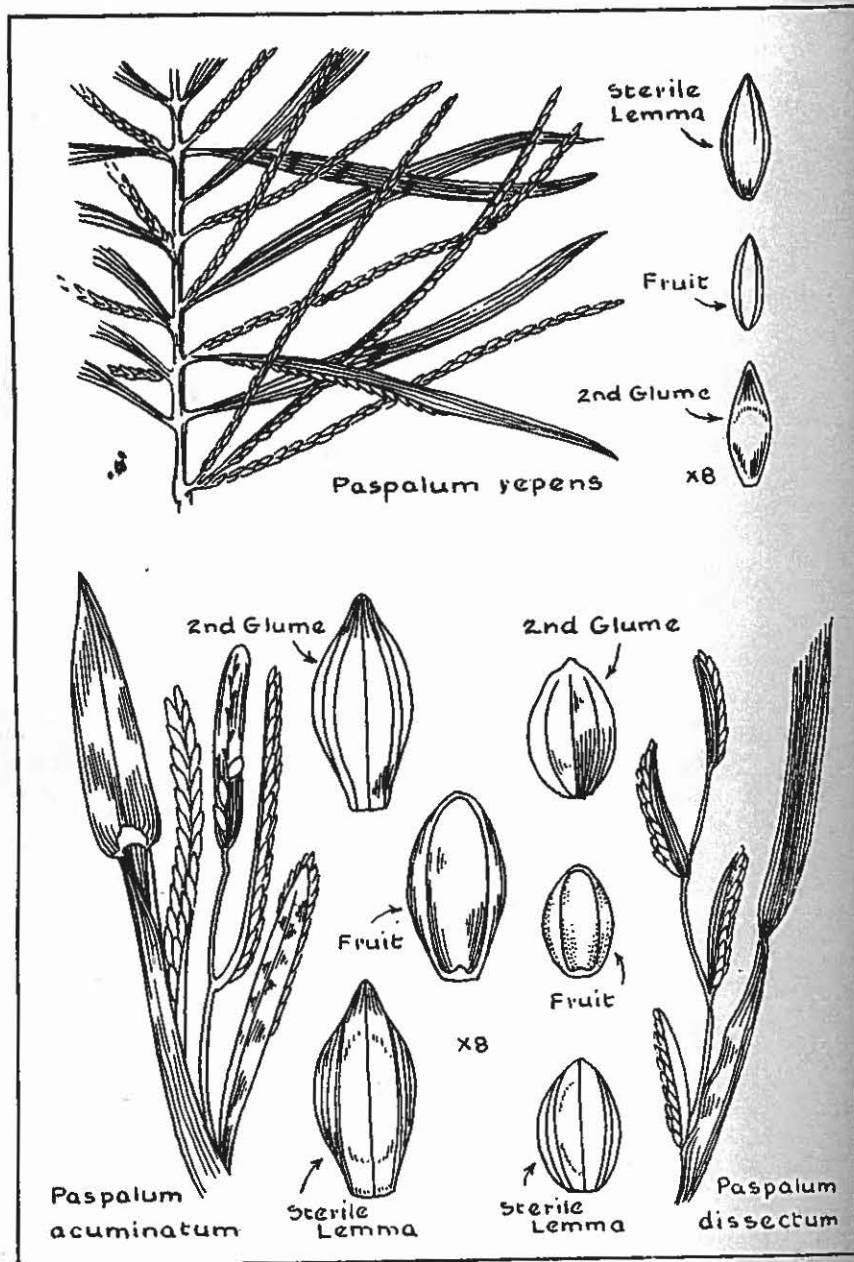
Cultivated in Asia and Africa, sparingly introduced in Texas (Abilene); also ballast, Camden, N. J.

33. *P. BIFIDUM* (Bertol.) Nash (bī'fī-dūm); erroneously referred to *P. racemosum* Lam. by Beal.

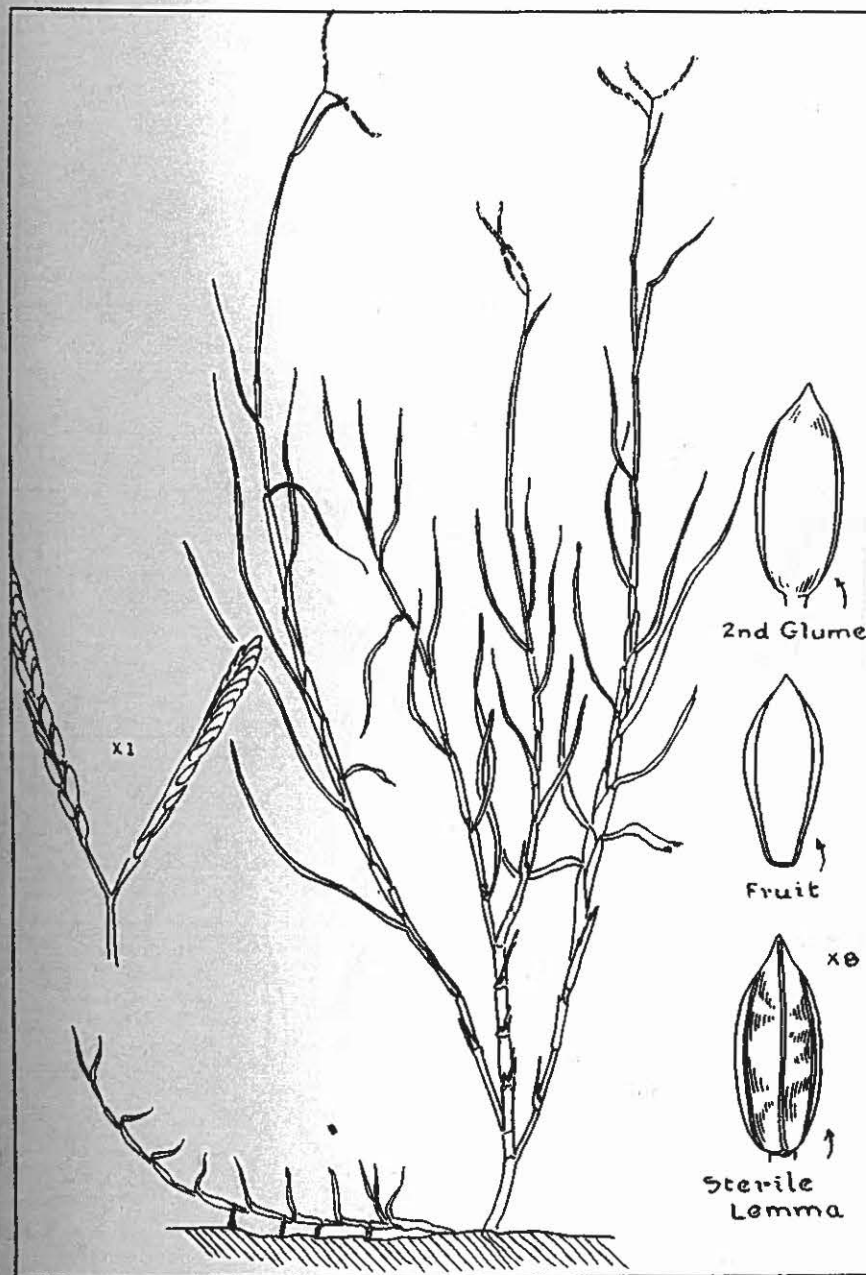
Culms 1.5-4 feet tall, forming small colonies, from numerous short rhizomes, erect, slender, simple, compressed, nodes glabrous or minutely pubescent; **Blades** 4-20' long, 3-14 mm. wide, the upper commonly obsolete, flat, ascending, tapering to a base as narrow as the summit of the sheath, the junction obscure, from conspicuously villous on both surfaces to glabrous except the upper surface toward the base; **Sheaths** narrow, the lower commonly free from the culm, from villous to nearly glabrous; **Ligule** about 2 mm. long; **Racemes** 2-6 rarely 8 commonly 3 or 4, at first erect, spreading toward maturity, 1.5-6' long, distant on a slender flat rachis; **Rachis** very slender, subflexuous, with copious long hairs at the base; **Spikelets** in pairs, distant to irregularly approximate on slender stiff angled pedicels, elliptic-obovate, turgidly biconvex 3.3-4 mm. long, 2.2-2.5 mm. wide, olivaceous to russet-brown and commonly blotched with purple;

Glumes, the first developed into a minute thin scale or wanting in the same raceme (rarely wholly wanting in an entire inflorescence), second shorter than the fruit, strongly 7-nerved; **Sterile Lemma** barely equaling the fruit or slightly shorter, 5-nerved; **Fruit** strongly indurate, stramineous, very obscurely papillose-striate.

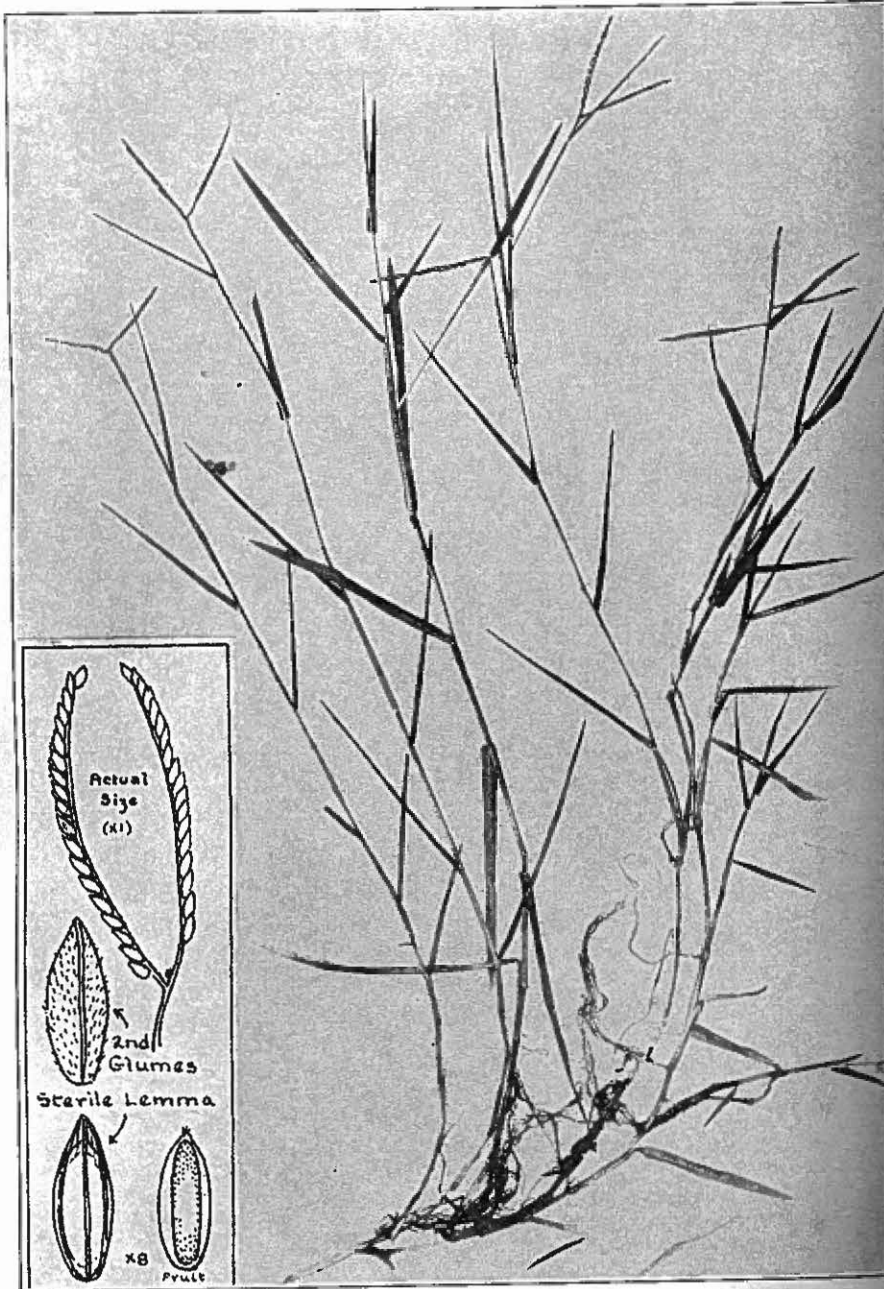
Sandy pine and oak woods, occasionally in hammocks, nowhere common, on the coastal plain from Texas to South Carolina and Oklahoma. (Waller county, Dallas county, Texas.)



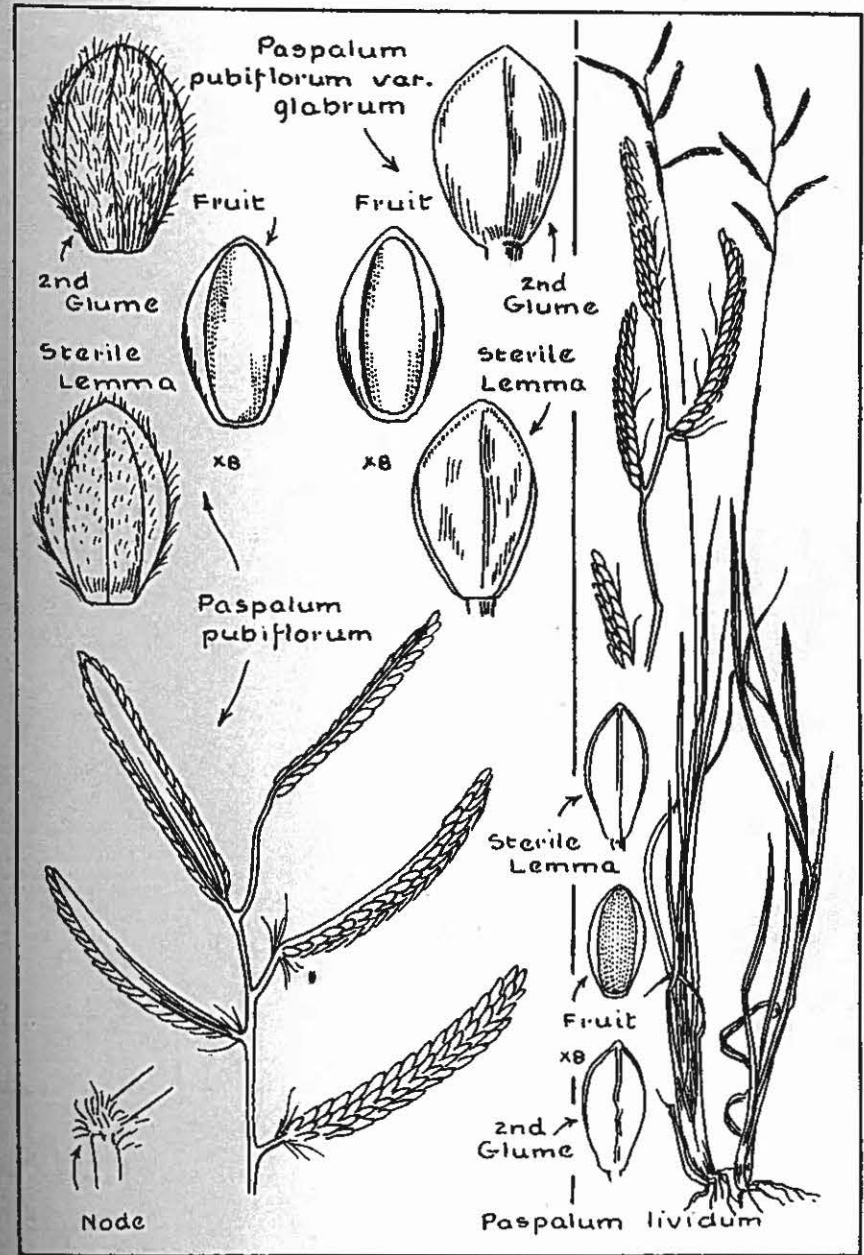
PASPALUM REPENS, PASPALUM ACUMINATUM,
PASPALUM DISSECTUM



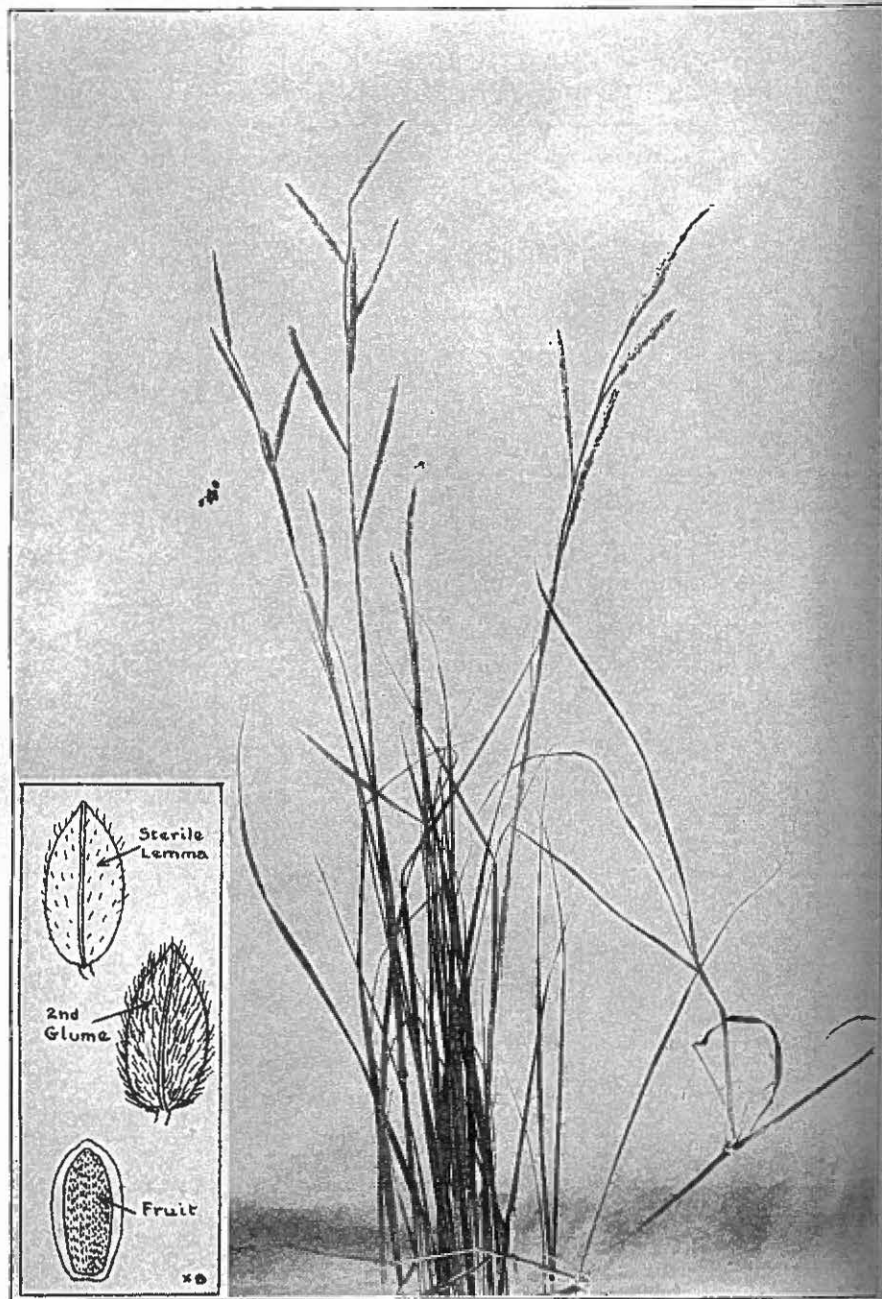
PASPALUM VAGINATUM



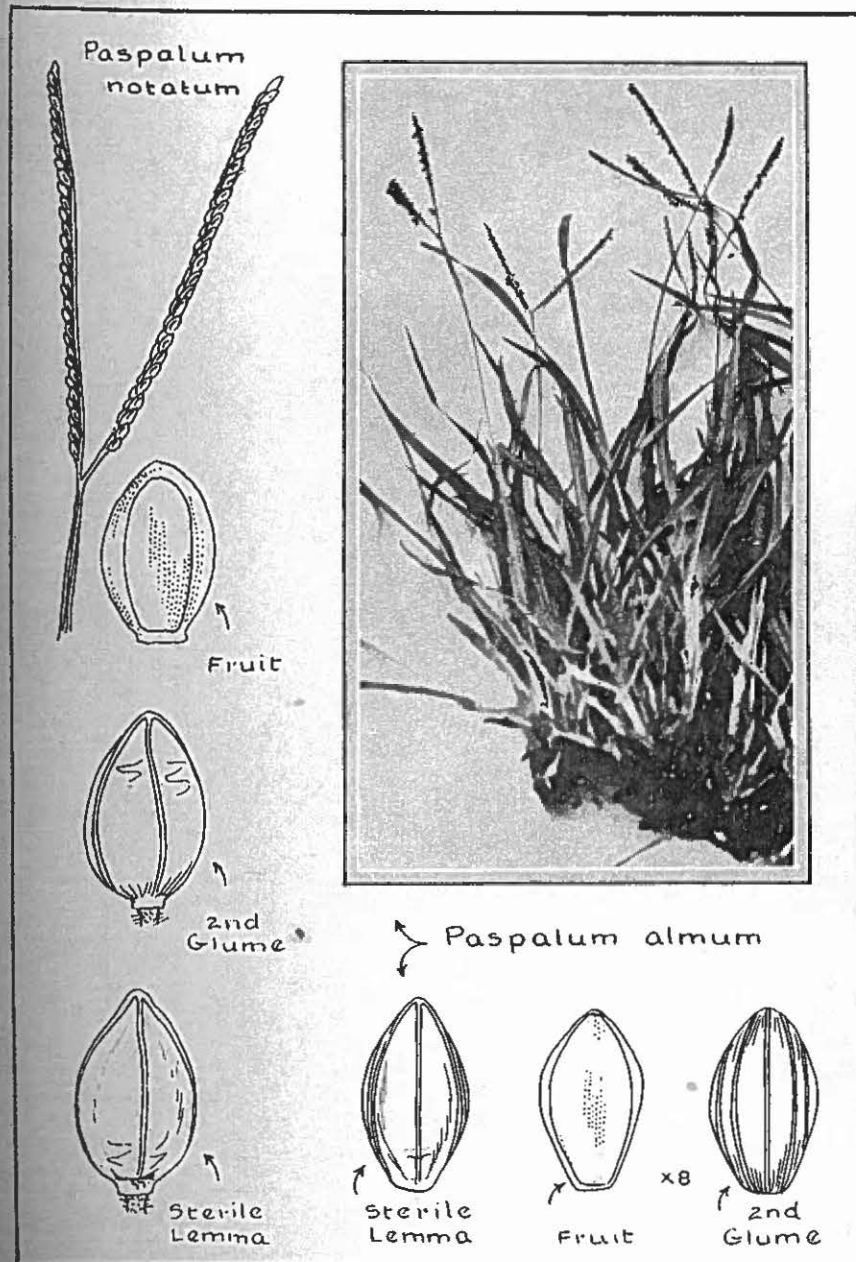
PASPALUM DISTICHUM



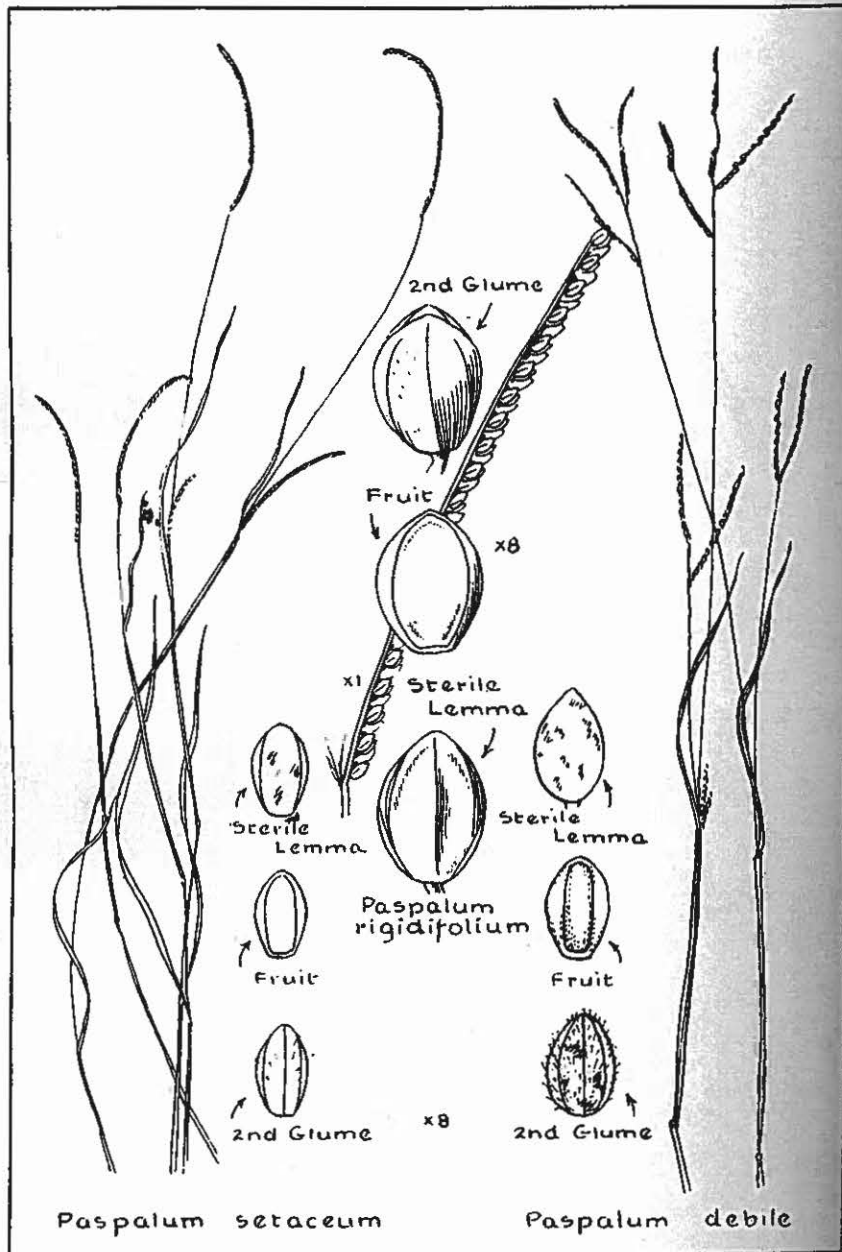
PASPALUM PUBIFLORUM, PASPALUM PUBIFLORUM VAR. GLABRUM, PASPALUM LIVIDUM



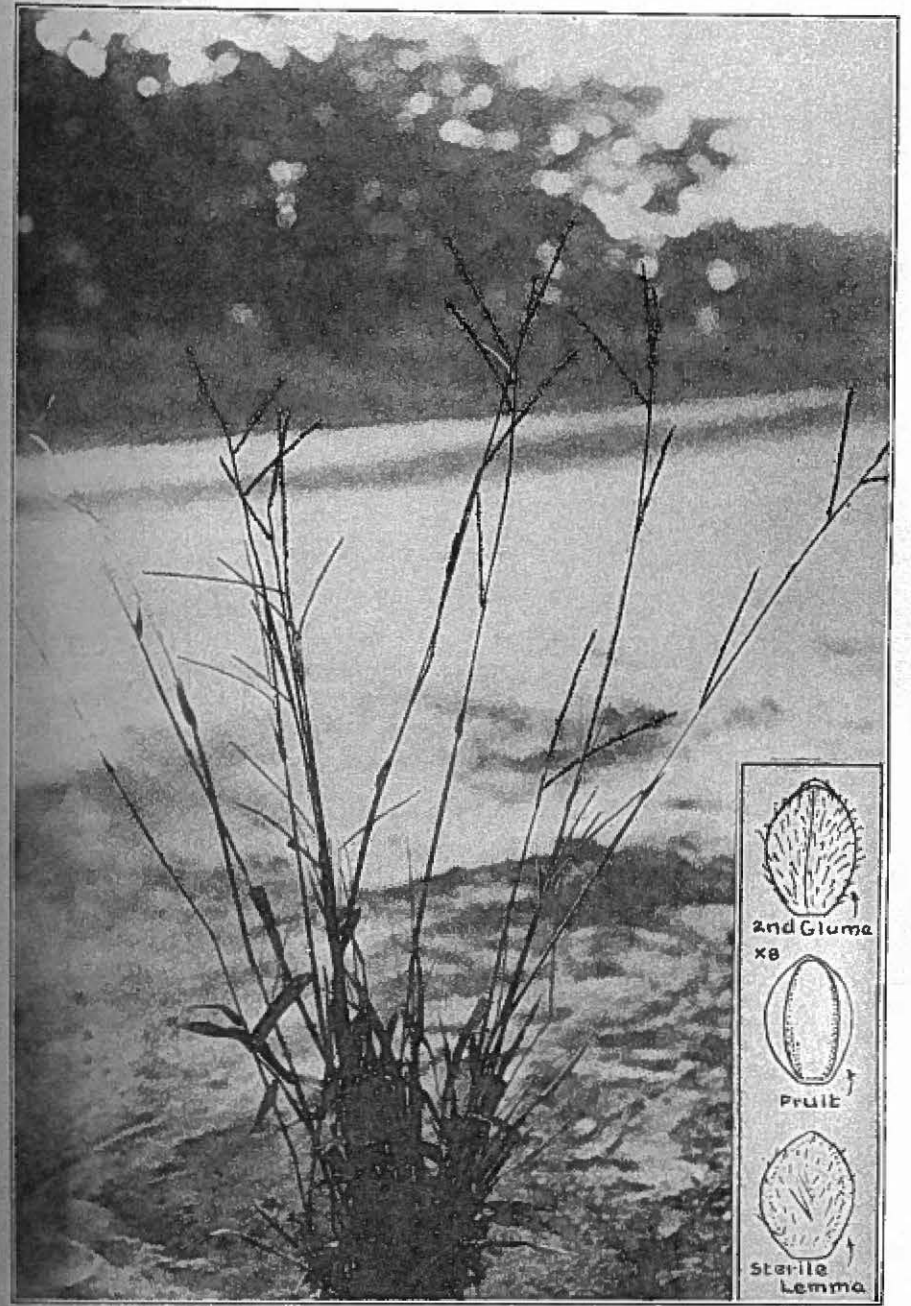
PASPALUM HARTWEGIANUM



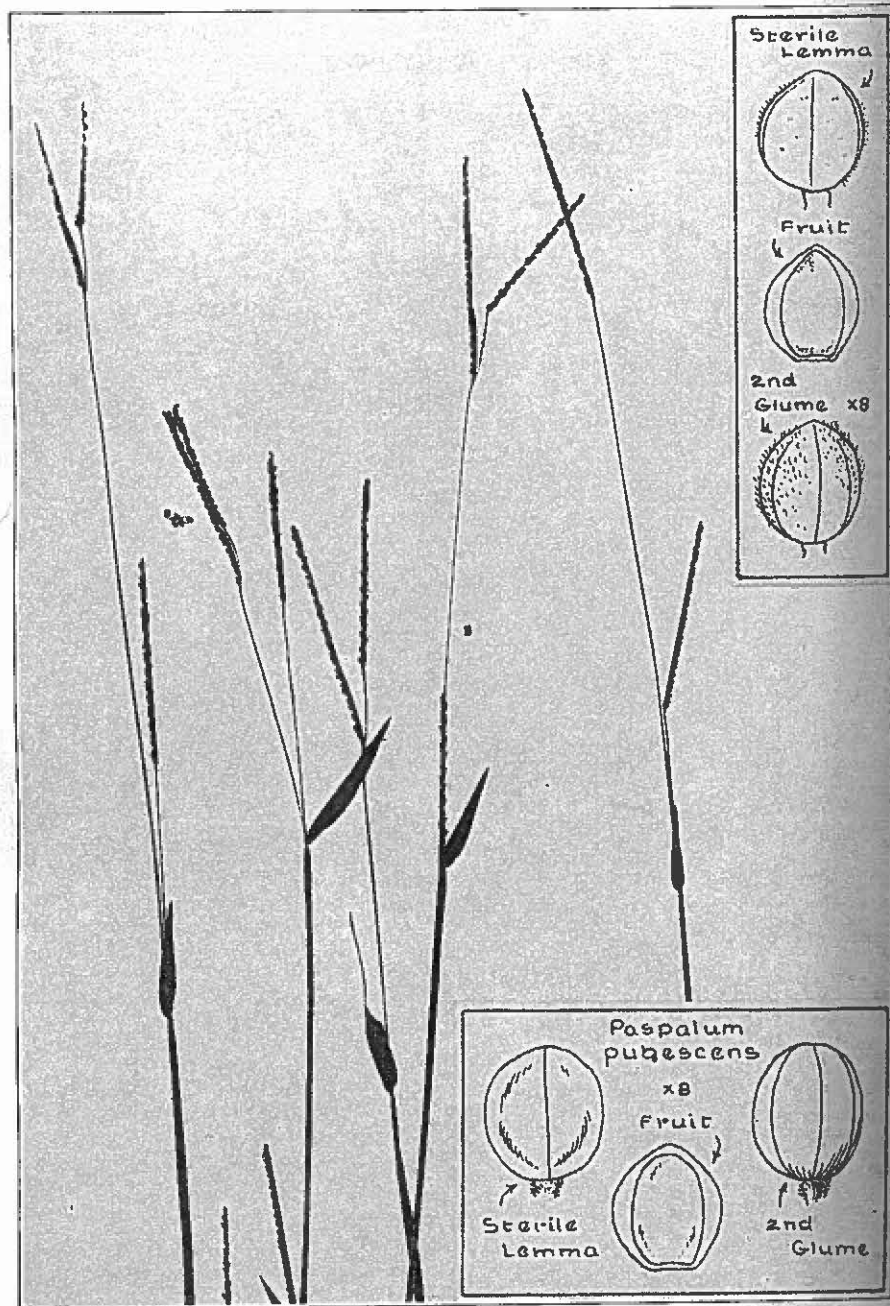
PASPALUM NOTATUM, PASPALUM ALNUM, COMBS-GRASS



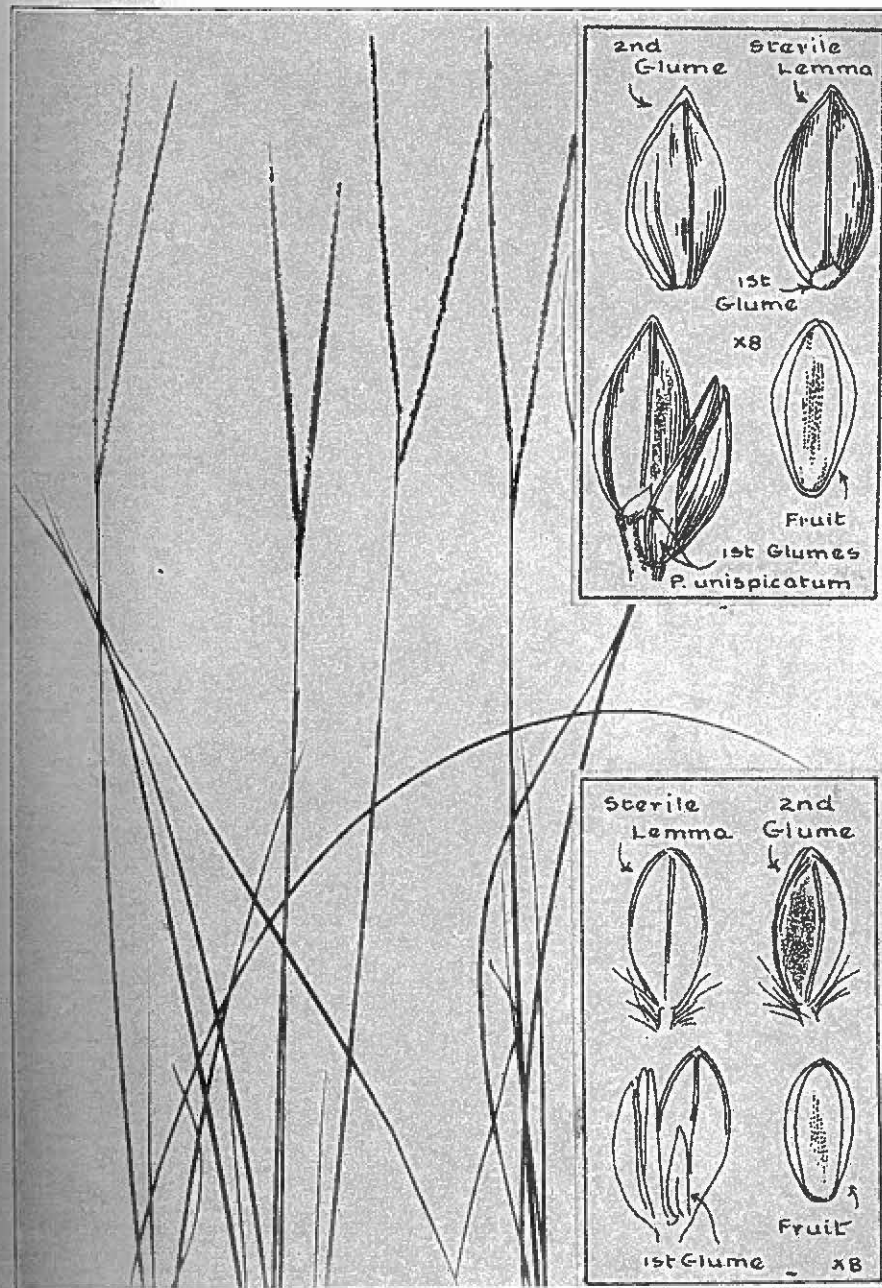
PASPALUM SETACEUM, PASPALUM DEBILE, PASPALUM RIGIDIFOLIUM



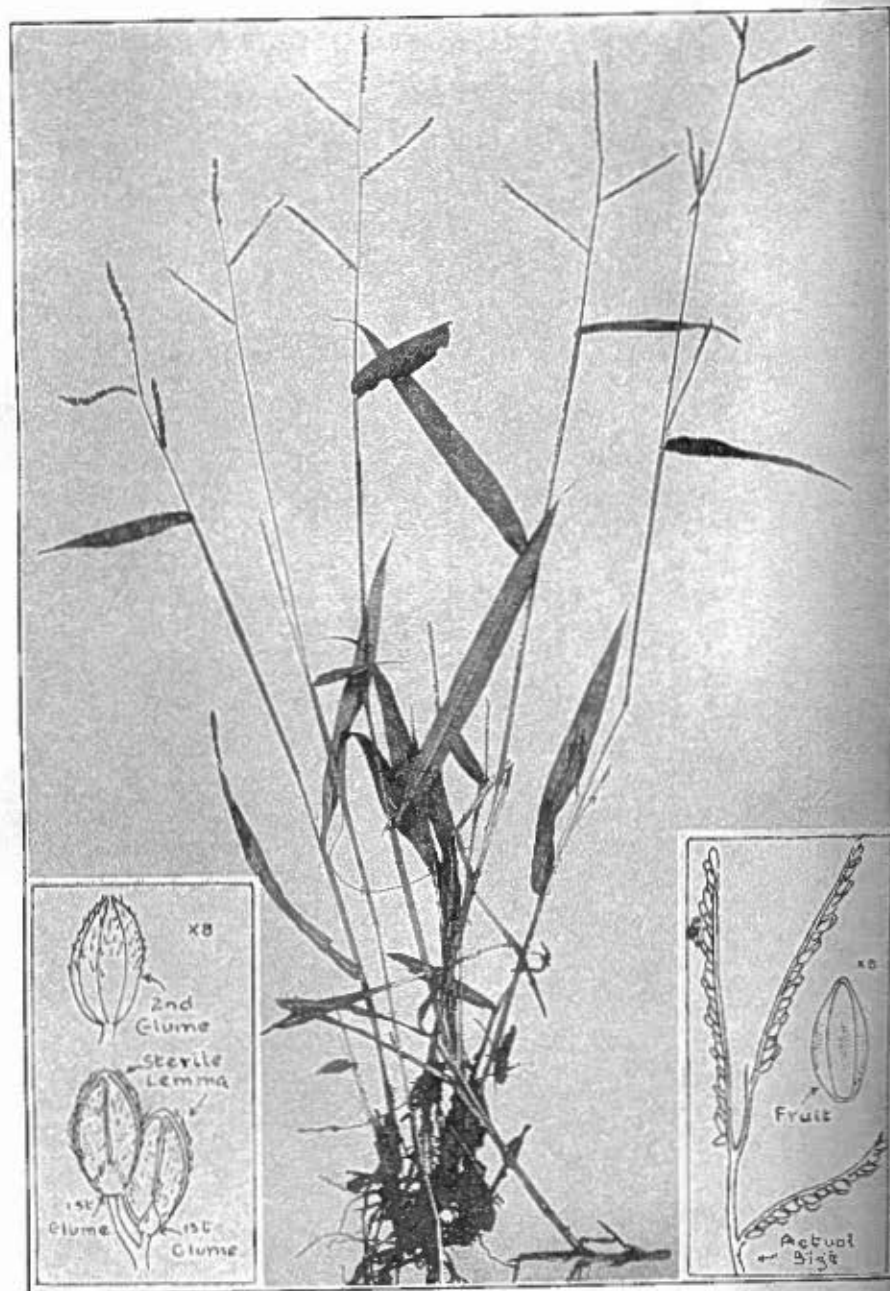
PASPALUM STRAMINIUM



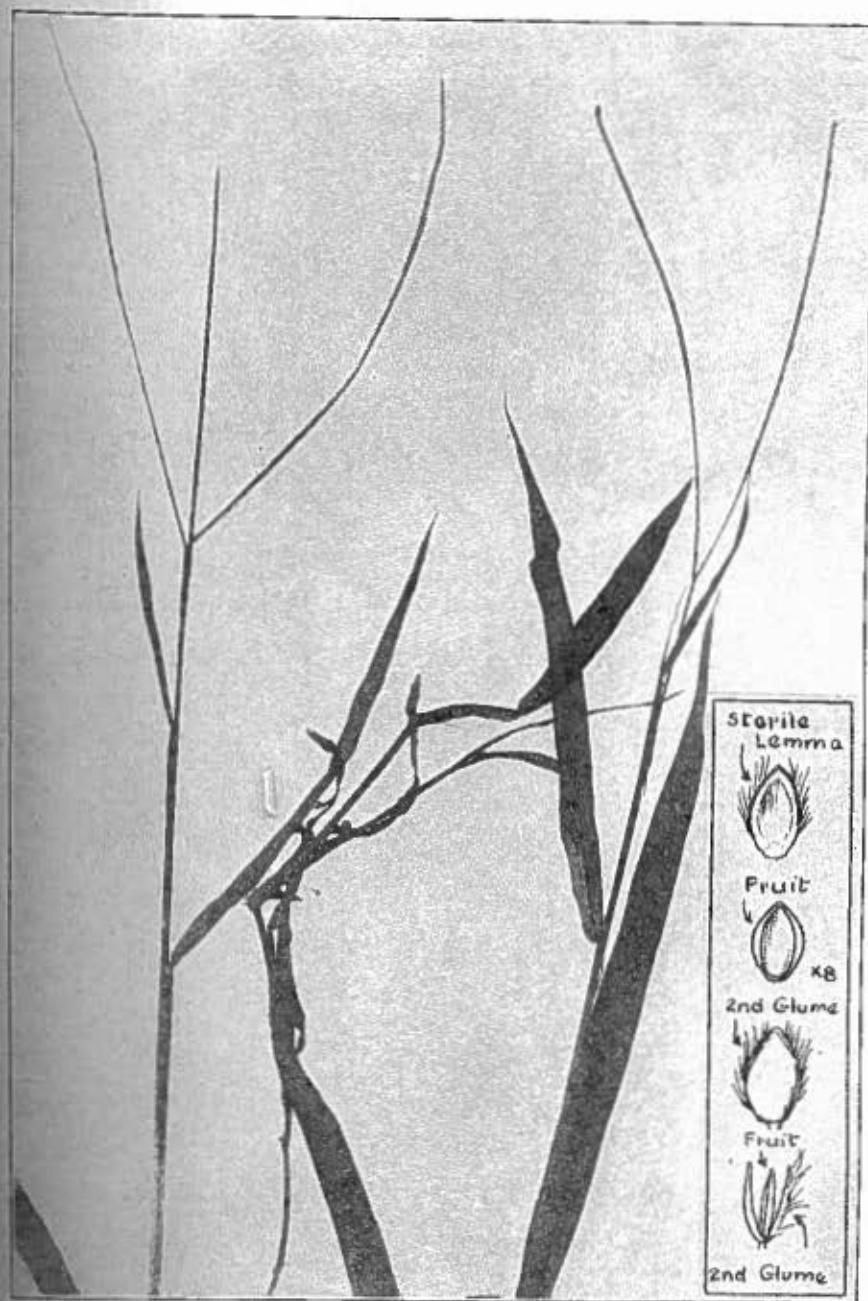
PASPALUM CILIATIFOLIUM, also drawings of PASPALUM
PUBESCENS



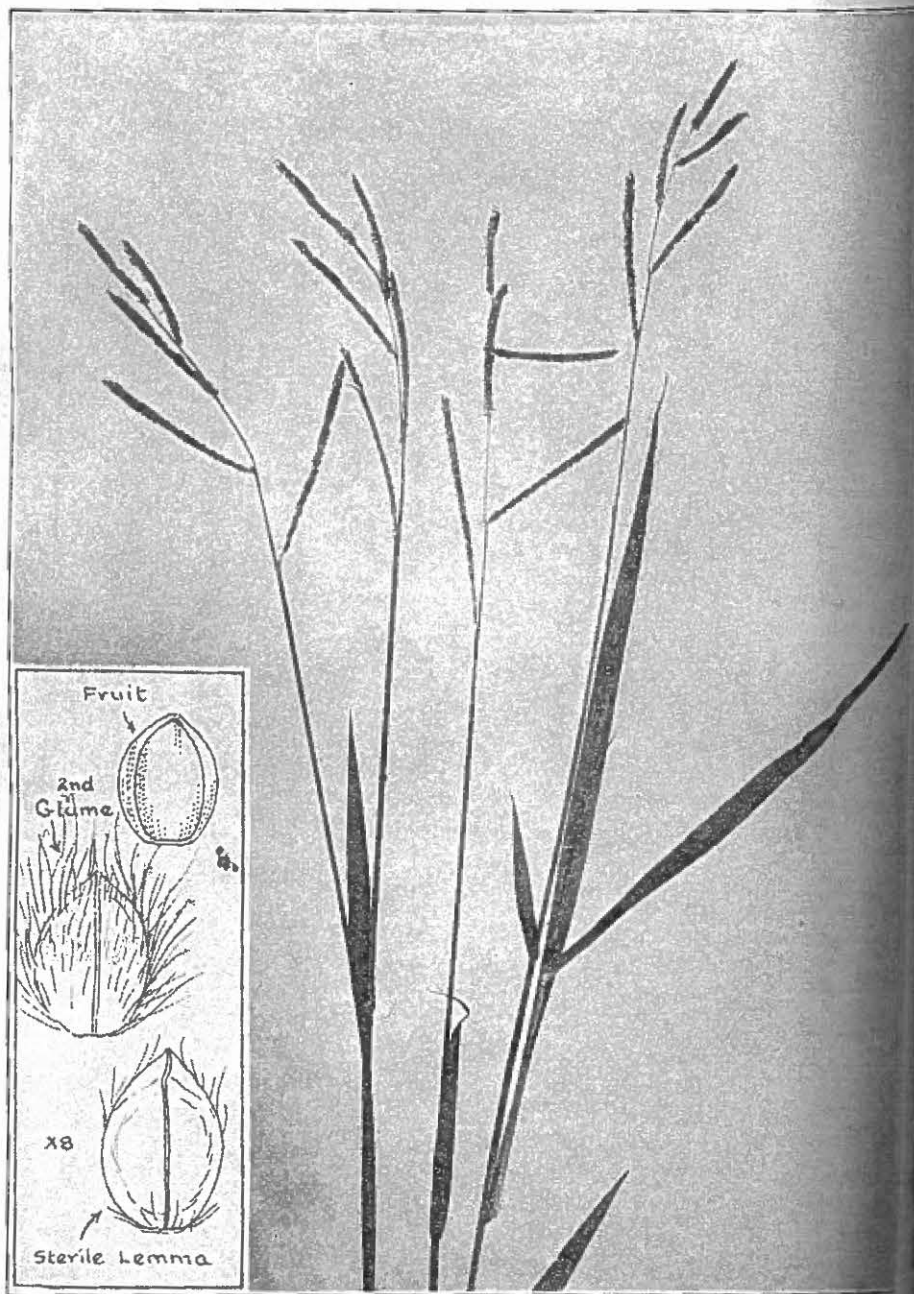
PASPALUM MONOSTACHYUM, also drawings of PASPALUM
UNISPICATUM



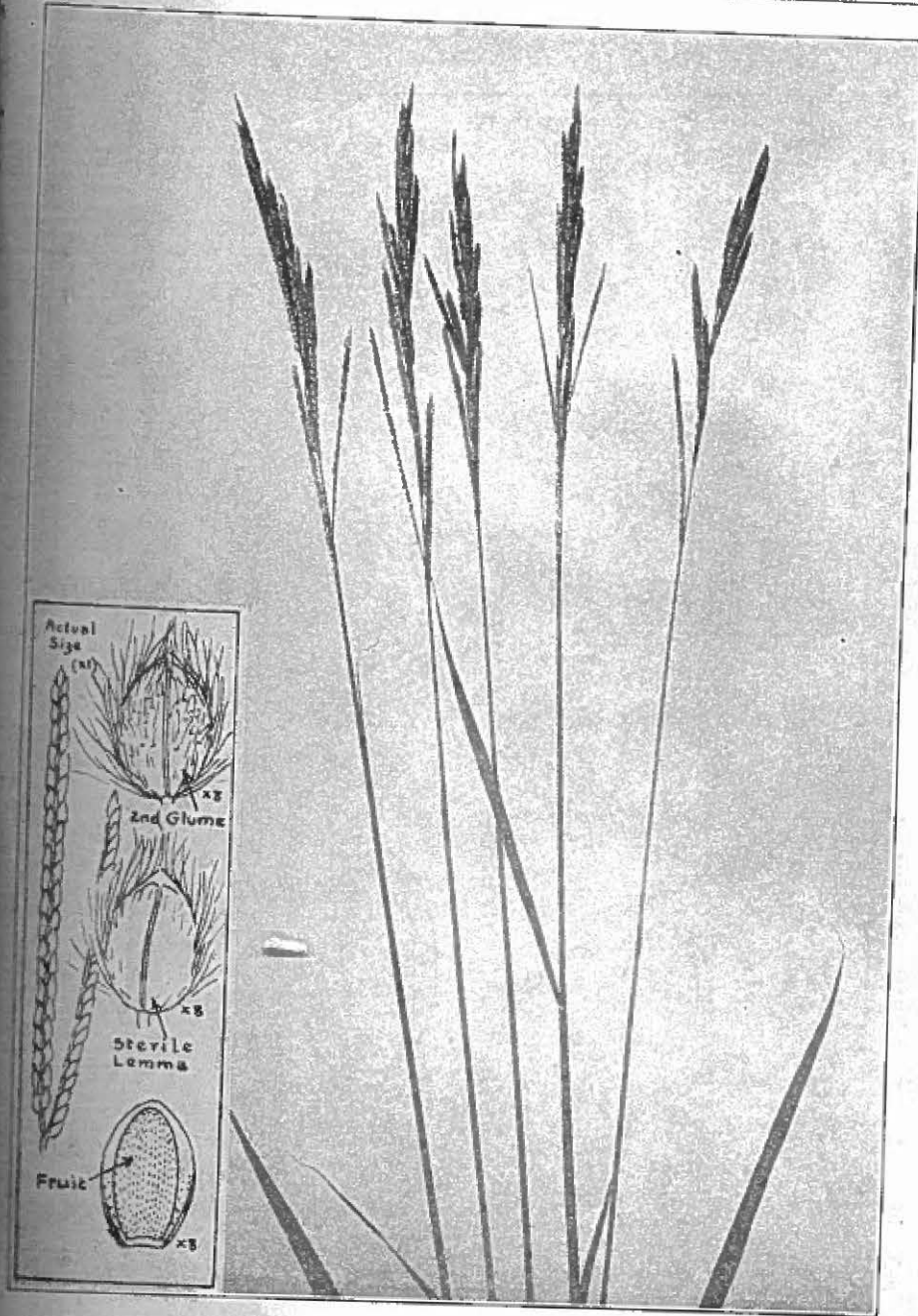
PASPALUM LANGHEI.



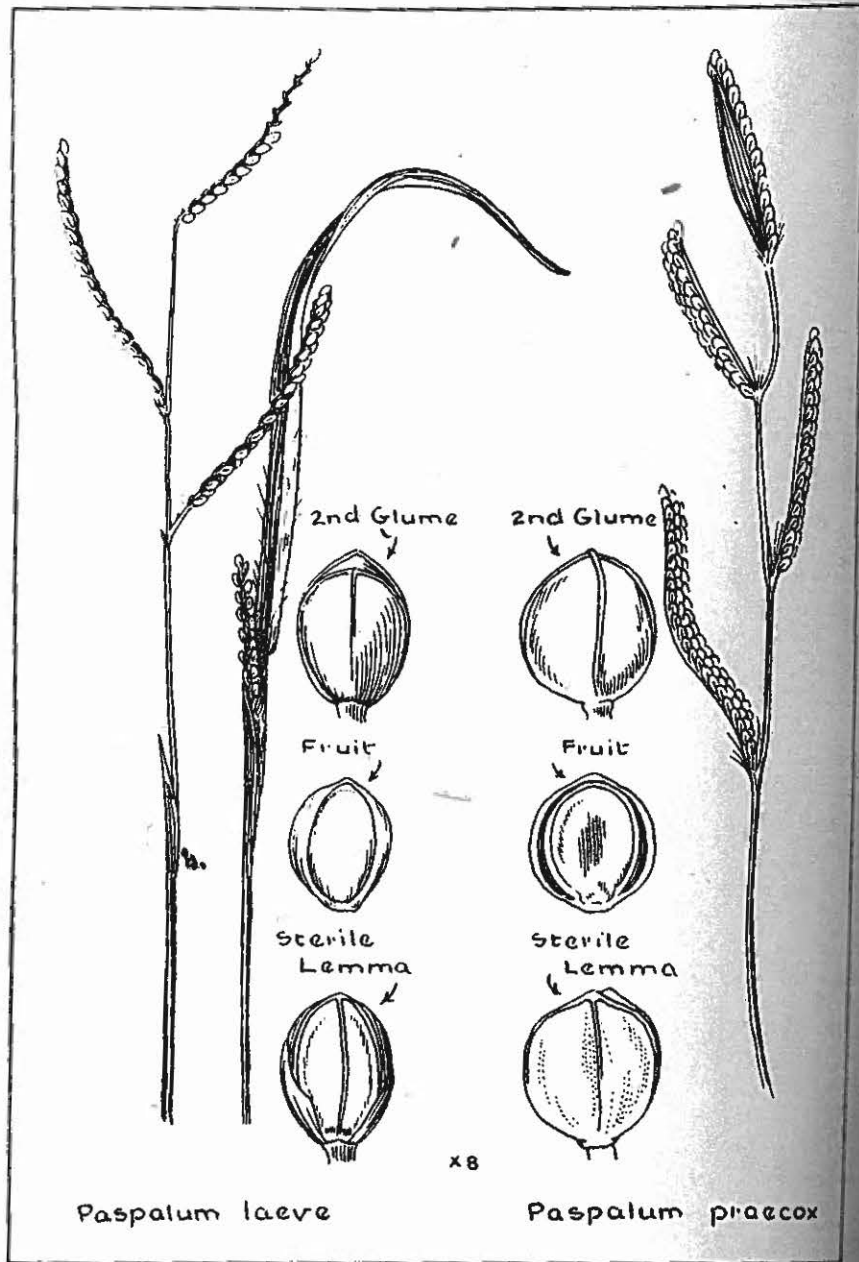
PASPALUM CONJUGATUM, SOUR-GRASS



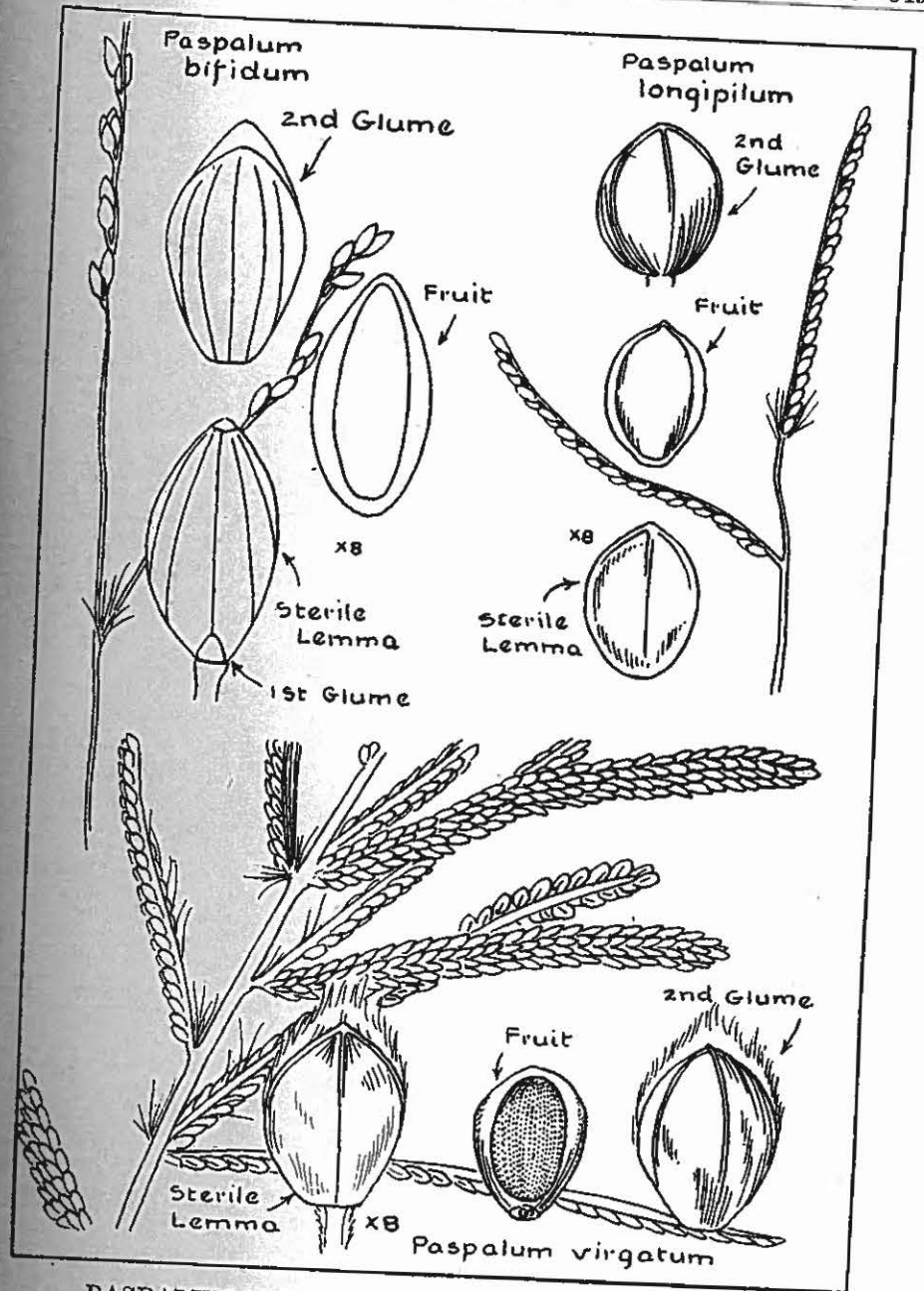
PASPALUM DILATATUM, DALLIS-GRASS



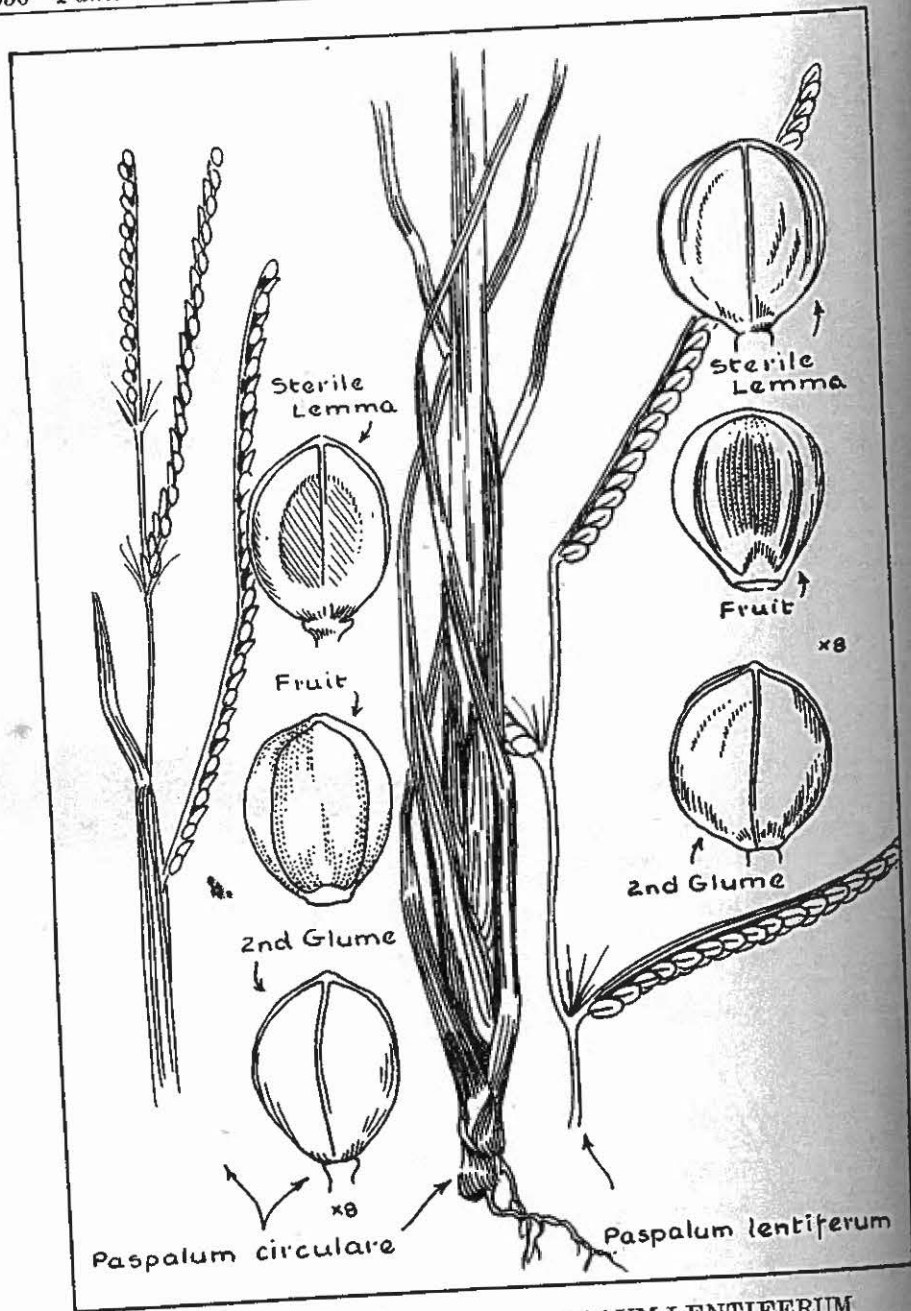
PASPALUM URVILLEI, VASEY-GRASS



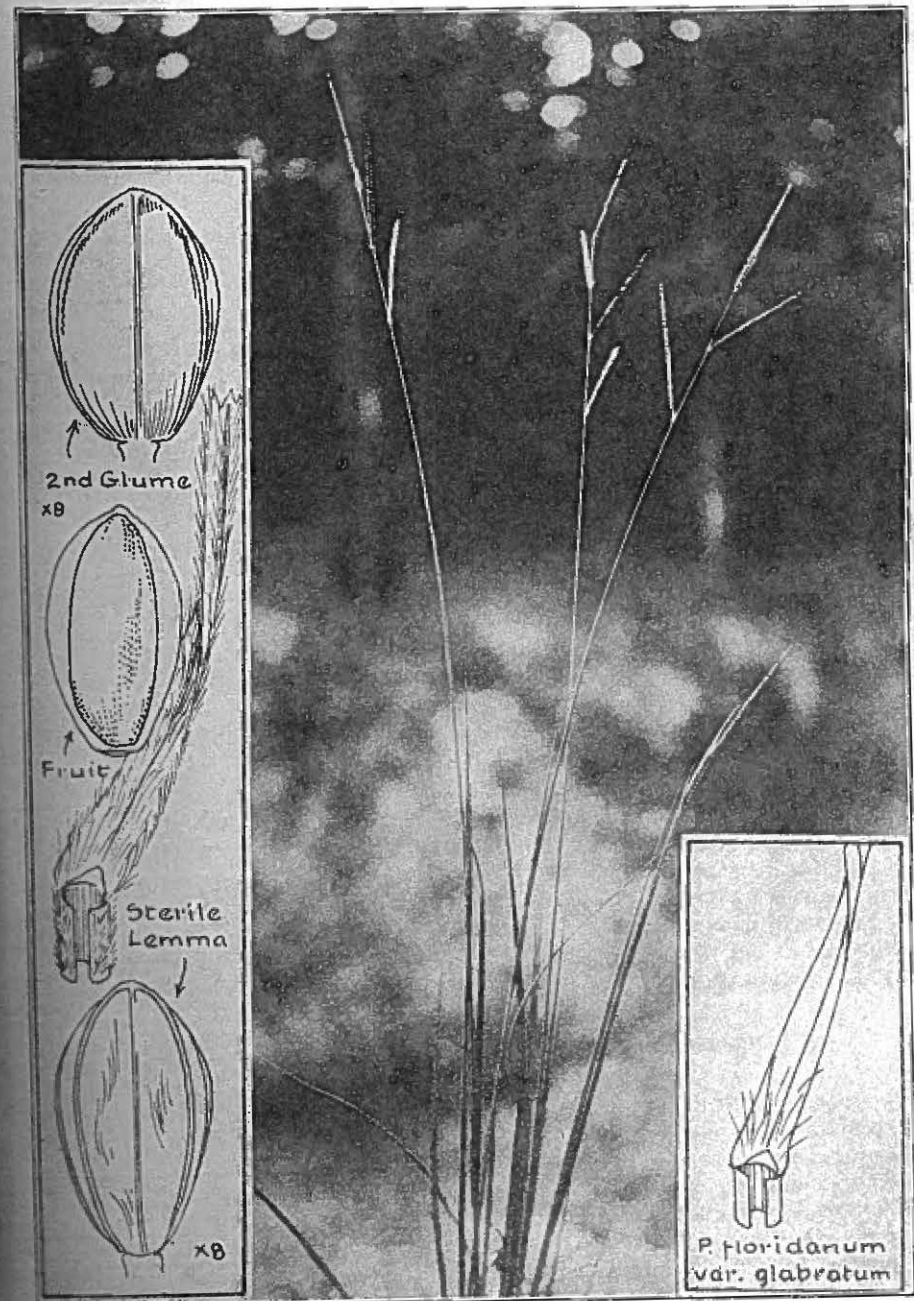
PASPALUM LAEVE, PASPALUM PRAECOX



PASPALUM BIFIDUM, PASPALUM LONGIPILUM,
PASPALUM VIRGATUM



PASPALUM CIRCULARE, PASPALUM LENTIFERUM



PASPALUM FLORIDANUM, drawing of P. FLORIDANUM var. GLABRATUM



PASPALUM PLICATULUM

88. PANICUM L. (păn'î-kûm)

Spikelets more or less compressed dorsiventrally, arranged in open or compact panicles, rarely racemes; **Glumes** 2, herbaceous, nerved, usually very unequal, the **First** often minute, the **Second** typically equaling the sterile lemma, the latter of the same texture and simulating a third glume, bearing in its axil a membranaceous or hyaline palea and sometimes a staminate flower, the palea rarely wanting; **Fertile Lemma** chartaceous-indurate, typically obtuse, the nerves obsolete, the margins inrolled over an inclosed palea of the same texture, a lunate line of thinner texture at the back just above the base, the rootlet protruding through this at germination.

Annual or *perennial* grasses of various habit confined mostly to the warmer regions; about 150 species in the United States, 85 in Texas.

A number of species here included in the genus *Panicum* depart in a measure from the generic characters: the subgenus *Paurochaetium* approaches *Setaria* in that the uppermost spikelet of each branchlet is subtended by a bristle-like prolongation of the axis; *P. geminatum* and *P. paludivagum* have a racemose inflorescence as in *Brachiaria*, but the spikelets are placed with the back of the fruit turned toward the rachis as in True *Panicum*, not in the reverse position as in *Brachiaria*.

In the genera *Axonopus*, *Eriochloa* and *Brachiaria*, the back of the lemma or fruit is turned from the rachis, while in *Digitaria*, *Paspalum* and *Panicum* the back of the fruit is turned toward the rachis. In all except *Panicum* (rarely in *Panicum*) the sessile spikelets are borne on one side of a spikelike raceme. In *Axonopus* the first glume is suppressed, in *Eriochloa* it is reduced to a minute sheath or ring, in *Digitaria* it is sometimes wanting, in *Paspalum* it is typically wanting, and in *Panicum* always present. The first glume in *Panicum* is typically not more than half the length of the spikelet, and is commonly much shorter than this, but in a few species, especially those included under "Miscellaneous Species" at the end of True *Panicum*, the first glume is nearly as long as the second.

Under "Miscellaneous Species" we have four in Texas: *P. obtusum* and *P. gymnocarpon*, with the first glume nearly as long as the spikelet, the last with the fruit about one-third as long as the spikelet; *P. hemitomon*, differing from the typical *Panicums* in that the fruit is less rigid and the tip of the palea is not entirely inclosed by the fertile lemma; and *P. hians* with the sterile palea enlarged at maturity.

Three subdivisions of this genus are recognized in the United States: subgenus *Paurochaetium*, with only a few species in the United States, three in Texas; *Panicum* proper, or True *Panicum*, sometimes known as the subgenus *Eupanicum*; and the subgenus *Dichantheium*. All the species of *Paurochaetium*, *Dichantheium*, and *Miscellaneous Species* are perennials, while those of True *Panicum* include both *perennials* and *annuals*.

The group True *Panicum* and the subgenus *Dichantheium* are susceptible of further divisions into minor groups, the names of which are the plurals of the characteristic species of the group. These names are not intended to be formal and should have no nomenclatorial standing. The term *Angustifolia* is used as if we were to say *P. angustifolium* and its allies. The groups of these two main divisions are arranged to represent their relationship so far as this can be done in a linear sequence. In True *Panicum* the first group, the *Geminata*, is furthest removed from the typical species, the inflorescence resembling that of *Paspalum*.

The *Capillaria*, *Diffusa* and *Virgata*, typical groups, are near the center of the series. In the same way the *Depauperata* are an outlying group of *Dichantherium*, the typical groups being the *Dichotoma* and *Lanuginosa*. The species of each group are also arranged to represent their affinities but it is impossible to indicate the difference in the degree of relationship. Some of the groups are manifestly more homogeneous than others. The group *Geminata*, for example, includes two closely allied species, *P. geminatum* and *P. paludivagum*, and one, *P. purpurascens*, in which the affinity is less evident. The latter species is placed in the same group as the other two partly as a matter of convenience.

In the preparation of the portion of this book relating to the genus *Panicum*, the writer is very much indebted to *The North American Species of Panicum*, by A. S. Hitchcock and Agnes Chase. As far as applicable the groupings and keys, as well as explanations of same, have been copied from this work. As *Panicum* is quite a large genus, with numerous species in Texas, it would be very difficult to collect a specimen of each species. When unable to collect a suitable specimen for photographing, the author, for description and drawing, has rearranged the description of the species as described in that work, and had the artist copy the illustrations.

The photographs and drawings of each subgenus are placed immediately following the description of the last species, *Miscellaneous Species* being placed between True *Panicum* and *Dichantherium*.

In a few cases the photographs show both forms, the vernal and autumnal. A drawing of a spikelet of each species is also shown.

KEY TO SUBDIVISIONS

AXIS OF BRANCHLETS EXTENDING beyond the base of the uppermost spikelet as a point or bristle 1-6 mm. long.

See subgenus *Paurochaetium*, Pages 554-558.

AXIS OF BRANCHLETS NOT EXTENDING into a bristle.

Basal leaves usually distinctly different from those of the culm, forming a winter rosette.

See subgenus *Dichantherium*, Pages 609-655.

Basal leaves not forming a winter rosette.

See True *Panicum* (including *Miscellaneous Species*), Pages 559-608.

Subgenus **PAUROCHAETIUM** Hitchc. & Chase (pô-rô-kê'ti-ŭm).

Perennials; Culms tufted, erect; **Blades** not over 7 mm. wide;

Inflorescence narrow, more or less interrupted, the branches short and appressed, the ultimate branchlets bearing one-to-several spikelets, produced beyond the uppermost spikelet as a bristle 1-6 mm. long; **Spikelets** 1.5-3.5 mm. long, much swollen on the face, glabrous; **Fruit** transversely rugose, apiculate. This group approaches *Setaria* in having branchlets produced into bristles, and in the shape of the spikelets and rugose fruits.

BRISTLES USUALLY SHORTER THAN THE SPIKELET. Spikelets about 2.6 mm. long; blades of the midculm usually more than 4' long.

BRISTLES USUALLY LONGER THAN THE SPIKELET.

Spikelets 3.5 mm. long; blades usually more than 6' long, narrowed toward the base.

Spikelets about 3-3.2 mm. long; blades of the midculm usually less than 4' long, abruptly acute; second glume obscurely reticulate.

1. *P. RAMISETUM* Scribn. (rām-ī-sē'tŭm); *P. subspicatum* Vasey.

Culms 1-3 feet tall, tufted, from short horizontal rootstocks, branching at the base and lower nodes, erect or ascending, sometimes decumbent at the base, somewhat flattened, scabrous below the nodes, the nodes

glabrous to appressed-pubescent, more or less hirsute around the base; **Blades** mostly 3-7' long, 3-6 mm. wide, the lower shorter, flat or soon involute, not narrowed at the base, often sparsely-ciliate, more or less papillose-pilose on the upper surface, sometimes on the lower surface, the papillae sometimes without hairs; **Sheaths** longer or shorter than the internodes, not compressed, sparingly papillose-pilose, especially along the margins and at the summit; **Ligule** a dense ring of hairs 1.5-2 mm. long; **Panicle** finally exserted, 3-8' long, slender, 5-8 mm. thick, sometimes interrupted below, the appressed branches usually less than 10 mm. long, mostly crowded, with 1-3 spikelets on each branchlet, the branchlet extending into a short bristle usually not exceeding the short-pediceled spikelet (some plants have the bristles longer than the spikelet); **Spikelets** 2.4-2.6 mm. rarely 3 mm. long, 1.2-1.5 mm. wide, ovate-lanceolate, acute, turgid, plano-convex; **Glumes**, the first clasping, about half the length of the spikelet, subacute, 3-5-nerved, the second slightly shorter than the **Sterile Lemma**, acute, strongly 5-9-nerved; **Fruit** 1.9-2.2 mm. long, 1.2-1.4 mm. wide, abruptly pointed, transversely rugose. (This species differs from *P. reverchoni* in the smaller spikelets, having more spikelets to a branchlet and therefore a less number of bristles.) (Illustrated on photograph of *P. reverchoni*.)

Sandy plains and prairies, southern Texas to northern Mexico.

2. *P. REVERCHONI* Vasey (rĕv-ĕr-shō'nī).

Culms 12-27' tall, in large tufts, from short rootstocks, erect, simple or with one or two sterile branches toward the base, the slender nodes and lower internodes pubescent with appressed hairs, the numerous culms giving the plant a leafy aspect; **Blades** stiffly erect, 3-8' long, 2-5 mm. wide, flat, or involute at apex, narrowed toward the base, leaves of sterile shoots involute-setaceous, scabrous especially above, somewhat scabrous below, sparsely papillose-ciliate on margins; **Sheaths** mostly longer than the internodes, ciliate on margins near the summit, villous at throat at each end of ligule; **Ligule** very short-ciliate, hairs 1 mm. long or less; **Panicles** somewhat included or long-exserted, very slender, 2-7' long, interrupted, branches short, appressed, branchlets bearing 1-2 short-pediceled or sessile spikelets, the branchlets usually terminated by awn-like bristle 5-8 mm. long; **Spikelets** about 3.5 mm. long, about 2 mm. wide, turgid, elliptic, pointed; **Glumes**, the first about half as long as the spikelet, acute, 3-7-nerved, the second and **Sterile Lemma** slightly shorter than the fruit, strongly 5-7-nerved, often with a few short nerves between the prominent nerves; **Fruit** 3-3.3 mm. long, 1.8-1.9 mm. wide, elliptic, minutely pointed, and minutely transversely rugose.

Rocky or sandy prairies and limestone hills. Spring to fall.

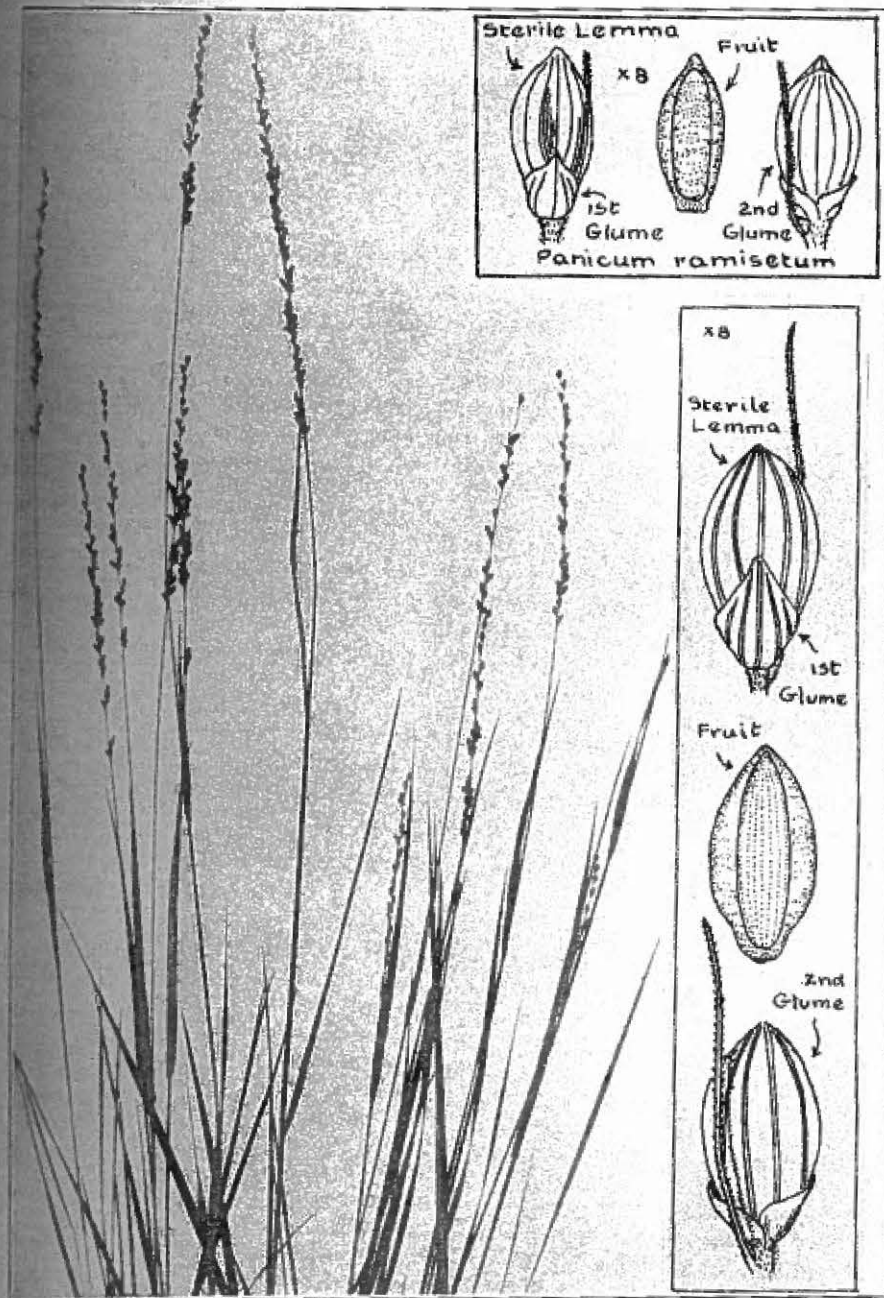
3. *P. FIRMULUM* Hitchc. & Chase (fĭr'mŭ-lŭm).

Culms 10-30' tall, rather loosely tufted, ascending or decumbent at the base, simple or with a few appressed branches, glabrous or the nodes appressed-pubescent, from creeping knotted rootstocks; **Blades** 1-3' (1.5-4') long, 4-7 mm. wide, flat, stiffly ascending or spreading, the lower shorter and more spreading, abruptly acute, rounded at the base, wider than the sheath, smooth or slightly rough on the upper surface, sparsely papillose-ciliate, at least toward the base; **Sheaths** overlapping, striate, papillose or papillose-pubescent or nearly glabrous, often with a tuft of stiff hairs on both sides at the summit; **Ligule** a dense ring of hairs 1.5-2 mm. long, often of different lengths; **Panicles** finally exserted, mostly

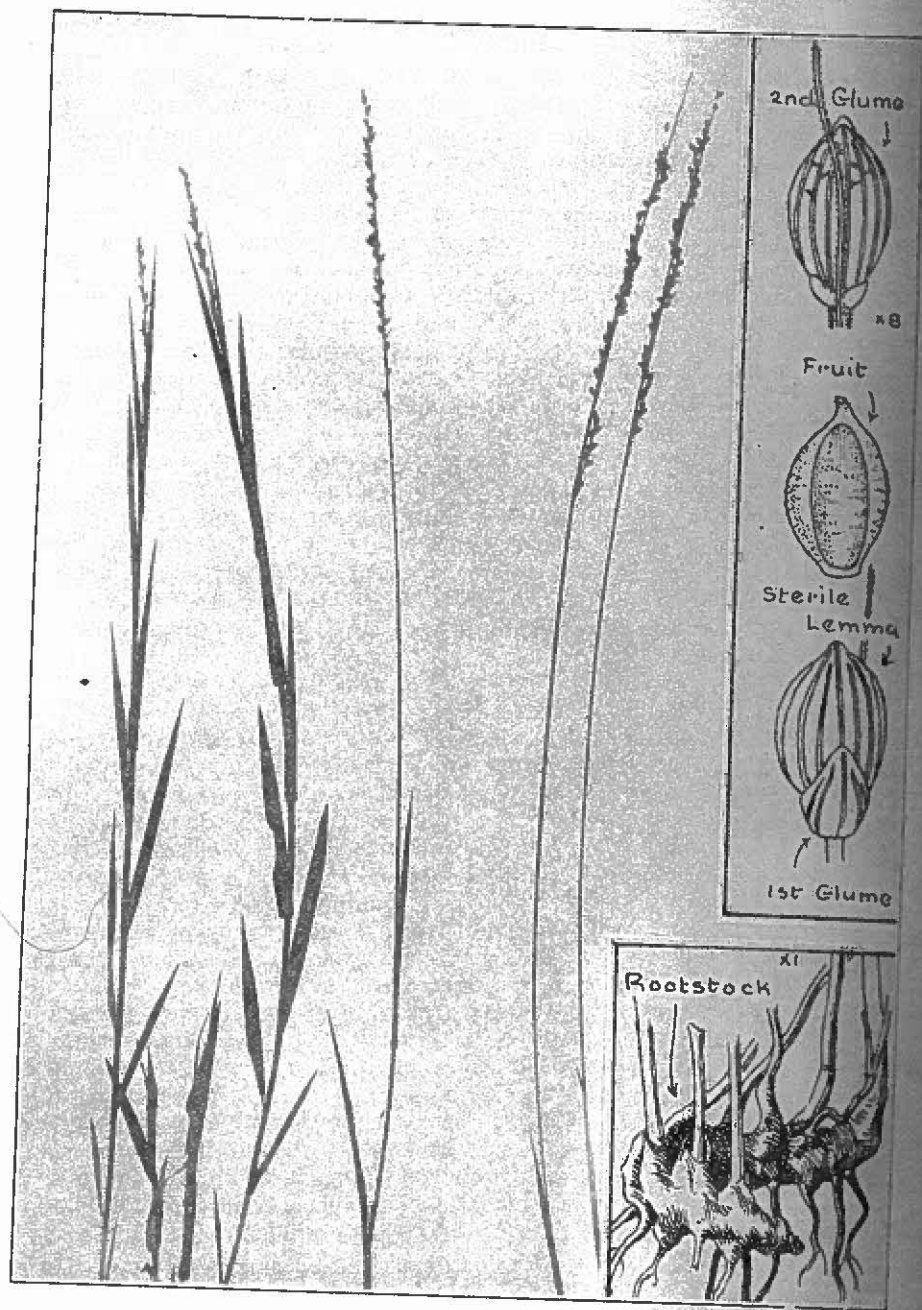
3-5' long, slender, interrupted, the short branches erect and appressed, the branchlets bearing 1-3 short-pediceled spikelets, the setiform prolongation of the axis usually slightly longer or sometimes twice as long as the spikelet; **Spikelets** 3-3.2 mm. long, about 1.8 mm. wide, obovate, subacute, turgid, strongly nerved; **Glumes**, the first clasping, about half as long as the spikelet, pointed, 5-7-nerved, the second and **Sterile Lemma** subequal, scarcely covering the fruit, 5-7-nerved, the glume reticulated toward the summit, sometimes obscurely so, subacute, slightly exceeded by the sterile lemma; **Fruit** about 2.7 mm. long, 1.6-1.8 mm. wide, obovate-elliptic, abruptly acute, very turgid, minutely scabrous at the apex.

This species resembles *P. ramisetum*, from which it differs in the larger spikelets, usually longer setae, broader, more or less ciliate blades, and markedly knotty rootstocks.

Sandy prairies, southern Texas. (Near Encino and Sarita.) Spring.



PANICUM REVERCHONI; drawings of Spikelet of P. RAMISETUM



PANICUM FIRMULUM

TRUE PANICUM AND MISCELLANEOUS SPECIES

(Synopsis of groups—Key to miscellaneous species)

INFLORESCENCE CONSISTING OF SEVERAL MORE OR LESS SECUND
 spikelike racemes, the spikelets short-pediceled.

FRUITS TRANSVERSELY rugose.

Racemes appressed; perennials.

Geminata (p. 559)

Racemes ascending or spreading; annuals.

Fasciculata (p. 561)

FRUITS NOT transversely rugose, spikelets glabrous; perennials. (Miscellaneous Species.)

FIRST glume nearly equaling the sterile lemma.

Racemes spreading; fruit not over one-third the length of the spikelet.

38. *P. gymnocarpon*

Racemes appressed; spikelets 3-3.8 mm. long, obtuse.

39. *P. obtusum*

FIRST glume about half the length of the sterile lemma.

Panicle very narrow; spikelets 2.4-2.7 mm. long; fruit not rigid.

40. *P. hemitomon*

Panicle open, but usually contracted; spikelet- or branchlet-bearing along the upper half or towards the ends only; sterile palea enlarged at maturity.

41. *P. hians*

INFLORESCENCE AN OPEN OR CONTRACTED PANICLE, OR IF WITH
 racemose branches fruit not transversely rugose.

PLANTS ANNUAL; panicles open, usually diffuse.

SPIKELETS glabrous, not warty nor rugulose; fruit polished.

First glume less than one-fourth the length of the spikelet, obtuse or truncate; sheaths glabrous.

Dichotomiflora (p. 564)

First glume nearly half the length of the spikelet or more, acute or acuminate, sheaths hispid.

Capillaria (p. 565)

SPIKELETS warty, rugulose or hispid; fruit not polished, margins of lemma not inrolled; spikelets 2 mm. or more long.

Verrucosa (p. 578)

PLANTS PERENNIAL.

FRUIT transversely rugose (very faintly so in *P. plenum*); spikelets ellipsoid, glabrous; plants robust.

Maxima (p. 570)

FRUIT not transversely rugose; spikelets not silky-villous.

Panicles more or less diffuse; spikelets long pediceled; spikelets pointed, glabrous; culms terete.

Rootstocks wanting; sheaths usually hirsute.

Diffusa (p. 567)

Rootstocks present; sheaths glabrous.

Virgata (p. 572)

Panicles more or less contracted, or the spikelets short-pediceled along the main branches; first glume usually more than one-third the length of the acute spikelets; culms erect, wiry, not geniculate.

Panicles few-flowered; contracted.

Tenera (p. 574)

Panicles many-flowered, open or contracted; the short-pediceled pointed spikelets often secund.

Agrostoidia (p. 575)

GEMINATA (jēm-ī-nā'tá):—Perennials; Culms tall, spreading or creeping; Inflorescence consisting of several erect, or spreading in *P. purpurascens*, spikelike racemes, distributed along an elongated axis; Spikelets secund, glabrous; Fruit more or less transversely rugose or roughened. Growing in water or wet places.

P. geminatum and *P. paludivagum* are similar in aspect, but the latter differs from the former by its succulent lower culms, the lower part submerged, branching and rooting at the lower nodes, the elongated aerial blades, and almost bladeless lower portion, the longer and less turgid spikelets, and nearly smooth fruit.

Para grass has widely creeping stolons, sometimes as much as 10-15 feet long, the flower culms erect from a decumbent or prostrate base, commonly 3-6 feet tall, the nodes bearded. The panicles consist of several spikelike racemes, usually ascending or spreading. It is found growing along irrigation ditches, especially in the water and along the banks, often a tangle of prostrate or decumbent culms and stolons. It is said to flower

NODES GLABROUS; panicle branches appressed.

Spikelets not over 2.4 mm. long; glumes and sterile lemma not papery.

Spikelets 3 mm. long; glumes and sterile lemma papery.

NODES BEARDED; panicle branches ascending or spreading.

4. *P. GEMINATUM* Forsk. (jēm-ī-nā'tūm).

Culms commonly 2-3 feet tall, tufted, usually numerous, erect or ascending from a more or less decumbent base or with stolons rooting at the nodes, scarcely succulent, sparingly branched; **Blades** 4-8' long, 3-5 mm. wide, flat, or involute toward the apex, somewhat rough on upper surface; **Sheaths** overlapping, close; **Ligule** ciliate, about 1 mm. long; **Panicle** short-exserted or included at the base, 5-15' long, narrow, the axis angled, hollowed out next to the racemes, scabrous toward the apex, the racemes commonly 12-18, appressed, erect or narrowly ascending, the lower distant, the upper gradually shorter and approximate, the lower 25-35 mm. long, the rachis usually ending in a pointed prolongation, the spikelets in two rows, single, on one side of a triangular winged rachis; **Spikelets** subsessile, about 2.3 mm. long, 1.4 mm. wide, turgid, abruptly and minutely pointed; **Glumes**, the first about one-third the length of the spikelet, obtuse or truncate, usually 3-nerved, the second nearly as long as the fruit, exceeded only by the point of the fruit, 5-nerved; **Sterile Lemma** 5-nerved, abruptly pointed, equaling the fruit, and like the second glume faintly reticulate toward the apex, inclosing a hyaline palea and usually an abortive staminate flower; **Fruit** about 2.2 mm. long, 1.2 mm. wide, elliptic, abruptly pointed, strongly transversally rugose.

Moist ground or shallow water, mostly near the coast, Texas and southwest Florida. (Mitchell Lake, Bexar county.) Spring to fall.

5. *P. PALUDIVAGUM* Hitchc. & Chase (pāl-ōō-dīv'ā-gūm); **WATER-GRASS.**

Culms erect or ascending, from a long creeping base, the upper portion out of the water 1-3 feet, the submerged portion often 3-4 feet long, the upper internodes somewhat flattened, the lower more or less swollen, soft and succulent, taking root at the dark constricted nodes, the lower portion sometimes branching; **Blades** 6-13' long, 3-7 mm. wide, conduplicate at the base, laxly ascending, the upper surface scabrous, those of the submerged portion often reduced or rudimentary, soon deciduous; **Sheaths** longer than the internodes, the upper flattened, loose at the summit, papery, smooth, mostly deciduous from the submerged portion; **Ligule** ciliate, about 1 mm. long; **Panicle** exserted or included at the base, blades often equaling or exceeding the panicle, narrow, 8-12' long, axis angled, the edges scabrous toward the summit, furrowed out next to each raceme, the racemes about 12-15, erect or appressed, commonly 15-35 mm. long, the lower distant, the upper gradually shorter and approximate, the axis ending in a rudimentary spikelet or slender pointed prolongation; the spikelets appressed, in two rows on one side of a triangular winged rachis, those on one side overlapping about half way those of the other side, single, subsessile; **Spikelets** 2.8-3 mm. long, about 1.4-1.6 mm. wide, narrowly ovate, subacute, not turgid; **Glumes** papery, the first about one-fifth the length of the spikelet, nerveless, erose-truncate; the second half to two-thirds the length of the spikelet, faintly 3-5-nerved; **Sterile Lemma** papery, as long as the fruit, 5-nerved, enclosing a palea of about equal length and a staminate flower; **Fruit** about 2.8-3 mm. long, 1.2-1.3 mm. wide, narrowly ovate, acute, very obscurely rugose, the margins scarcely inrolled.

More or less submerged in fresh water, rivers and lakes of the interior and along the coast. Texas, Florida and Mexico. (Sabinal River near Sabinal.) Spring to fall.

6. *P. PURPURASCENS* Raddi (pūr-pūr-ās'ēns); *P. barbinode* Trin.; (has been wrongly referred to as *P. molle* Sw.) ; **PARA GRASS.**

Culms commonly 3-6 feet tall, erect or ascending from stout creeping stolons or a decumbent base, taking root at the lower nodes, robust, simple or producing leafy shoots, the swollen nodes densely-villous; **Blades** 4-12' long, 10-15 mm. wide, flat, rounded at the base, lanceolate, ascending or spreading, margins scabrous; **Sheaths** mostly about equal to the internodes, from glabrous, especially toward the summit, to softly villous or merely papillose, but densely-pubescent at the collar and at the base close to the nodes; **Ligule** membranaceous, including the ciliate hairs slightly over 1 mm. long; **Panicle** finally exserted, oblong-pyramidal, 4-8' long, one-third to one-half as wide, purplish or lead color, the axis 4-6' long, scabrous on the edges, racemes commonly 10-18, the lower 4' long or less, the upper shorter, densely-pubescent in the axils, ascending or spreading, rather distant, subracemose, densely-flowered, the spikelets mostly on short branchlets with a few to a dozen or more spikelets to a branchlet, alternate on one side of a flattened rachis, a few stiff hairs on the short pedicels; **Spikelets** 3-3.2 mm. long, 1.4 mm. wide, elliptic; **Glumes** membranaceous, the first about 1 mm. long, 1-nerved, acute; the second and **Sterile Lemma** about equal, both slightly exceeded by the sterile palea which is as long as the spikelet, 5-nerved, obtuse; the **Palea** often subtending a staminate flower; **Fruit** 2.3-2.5 mm. long, 1.1 mm. wide, obtuse, minutely transversely rugose or roughened.

Cultivated and waste ground escaped from cultivation; Texas to Florida. (Mercedes.) Summer and fall.

FASCICULATA (fä-sik-ū-lā'tā):—**Annuals**; usually rather wide flat blades; **Ligule** ciliate or membranaceous-ciliate, not over 1 mm. long; **Inflorescence** of several narrow or spikelike racemes along a main axis; **Second Glume** and **Sterile Lemma** usually more or less reticulate-veined, at least toward the apex, the **Lemma** inclosing a palea of nearly equal length and often a staminate flower; **Fruit** transversely rugose.

SPIKELETS STRONGLY RETICULATE-VEINED, bronze to mahogany-colored, glabrous.

Spikelets 2.1-2.5 mm. long; blades 6-20 mm. wide, pubescent or glabrous.

8. *P. fasciculatum*

Spikelets 2.6-3.2 mm. long, blades narrow, 6-10 mm. wide, pubescent.

8a. *P. fasciculatum* var. *reticulatum*

SPIKELETS SCARCELY RETICULATE-VEINED, or only near the apex.

Spikelets 2 mm. long, glabrous; plants usually prostrate.

7. *P. reptans*

Spikelets 3.5-3.8 mm. long, pubescent, rachis sparsely hispid; sheaths papillose.

9. *P. arizonicum*

Spikelets 5-6 mm. long, sparsely pilose.

10. *P. texanum*

7. *P. REPTANS* L. (rēp'tāns).

Culms ascending, 4-12' tall, above the decumbent or creeping base, usually prostrate, rooting at the nodes, freely branching, slender, nodes puberulent; **Blades** lanceolate or ovate-lanceolate, about 1.5-2.5' long, 4-12 mm. wide, cordate, glabrous or puberulent on both surfaces, the undulate margins scabrous, papillose-ciliate with stiff hairs at base; **Sheaths** shorter than the internodes, loose, densely ciliate; **Ligule** a dense ring of hairs less than 1 mm. long; **Panicle** about 1-2.5' long, finally long-exserted,

consisting of about 5-13 spikelike racemes, ascending or spreading, solitary or somewhat fascicled, the lower 20-30 mm. long, upper shorter; rachises and pedicels scabrous, often sparsely pilose with rather long hairs, spikelet-bearing on one side of the rachis, rather densely clustered, branches very short, pedicels about 1 mm. long or less, with short rather stiff hairs; **Spikelets** about 2 mm. long, about 1 mm. wide, acute; **Glumes**, the first about one-fifth the length of the spikelet, rounded or truncate, the second and **Sterile Lemma** slightly exceeding the fruit, strongly 5-7-nerved; **Fruit** slightly shorter and narrower than the spikelet, elliptic, apiculate.

Moist open ground and frequent weed in waste places and cultivated soil; Texas to Florida; Mexico. Spring and summer.

8. *P. FASCICULATUM* Swartz (fă-sîk-û-lă'tûm); *P. fuscum* Swartz; *P. fuscum* var. *fasciculatum* Griseb.

Plants erect or spreading from a decumbent base, the more robust becoming much branched from the lower nodes; **Culms** 12-40' tall, sometimes taller, glabrous or scabrous, or sometimes pubescent below the panicle or hispid below the appressed-pubescent nodes; **Blades** 1.5-12' long, 6-20 mm. wide, flat, glabrous, usually scabrous above, sometimes sparsely hispid on one or both surfaces, the nerves in the larger blades conspicuous, sometimes appearing somewhat plicate; **Sheaths** glabrous to papillose-hispid; **Ligule** a dense ring of hairs about 1 mm. long; **Panicle** 2-6' long, short-exserted or included at the base until maturity, consisting of a series of spikelike racemes arranged along a scabrous sometimes pilose main axis, the racemes 2-4' long, solitary or fascicled, narrowly ascending to spreading, spikelet-bearing from the base, or naked below, the short-pedicled spikelets approximate or somewhat crowded, borne singly or 2-3 together on short branchlets, along the under side of the rachis; **Spikelets** bronze to mahogany colored, 2.1-2.5 mm. long, in occasional specimens as much as 3 mm. long, obovate, turgid, abruptly short-pointed, glabrous; **Glumes**, the first clasping, about one-third the length of the spikelet, subacute, 5-7-nerved, the second glume and **Sterile Lemma** slightly exceeding the fruit, 9-nerved, faintly to strongly transversely wrinkled between the nerves; **Fruit** 1.9-2.3 mm. long, obovate, obscurely apiculate.

This species is variable in the amount of pubescence and in the size of the spikelets. The greater number of specimens from Mexico and the United States have spikelets 2.5-2.8 mm. long. There are many specimens intermediate between the species and subspecies. (Illustrated on photograph of *P. fasciculatum* var. *reticulatum*.)

Moist open ground, often a weed in fields and along roadsides, southern Florida and southern Texas, southward through Mexico. (Robstown.)

8a. *P. FASCICULATUM* var. *RETICULATUM* (Torr.) Beal (rê-tik-û-lă'tûm).

Culms 6-30' tall, tufted, decumbent at the base, branching from lower nodes, spreading or erect, pubescent at and below the nodes, axis hispidulous just below panicles; **Blades** 2-6.5' long, 6-10 mm. sometimes 15 mm. wide, flat, flaccid, rough, especially above, ciliate on the margins, usually harshly pubescent on both surfaces; **Sheaths** shorter than the internodes, upper inflated, densely ciliate, more or less hispid or papillose-hispid; **Ligule** membranaceous-ciliate about 1 mm. long; **Panicles** exserted or included at base until maturity, 3-6' long, consisting of about 10 spike-like racemes along a scabrous sometimes pilose axis, pubescent in the axils,

the racemes commonly less than 2' rarely 4' long, ascending or spreading, usually solitary and distant about one-half their length, spikelet-bearing nearly or to the base, the short-pedicled spikelets approximate or crowded, single or two or three together, on short branchlets, along the under side of the axis of the raceme, apex of pedicels often pilose; **Spikelets** 2.6-3.2 mm. long, about 1.7-1.9 mm. wide, obovate; **Glumes**, the first ovate, about one-third as long as the spikelet, 3-5-nerved; the second and **Sterile Lemma** about 7-nerved (7-9-nerved) as long as the spikelet and slightly exceeding the fruit, bronze to mahogany colored, strongly transversely wrinkled between the nerves; the **Lemma** enclosing a palea of nearly equal length; **Fruit** 2.3 mm. long and about 1.3 mm. wide, slightly obovate, obscurely apiculate, transversely rugose.

Prairies, fields and waste ground; Texas and Arizona to Mexico. (Common near San Antonio.) Spring and summer.

9. *P. ARIZONICUM* Scribn. & Merr. (ăr-î-zôn'î-kûm).

Culms 8-24' tall, tufted, erect or ascending from a decumbent base, often rooting at the lower nodes, branching, bristly-hispid below the panicle and sometimes sparsely pubescent at the nodes; **Blades** 2-6' long, 5-12 mm. wide, ascending or spreading, flat, rounded at the base, glabrous on both surfaces, or scabrous to papillose-hispid beneath, the scabrous, thin cartilaginous margin usually papillose-ciliate at the base; **Sheaths** shorter than the internodes, or the upper overlapping, rather loose, glabrous to strongly papillose-hispid; **Ligule** a ring of hairs about 1 mm. long; **Panicles** 3-8' long, finally exserted, open, the solitary loosely-flowered slender branches ascending, 2' long or less, the spikelets borne on very short appressed branchlets, the pedicels, main axis and branches scabrous and more or less papillose-hirsute or hispid; **Spikelets** 3.5-3.9 mm. long, about 1.8 mm. wide (drawing was made from immature spikelets; they are plumper when more mature), obovate-elliptic, abruptly pointed, attenuate at the base, densely pubescent to glabrous, the hairs rather stiff, bronze or dirty-yellow; **Glumes**, the first about half the length of the spikelet, clasping, acute, 5-nerved, the second and **Sterile Lemma** pointed beyond the fruit, the glume 5-7-nerved, the lemma 5-nerved, the nerves often reticulate; **Fruit** 2.9-3 mm. long, 1.5-1.6 mm. wide, obovate-elliptic, apiculate.

This species varies much as to size and amount of pubescence. Open sandy or rocky ground, western Texas to southern California and northern Mexico; introduced into North Carolina, South Carolina, Florida and Mississippi. (Rocky ground about 10 miles west of Van Horn, banks of foothills.) Fall.

10. *P. TEXANUM* Buckl. (têks-ă'nûm); COLORADO GRASS, CONGHO GRASS, TEXAS MILLET.

Culms 1-5 commonly 2-3 feet rarely as much as 10 feet tall, tufted, erect or ascending, often decumbent and rooting at the lower nodes, branching from the middle and lower nodes, leafy, softly pubescent, at least below the nodes and beneath the panicles; **Blades** ascending or spreading, 3-8' long, 7-16 mm. wide, flat, rounded at the base, softly pubescent on both surfaces, often finely papillose; **Sheaths**, the lower pubescent than the internodes, the upper usually overlapping, densely ciliate, shorter than the internodes, the upper usually overlapping, densely ciliate, softly pubescent; **Ligule** about 1 mm. long, ciliate; **Panicles** finally exserted, 3-10' long, 10-30 mm. thick, the main axis much exceeding the erect branches, the axis densely clothed with short pubescence having

long stiff hairs intermixed, the short-pedicel spikelets somewhat crowded on several narrow spikelike racemes, 1.5-4' long, commonly 6-12; **Spikelets** 5-6 mm. long, about 2 mm. wide, fusiform, pointed, short-attenuate at the base, pilose; **Glumes**, the first more than half the length of the spikelet, 3-5-nerved (3-7), acute, the second and **Sterile Lemma** exceeding the fruit, often obscurely reticulate, 5-7-nerved; **Fruit** 3.7-3.8 mm. long, about 2 mm. wide, elliptic, apiculate, transversely rugose. (Illustrated on photograph of *P. reptans*.)

Prairies and open ground, often a weed in waste ground and cultivated fields, especially in corn fields in late summer and fall. Texas and northern Mexico; introduced into North Carolina, Oklahoma, Florida and Oregon. Summer and fall.

DICHOTOMIFLORA (dī-kōt-ō-mī-flō'rā):—**Annual** plants with mostly large, spreading panicles, the branchlets short and appressed along the ascending or rarely spreading main branches; **Ligule** membranaceous below, densely ciliate above, 1-3 mm. long; **Spikelets** glabrous, narrow, acute or acuminate, the first glume one-fifth to one-fourth as long, truncate or with a broadly triangular tip; **Fruit** smooth and shining.

Our one species of this group, *P. dichotomiflorum*, is common along irrigation canals and ditches, and low bottoms in the rice fields in south-east Texas.

This species as it occurs in the United States is usually glabrous throughout but varies much in size of the blades and spikelets, the latter varying from 2-3.2 mm. in length. Specimens are often found with the blades sparsely or even densely pilose. These variations cannot be in any way correlated, and each is connected by intergrading specimens with the typical form.

11. *P. DICHOTOMIFLORUM* Michx. (dī-kōt-ō-mī-flō'rūm); **SPREADING WITCH-GRASS.**

Culms 1.5-3.5 feet sometimes over 6 feet long, usually freely branching, at first erect, finally ascending, or spreading from a geniculate or prostrate base, usually smooth throughout (in tropical forms more or less pubescent), somewhat flattened, often thick and succulent, drying furrowed, the nodes swollen, at least the lower; **Blades** 3-20' long, 3-20 mm. wide, flat, or sometimes folded, the white midnerve usually prominent, rough on the margins and surface except below near the base, or sometimes sparsely pilose above; **Sheaths** usually longer than the internodes, somewhat flattened, loose, ciliate on the margins toward the summit; **Ligule** membranaceous, ciliate, 1-2 mm. long; **Panicles** terminal and axillary, included at the base or tardily exerted, 4-15' long, the main branches ascending or finally spreading or even reflexed, 3-6' long, usually single or in twos, naked at the base, the main axis and branches scabrous toward the summits, the short branchlets appressed, bearing short-pedicel, often rather crowded spikelets; **Spikelets** 2-3.2 mm. usually 2.5 mm. long, about 0.9 mm. wide, narrowly oblong, acute, often greenish-purple; **Glumes**, the first usually less than one-fourth the length of the spikelet, truncate or broadly triangular, 1-3-nerved, the second and **Sterile Lemma** about equal, somewhat pointed beyond the fruit, rather faintly 7-nerved, the palea of the sterile lemma nearly equal to the fruit or wanting; **Fruit** about 2 mm. long, 0.8 mm. wide, elliptic.

Moist ground, along streams, and a weed in waste places and cultivated soil. Texas to Florida, north to Maine and Nebraska. (Common in

CAPILLARIA (kăp-ī-lăr'ī-ă):—**Annuals**; papillose-hispid at least on the sheaths, or rarely glabrous; **Ligule** membranaceous, ciliate, 1-3 mm. long; **Panicles** many-flowered, more or less diffuse, often breaking away at maturity and rolling before the wind; **Spikelets** pointed, glabrous, the first **Glume** large and clasping, the **Fruit** often falling from the spikelet before the disarticulation of the latter, smooth and shining, usually olive-brown at maturity, the nerves showing as faint pale lines.

P. miliaceum, known as hog-millet, commonly 2-3 feet tall, with large blades and large heavy drooping panicles, is often cultivated for forage and fodder, frequently escaping from cultivation. It is cultivated at many places in Texas.

P. capillare, known as old-witch grass, has a large purplish panicle, at maturity often as broad as long, the numerous long-pedicel spikelets at the ends of the many branches. At maturity the panicle breaks away and rolls before the wind as a tumble-weed. The plants, especially the larger ones, are conspicuous for their purplish panicles.

P. flexile, with a long but narrow panicle, and *P. capillare* var. *occidentale*, with a long broad panicle, have spikelets much larger than those of *P. capillare*. *P. philadelphicum* differs from *P. capillare* in the few-flowered slender panicle and more divergent branches. *P. hirticaule*, usually with reddish-brown spikelets, has the first glume half to two-thirds the length of the spikelet.

PANICLES MORE OR LESS DROOPING. Spikelets 4.5-5 mm. long; in cultivation; introduced. 16. *P. miliaceum*

PANICLES ERECT, USUALLY LONG.

PANICLES MORE than half the length of the entire plant; first glume one-third to half as long as the spikelet.

PANICLES narrow, usually less than half as broad as long; spikelets 3.1-3.5 mm. long. 12. *P. flexile*

PANICLES diffuse, as broad as long.

Spikelets 2-2.2 mm. rarely 2.5 mm. long; blades not crowded toward the base. 14. *P. capillare*

Spikelets 3-3.3 rarely 2.5 mm. long; blades usually crowded toward the base. 14a. *P. capillare* var. *occidentale*

PANICLES NOT more than one-third the entire length of the plant; first glume two-fifths to two-thirds as long as the spikelet.

Spikelets 1.7-2 mm. long, not turgid, acute but not long-acuminate; panicle diffuse; plants slender, with blades not over 6 mm. wide.

13. *P. philadelphicum*
Spikelets 2.7-3.3 mm. long; panicle branches narrowly ascending; blades 4-13 mm. wide. 15. *P. hirticaule*

12. *P. FLEXILE* (Gattinger) Scribn. (flēks'īl); **WIRY WITCH-GRASS.**

Culms 8-28' tall, erect, slender, freely branching from the base, glabrous or somewhat hispid below, the nodes pubescent; **Blades** as much as 12' long, 2-6 mm. wide, rarely narrower, erect but not stiff, glabrous or sparsely hispid; **Sheaths** papillose-hispid, the hairs shorter than in *P. capillare*; **Panicles** 4-8' rarely 12' long, oblong, about one-third as wide, the branches at first narrowly ascending, somewhat spreading at maturity, the peduncles of the panicle not brittle and readily breaking as in *P. capillare*; **Spikelets** long-pedicel, 3.1-3.5 mm. long, 0.9-1 mm. wide, lanceolate, acuminate; **Glumes**, the first about one-third the length of the spikelet, the second slightly longer than the **Sterile Lemma**, both 7-9-nerved, much exceeding the fruit, the palea of the sterile floret wanting; **Fruit** 2 mm. long, 0.9 mm. wide, elliptic.

This species is distinguished from *P. capillare* by the more slender culms, less pubescent panicles, narrower blades, less diffuse panicles and the

longer acuminate spikelets; and from *P. philadelphicum* by the narrow panicle and larger, acuminate and longer-pedicelled spikelets. (See drawing.)

Sandy, mostly damp soil, meadows and open woods, east Texas to Florida, north to South Dakota and Ontario; introduced in Utah. Summer-fall.

13. *P. PHILADELPHICUM* Bernh. (fil-à-dě'f'i-kūm); WOOD WITCH-GRASS.

Plants light-yellowish-green, in small tufts, freely branching, 8-20' tall, erect, or rarely decumbent at the base, depauperate, northern specimens sometimes forming small mats; Culms slender, the lower internodes much shortened, more or less zigzag at the base, papillose-hispid to nearly glabrous; Blades 1.5-6' long, 2-6 mm. wide, erect or ascending, sparsely hirsute, rarely nearly glabrous; Sheaths mostly longer than the internodes, papillose-hispid; Panicles exserted, diffuse, ovoid, 4-8' long, forming one-third the entire length of the plant or more, few-flowered, the capillary scabrous branchlets solitary, bearing rather short-pedicelled spikelets, usually in twos at the ends; Spikelets 1.7-2 mm. long, 0.7 mm. wide, elliptic; Glumes, the first about two-fifths the length of the spikelet, 5-nerved, acute, the second and Sterile Lemma equal, only slightly exceeding the fruit, the palea of the sterile lemma wanting; Fruit 1.5 mm. long, 0.6 mm. wide, elliptic.

This species differs from *P. capillare* in its narrow, erect blades, more slender culms, and smaller, few-flowered panicles, with more divergent branches, and spikelets mostly in twos. The spikelets are usually slightly smaller, but the spikelets of the type of *P. philadelphicum* and of several other specimens are 2 mm. long. (See drawings of *P. flexile*.)

Dry open or sandy ground, Texas to Mississippi, Georgia, north to Maine, Oklahoma and Wisconsin. (Dallas county.) Summer-fall.

14. *P. CAPILLARE* L. (kăp-i-lăr'ē); OLD-WITCH-GRASS.

Culms 9-34' tall, tufted, erect, or ascending from a decumbent or geniculate base, simple or sparingly branched especially at the base, papillose-hispid to nearly glabrous, densely hispid or pubescent at the nodes; Blades 4-10' long, 5-20 mm. wide, larger blades slightly narrowed and rounded at the base, midrib prominent, papillose-hispid on the margins, hispid on both surfaces or nearly glabrous above; Sheaths usually longer than the internodes, densely papillose-hispid; Ligule very short, ciliate; Panicle included at the base until maturity, 3-15' long, often more than half as long as the plant, nearly as broad, erect, ovate or pyramidal, diffuse, the scabrous and sparsely pilose branches in ones to threes, 1-8' long, ascending or at maturity divaricately spreading, the main axis sparsely pilose, scabrous toward the apex, the numerous capillary scabrous branchlets bearing toward their ends long-pedicelled spikelets, the whole panicle breaking away and rolling before the wind; Spikelets 2-2.5 mm. long, about 0.9 mm. wide, elliptic; Glumes, the first about half the length of the spikelet, acute, 5-7-nerved, the second and Sterile Lemma equal or subequal, the glume often slightly longer, more or less acuminate beyond the fruit; Palea of the sterile floret wanting; Fruit about 1.5 mm. long, about 0.8 mm. wide, elliptic, shiny, brownish, strongly nerved with several pale nerves.

Open ground, fields and waste places. Texas to Florida, north to Maine, the Dakotas and Colorado. Spring and summer.

14a. *P. CAPILLARE* var. *OCCIDENTALE* Rydb. (ök-si-děn-täl'ē); *P. barbipulvinatum* Nash; BARBED WITCH-GRASS.

Differs from the species chiefly in being on the average lower; Blades shorter, crowded toward the base, less pubescent; Panicles more exserted, the branches early divaricate; Spikelets usually about 3 mm. (2.5-3.3) long, acuminate. (See drawings of *P. flexile*.)

Open ground and waste places, Texas to California and north to Canada. (Abilene.)

15. *P. HIRTICAULE* Presl (hīr-ti-kô'lē).

Culms 6-28' tall, erect, simple or nearly so, or sometimes branching and decumbent at the base, papillose-hispid to glabrous, nodes hispid, the hairs spreading; Blades 2-6' long, 4-13 mm. wide, often cordate at the base, sparsely hispid or nearly glabrous, ciliate toward the base; Sheaths papillose-hispid, but sometimes sparsely so; Panicle exserted, 2-6' long, scarcely one-third the entire length of the plant, rather many-flowered, the branches ascending, the lower usually narrowly so, scabrous but not pilose, bearing rather short and appressed-pedicelled spikelets along half to two-thirds their length, the glabrous pulvini inconspicuous; Spikelets 2.7-3.3 mm. long, 1-1.1 mm. wide (smaller in occasional specimens) lanceolate-fusiform, acuminate, typically reddish-brown; Glumes, the first half to three-fourths the length of the spikelet, acuminate, the midnerve scabrous toward the apex, the second slightly longer than the Sterile Lemma, both much exceeding the fruit, strongly many-nerved, the midnerves scabrous toward the summit, the palea of the sterile floret small, nerveless; Fruit 2 mm. long, 1 mm. wide, elliptic, a scar sometimes showing on either side at the base.

This species is variable; the Mexican specimens are mostly fairly typical, but the more northern are often rather freely branching, or the panicles are less strict, or the spikelets not reddish. (See drawings of *P. flexile*.)

Rocky or sandy soil, western Texas to southern California, and south through Mexico. (El Paso.)

16. *P. MILIACEUM* L. (mīl-i-ā'sē-ūm); BROOMCORN MILLET.

Culms 8-36' tall, stout, erect, or decumbent at the base, usually branching from the basal nodes, hispid below the pubescent nodes or glabrous; Blades as long as 12', as wide as 25 mm., rounded at the base, gradually narrowed to the apex, more or less pilose on both surfaces, margins scabrous, sometimes almost glabrous; Sheaths usually shorter than the internodes, papillose-hispid; Ligule a ring of hairs about 1 mm. long; Panicle 4-12' long, usually more or less included at the base, commonly nodding, rather compact, the numerous very scabrous branches narrowly ascending, several inches long, spikelet-bearing toward the summit; Spikelets 4.5-5 mm. long, ovate, acuminate, strongly many-nerved; Glumes exceeding the fruit, the first about half the length of the spikelet or even longer, acuminate, the second and Sterile Lemma subequal, the sterile lemma subtending a small palea; Fruit about 3 mm. long, 2 mm. wide, elliptic, stramineous to reddish-brown.

Waste places or in cultivation. Abundant in the northeastern states, here and there over most of the United States. Spring and summer.

DIFFUSA (dif-ū'zà):—Perennials; Culms stiff, somewhat tufted, sheaths mostly hirsute; Blades long and narrow; Ligule membranaceous,

ciliate, 1-3 mm. long; **Spikelets** mostly narrowly ovate, acuminate, glabrous; first glume clasping, the equal second glume and **Sterile Lemma** exceeding the fruit and pointed beyond it, the **Palea** and sterile floret about half as long as its lemma; **Fruit** smooth and shining. The species of this group often resembles those of *Capillaria*, especially in their spikelets, but the latter are all annuals.

P. hirsutum, a stout plant 3-5 feet tall, with blades 20 mm. wide more or less, is found in the United States only in the Rio Grande Valley from Mercedes to Brownsville; *P. capillarioides*, with the fruit about one-third as long as the second glume and sterile lemma, is confined to southern Texas and northern Mexico; *P. hallii*, with spikelets 3-3.2 mm. long and *P. filipes*, with spikelets 2.2-2.6 mm. long, both 1-2 feet tall, have blades glaucous on the upper surface and less than 8 mm. wide, the uppermost blades of *P. filipes* usually equaling or exceeding the panicle.

SECOND GLUME AND STERILE LEMMA ELONGATED, at least three times as long as the fruit; spikelets 5-6 mm. long. 17. *P. capillarioides*

SECOND GLUME AND STERILE LEMMA NOT ELONGATED; panicles usually more or less diffuse.

BLADES 20 mm. WIDE more or less; plants stout, 3-5 feet tall, ascending or spreading; spikelets 2-2.2 mm. long. 20. *P. hirsutum*

BLADES LESS than 8 mm. wide, usually glabrous on both surfaces, glaucous above; plants erect, usually 1-2 feet tall.

Panicles much exceeding the blades; spikelets 3-3.5 mm. long. 19. *P. hallii*

Panicles usually equaled or exceeded by the uppermost blades; spikelets 2-2.6 mm. long. 18. *P. filipes*

17. *P. CAPILLARIOIDES* Vasey (kăp-î-lăr-î-oi'děz).

Culms 10-30' tall, in small or large spreading tufts, sparingly branched, erect or ascending, flattened, almost glabrous to appressed-pubescent, the nodes densely-pubescent; **Blades** 4-12' long, 4-9 mm. wide, slightly rounded at the narrowed base, flat, stiffly ascending, margins papillose-ciliate, papillose-pubescent on both surfaces, slightly so below; **Sheaths** about equal to the internodes, harshly papillose-pubescent; **Ligule** loose, hairs about 1.5-2 mm. long; **Panicle** commonly short-exserted, 4-12' long, often as wide as long, diffuse, few-flowered, branches stiffly spreading, as much as 8' long, mostly single and alternate, scabrous, naked at base, axils pubescent, bearing short-pedicel spikelets near the end; **Spikelets** 5-6 mm. long, about 1.2 mm. wide, lanceolate, acuminate; **Glumes**, the first about 2.5 mm. long, acute, 5-7-nerved; the second and **Sterile Lemma** about equal, acuminate, many-nerved and about three times as long as the fruit; **Fruit** about 1.8 mm. long and nearly 1 mm. wide, obtuse, elliptic, pale, shining.

Prairies, southern Texas and northern Mexico. Spring and fall.

18. *P. FILIPES* Scribn. (fil'î-pěz).

Culms 1-2.5 feet tall, in small to rather large dense tufts, erect or spreading, stiff, simple or sparingly branched, glabrous except the sparsely-appressed pubescent nodes, the panicles readily disarticulating at the first node below the panicle; **Blades** 4-12' long, 3-7 mm. wide, the uppermost blades often equaling or exceeding the panicles, thin, ascending or laxly spreading, flat, or those of the sterile shoots narrow and involute, the upper surface and margins usually rough, glabrous or sparsely pubescent on the upper surface toward the base, or sparsely papillose-hirsute on the midrib on the under surface toward the base; **Sheaths** shorter or sometimes longer than the internodes, villous at the throat, otherwise glabrous or sparsely papillose-hispidulous; **Ligule** mem-

branaceous, ciliate, 1-3 mm. long; **Panicle** purple, usually erect, finally exserted, 3-10' long, about three-fourths as wide, the slender axis and branches rather rigid and rough, the axils especially the lower often more or less pilose, the branches ascending or spreading, in ones to fours, the lower usually 4-7' long, naked at the base, some specimens branchlet- and spikelet-bearing only at the extremities and others on the upper three-fourths, the comparatively few spikelets on scabrous pedicels 1-3 times the length of the spikelet; **Spikelets** green to purple, 2.2-2.6 rarely 2.8 mm. long, about 1 mm. wide, pointed; **Glumes**, the first half to two-thirds as long as the spikelet, 3-5-nerved, acute or acuminate, the second and **Sterile Lemma** about equal, 5-7-nerved or the glume 9-nerved, the **Sterile Palea** about as long as the fruit; **Fruit** 1.5-1.8 mm. long, about 0.9 mm. wide, elliptic, shining and smooth, dimly nerved.

(Specimens collected near Hempstead had a few spikelets at the extremities of the branches, while those collected at San Antonio were spikelet-bearing on the upper two-thirds.)

Low open ground, often in sandy land; Texas, Louisiana and Mexico. Spring.

19. *P. HALLII* Vasey (hăl'î-î).

Plants glaucous, green, especially on the upper surface of blades; **Culms** 1-2 feet tall, usually in small tufts, erect, simple, or sparingly branched from the lower nodes, the nodes appressed-pubescent; **Blades** 1.5-8' long, 2.5 mm. wide, flat, not equal to or exceeding the panicle, but crowded at the base, commonly sparsely papillose-ciliate toward the base, otherwise glabrous, or with a few long delicate hairs on the upper surface, or sparingly papillose-hispid beneath toward the base, often with a narrow, scabrous, white cartilaginous margin; **Sheaths**, the lower overlapping, the upper about as long as the internodes, glabrous to sparsely papillose-hispid; **Ligule** about 1.5 mm. long, a short membrane, ciliate with hairs about 1 mm. long; **Panicle** commonly long-exserted, exceeding the leaves, 1.5-8' long, the few branches stiffly ascending, mostly single, or whorled at one or sometimes two nodes, naked at the base, the longest mostly less than 3' long, bearing short-appressed branchlets usually less than 1' long, the approximate appressed spikelets on pedicels commonly less than the length of the spikelet; **Spikelets** 3-3.2 mm. (3-3.7) long, 1.2 mm. (1.1-1.5) wide, turgid, green or purplish; **Glumes**, the first half to two-thirds the length of the spikelet, 3-5-nerved, acute, the second and **Sterile Lemma** prominently 5-7-nerved, often with 1 or 2 additional obscure nerves; **Fruit** 1.7-2 mm. long, 1-1.3 mm. wide, oval, obtuse, dark olive-brown at maturity.

Dry prairies, rocky and gravelly hills, canyons and in bottom lands, Texas to Arizona, and south into Mexico.

20. *P. HIRSUTUM* Swartz (hěr-sūt'üm).

Culms 3-5 feet tall, tufted, erect, stout, the culms as much as 10 mm. thick, from short rootstocks, glabrous or with a few scattered stiff hairs, the nodes appressed-pubescent; **Blades** 6-28' long, 12-20 mm. sometimes 35 mm. wide, slightly narrowed toward the base, flat, ascending or spreading, sometimes reflexed, margins and surface smooth or rough, glabrous or sparsely pubescent, especially toward the base on the upper surface; **Sheaths** grayish-hairy, mostly longer than the internodes, the lower crowded and overlapping, often hirsute at the collar, commonly densely papillose-hispid, the prominent papillae between the strong nerves with or

without hairs, the rather long hairs appressed, ascending or erect, harsh and sometimes irritating to the skin; **Ligule** membranaceous, about 0.5 mm. long or reduced to a mere line on the upper leaves, often with a dense row of stiff hairs 3-5 mm. long back of the ligule; **Panicles** finally exserted, erect, 6-15' long, somewhat fan-shaped, axis scabrous, the branches single or in half whorls, ascending or slightly spreading, the lower often distant and as much as 10' long, with branchlets as much as 4' long, naked at the base; **Spikelets** 2-2.3 mm. long, about 0.8 mm. wide, lanceolate, acute, glabrous; **Glumes**, the first about two-fifths as long as the spikelet, 3-5-nerved, acute, the second and **Sterile Lemma** exceeding the fruit, the lemma slightly longer than the glume, 7-9-nerved, the glume 7-nerved; **Sterile Palea** about as long as the fruit; **Fruit** 1.4-1.6 mm. long, about 0.7 mm. wide, elliptic, smooth and shining, the nerves evident.

In dry or moist places, banks of ditches or rivers, often among shrubs. Southern Texas and Mexico. (Rio Rico, near Mercedes.)

MAXIMA (mäks'i-mä):—**Perennials**; **Culms** mostly robust and more than 3 feet high, simple or branching at the base only, or with small sterile shoots from the lower nodes; **Blades** linear, flat; **Ligule** membranaceous, ciliate; **Panicles** large, many-flowered; **Spikelets** ellipsoid, glabrous, mostly faintly nerved, the sterile lemma with a well-developed palea, and in *P. maximum* a staminate flower; **Fruit** strongly to very obscurely rugose, puberulent at the apex.

CULMS WITH A CORM-LIKE BASE.

Blades mostly over 5 mm. wide; culms more than 3.5 feet tall. 23. *P. bulbosum*
Blades less than 5 mm. wide; culms rarely as much as 3.5 feet tall.

CULMS FROM A CREEPING ROOTSTOCK, NOT CORM-LIKE BASE.
Nodes hirsute; ligules 4-6 mm. long; fruit strongly rugose. 21. *P. maximum*
Nodes glabrous; ligules 3 mm. long; fruit very obscurely rugose. 22. *P. plenum*

21. *P. MAXIMUM* Jacq. (mäks'i-müm); **GUINEA GRASS.**

Culms 3-8 feet tall, even taller in cultivation, robust, in small or large tufts, from creeping rootstocks, erect or sometimes geniculate and rooting at the lower nodes, the nodes commonly densely hirsute; **Blades** 7-30' long, 8-35 mm. wide, flat, erect or ascending, very scabrous on the margins, often hirsute on the upper surface near the base; **Sheaths** shorter than the internodes, ciliate, pubescent at collar, otherwise papillose-hirsute to glabrous; **Ligule** membranaceous at base, stiffly and densely ciliate with rather long hairs; **Panicle** long-exserted, 8-20' long, usually about one-third as wide, stiffly erect, branches single or in whorls, ascending, naked at the base, axils pilose, the branchlets short, appressed, bearing more or less clustered short-pedicel spikelets; **Spikelets** about 2.8-3.3 mm. long, 1-1.2 mm. wide, oblong-ellipsoid, faintly nerved; **Glumes**, the first about one-third the length of the spikelet, obtuse, the second and **Sterile Lemma** about equal, slightly exceeding the fruit, usually purple, thin, the lemma inclosing a staminate flower; **Fruit** about 2.4 mm. long, 1 mm. wide, elliptic, strongly transversely rugose, minutely puberulent at the apex, acute.

Guinea grass has been cultivated for forage in the Gulf states, especially in Florida and southwest Texas. (Riviera and Padre Island causeway.) Spring and fall.

22. *P. PLENUM* Hitchc. & Chase (plē'nüm).

Culms 1-6 feet tall, growing in rather large clumps from stout rootstocks, robust, flattened, glabrous to minutely pubescent, often glaucous, branching at the lower nodes; **Blades** 8-15' long, 7-15 mm. wide, erect or ascending, flat, revolute on drying, margins and toward the apex scabrous, sometimes sparsely hairy on both surfaces near the base; **Sheaths** overlapping on the lower short internodes (shorter than the upper), glabrous or the lower sometimes pubescent toward the summit, flattened; **Ligule** densely ciliate, about 1.5 mm. long; **Panicle** 8-24' long, the lower branches 8' long or less, slender, 1-5 at a node, somewhat spreading, naked at the base, with numerous slender branchlets; **Spikelets** 2.5-3.4 mm. (3-3.4) long, 1.2 mm. wide, oblong-elliptic, strongly nerved; **Glumes**, the first 3-nerved, 1-1.5 mm. long, scarcely half the length of the spikelet, subacute, slightly scabrous on the midnerve toward the apex, the second and **Sterile Lemma** nearly equal, scarcely exceeding the fruit; the **Palea** of the sterile floret about as long as its lemma; **Fruit** about 3 mm. long, 1 mm. wide, elliptic, acute, very obscurely rugose, minutely pubescent at the apex.

Moist places in canyons and on rocky hillsides. Texas to Arizona and Mexico. (San Antonio and Natalia.) Summer and fall.

23. *P. BULBOSUM* H. B. K. (bül-bō'süm); **BULBOUS PANIC-GRASS.**

Culms 3-7 feet tall, in tufts of few-to-several culms, robust, erect, flattened, the lowest internode thickened into a hard corm-like base 8-20 mm. thick, sometimes with one or more of the corms of the previous year attached, simple, the roots strong, scaly; **Blades** 8-16' long, 3-12 mm. wide, flat, erect or ascending, margins and upper surface scabrous, more or less papillose-pilose, especially near the base; **Sheaths** shorter than the internodes, glabrous to appressed-pubescent toward the base, sometimes villous at throat, often papillose; **Ligule** membranaceous, truncate, about 1 mm. long, fimbriate; **Panicle** exserted, open, usually 8-13' sometimes as much as 25' long, usually about half as wide, the slender flexuous branches ascending or spreading, commonly in ones, twos or threes, often one long and other or others shorter, the lower sometimes as much as 17' long, with branchlets as much as 7' long, naked at the base, the ultimate branchlets bearing rather short-pedicel spikelets, the axis and pedicels scabrous; **Spikelets** 3-3.5 mm. (3.5-4.2) long, about 1.2 mm. wide, subacute, glabrous, usually purplish; **Glumes**, the first about half as long as spikelet, usually 3-nerved, the second at maturity shorter than the **Sterile Lemma** and fruit, the sterile lemma rarely inclosing a staminate flower, both usually 5-nerved; **Fruit** about as long as the spikelet, narrowly ovate, transversely rugose, the subacute apex minutely puberulent.

Moist places in valleys and canyons; west Texas to Arizona and Mexico. (Alpine.) Summer.

23a. *P. BULBOSUM* var. *MINUS* Vasey (mī'nūs); *P. bulbosum sciaphilum* (Rupr.) Hitchc. & Chase.

Plants less than 3.5 feet sometimes only 12-16' tall; **Culms** slender, few-to-several in loose clusters, the corms smaller, not over 8 mm. in diameter, commonly many together attached at the base to a rootstock; **Blades** 4-16' usually less than 10' long, 2-4 mm. wide; **Spikelets** 2.8-3.2 mm. long. As limited here, this subspecies includes only those specimens having both the smaller spikelets and narrower blades. Many intergrading forms are included in the species. (No illustration, as spikelets similar but

smaller.) This grass has been collected in New Mexico and near Ft. Davis, Texas.

Gravelly river banks, ravines, mesas and similar situations in the mountains from Texas to New Mexico and Arizona and central Mexico.

VIRGATA (vēr-gā'tá):—**Perennials** from stout rootstocks; mostly maritime species, with stout simple culms and firm foliage; **Ligule** membranaceous, ciliate; **Panicles** open or contracted; **Spikelets** glabrous, mostly large, terete or thicker than wide, usually gaping owing to the well-developed staminate floret and its palea in addition to the perfect one, the **Glumes** and **Sterile Lemma** firm in texture, the **Fruit** relatively rather small, smooth and shining, in some species the margins of the lemma scarcely inrolled.

All of our species of this group are usually large robust plants, often glaucous, and with large spikelets.

P. amarum, first collected in Texas by the writer, and *P. amarulum*, a taller plant, both with narrow elongated panicle, are stout woody plants of the seacoast.

P. havardii, with spikelets 6-8 mm. long, confined to extreme western Texas, New Mexico and northern Mexico, and *P. virgatum*, with a wide range, have diffuse open panicles.

P. virgatum is very variable as to aspect, size of plants and spikelets, and thrives under a diversity of soil and climate. The plants are sometimes robust and rigid, attaining a height of 7 feet. Frequently these plants have abortive spikelets, the writer having found this form at many places in east Texas, at San Antonio and Ft. Worth, and often on higher and drier soil nearby were plants with fully developed spikelets. It is claimed that these plants are affected by a smut, this sometimes resulting in abnormal forms. This form should be further investigated.

SPIKELETS NOT OVER 2.5 mm. LONG. FIRST GLUME LESS THAN HALF as long as the spikelet. Panicle loosely-flowered, first glume truncate, about one-fifth the length of the spikelet.

SPIKELETS 3-7 mm. LONG; FIRST GLUME MORE THAN HALF THE length of the spikelet.

PANICLES ELONGATED, contracted; seacoast plants.

Culms rarely 3.5 feet tall, solitary, from the nodes of horizontal rootstocks.

Culms 3-7 feet tall, in dense tufts.

PANICLES DIFFUSE, or only slightly contracted; plants from creeping rootstocks, sometimes of salt marshes but not littoral.

Spikelets 6-8 mm. long; culms solitary with a creeping base.

Spikelets 3.5-5 mm. long, long-beaked; culms erect.

24. *P. REPENS* L. (rē'pēns).

Culms 1-2.5 feet tall, rigid, erect or ascending from the nodes of strong horizontal often extensively creeping rootstocks, simple, clothed at the base with bladeless overlapping sheaths; **Blades** 1.5-6' long, 2-5 mm. wide, flat or folded, or those of the sterile shoots sometimes longer and wider, firm, long-pilose at the base on the upper surface, otherwise sparsely pilose to glabrous on both surfaces; **Sheaths** usually overlapping, rather loose, more or less pilose, especially along the margins, or sometimes glabrous; **Ligule** about 1 mm. long; **Panicles** stramineous, rather short-exserted, 2.5-5' long, one-third to two-thirds as wide, the somewhat distant branches stiffly ascending, rarely spreading, usually naked at the base, bearing short-appressed branchlets with short-pedicelled spikelets toward the ends; **Spikelets** 2.2-2.5 mm. long, 1-1.1 mm. wide, ovate, sharply

pointed; **Glumes**, the first about one-fifth as long as the spikelet, broad, loose and truncate, obscurely nerved, the second and **Sterile Lemma** equal, 5-7-nerved; **Fruit** 1.8-1.9 mm. long, about 1 mm. wide, obovate-elliptic. (See photograph of *P. virgatum* for drawings.)

Seabeaches, extensively creeping and acting as a sandbinder, along the coast, Texas to Alabama.

25. *P. VIRGATUM* L. (vēr-gā'tūm); SWITCH-GRASS.

Culms commonly 3-5 feet tall, rarely taller, solitary or in small or large clumps, simple, robust, with numerous scaly creeping rootstocks, mostly glabrous throughout, often glaucous or purple-tinged; **Blades** 4-24' long, 3-15 mm. wide, flat, long, attenuate, margins scabrous, sometimes pilose or sparsely pubescent on the upper surface near the base, rarely extending to the apex; **Sheaths** shorter than the internodes, or longer below, often ciliate, sometimes villous at the throat; **Ligule** a dense ring of hairs 3-4 mm. long; **Panicles** long-exserted, 5-20' long, ovate to pyramidal, mostly one-third to half as wide as long, sometimes contracted, usually many-flowered, the slender, scabrous, single or fascicled branches, naked at the base, ascending or spreading, with many branchlets along the upper half or two-thirds; **Spikelets** prominently nerved, rather short-pedicelled, commonly 3.5-5 mm. long (ranging from 3-6 mm.), 1.2-1.5 mm. wide, elliptic-ovate, acuminate; **Glumes**, the first clasping, about two-thirds the length of the spikelet, rarely equaling the sterile lemma, acuminate to cuspidate, 5-nerved, the second longer than the **Sterile Lemma**, both much exceeding the fruit, 5-7-nerved; **Fruit** about three-fourths as long as the spikelet, narrowly ovate, the margins of the lemma inrolled only at the base.

Prairies, moist open ground, open woods and salt marshes, over most of the United States, except the Pacific coast. Spring to fall.

26. *P. HAVARDII* Vasey (hā-vār'dī-i); *P. virgatum macranthum* Vasey.

Plants 3 feet tall or more, pale-green, glaucous, glabrous throughout; **Culms** robust, solitary, erect from creeping rootstocks, simple; **Blades** erect or ascending, 10-16' long, 5-10 mm. wide, broadest at the base, tapering into a long involute-setaceous tip, sometimes pilose on the upper surface at the base; **Sheaths** longer than the internodes; **Ligule** about 3 mm. long, dense; **Panicle** short-exserted, as much as 16' long, half to three-fourths as wide, loosely-flowered, the mostly verticillate branches ascending or finally spreading; **Spikelets** 6-8 mm. long, about 2 mm. wide, ovate-acuminate, strongly nerved; **Glumes**, the first clasping, half to two-thirds the length of the spikelet, the second slightly shorter than the **Sterile Lemma**, both exceeding the fruit, 7-9-nerved; **Fruit** 4.5-5 mm. long, about 1.8 mm. wide, narrowly ovate, the margin of the lemma inrolled only at the base.

This apparently rare species resembles *P. virgatum* from which it differs in the decumbent base of the solitary culms and in the larger spikelets. (No illustration, as spikelets similar to *P. virgatum* except larger.)

Arroyos and sandhills, western Texas to New Mexico and northern Mexico. (Guadalupe Mountains.)

27. *P. AMARUM* Eil. (ām'ā-rūm).

Plants glaucous and glabrous throughout; **Culms** commonly 2-3 rarely 4.5 feet tall, solitary, in small or large colonies, sparingly branched at the base, erect or ascending, from extensively creeping horizontal root-

stocks, the culms and rootstocks thick, woody and rigid, the large rootstocks making the plant a good sand-binder; **Blades** ascending or spreading, 6-16' long, 6-16 mm. wide, flat, soon becoming involute toward the tip, broadest at the base, thick, leathery; **Sheaths** mostly longer than the internodes, the collar often purplish; **Ligule** membranaceous, short, the ciliate hairs about 2-3 mm. long; **Panicles** short-exserted, or included at the base, contracted, commonly 6-12' long, 20-30 mm. wide, one-fourth to one-third the length of the plant, rather densely-flowered, the leaves often exceeding the panicles, the appressed or slightly ascending branches distant, usually several to a node, commonly 2-4' long, bearing scattered short-appressed branchlets, the pedicels short; **Spikelets** 4.5-5.5 mm. (5-6.5) long, 1.8-2 mm. wide, as much as 3 mm. thick, narrowly ovate, acuminate, prominently nerved; **Glumes**, the first clasping, usually about two-thirds as long as the spikelets, acuminate, 5-7-nerved (7-9), the midnerve usually scabrous toward the apex, the second usually slightly longer than the **Sterile Lemma**, both much exceeding the fruit, 7-9-nerved, the midnerve scabrous toward the apex; **Fruit** about three-fifths as long as the spikelet, 1.5 mm. wide, narrowly ovate.

(Specimens collected at Galveston and Corpus Christi have panicles shorter, more densely-flowered, and spikelets smaller than usual for the species.)

Sandy seashores and coast dunes, Texas to Mississippi, Georgia to Connecticut. Fall.

28. *P. AMARULUM* Hitchc. & Chase (â-mâr'û-lûm).

Plants less glaucous than *P. amarum*, glabrous throughout, tufted, in small or large bunches, sometimes 3-7 feet across, the rootstocks vertical or ascending; **Culms** 3-6 feet tall, simple above the base, stout, sometimes 10 mm. thick; **Blades** 5-20' long, 5-12 mm. wide, erect or ascending, broadest at the base, more or less involute, sometimes pilose on the upper surface near the base; **Sheaths** mostly shorter than the internodes (or overlapping); **Ligule** a densely ciliate membrane, 2-3 mm. long; **Panicle** finally exserted, 10-18' long, 1-4' wide, often one-third the length of the plant, slightly nodding, the branches longer, and not so densely-flowered or compact as in *P. amarum*, the branches erect or narrowly spreading at their tip, often 4-6' long, fasciated, mostly spikelet-bearing to the base; **Spikelets** short-pedicel, 4.3-5.5 mm. long, about 1.8 mm. wide, narrowly ovate, acuminate, strongly nerved; **Glumes**, the first half to two-thirds as long as the spikelet, acuminate, 5-7-nerved, scabrous on the midnerve toward the apex, the second slightly longer than the **Sterile Lemma**, both 7-9-nerved, pointed beyond the fruit; **Fruit** 3-3.5 mm. long, 1.2-1.5 mm. wide, narrowly ovate, bluntly pointed. (No illustration, as spikelets similar to those of *P. amarum* except usually smaller.)

Sandy seashores and coast dunes, Texas to Louisiana, Florida to Virginia. (Sand dunes south of Corpus Christi.) Fall.

TENERA (tên'êr-â):—**Perennials**; **Culms** slightly compressed, wiry, the internodes much elongated; **Blades** linear, at the base narrower than their sheaths; **Ligule** membranaceous, about 0.5 mm. long; **Panicles** small, narrow, nearly simple; **Spikelets** short-pedicel, glabrous or nearly so; **Palea** of sterile floret a small nerveless seale; **Fruit** elliptic, smooth and shining.

In our single species the panicle is 1-3' long, the pointed spikelets 2.2-2.8 mm. long.

29. *P. TENERUM* Beyr. (tên'êr-ûm).

Plants in small tufts from a knotted crown, 1-3 feet high, olivaceous; **Culms** erect, stiff and wiry, producing small, solitary panicles from the upper nodes or remaining simple, glabrous; **Blades** 1-6' long, 2-4 mm. wide (the uppermost much reduced), erect, firm, drying involute at least toward the summit, pilose on the upper surface toward the base, or the lower sometimes on both surfaces; **Sheaths** much shorter than the internodes, the upper glabrous, the lower sparsely to copiously papillose-pubescent toward the summit with soft spreading or reflexed hairs; **Panicles** rather short-exserted, 1-3' long, rarely over 5 mm. wide, the short-appressed subracemose branches bearing rather crowded spikelets throughout their length, the pedicels usually with a few long hairs at the summit; **Spikelets** 2.2-2.8 mm. long, 0.8-1 mm. wide, narrowly ovate, pointed; **Glumes**, the first clasping, half as long as the spikelet or more, 1-nerved, glabrous or obscurely strigose toward the summit, the second and **Sterile Lemma** equal, exceeding the fruit, 5-7-nerved, glabrous; **Fruit** 1.7-1.8 mm. long, about 0.8 mm. wide.

This species has been described under the name of *P. stenodes* (Griseb.) Nash. (See drawings of *P. flexile*.)

Margins of swamps and wet places in flatwoods and pine barrens near the coast, Texas to Florida and North Carolina. (Nona, Texas.) Spring and fall.

AGROSTOIDIA (äg-rös-toi'di-â):—Tufted **Perennials**; **Culms** erect, compressed, sheaths more or less keeled; **Ligule** membranaceous, short, sometimes ciliate; blades long and narrow; **Spikelets** lanceolate, glabrous; **First Glume** keeled, scabrous on the keel toward the apex, the **Second Glume** and **Sterile Lemma** pointed beyond the fruit, more or less keeled, the spikelet thus often appearing laterally compressed, the palea of the sterile floret about half as long as its lemma; **Fruit** elliptic, smooth and shining, a minute tuft of thickish hairs at the apex.

SPIKELETS SET OBLIQUELY ON THEIR APPRESSED PEDICELS. Culms but little compressed; rootstocks present. 34. *P. anceps*
Panicles open; spikelet 3-3.8 mm. (usually 3.4-3.8) long.
Panicles more or less contracted; spikelets not over 2.8 mm. long.

SPIKELETS NOT OBLIQUELY DISPOSED. Culms strongly compressed with keeled sheaths; rootstocks absent. 35. *P. rhizomatum*
LIGULES CILIATE, 2-3 mm. long; basal leaves half as long as the culm or more; panicle much exceeding the upper blades; spikelets not over 2.7 mm. usually 2.5 mm. long, the first glume less than half the length of the spikelet. 33. *P. longifolium*

LIGULES EROSE or lacerate, not ciliate; basal blades in short tufts, the upper usually nearly equaling the terminal panicle. 32. *P. stipitatum*
FRUIT stipitate; spikelets 2.5-2.8 mm. long, conspicuously secund.

FRUIT not stipitate; spikelets not conspicuously secund. 30. *P. agrostoides*
Spikelets 1.8-2 mm. long, in occasional specimens 2.2 mm. long; panicle branches ascending or spreading.
Spikelets about 2.5 mm. long; panicle branches erect or nearly so. 31. *P. condensum*

30. *P. AGROSTOIDES* Spreng. (äg-rös-toi'dêz); **RED-TOP PANIC-GRASS**, **MUNRO-GRASS.**

Culms 1.5-3 feet tall, commonly in dense clumps, from a short caudex, erect, glabrous throughout except as noted, rather stout, flattened, with numerous shoots of short leaves at the base, much shorter than those of

the culm; **Blades** 7-24' long, the upper shorter, 5-12 mm. wide, erect, conduplicate, or revolute at the base on drying, flat above, narrowed somewhat toward the base, rough on the margins and midnerve underneath; **Sheaths** longer than the internodes, keeled, often pilose on the sides at the union with the blade; **Ligule** membranaceous, erose, less than 1 mm. long; **Panicles** terminal and axillary, finally long-exserted, at first purplish, finally pale, 4-10' long, rarely longer, usually half to two-thirds as wide, the stiff branches as long as 7', ascending or sometimes spreading at maturity, with more or less divergent densely-flowered branchlets, commonly from the lower side, the ultimate branchlets and short pedicels appressed, scabrous, the pedicels usually bearing at their summit one to several delicate white hairs; **Spikelets** 1.6-2 mm. rarely 2.2 mm. long, 0.7-0.8 mm. wide, at first purple, finally pale; **Glumes**, the first about half the length of the spikelet, 3-5-nerved, scabrous on the midnerve toward the apex, the second and **Sterile Lemma** subequal, 5-nerved, the midnerve scabrous at the summit, the sterile palea nearly equal to the fruit; **Fruit** 1.2-1.3 mm. long, about 0.6 mm. wide, a minute tuft of thickish hairs at the apex. The panicles much resemble those of red-top, *Agrostis alba* L.

Low places and wet meadows, eastern Texas to Florida, north to Maine and Kansas. (Orange.) Summer and fall.

31. *P. CONDENSUM* Nash (kōn-dēn'sūm).

Culms 3-6 feet tall, erect, sometimes geniculate at the base, rather stout, flattened, branched above; **Blades** 5-25' long, 7-12 mm. wide, flat and thin above, conduplicate with a very large midrib toward the base, smooth or margins and upper surface rough; **Sheaths** shorter than the internodes, flattened, appressed-pubescent toward the summit; **Ligule** membranaceous, less than 1 mm. long, erose; **Panicles** terminal and axillary, 4-10' long, narrowly oblong, commonly less than 2' wide, slightly nodding, greenish-purple, the axillary smaller and more slender, the branches mostly 1-6' long, the lower naked at the base, distant, solitary or several to a node, appressed, erect or narrowly ascending, the short-appressed branchlets crowded with spikelets on short scabrous pedicels; **Spikelets** about 2.2 mm. long, about 0.8 mm. wide, lanceolate, green to purplish; **Glumes**, the first half to slightly more than half as long as the spikelet, keeled, acuminate, very scabrous on midnerve toward the apex, the second slightly longer than the **Sterile Lemma**, both acuminate, the tips slightly spreading, scabrous on the midnerve toward the apex; **Palea** about half as long as its lemma; **Fruit** about 1.3 mm. long (1.4-1.5), about 0.7 mm. wide, elliptic, shining, smooth, with a minute tuft of hairs at the apex.

In wet places along borders of streams and ponds; Texas to Florida and north to Pennsylvania.

32. *P. STIPITATUM* Nash (stīp-ī-tā'tūm); TALL FLAT PANIC-GRASS.

Plants like *P. agrostoides* in habit, often purple-tinged throughout; **Culms** on the average stouter, strongly compressed; **Blades** usually equaling or exceeding the terminal panicles, often scabrous on the lower surface; **Sheaths** much overlapping; **Panicles** usually several to a culm, sometimes as many as five axillary panicles, commonly dark-purple, short-exserted, 4-8' long, one-third to half as wide, densely-flowered, the numerous stiff branches ascending, with numerous divaricate branchlets, mostly from the lower side and beginning at the base, bearing crowded subsecund spikelets, the short scabrous pedicels only rarely with one or two erect hairs; **Spikelets** 2.5-2.8 mm. long, about 0.7 mm. wide, often

curved at the point; **Glumes**, the first about half the length of the spikelet, the second and **Sterile Lemma** subequal, scabrous on the midnerve at the acuminate apex; **Fruit** about 1.5 mm. long, about 0.6 mm. wide, short-stipitate. (See drawings of *P. flexile*.)

Typical specimens of this species are characteristic and readily distinguished from *P. agrostoides*, but less densely-panicked forms, with smaller spikelets, approach that species.

Moist soil, east Texas to Missouri, Kentucky, South Carolina and north to Connecticut. Summer.

33. *P. LONGIFOLIUM* Torr. (lōn-jī-fō'li-ūm); LONG-LEAVED PANIC-GRASS.

Culms in dense tufts, 14-32' tall, usually surrounded by basal leaves nearly half as long as the culm, slender, stiff, much compressed; **Blades** 3-16' long, 2-5 mm. wide, conduplicate at the base, flat above or somewhat involute, erect or sometimes recurved or tortuous, pilose on the upper surface near the base, sometimes also on the lower surface; **Sheaths** mostly shorter than the internodes or longer at the base, keeled, usually hairy on the sides at the junction with the blades, otherwise glabrous or villous toward the summit, sometimes densely so; **Ligule** fimbriate-ciliate, 2-3 mm. long, the ciliae usually at the sides only, not meeting at the back; **Panicles** finally long-exserted, much exceeding the leaves, the lateral panicles few or none, 4-10' long, usually half to two-thirds as wide, but sometimes rather contracted, the distant slender branches solitary or fasciated, ascending, usually naked at the base, bearing short-appressed rather closely-flowered branchlets, these and the pedicels scabrous, the latter sometimes with a few hairs at the summit; **Spikelets** 2.4-2.7 mm. long, about 0.7 mm. wide; **Glumes**, the first two-fifths to scarcely half the length of the spikelet, acute, the second slightly longer than the **Sterile Lemma**, both keeled, usually spreading at the tip, scabrous on the midnerve at the apex; **Fruit** 1.6 mm. long, 0.6 mm. wide. (See drawings of *P. flexile*.)

Moist sandy land, mostly along the coast, central Texas to Florida, north to Connecticut and Rhode Island. (Jefferson.) Summer.

34. *P. ANCEPS* Michx. (ān'sēps); *P. rostratum* Muhl.; BEAKED OR FLAT-STEMMED PANIC-GRASS.

Culms commonly 1.5-3 feet tall, sometimes taller, in small or large tufts, rather stout, from stout scaly branching rootstocks, somewhat flattened, one side channeled, glabrous to sparsely pubescent; **Blades** 4-22' long, 6-13 mm. wide, flat or slightly conduplicate at the base, erect, the upper surface slightly roughened, sometimes papillose, commonly ciliate and densely pubescent on the upper surface toward the base, otherwise glabrous to sparsely pubescent; **Sheaths** mostly longer than the internodes (said to be usually shorter), somewhat flattened, glabrous to densely papillose-pilose, especially at the summit; **Ligule** membranaceous, very short; **Panicles** terminal only, or narrow panicles produced from the upper sheaths, partly included, or sometimes long-peduncled, the terminal finally long-exserted, open, 4-12' long, often equalled or exceeded by the long blades, the rather long slender remote branches single, branching near the base and often appearing verticillate, ascending or spreading, bearing short mostly-appressed branchlets, the distant or approximate branchlets with rather crowded spikelets, somewhat secund, the spikelets set obliquely on their short appressed scabrous pedicels, usually shorter than the spikelets, the first glume toward the axis, the axis and branches scabrous; **Spikelets**

3-3.2 mm. (3-3.8) long, 1-1.2 mm. wide, lanceolate, glabrous; **Glumes**, the first keeled, one-third to one-half as long as the spikelet, 3-5-nerved, scabrous on the keel toward the apex, acute; the second and **Sterile Lemma** subequal, the glume often slightly longer, forming a beak beyond the fruit, the tips open and often curved at maturity, the glume 5-7-nerved, midnerve often scabrous toward the apex, the lemma 5-nerved, with palea about half as long; **Fruit** 2-2.2 mm. long, about 1 mm. wide, elliptic, smooth and shining, a minute tuft of thickish hairs at the apex.

Moist sandy land, New Jersey to Florida and west to Kansas and Texas. Summer-fall.

35. *P. RHIZOMATUM* Hitchc. & Chase (rī-zō-mā'tūm).

Plants like *P. anceps* in habit; **Culms** less robust, the scaly rhizomes slender and more numerous, the leaves more or less clustered at the base; **Blades** 4-16' commonly less than 12' long, 5-10 mm. wide, pubescent on both surfaces or sometimes glabrous except on the upper surface near the base; **Sheaths** shorter than the internodes; or the lower overlapping densely to sparsely villous along the margins and toward the summit, a dense ring of pubescence at the junction of the blade; **Ligule** nearly obsolete; **Panicles**, the terminal long-exserted, the usually numerous smaller axillary ones short-peduncled or partially included, 4-10' long, usually less than one-third as wide, more or less contracted and densely-flowered, rather more compound than in *P. anceps*, the distant primary branches ascending, bearing numerous branchlets 10-30 mm. long, these with appressed, short, approximate branchlets, with crowded spikelets *set obliquely* on their short appressed pedicels as in *P. anceps*, but hardly at all secund. **Spikelets** 2.4-2.8 mm. long, about 1 mm. wide; **Glumes**, the first one-third to scarcely half as long as the spikelet, acute, the second and **Sterile Lemma** subequal, beaked as in *P. anceps* but less strongly so, but little exceeding the fruit; **Fruit** 1.9 mm. long, 0.9 mm. wide.

It is distinguished from *P. anceps* by the somewhat contracted, more densely-flowered panicles of smaller spikelets, and by the short leaves more or less crowded at the base. Usually the panicle is less open than in *P. anceps*. (See drawings of *P. flexile*.)

Moist sandy woods, Texas to Florida and north to Maryland. (Pierce, Texas.) Summer.

VERRUCOSA (vēr-ōō-kō'sā):—Glabrous **Annuals** with weak, divaricately branching culms, decumbent at base and usually provided with aerial braceroots at the lower nodes, the lower internodes much shorter than the middle and upper; **Ligule** ciliate, not over 0.5 mm. long; **Panicles** with divaricate capillary branches, spikelet-bearing toward the ends; **Spikelets** tuberculate; **Fruit** minutely papillose, the margins of the lemma flat, inrolled only at base.

SPIKELETS about 2 mm. long, glabrous.
SPIKELETS over 3 mm. long, hispid.

36. *P. VERRUCOSUM* Muhl. (vēr-ōō-kō'sūm).

Culms 0.6-5 feet tall, slender (plants light-green), solitary or few together, lax, at first erect but soon decumbent at base, and ascending or widely spreading; **Blades** 2-8' long, 4-10 mm. wide, flat, thin, lax, somewhat narrowed toward the base, gradually narrowed to the acuminate tip; **Sheaths** shorter than the internodes, ciliate; **Ligule** ciliate, not over 0.5 mm. long; **Panicles** finally exserted, diffuse, 2-12' long, about as wide,

small panicles often produced at the lower nodes, at least the ultimate branchlets scabrous, the branches mostly solitary, the branchlets bearing a few short-pedicelled spikelets mostly in twos toward the ends; **Spikelets** 1.8-2.1 mm. long, about 1 mm. wide, elliptic-obovate, subacute; **Glumes**, the first one-fourth the length of the spikelet or less, the second and **Sterile Lemma** warty, glabrous, the glume shorter than the fruit at maturity; **Fruit** 1.8-2 mm. long, 1 mm. wide, elliptic, acute. (See drawings of *P. flexile*.)

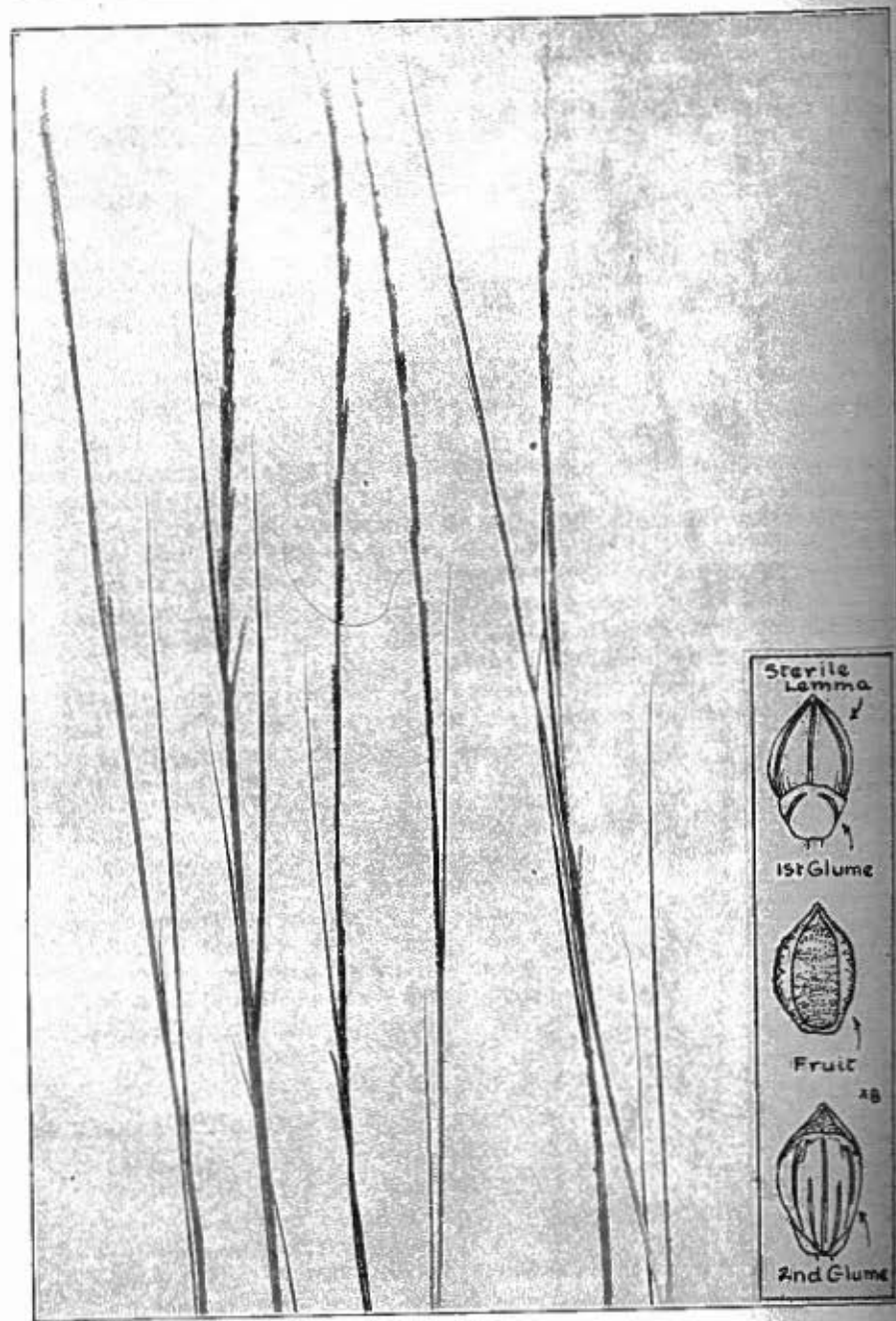
Wet, mostly shady soil, Atlantic Coastal Plain, southeast Texas to Florida and north to Massachusetts. Also Indiana and Tennessee. (Jefferson.) Spring-fall.

37. *P. BRACHYANTHUM* Steud. (brāk-ī-ān'thūm); *P. sparsiflorum* Vasey.

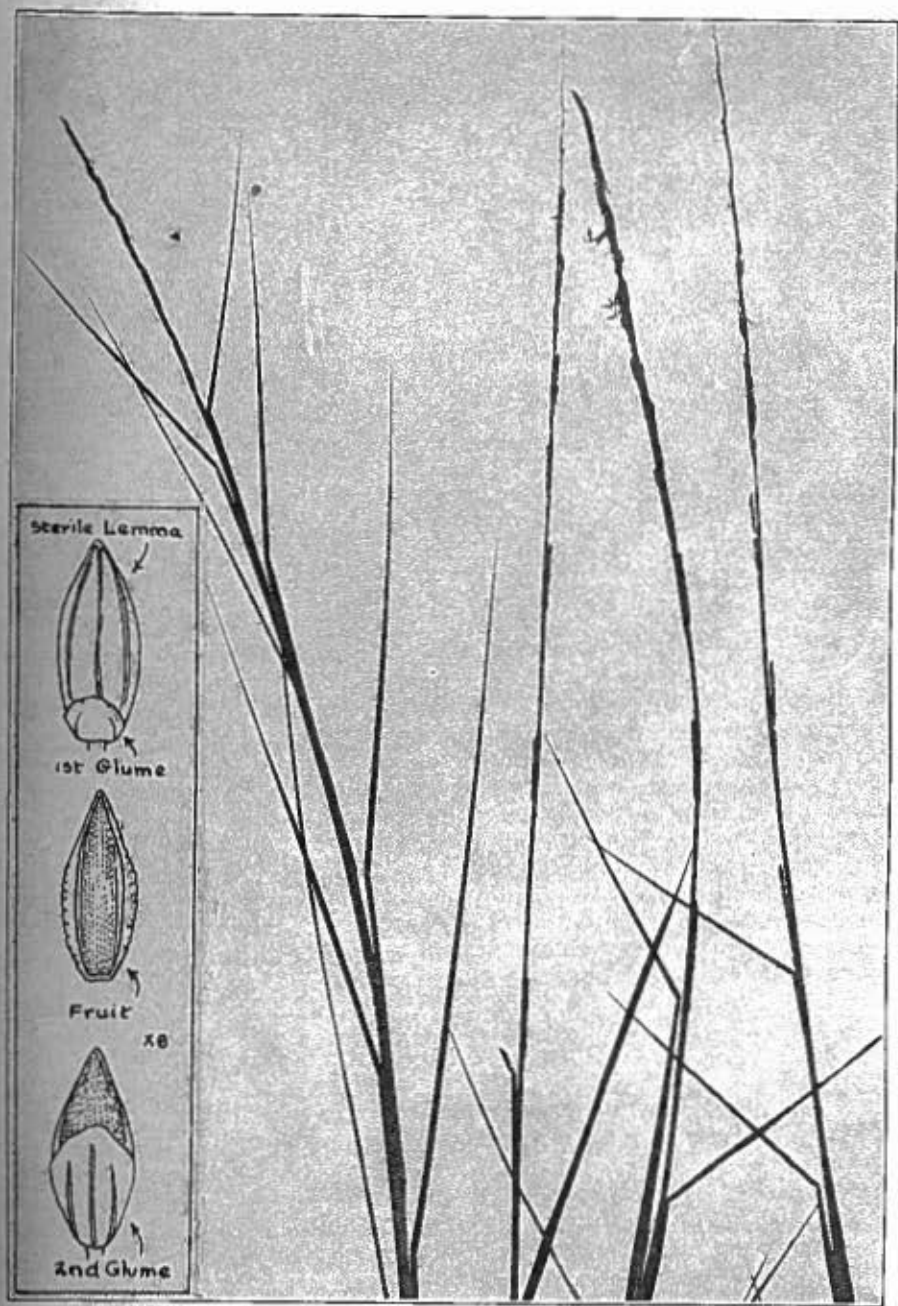
Culms 1-3.5 feet tall, slender, freely branching from the lower nodes, the plants weakly ascending or spreading from a decumbent base; **Blades** 2-6' long, 2-3 mm. wide, narrowed toward the base, often involute and scabrous toward the tip, the uppermost usually reduced; **Sheaths** shorter than the internodes, minutely ciliate; **Ligule** ciliate, not over 0.5 mm. long; **Panicles** finally exserted, 2-6' long, about as wide, the branches few, scabrous, the lower sometimes as much as 4' long, bearing a few short-pedicelled spikelets, mostly in twos, toward the ends; **Spikelets** 3.2-3.6 mm. long, 1.5 mm. wide, elliptic-obovate, abruptly pointed; **Glumes**, the first minute, the second and **Sterile Lemma** subequal, the tubercles bearing stiff spreading hairs; **Fruit** 2.9-3 mm. long, 1.4 mm. wide, obovate-elliptic, subacute. (See drawings of *P. flexile*.)

Sandy soil, Texas, Louisiana and Oklahoma. (Jacksonville, College Station, Galveston.)

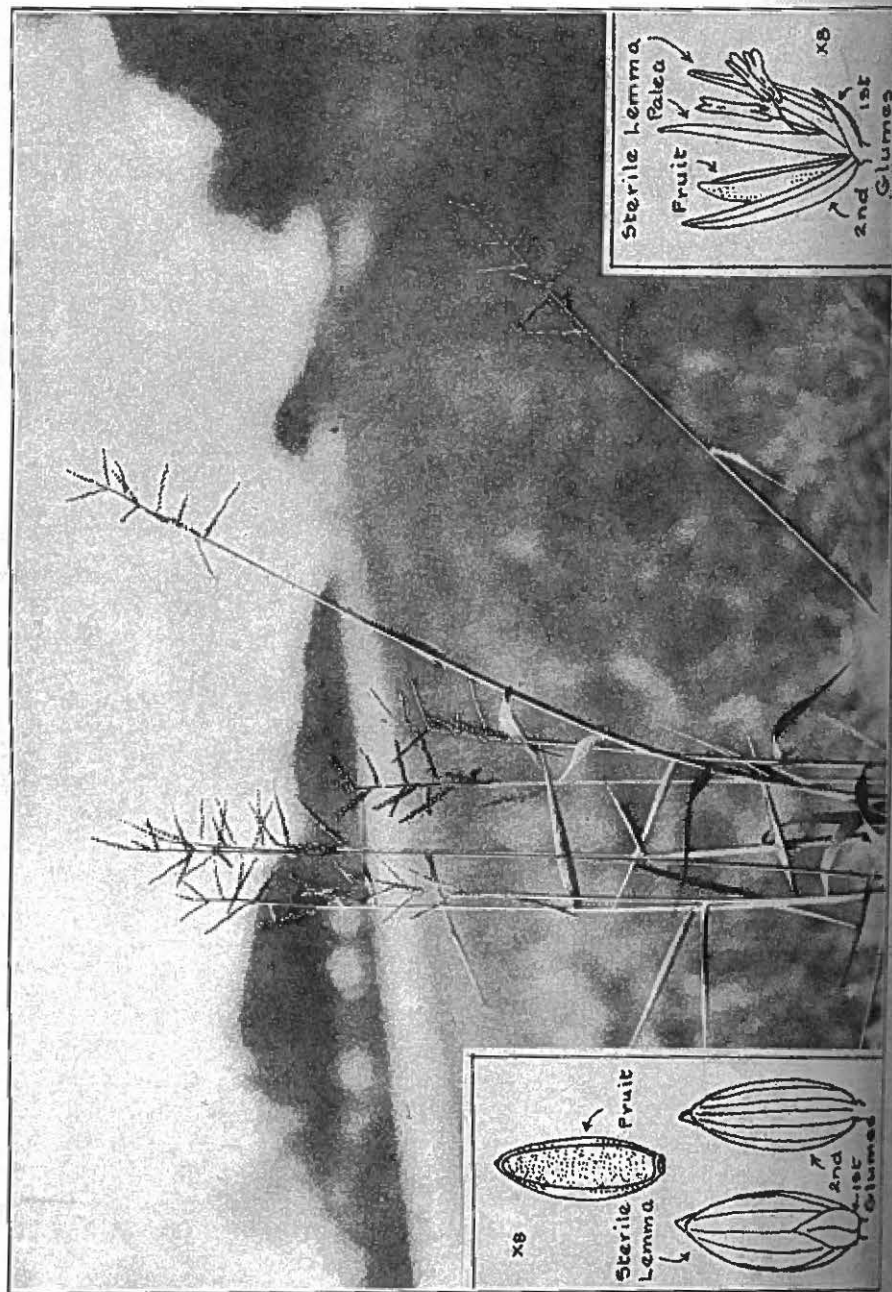
36. *P. verrucosum*
37. *P. brachyanthum*



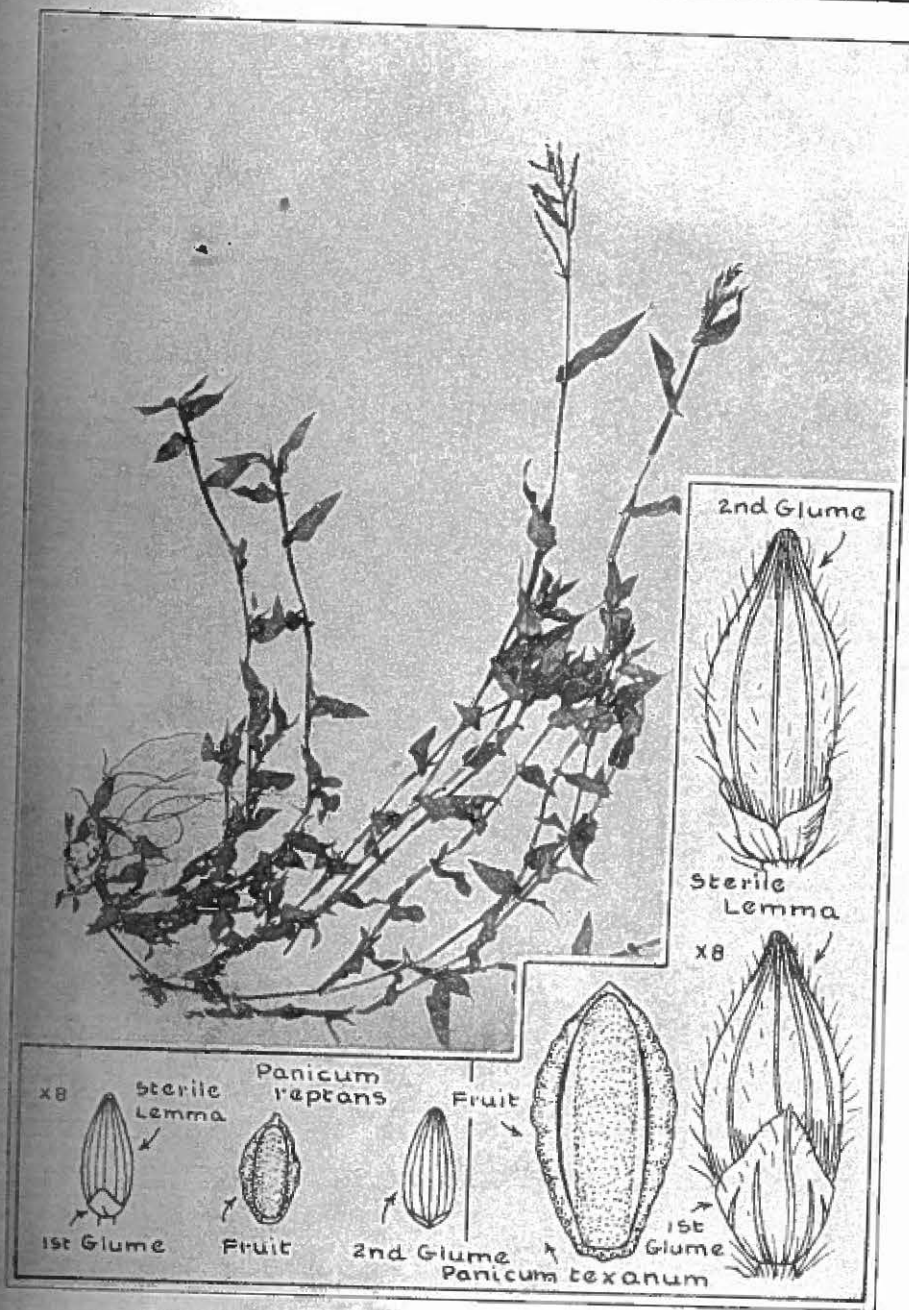
PANICUM GEMINATUM



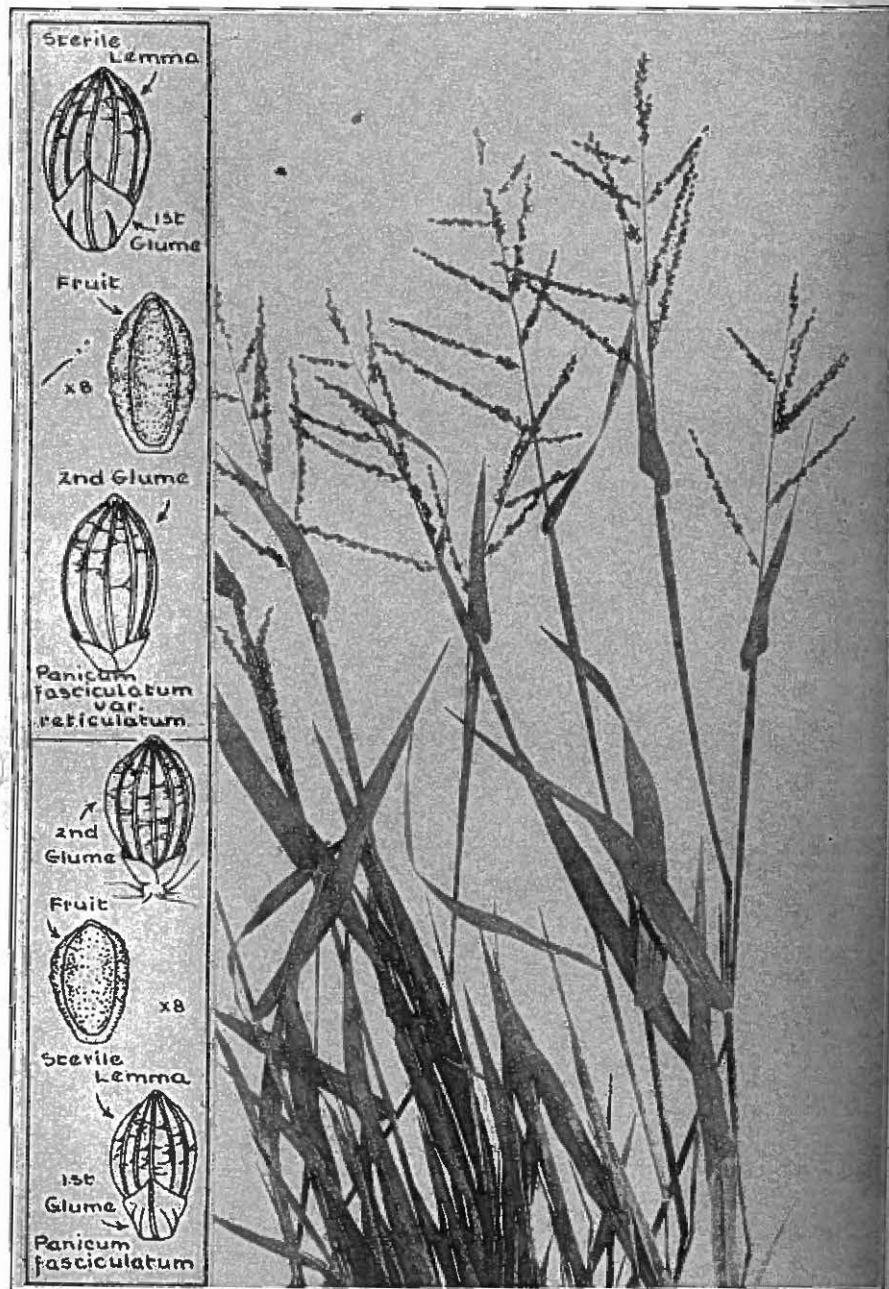
PANICUM PALUDIVAGUM



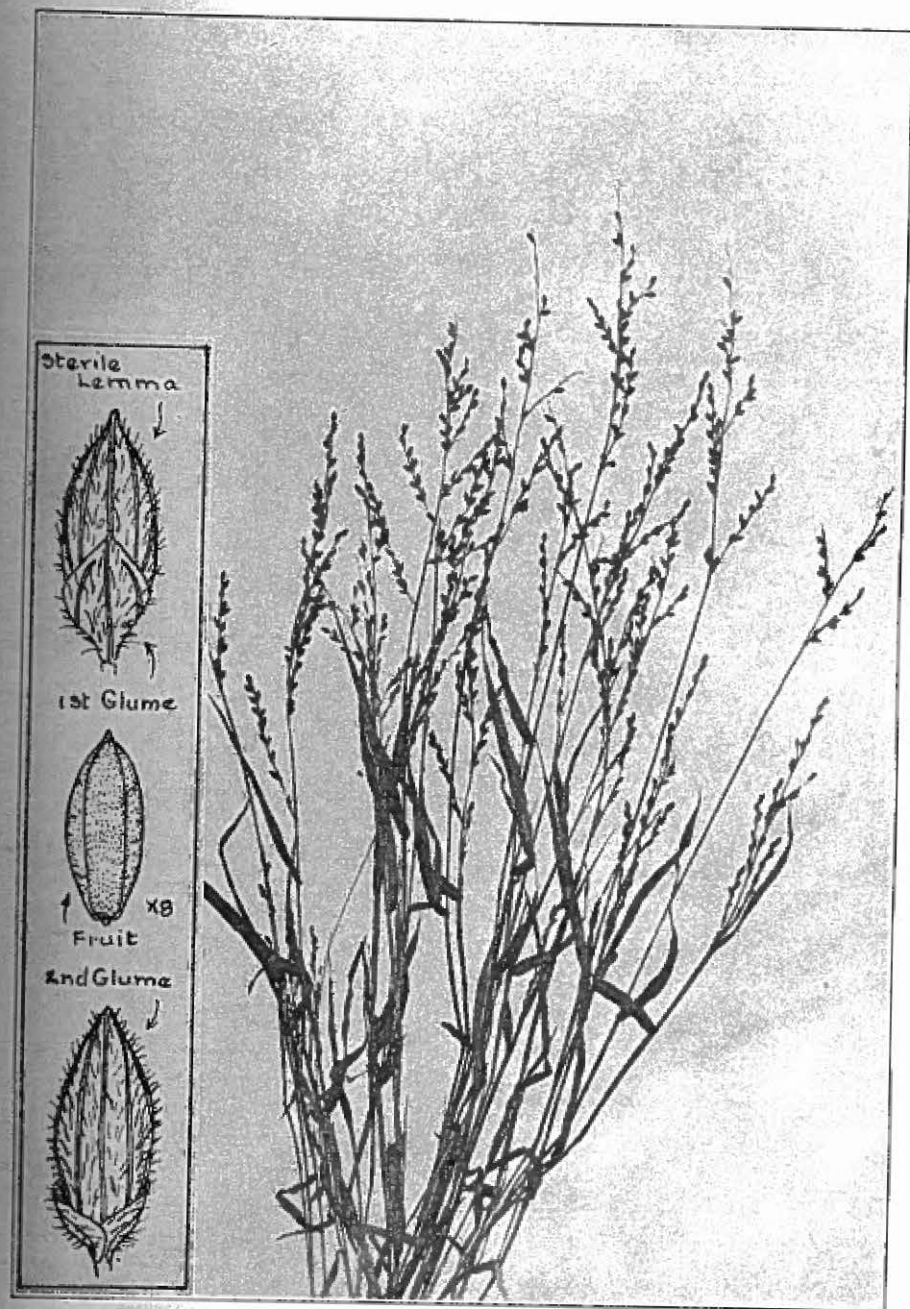
PANICUM PURPURASCENS; PARA GRASS



PANICUM REPTANS; drawings of PANICUM TEXANUM



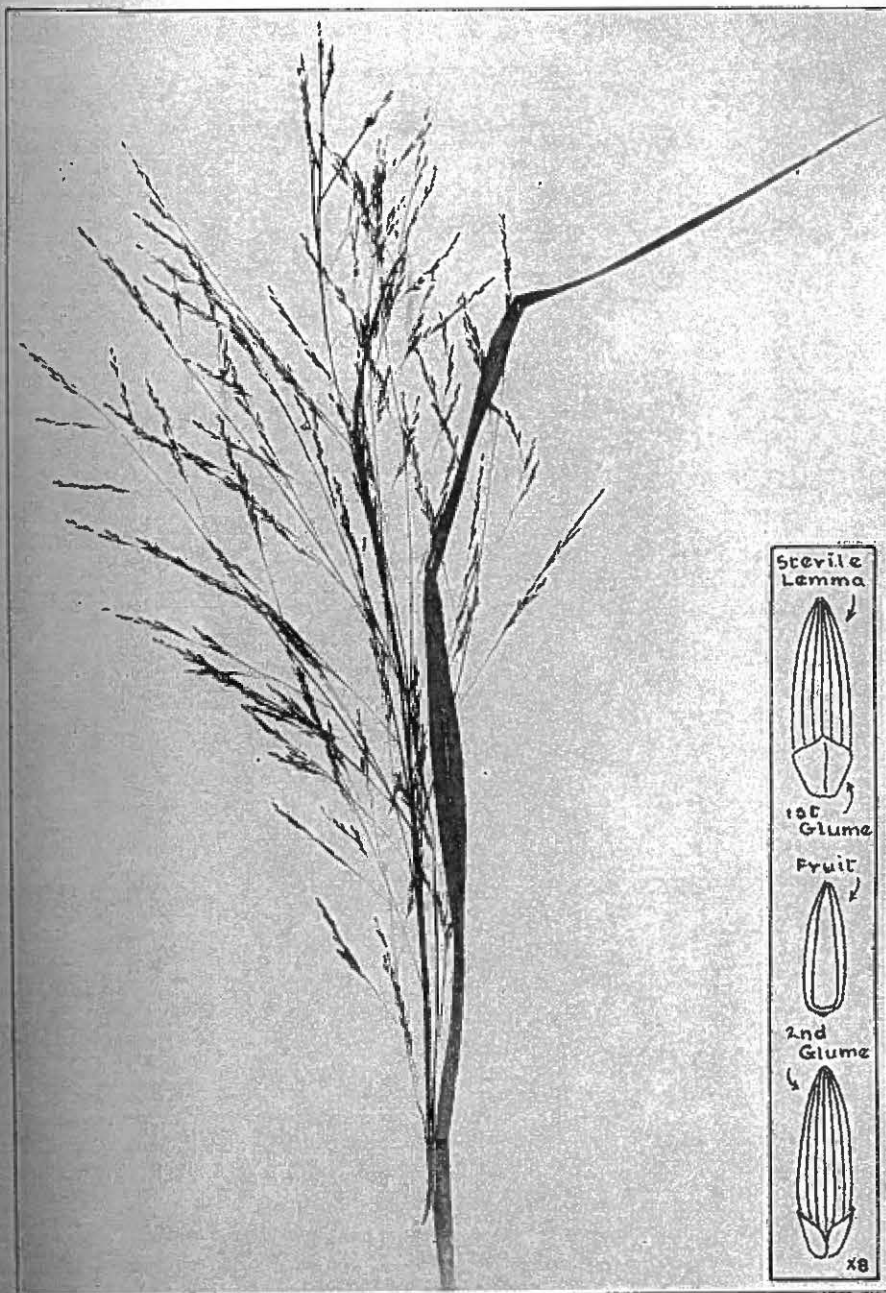
PANICUM FASCICULATUM VAR. RETICULATUM; drawing of
PANICUM FASCICULATUM



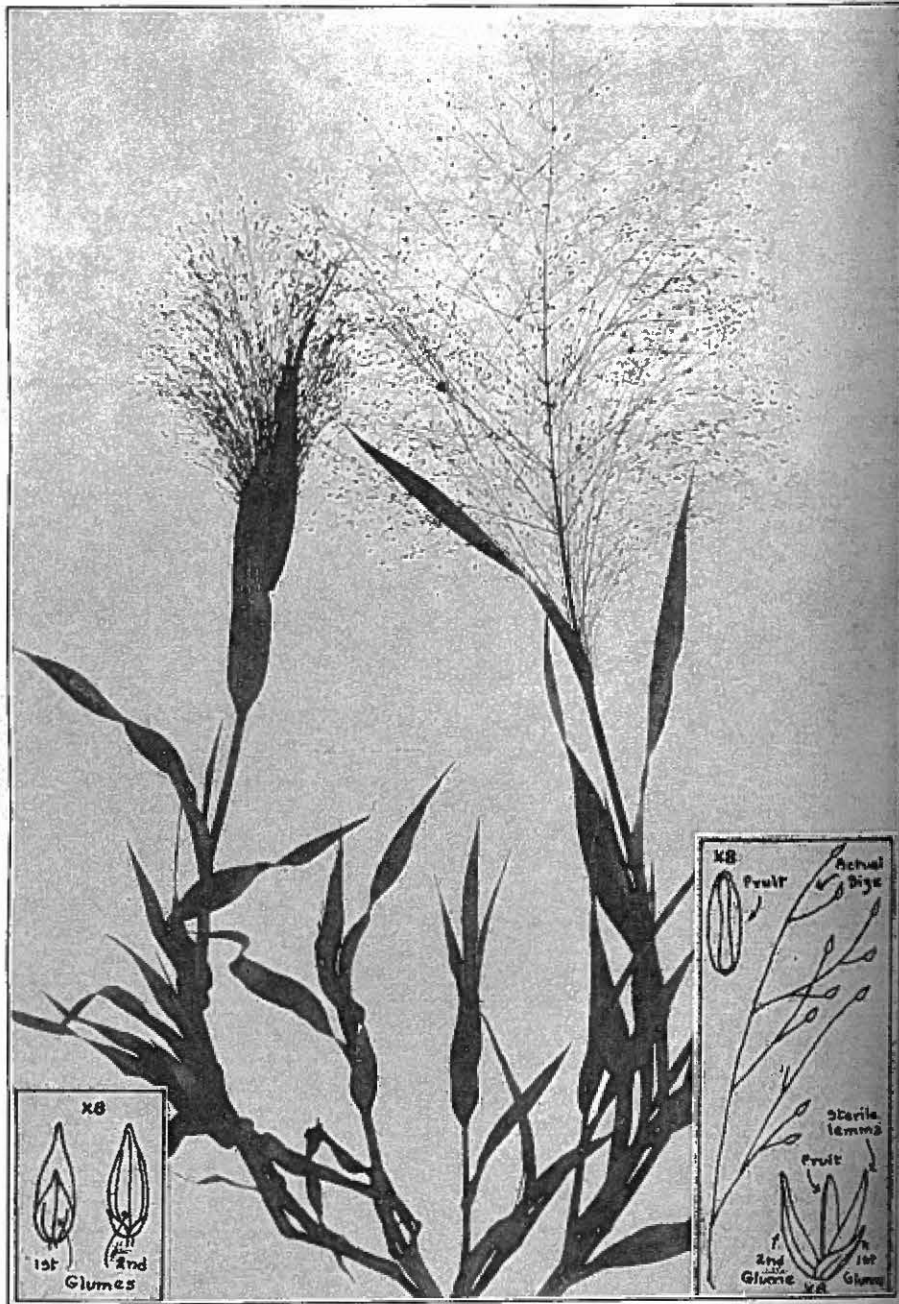
PANICUM ARIZONICUM



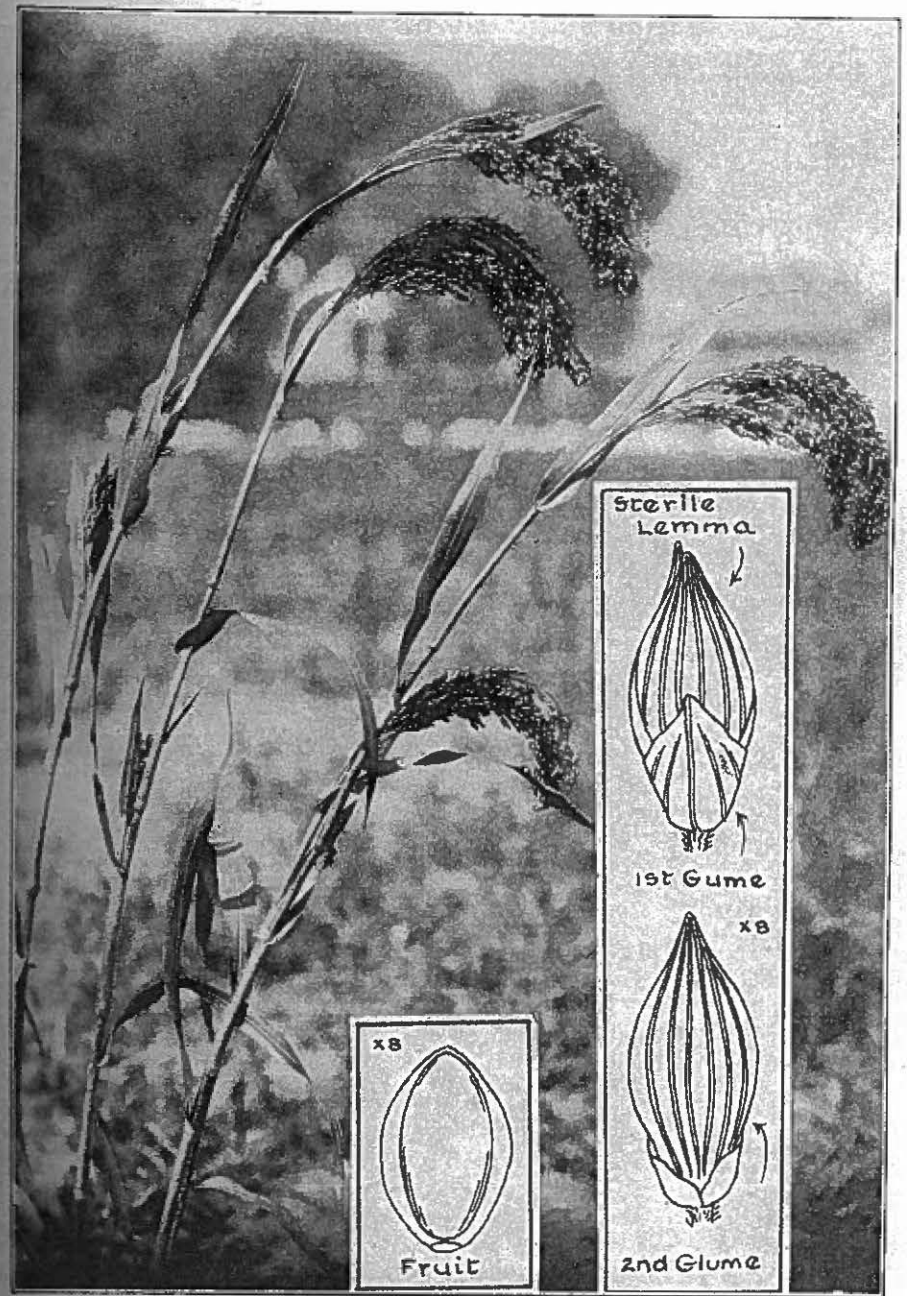
PANICUM TEXANUM; COLORADO GRASS, CONGHO GRASS, TEXAS MILLET.
(See *P. reptans* for drawing of spikelet)



PANICUM DICHOTOMIFLORUM



PANICUM CAPILLARE; OLD-WITCH-GRASS



PANICUM MILIACEUM; PROSO MILLET