

# THE NORTH AMERICAN SPECIES OF ICHNANTHUS.

By A. S. HITCHCOCK.

## INTRODUCTION.

The genus *Ichnanthus* is closely allied to *Panicum*, the largest genus of the tribe Paniceae. The technical character that separates it is the presence of two winglike appendages at the base of the fertile lemma. In many of our North American species the appendages are obsolete and are indicated only by minute scars or excavations. Along with this technical character is that of a general resemblance in habit and in the appearance of the panicles and spikelets, especially the slightly boat-shaped tips of the glumes and lemmas. Most of the species have broad flat blades. One species, *I. ichnodes*, deviates from this concept in every respect except in the presence of well-marked appendages. Altogether the genus is an assemblage of somewhat diverse species, which are segregated from *Panicum* on rather weak technical grounds. The type species, with its large blades and prominent appendages, was more distinct from *Panicum* than most of the species that have since been united with it. As a genus *Ichnanthus* is less distinct than several groups, such as *Syntherisma*, *Lasiacis*, and *Echinochloa*, that were included by older authors in *Panicum* as sections.

There are about 25 known species of *Ichnanthus*, mostly South American, 10 extending into tropical North America and one, *I. pallens*, found also in the Philippines and tropical Asia.

## DESCRIPTION OF THE GENUS AND SPECIES.

### ICHNANTHUS Beauv.

*Ichnanthus* Beauv. Ess. Agrost. 56. 1812. Beauvois gives a generic description and mentions one species, *I. panicoides*, sent to him by Desfontaines from tropical America. This species, which has large appendages, is figured by Beauvois (pl. 12. f. 1).<sup>1</sup> Beauvois misunderstood the structure of the spikelet. He describes it as 3-flowered and calls attention to the unusual position of the intermediate floret, which, he says, consists of two paleae opposite and placed crosswise to the rest of the spikelet. He mistook the large appendages to the fertile lemma for an intermediate floret. The intermediate floret shown in his plate evidently represents the two appendages of the fertile lemma.

*Navicularia* Raddi, Agrost. Bras. 38. pl. 1. f. 5. 1823. Three species are described, *N. hirta*, *N. glabra*, and *N. lanata*. The third species, being the one figured, is taken as the type. In this the appendages are one-third as long as the fertile lemma. The usual reference to *Navicularia* is Bertol. Opus. Sci. Bologn. 3: 408. 1819, but this is an error; the name does not appear there. The name Bertoloni gives is *Panicum loliaceum*; this Raddi cites under *Navicularia hirta*.

<sup>1</sup> For a history of the genus see Chase, Proc. Biol. Soc. Washington 24: 142-144. 1911.

## DESCRIPTION.

Perennials or sometimes apparently annuals with erect or creeping culms and flat, usually broad, sometimes petioled leaf blades. Inflorescence paniculate, the open or contracted panicles terminal and axillary, the spikelets usually in pairs, unequally short-pedicelated along the stiffly spreading or ascending main branches, or rarely single in an open panicle. Spikelets with keeled glumes, thus appearing somewhat laterally compressed, similar in structure to those of *Panicum*, the glumes and sterile lemma usually rather strongly nerved, and commonly ending in an apiculation or convolute point. First glume usually more than half as long as the spikelet, clasping, 3-nerved, the second glume and sterile lemma about equal, longer than the fruit, 5-nerved, the lemma inclosing a membranaceous palea and rarely a staminate flower; fertile lemma usually acute or acutish, indurate, dorsally compressed, usually raised on a short stipe, the margins usually flat but in our species more or less inrolled, the base bearing on either side membranaceous appendages adnate to the lemma below, free above, the appendages in many of our species obsolete and indicated only by minute scars or excavations; palea entirely inclosed in the margins of the lemma.

Abnormal specimens occur, especially in nos. 2 to 4, in which the sterile lemmas are greatly multiplied, forming elongate curved spikelets, as much as 2 cm. long.

## KEY TO THE SPECIES.

Appendages of fertile lemma well-developed wings.

Blades widest near the cordate base . . . . . 9. *I. mexicanus*.

Blades narrowed toward the base, this not cordate.

Sheaths densely long-villous . . . . . 8. *I. leiocarpus*.

Sheaths glabrate or somewhat pilose.

Blades lanceolate-linear, many times longer than wide; spikelets long-pedicelated . . . . . 10. *I. ichnodes*.

Blades lanceolate-elliptic, not more than 6 times longer than wide.

7. *I. nemoralis*.

Appendages of fertile lemma reduced to scars.

Blades petiolate, the petiole 1 to 15 mm. long; first glume acute, about half as long as the spikelet.

Spikelets 3 mm. long; culms delicate, spreading, much branched; blades not over 6 mm. wide . . . . . 1. *I. mayarensis*.

Spikelets 3.5 to 4 mm. long; culms erect, simple or sparingly branched; blades 1 to 3 cm. wide. . . . . 6. *I. lanceolatus*.

Blades more or less clasping, often oblique at base, usually over 1 cm. wide.

Glumes with attenuate tips, usually exceeding the sterile lemma and floret; blades thin, more or less pilose.

Spikelets with a few long stiff hairs near the margin toward the summit of both glumes; plants delicate; blades rarely over 4 cm. long and 1 cm. wide. . . . . 2. *I. tenuis*.

Spikelets glabrous or scabrous on the midnerves only; blades up to 7 cm. long and 2 cm. wide. . . . . 3. *I. nemorosus*.

Glumes acute or acuminate but not attenuate, the first shorter than the spikelet; blades firmer.

Blades lanceolate, 1 to 2 cm. wide, glabrous. . . . . 4. *I. pallens*.

Blades oval to ovate-lanceolate, 1.5 to 3.5 cm. wide, often pubescent beneath . . . . . 5. *I. axillaris*.

1. *Ichnanthus mayarensis* (Wright) Hitchc.

*Panicum mayarense* Wright, Anal. Acad. Cienc. Habana 8: 296. 1871. "Mayarí Abajo," Cuba. The type specimen in the Gray Herbarium (*Wright* 3468) consists of several culms with decumbent bases, sessile or nearly sessile blades 2 to 3 mm. wide, and a panicle one-fourth the entire height of the plant.

*Ichnanthus mayarensis* Hitchc. Contr. U. S. Nat. Herb. 12: 229. 1909. Based on *Panicum mayarense* Wright.

*Ichnanthus wrightii* Hitchc. Contr. U. S. Nat. Herb. 12: 229. 1909. "Wright's 3880. U. S. National Herbarium no. 559959 of this collection is the type." This was collected at Río Seco in Arroyo Hondo, Pinar del Río, Cuba. The specimen consists of several delicate sterile culms rooting at the nodes, the thin blades as much as 1 cm. wide with petioles as much as 12 mm. long, and of a few culms, lacking the base, bearing small panicles. The plants appear to have grown in the shade.

## DESCRIPTION.

Culms slender, wiry, straggling or spreading, rooting at the lower nodes, 20 to 40 cm. long, glabrous or the lower part minutely pubescent, striate, the nodes several; sheaths shorter (often much shorter) than the internodes, striate, glabrous or sparsely papillose-hispid on the surface, puberulent on the margin, especially toward the apex; blades lanceolate to narrowly elliptic, 2 to 5 cm. long, 3 to 6 mm. wide (or exceptionally as much as 1 cm. wide), striate, glabrous throughout or scaberulous above, abruptly narrowed at base into a petiole 1 to 5 mm. long, or on the sterile shoots as much as 15 mm. long; panicles 2 to 10 cm. long, usually long-exserted, the few main branches as much as 3 cm. long, rather stiffly spreading, the primary and secondary axes glabrous or scaberulous; spikelets about 3 mm. long, lanceolate, nearly terete, acute, glabrous, the unequal pedicels 0.5 to 2 mm. long; first glume 1.5 mm. long, broad and clasping at base, acute; second glume and sterile lemma equal, 3 mm. long, acuminate, strongly nerved, the sterile palea narrow, about 1 mm. long; fertile lemma 2 mm. long, acute, only slightly compressed dorsally, the margins inrolled, nearly or quite meeting, the scars at base about 0.5 mm. long, the stipe obsolete.

At the time *Ichnanthus wrightii* was described there were no specimens at hand except those collected by Wright. The specimens received since then show that the two forms must be united under one species.

## DISTRIBUTION.

Dry pine woods and palm barrens, Cuba.

CUBA: Mayarí, *Wright* 3468. Arroyo Hondo, *Wright* 3880. Woodfred, *Shafer* 2966, 3058. Campo Florido, *León* 3450, 4143. Madruga, *León* 6373.

EXPLANATION OF PLATE 1.—*Ichnanthus mayarensis*. Specimen from Campo Florido, Cuba, *León* 4143 (U. S. Nat. Herb. no. 946900). Natural size.

2. *Ichnanthus tenuis* (Presl) Hitchc. & Chase.

*Oplismenus tenuis* Presl, Rel. Haenk. 1: 319. 1830. "Hab. in Mexico, Panama." A duplicate type has been examined at the herbarium of the Petrograd Botanical Garden.

*Panicum exile* Steud. Syn. Pl. Glum. 2: 45. 1854. Based upon *Oplismenus tenuis* Presl, the name changed probably because of *Panicum tenue* Roxb.

*Panicum alsinoides* Griseb. Fl. Brit. W. Ind. 550. 1864. "Hab. Jamaica!, March; St. Kitts!; Trinidad! Pd." The description applies to *Ichnanthus tenuis*, but the specimen (sterile) in the Gray Herbarium collected in Jamaica by March is *Oplismenus setarius*. *Ichnanthus tenuis* is not known from Jamaica. The specimen of *P. alsinoides* in the Grisebach Herbarium from St. Kitts is also sterile and is probably not *Ichnanthus tenuis*.

*Ichnanthus alsinoides* Munro; Hemsl. Biol. Centr. Amer. Bot. 3: 500. 1885. Based on *Panicum alsinoides* Griseb.

*Ichnanthus tenuis* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18: 334. 1917. Based on *Oplismenus tenuis* Presl.

## DESCRIPTION.

Apparently annual; culms slender, spreading or creeping, rooting at the nodes, much branched, the fertile shoots ascending, 10 to 20 cm. high, glabrous or puberulent mostly in lines, purplish; sheaths shorter than the internodes, papillose-hispid with weak hairs; blades lanceolate, 2 to 5 cm. long, 4 to 10 mm. wide, sessile, rounded or slightly cordate at base, acute or acuminate, thin, glabrous or puberulent, often sparsely hispid, the margins scabrous; panicles terminal and axillary, 2 to 4 cm. long, or the axillary ones smaller, mostly on long slender peduncles, the few branches rather weakly spreading, as much as 2 cm. long, the axes slender, angled, scaberulous, and sometimes puberulent, often villous or with a few long hairs at the base of the branches; spikelets narrowly lanceolate, 3 mm. long, acuminate, hispid, the pedicels slender, unequal, the shorter one of the pair 1 mm. long or less, the other twice or thrice as long; first glume broad and clasping at base, nearly as long as the spikelet, attenuate into a slender point, glabrous or scaberulous; second glume and sterile lemma nearly equal, acuminate, the former attenuate-pointed, prominently nerved, sparsely hispid along the lateral nerves, the sterile palea small and narrow; fertile lemma 1.5 to 2 mm. long, dorsally compressed, oblong, rounded at the apex, the margins flat, widely separated, the scar about 0.3 mm. long, extending downward into a wing decurrent on the short stipe.

## DISTRIBUTION.

Damp shady places, Guatemala to northern South America.

GUATEMALA: Cubilquitz, *Türckheim* 8799 (abnormal). Cobán, *Türckheim* 908 (abnormal).

COSTA RICA: Alajuela, *Jiménez* 164, 165, 701, 705. Boruca, *Tonduz* 3363, 4460. Buenos Aires, *Tonduz* 3647. Piedro del Convento, *Pittier* 3654. Río General, *Pittier* 3359, 3363.

PANAMA: Gatún, *Hitchcock* 9186. Culebra, *Pittier* 2119; *Amer. Gr. Nat. Herb.* 581; *Hitchcock* 9166. Chagres, *Fendler* 373 (abnormal). El Boquete, *Hitchcock* 8274 (abnormal). Cerro Vaca, *Pittier* 5366, 5370. Balboa, *Hitchcock* 8000 (abnormal). Bohío, *Hitchcock* 8394 (abnormal). Ancón, *Killip* 4029.

TRINIDAD: Maraval, *Broadway* 4912, 4913. Arima, *Hitchcock* 10313. Port of Spain, *Hitchcock* 10052, 10199. St. Joseph, *Amer. Gr. Nat. Herb.* 580.

COLOMBIA: Santa Marta, *Smith* 2129, 2135, 2572.

VENEZUELA: Tovar, *Fendler* 2532, 2544 (abnormal).

EXPLANATION OF PLATE 2.—*Ichnanthus tenuis*. Specimen from Río Grande, Panama, *Pittier* 2119 (U. S. Nat. Herb. no. 975195); also a branch with proliferous spikelets, collected between Bohío and Frijoles, Panama, *Hitchcock* 8394 (U. S. Nat. Herb. no. 946903). Both natural size.

3. *Ichnanthus nemorosus* (Swartz) Doell.

*Panicum nemorosum* Swartz, Prodr. Veg. Ind. Occ. 22. 1788. "Jamaica, Domingo." The type has been examined in the Swartz Herbarium at Stockholm. It is from Jamaica.

*Milium nemorosum* Moench, Meth. Pl. Suppl. 67. 1802. Based on *Panicum nemorosum* Swartz.

*Ichnanthus nemorosus* Doell in Mart. Fl. Bras. 2<sup>o</sup>: 289. 1877. Based on *Panicum nemorosum* Swartz.

## DESCRIPTION.

Culms spreading and creeping, rooting at the nodes, much branched, pubescent or glabrescent, the nodes pubescent, the fertile shoots decumbent or rising to the height of 10 to 20 cm.; sheaths shorter than the internodes, pubescent or glabrescent, villous on the margin and collar; blades ovate-lanceolate to elliptic-lanceolate, 3 to 7 cm. long, 1 to 2 cm. wide, clasping at the usually asymmetric base, somewhat abruptly narrowed toward the apex, thin, sparsely hispid and scaberulous on both surfaces or glabrescent; panicles terminal and axillary, 1 to 4 cm. long, ovate or often narrow, the few branches weakly spreading or appressed, usually not over 2 cm. long, the axes angled and scabrous, villous at the base of the branches; spikelets 2.5 to 3 mm. long, glabrous, the pedicels short, 1 to 2 mm. long or less; first glume a little shorter than the second and about as long as the sterile lemma, broad and somewhat clasping at the base, 5-nerved, the lateral nerves contiguous, acuminate or attenuate-pointed, the keel scaberulous above; second glume and sterile lemma 5-nerved, the lateral nerves distant, the glume scaberulous on the keel, acuminate or attenuate-pointed, sometimes with a few hairs near the margin, the lemma smooth on the keel, acute or somewhat rounded at apex, the sterile palea well developed, nearly as long as the lemma; fertile lemma lanceolate, 2 mm. long, acutish, yellow-brown at maturity, the scar at base about 0.3 mm. long, bearing no wing below, the margins somewhat inrolled, distant.

This species resembles *I. pallens*, but is more delicate, has thinner blades, and is usually more prostrate; the spikelets are shorter and more obtuse.

## DISTRIBUTION.

Shady banks and rich woods, West Indies, Mexico, and Central America.

SAN LUIS POTOSÍ: Las Canoas, *Pringle* 3827.

VERACRUZ: Misantla, *Purpus* 6217. Jalapa, *Hitchcock* 6649.

GUATEMALA: Guatemala City, *Hitchcock* 9047. Cubilquitz, *Türckheim* 4038.

COSTA RICA: La Palma, *Tonduz* 12509, 12515. La Esmeralda, *Tonduz* 1346.

Santa Rosa du Copey, *Tonduz* 11889. San José, *Hitchcock* 8479.

PANAMA: El Boquete, *Hitchcock* 8268, 8276, 8318, 8329. Chiriquí Volcano, *Hitchcock* 8195, 8205.

CUBA: Habana, *León* 8635. Sierra de Anafe, *Wilson* 11538 (*León* 2873). Banao Hills, Santa Clara, *León* 3997. La Perla, Oriente, *León* 3908. Retiro, *Wright* 3881. Mogote de Mono, *Wright* 3882. Arroyo Hondo, *Wright* 3858.

SANTO DOMINGO: Without locality, *Poiteau*.

JAMAICA: Gordon Town, *Harris* 11476; *Hart* 923. Ramble, *Amer. Gr. Nat. Herb.* 582. Troy, *Hitchcock* 9798. Catherine's Peak, *Hitchcock* 9741. Castleton, *Harris* 11296. Clyde River, *Harris* 11447.

PORTO RICO: Cayey, *Sintenis* 2406.

LEEWARD ISLANDS: St. Kitts, *Britton & Cowell* 632.

WINDWARD ISLANDS: Grenada, *Broadway* 177.

TRINIDAD: Port of Spain, *Hitchcock* 10041. Caparo Woods, *Broadway* 4931.

EXPLANATION OF PLATE 3.—*Ichnanthus nemorosus*. Specimen from River Estate, Port of Spain, Trinidad, *Hitchcock* 10041 (U. S. Nat. Herb. no. 975139). Natural size.

#### 4. *Ichnanthus pallens* (Swartz) Munro.

*Panicum pallens* Swartz, Prodr. Veg. Ind. Occ. 23. 1788. "Jamaica." The type has been examined in the Swartz Herbarium at Stockholm.

*Panicum hemignostum* Steud. Syn. Pl. Glum. 1: 77. 1854. "Paraguay." The type has been examined at the Paris Herbarium.

*Ichnanthus pallens* Munro; Benth. Fl. Hongk. 414. 1861. Based on *Panicum pallens* Swartz.

#### DESCRIPTION.

Culms much branched, spreading, creeping at the base, rooting at the nodes, the fertile culms ascending 30 to 80 cm. or sometimes more, puberulent; sheaths usually glabrous on the surface, villous on the margin; blades lanceolate, often somewhat falcate, 5 to 10 cm. long, mostly 1 to 2 cm. wide, somewhat clasping at the asymmetric narrowed base, somewhat abruptly narrowed to an acuminate point, the lower surface glabrous or slightly scaberulous, roughened with irregular crossveins, sometimes with a few scattered stiff hairs, the upper surface scaberulous, often with a few stiff hairs at the base and on the basal portion of the margin; panicles terminal and from several of the upper axils, 5 to 10 cm. long, rather compact, elliptic, the main branches ascending, as much as 6 cm. long, usually bearing secondary branches, the axes angled and scabrous, pubescent at the base of the branches; spikelets 3 to 3.5 mm. long, glabrous or rarely with a few stiff hairs; first glume 1.5 to 2 mm. long, somewhat clasping at base, attenuate-pointed, scabrous on the keel; second glume longer than the sterile lemma, acuminate but scarcely attenuate-pointed, scabrous on the keel and roughened on the lateral nerves; sterile lemma similar to the second glume, but shorter and less narrowed at the summit, the palea well developed, nearly as long as the lemma; fertile lemma oblong, 1.5 mm. long, rounded at apex, the margins inrolled, distant, the scars at base 0.3 mm. long, narrowly winged at the side.

#### DISTRIBUTION.

Shady banks and rich woods, tropics of the Western Hemisphere, from southern Mexico and Cuba southward; introduced in southeastern Asia.

VERACRUZ: Córdoba, *Hitchcock* 6454. Jalapa, *Hitchcock* 6675. Mirador, *Liebmann* 400, 401, 740 (abnormal).

CAMPECHE: Atasta, *Rovirosa* 642 (abnormal).

GUATEMALA: Cubilquitz, *Türckheim* 4038. Sepacuité, *Collins & Goll* 011 (abnormal). Senahú, *Goll* 178 (abnormal). Livingston, *Türckheim* 8792.

HONDURAS: San Pedro Sula, *Thieme* 17, 5590, 5594. Puerto Sierra, *Wilson* 614.

COSTA RICA: San José, *Cooper* 5991. Bucnos Aires, *Pittier* 10591. Cañas Gordas, *Pittier* 7361. Boca de Zhorquin, *Tonduz* 8636. San Marcos, *Tonduz* 7564. Rodeo de Pacaca, *Pittier* 3269. Luis, *Tonduz* 11393. Terraba, *Tonduz* 3616. Boruca, *Tonduz* 3633.

PANAMA: Matías Hernández, *Pittier* 6923. Bocas del Toro, *Hart* 69, 72, 89. Culebra, *Hitchcock* 8023, 9164. Bas Obispo, *Hitchcock* 9210. Gatún, *Maxon* 4654; *Hitchcock* 9181. Alhajucla, *Pittier* 2335. Corozal, *Hitchcock* 9201. El Boquete, *Hitchcock* 8273, 8302, 8306. San Felix, *Pittier* 5204 (abnormal), 5230, 5272.

CUBA: Monte Verde, *Wright* 750. Sancti Spiritus Mountains, *León* 6524 (abnormal). Camino Aguacate, *Wilson* 9210. Gran Piedra, *Shafer* 9015. Woodfred, *Shafer* 3022. Holguin, *Shafer* 1446. Baracoa, *Pollard, Palmer & Palmer* 15. El Guama, *Palmer & Riley* 130 (abnormal), 218. El Palenquito, *Eggers* 4814. San Diego de los Baños, *León* 4849.

JAMAICA: Red Hills, *Harris* 11837. Ipswich, *Harris* 12511; *Hitchcock* 9619. Devon Pen, *Harris* 12472. Holliss Savanna, *Harris* 12258. Bull Head Mountain, *Hitchcock* 9531. Troy, *Hitchcock* 9799. Claverty Cottage, *Harris* 11523. Castleton, *Harris* 11298, 11485. Port Morant, *Hitchcock* in 1890. Cedar Hurst, *Harris* 11549.

PORTO RICO: Rio Piedras, *Stevenson* 3327; *Hioram* 362; *Wetmore* 171. Sierra de Luquillo, *Eggers* 1172; *Chase* 6717. Maricao, *Sintenis* 214; *Chase* 6196. Bayamon, *Millsbaugh* 352; *Heller* 92. Mayaguez, *Holm* 3, 165; *Heller* 4374; *Cowell* 628; *Chase* 6321. Santurce, *Heller* 826. Ponce, *Heller* 6093. Santa Ana, *Goll* 136. Toa Alta, *Goll* 884. Utuado, *Britton & Cowell* 369, 883. Jayuya, *Britton & Cowell* 949. Alegriillo, *Britton, Stevens & Hess* 2576. Monte Montoso, *Britton & Cowell* 4139. Sierra de Naguabo, *Shafer* 3388, 3629. Fajardo, *Britton & Shafer* 1633. Campo Alegre, *Chase* 6805. San Juan, *Chase* 6362, 6405, 6411, 6628, 6629, 6640, 6774. Cayey, *Chase* 6736. Quebradillas, *Chase* 6571. Arecibo, *Chase* 6450. Vega Baja, *Chase* 6418.

SANTO DOMINGO: Sánchez, *Rose* 4333. Santo Domingo City, *Rose* 3748. Without locality, *Wright, Parry & Brummel* 608.

LEEWARD ISLANDS: Antigua, *Rose* 3487; *Wullschlaegel* 619. Montserrat, *Shafer* 710. Guadeloupe, *L'Herminier* 397; *Duss* 2686.

WINDWARD ISLANDS: Martinique, *Duss* 772. Barbados, *Eggers* 7186; *Bot. Sta. Herb.* 458. St. Vincent, *Eggers* 6560. Grenada, *Broadway* 1103, 4615, 4672.

TRINIDAD: *Bot. Gard. Herb.* 2281, 3189, 3191. Port of Spain, *Crueger* 74; *Hitchcock* 9955, 9966; *Amer. Gr. Nat. Herb.* 583, 584. Maraval, *Broadway* 4911. Tamana, *Broadway* 4960. Blanchisseuse, *Broadway* 3820. St. Joseph, *Hitchcock* 10013. San Fernando, *Hitchcock* 10104. Tabaquite, *Hitchcock* 10130. La Brea, *Broadway* 4977. Cedros, *Hitchcock* 10140.

TOBAGO: *Broadway* 4039, 4080; *Eggers* 5685; *Hitchcock* 10240, 10248.

COLOMBIA: Santa Marta, *Smith* 2133.

BRAZIL: *Capanema* 5392, 5453; *Burchell* 1623. Rio Grande do Sul, *Malme* 506; *Lindman* 1413. Campina, *Campos Novaes* 1285 (abnormal), 1286. Rio Janeiro, *Glaziou* 17393, 17404.

PARAGUAY: Sierra de Amambaby, *Hassler* 11269.

ARGENTINA: Misiones, *Ekman* 654, 656.

EXPLANATION OF PLATE 4.—*Ichnanthus pallens*. Specimen from Port of Spain, Trinidad, *Hitchcock* 9955 (U. S. Nat. Herb. no. 946899). Natural size.

##### 5. *Ichnanthus axillaris* (Nees) Hitchc. & Chase.

*Panicum axillare* Nees, *Agrost. Bras.* 141. 1829. "Itambé da Villa et Itacolumi etc. provinciae Minarum." The type specimen, collected by Martius, has been examined at the Munich Herbarium.

*Ichnanthus axillaris* Hitchc. & Chase, *Contr. U. S. Nat. Herb.* 18: 334. 1917. Based on *Panicum axillare* Nees.

##### DESCRIPTION.

Culms much branched, spreading or prostrate, rooting at the nodes, the fertile shoots ascending 10 to 20 cm. in open ground, or among shrubs clambering to the height of 1 to 1.5 meters, puberulent or glabrescent; sheaths villous, at least on the margin; blades oval, ovate, or ovate-lanceolate, 3 to 12 cm. long.

1.5 to 3.5 cm. wide, cordate-clasping at base, acute or acuminate, rather thick or firm, pubescent or glabrous beneath, scabrous above; panicles terminal and axillary, similar to those of *I. pallens* but on the average larger, sometimes as much as 20 cm. long; spikelets similar to those of *I. pallens* in arrangement and structure, but usually larger; glumes often sparsely pilose; sterile lemma containing a well-developed palea and a staminate flower; fertile lemma 2 mm. long, with prominent scars at base.

This species is closely related to *I. pallens*, from which it differs in the thicker, proportionately broader blades and larger, often sparsely pilose spikelets.

#### DISTRIBUTION.

Moist, more or less shaded slopes in the uplands, Porto Rico and Guatemala to Ecuador and Brazil.

GUATEMALA: Cubilquitz, *Türckheim* 7800.

COSTA RICA: "Chemin de Carrillo," *Biolley* 3112.

PANAMA: Frijoles, *Hitchcock* 8398. San Felix, *Pittier* 5203. Juan Diaz, *Killip* 4063.

PORTO RICO: Adjuntas, *Chase* 6472; *Sintenis* 4610; *Britton & Shafer* 2018.

Utado, *Britton & Cowell* 1008. Mayaguez, *Heller* 4479. Cayey, *Chase* 6735. Aybonito, *Sintenis* 2869.

TRINIDAD: Tabaquite, *Hitchcock* 10125; *Amer. Gr. Nat. Herb.* 585. Maraval, *Bot. Gard. Herb.* 5425. Port of Spain, *Hitchcock* 10033.

TOBAGO: *Hitchcock* 10263.

VENEZUELA: Santa Catalina, *Rusby & Squires* 353.

BRAZIL: Parará, *Dusén* 7911.

ECUADOR: Balao, *Eggers* 14655.

EXPLANATION OF PLATE 5.—*Ichnanthus axillaris*. Specimen from Maraval, Trinidad, *Bot. Gard. Herb.* 5425 (U. S. Nat. Herb. no. 975122). Natural size.

#### 6. *Ichnanthus lanceolatus* Scribn. & Smith.

*Panicum lindeni* Fourn. Mex. Pl. 2: 29. 1886. Not *P. lindeni* Griseb. 1866. The type specimen, collected in Yucatán by Linden, has been examined at the Paris Herbarium.

*Ichnanthus lanceolatus* Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 4: 36, pl. 5. 1897. "Old fields about Izamal. No. 854. George F. Gaumer, September, 1895." The type is in the United States National Herbarium.

#### DESCRIPTION.

Culms erect or slightly spreading at base, 40 to 60 cm. high, striate, glabrous or puberulent, the nodes about 4, glabrous, or puberulent below the sheath at the margin of the latter; sheaths shorter than the internodes, striate, glabrous on the surface or the lowermost villous, the margin villous; blades lanceolate to ovate-lanceolate, or the lower ovate, 5 to 7 cm. long, 1 to 3 cm. wide, the uppermost reduced, rather firm in texture, glabrous or slightly scaberulous beneath, scabrous above, narrowed from a rounded or cordate base into a petiole 1 to 10 mm. long; panicles terminal or also axillary, 5 to 12 cm. long, the one from the uppermost sheath smaller, the few branches rather stiffly spreading, as much as 6 cm. long, the axes scaberulous; spikelets about 4 mm. long, lanceolate, slightly compressed laterally, glabrous, the pedicels scabrous, unequal, the shorter of the pair about 1 mm. long, the longer about 3 mm.



long; first glume 2 mm. long, broad and clasping at base, acute; second glume and sterile lemma nearly equal, clasping at base, acuminate, the sterile palea small and narrow, about 1 mm. long; fertile lemma nearly 3 mm. long, acute, the margins flat and overlapping toward the apex, inrolled and nearly meeting toward the base, the scar at base very short, extending downward into a minute wing on the very short stipe.

## DISTRIBUTION.

Forests and old fields; known only from Yucatán peninsula.

YUCATÁN: Izamal, *Gaumer* 854. Tiap, *Linden*.

QUINTANA ROO: Buena Vista Xbac, *Gaumer* 1111. Chichankanab, *Gaumer* 2181.

EXPLANATION OF PLATE 6.—*Ichnanthus lanceolatus*. Type specimen. Natural size.

7. *Ichnanthus nemoralis* (Schrad.) Hitchc. & Chase.

*Panicum nemorale* Schrad.; Schult. Mant. 2: 255. 1824. "In Brasilia, Principes Sereniss. Maximil. Neowidensis." The type has not been examined but the description identifies the species.

*Panicum martianum* Nees, Agrost. Bras. 138. 1829. "Habitat ad Almadam [Brazil] (Mart.)." Nees describes three varieties of which the first, *a*, is the type. This is described as having the sheaths, except the margins, glabrous.

*Panicum petiolatum* Nees, Agrost. Bras. 140. 1829. "Habitat in udis ad Guaratinguetá, in vicinia Parabae fluminis, provinciae S. Pauli," Brazil. The type specimen, collected by Martius, was examined in the Munich Herbarium.

*Ichnanthus petiolatus* Doell in Mart. Fl. Bras. 2<sup>a</sup>: 278. 1877. Based on *Panicum petiolatum* Nees.

*Ichnanthus martianus* Doell in Mart. Fl. Bras. 2<sup>a</sup>: 280. 1877. Based on *Panicum martianum a* Nees.

*Ichnanthus nemoralis* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18: 334. 1917. Based on *Panicum nemorale* Schrad.

## DESCRIPTION.

Culms as much as 1 meter tall, more or less decumbent at base, pubescent or glabrous; sheaths more or less pubescent, villous on the collar; ligule a ciliate membrane about 1 mm. long; blades elliptic or narrowly lanceolate, up to about 10 or 15 cm. long, as much as 3 cm. wide, narrowed into a petiole 1 to 2 mm. long, many-nerved, pubescent on both surfaces or glabrous above; panicle 10 to 15 cm. long, the few stout branches stiffly ascending, pubescent at base; spikelets about 4.5 mm. long, glabrous, or the glumes slightly roughened on the internerves toward the apex; fruit 3.5 mm. long, the appendages 1.5 mm. long.

## DISTRIBUTION.

Among shrubs, Trinidad to Brazil.

TRINIDAD: *Bot. Gard. Herb.* 2278.

TOBAGO: *Broadway*, 4472.

VENEZUELA: Island of Margarita, *Johnston* 208.

BRAZIL: Toca de Onca, *Rose* 26077; *Riedel* 1193, 1194A. Rio Janelro, *Wilkes Expl. Exped.* 14; *Mertens*. State of Paraná, *Dusén* 7594. Without locality, *Salzmann*.

EXPLANATION OF PLATE 7.—*Ichnanthus nemoralis*. Specimen from Tobago, *Broadway* 4472 (U. S. Nat. Herb. no. 725595). Natural size.

*Ichnanthus glaber* (Raddi) Hitchc. (*Navicularia glabra* Raddi, Agrost. Bras. 39. 1823; *Panicum navicularia* Nees, Agrost. Bras. 136. 1829). This species has been confused with *Ichnanthus nemoralis* but differs in having narrowly lanceolate blades, glabrous sheaths (including margin), and an open panicle with slender branches and pedicels. The appendages of the fertile lemma are distinctly different, being firm and rather thick, gradually narrowed to a blunt point, extending above the base of the palea for 0.5 mm. and united below to the base of the fruit for about the same distance. The appendages of *I. nemoralis* and its allies are thin membranaceous wings. The notes here given are from a specimen collected by J. N. Rose on Corcovado, Rio de Janeiro, Brazil (no. 20181). The type of *Navicularia glabra*, collected "in saltibus montosis prope Rio-janeiro," has not been examined, but the specimen above cited agrees perfectly with Raddi's description.

There is an *Ichnanthus glaber* Link<sup>1</sup> mentioned as a synonym under *Panicum glaberrimum* Steud. The name has no taxonomic standing, as it was not properly published.

#### 8. *Ichnanthus leiocarpus* (Spreng.) Kunth.

*Panicum leiocarpon* Spreng. Neu. Entd. 1: 243. 1820. "Hab. in Brasilia."

*Navicularia lanata* Raddi, Agrost. Bras. 40. 1823. "In herbis prope Rio-Inhumirim," Brazil. This is given as a synonym of *Panicum leiocarpon* by Nees,<sup>2</sup> who probably saw Sprengel's type at Berlin. Raddi describes and figures the glumes and sterile lemma as pubescent at apex, a character which is not mentioned by Sprengel. Sprengel's type has been examined; the spikelets are obscurely pubescent at apex but not bearded as stated by Raddi. As I have not seen Raddi's type, *Navicularia lanata* is included here somewhat doubtfully.

*Ichnanthus leiocarpus* Kunth, Rév. Gram. 1: Suppl. X. 1830. Based on *Panicum leiocarpon* Spreng.

#### DESCRIPTION.

Culms 1 to 2 meters tall, pubescent; sheaths villous or lanate; ligule a ciliate membrane, the hairs 1 to 2 mm. long; blades narrowly lanceolate, 10 to 20 cm. long, 1 to 3 cm. wide, pilose on both surfaces; panicle large and open, about 30 cm. long, obovoid, the axis villous below, scabrous above, the branches spreading, pubescent at base, these and the branchlets somewhat flexuous; spikelets about 4 mm. long, glabrous; first glume about half as long as spikelet; fruit narrow, brownish, 3 mm. long, the appendages about 1 mm. long.

#### DISTRIBUTION.

Trinidad to Brazil.

TRINIDAD: *Bot. Gard. Herb.* 3318.

BRAZIL: Bahia, *Riedel* 183. Rio Janeiro, *Beyrich*.

#### 9. *Ichnanthus mexicanus* Fourn.

*Ichnanthus mexicanus* Fourn. Mex. Pl. 2: 34. 1886. "Trapiche de la Concepcion [Oaxaca] (Liebm. n. 457)." The type, in the Copenhagen Herbarium, is the terminal part of a culm with a panicle and one or two leaves. The description below is drawn from this specimen.

<sup>1</sup> Steud. Syn. Pl. Glum. 1: 94. 1854.

<sup>2</sup> Agrost. Bras. 147. 1829.

## DESCRIPTION.

Culms tall, glabrous; sheaths densely villous or glabrate; ligule a very short, densely ciliate membrane; blades (only the upper seen) gradually narrowed from the cordate base to a slender point, 8 to 18 cm. long, as much as 2.5 cm. wide near base, pubescent on both surfaces; panicle 30 cm. long, about 8 cm. wide, rather densely flowered, the branches ascending, clustered, the longer ones as much as 10 cm. long, spikelet-bearing from base; spikelets single or in clusters along the scabrous rachis, 4 to 4.5 mm. long, the pedicels 1 to 2 mm. long, densely scabrous-hispidulous; first glume about as long as the spikelet, 3-nerved, pointed, scabrous, villous along the margins and at the apex; second glume about as long as the fruit, 5-nerved, scabrous, the long hairs sparse or wanting; sterile lemma similar to the second glume but weakly 5-nerved, the palea well developed, ciliate on the keels; fertile lemma about 3 mm. long, the boat-shaped point distinct, the appendages rather firm, ovate-oblong, distinct from near the base, about 0.5 mm. long.

## DISTRIBUTION.

Known only from the type collection.

OAXACA: Trapiche de la Concepción, *Liebmann* 457.

EXPLANATION OF PLATE 8.—*Ichnanthus mexicanus*. Type specimen. Natural size.

10. *Ichnanthus ichnodes* (Griseb.) Hitchc. & Chase.

*Panicum ichnodes* Griseb. Fl. Brit. W. Ind. 551. 1864. Collected in Trinidad by Crueger near Port of Spain, "heights of S. Anne." The type specimen in the Grisebach Herbarium consists of an incomplete leafy culm and a large spreading panicle.

*Ichnanthus ichnodes* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18: 335. 1917. Based on *Panicum ichnodes* Griseb.

## DESCRIPTION.

Plants erect from a somewhat decumbent base, bearing short knotty root-stocks and forming colonies; culms 1 to 2 meters tall, glabrous, or sparingly villous below; sheaths keeled, the lower overlapping, glabrous or sparsely villous, densely villous on the margin and on the collar; ligule a ciliate membrane about 1 mm. long; blades narrowly lanceolate to linear, the lower ones as much as 30 cm. long, 1 to 2 cm. wide, narrowed below, scabrous, sometimes sparsely villous, densely villous above near base; panicle oblong, as much as 30 cm. long, the branches fascicled or branched at base, finally spreading, pubescent or villous at base; spikelets blunt, about 2.5 mm. long; first glume very scabrous on the keel, more than half as long as spikelet, often sparsely villous; second glume roughened toward apex; sterile floret often staminate; fruit 2 mm. long, the appendages 0.5 mm. long.

The elongate blades and the large, much-branched, many-flowered panicles of blunt spikelets give this species the aspect of a species of *Panicum*. The small spikelets lack the point at the ends of the glumes and lemmas, but the appendages at the base of the fertile lemma show that the species belongs to *Ichnanthus*.

## DISTRIBUTION.

Wood borders, in partial shade, Trinidad.

TRINIDAD: Port of Spain, *Amer. Gr. Nat. Herb.* 586, 587; *Bot. Gard. Herb.* 3182. St. Anne, *Crueger* 77. St. Joseph, *Hitchcock* 10178, 10179, 10191. Piarco Savanna, *Hitchcock* 10357. Pitch Lake, *Bot. Gard. Herb.* 2299.

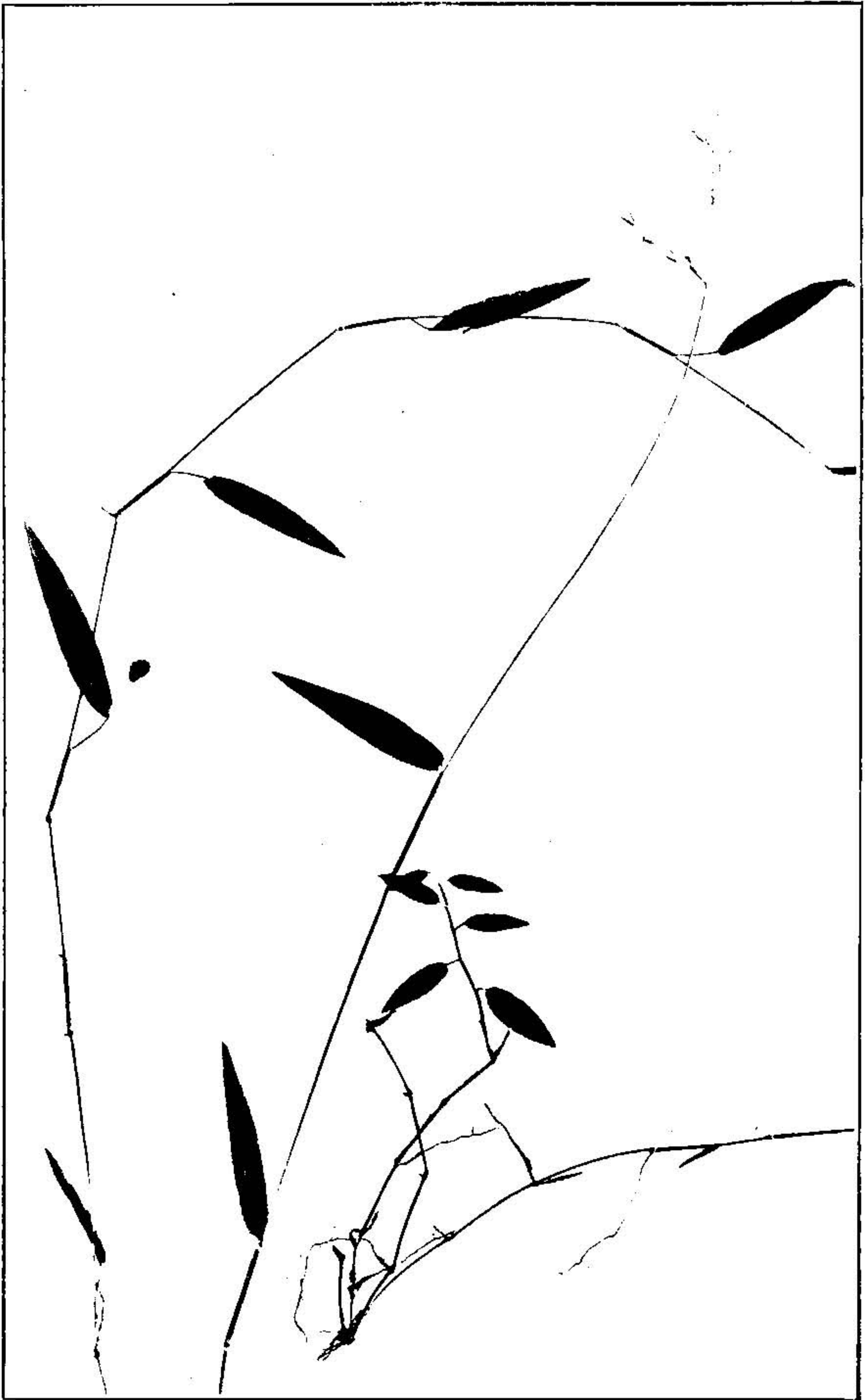
EXPLANATION OF PLATE 9.—*Ichnanthus ichnodes*. Specimen from St. Joseph, Trinidad, *Hitchcock* 10179 (U. S. Nat. Herb. no. 946898). Natural size.

## DOUBTFUL OR EXCLUDED SPECIES.

PANICUM SCHLECHTENDAHLII Fourn.; *Hemsl. Biol. Centr. Amer. Bot.* 3: 496. 1885, a name only; *Fourn. Mex. Pl.* 2: 22, 30. 1886. "P. pallens Schlecht . . . non Sw." No description except the few characters given in the key. These point to *I. nemorosus*.

PANICUM SCHLECHTENDAHLII var. MONSTROSUM Fourn. *Mex. Pl.* 2: 31. 1886. "Mirador (Gal. n. 5689)." Galeotti's specimen in the Paris Herbarium is a plant with abnormal spikelets. Probably *I. pallens*.

ICHNANTHUS APICULATUS Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 30: 1. 1901. This is *Panicum cordovense* Fourn.



*ICHNANTHUS MAYARENSIS* (WRIGHT) HITCHC.



*ICHNANTHUS TENUIS* (PRESL) HITCHC. & CHASE.

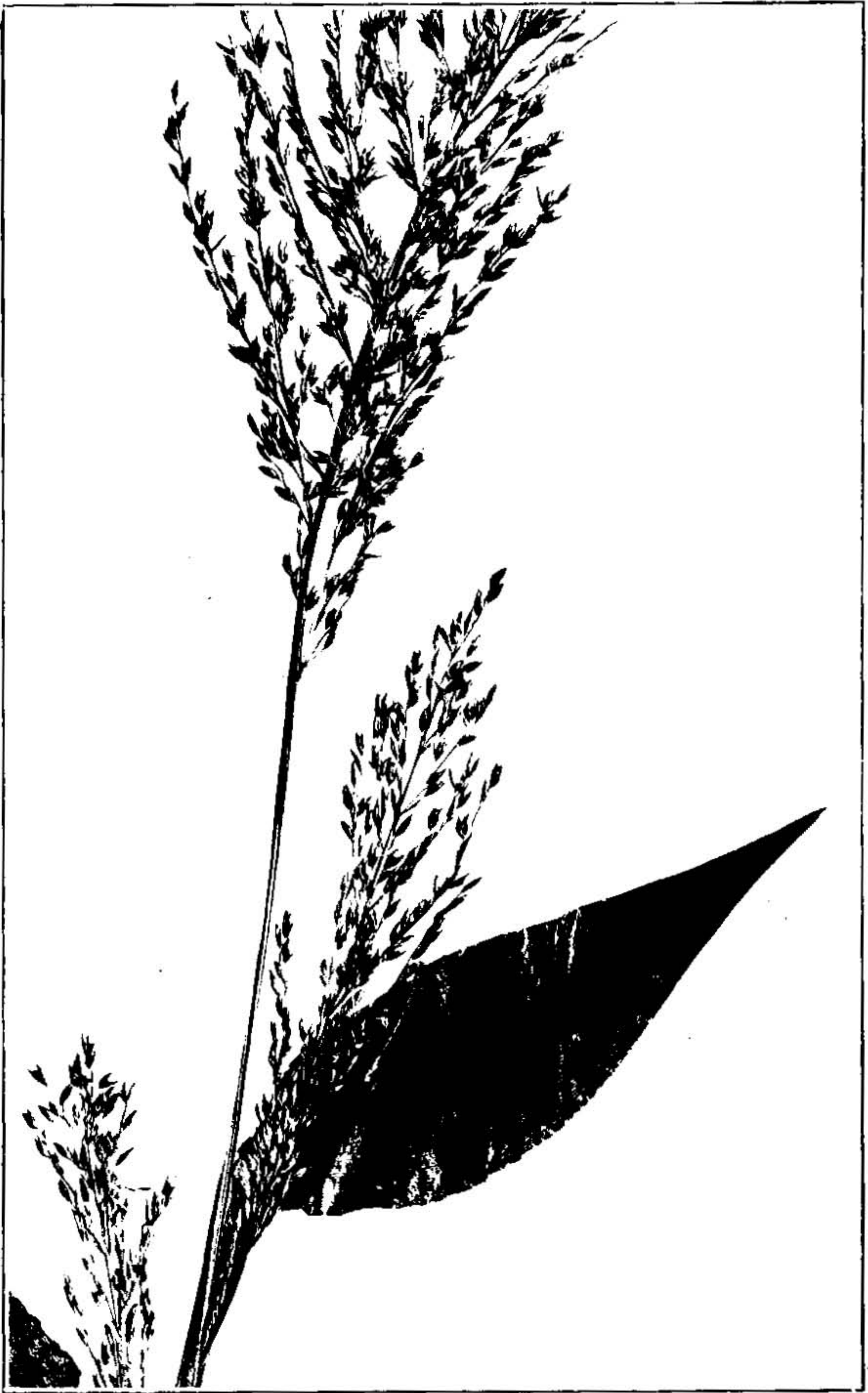


*ICHNANTHUS NEMOROSUS* (SWARTZ) DOELL.



*ICHNANTHUS PALLENS* (SWARTZ) MUNRO.





ICHNANTHUS AXILLARIS (NEES) HITCHC. & CHASE.



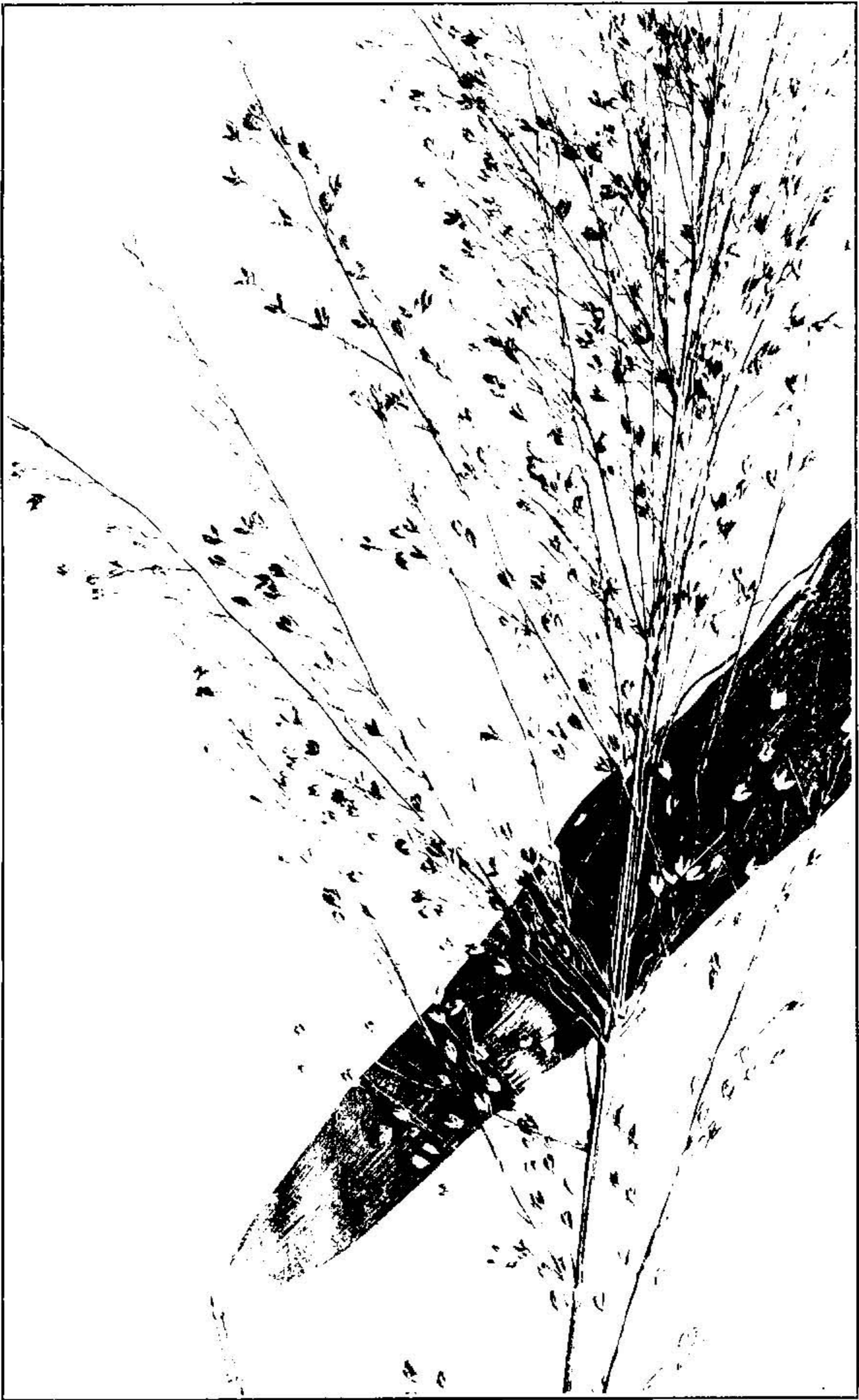
ICHNANTHUS LANCEOLATUS SCRIBN. & SMITH.



*ICHNANTHUS NEMORALIS* (SCHRAD.) HITCHC. & CHASE.



ICHNANTHUS MEXICANUS FOURN.



ICHNANTHUS ICHNODES (GRISEB.) HITCHC. & CHASE.