

# THE NORTH AMERICAN SPECIES OF CHAETOCCHLOA.

By A. S. HITCHCOCK.

## INTRODUCTION.

The genus *Chaetochloa* is closely allied to *Panicum*, from which it is separated technically by the presence of bristle-like sterile branchlets below the spikelets. Two species, introduced from Europe, are common weeds in the eastern states. One, *C. lutescens* (*Setaria glauca* of authors), with a dense cylindric spikelike panicle or head, and yellow bristles, is called yellow foxtail or pigeon grass. The other, green foxtail (*C. viridis*), has green heads. The bristly head or narrow panicle is characteristic of most of the species of the genus. One species, *C. italica* (*Setaria italica*), is cultivated under the name of millet or foxtail millet. Of this there are many varieties, such as Hungarian grass, German millet, and Golden Wonder. To these the general term millet is applied, a name which should not be confused with the common millet of Europe (*Panicum miliaceum*), cultivated occasionally in the United States for forage under the name of broom-corn millet, proso millet, and hog millet. The North American species of *Chaetochloa* were revised in 1900 by Scribner and Merrill.<sup>1</sup>

The allies of *Panicum palmifolium* are here included under *Chaetochloa* as a subgenus (*Ptychophyllum*). They are tropical species with broad plaited blades. Some are cultivated in greenhouses under the name of palm grass, because of the leaves which resemble those of a young palm.

In a small group of species of *Panicum* (forming the subgenus *Paurochaetium*<sup>2</sup>) the ultimate branchlets are produced beyond the few to several spikelets as minute bristles. In *Chaetochloa* proper each spikelet is subtended by one or more bristles. In the subgenus *Ptychophyllum* usually only the terminal of the one to few spikelets on a branchlet is subtended by the bristle. *Panicum* and *Chaetochloa* thus closely approach each other. The species of the subgenera *Paurochaetium* and *Ptychophyllum* are included respectively in *Panicum* and *Chaetochloa* because, all their characters taken into consideration, they show closer relationship to other species in *Panicum* and *Chaetochloa*, respectively, than they do to each other.

<sup>1</sup> U. S. Dept. Agr. Div. Agrost. Bull. 21. 1900.

<sup>2</sup> Contr. U. S. Nat. Herb. 15: 22. 1910.

The name *Setaria*, applied to this genus by many authors, has been replaced by *Chaetochloa* because the former name was applied to a genus of lichens by Acharius and by Michaux at a date earlier than that of its application to the grass genus (see synonymy in the technical description).

There are about 60 species of *Chaetochloa*, 26 in North America, about 15 more in South America, the remainder in the warmer parts of the Eastern Hemisphere.

The text figures are natural size.

## DESCRIPTION OF THE GENUS AND SPECIES.

### CHAETOCHLOA Scribn.

*Setaria* Beauv. Ess. Agrost. 51. pl. 13. f. 3. 1812. Not *Setaria* Ach. 1798,<sup>1</sup> nor Michx. 1803. Fourteen species are listed, *S. viridis* being illustrated. *Panicum viride* L., upon which the illustrated species is based, is taken as the type.

*Panicum* subgenus *Ptychophyllum* A. Br. Ind. Sem. Hort. Berol. App. 1855. The author mentions the plicate-leaved species of *Panicum* that had been long cultivated in botanic gardens under the name of *P. plicatum* Auct. He describes *Ptychophyllum* as a subgenus of *Panicum* and notes its close affinity to the subgenus *Setaria*. Ten species are described, the first of which is *Panicum plicatum* Lam. This species may be taken as the type.

*Chaetochloa* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 38. 1897. Scribner substitutes the name *Chaetochloa* for *Setaria* Beauv., not Ach. The type is the same as for *Setaria*, namely *Panicum viride* L.

Some of our species of *Chaetochloa* have been referred to *Ixophorus* Schlecht. and to *Chamaeraphis* R. Br., but the types of those genera are not congeneric with the type of *Chaetochloa*.

### DESCRIPTION.

Annual or perennial grasses with flat or rarely involute blades, and narrow, usually spikelike, or rarely open panicles. Culms simple or usually branched at the base and sometimes at the middle nodes, the branches from the latter appressed or ascending, bearing secondary panicles, these usually smaller than those of the primary culms. Spikelets lanceolate or elliptic, usually turgid, rarely globose, sessile or short-pedicelated, single or in clusters, some or all subtended by one to several bristles (sterile branchlets), deciduous, falling free from the bristles, awnless, the main branches of the panicle usually short, rarely elongate. First glume broad, usually less than half the length of the spikelet, 3 to 5 nerved. Second glume and sterile lemma equal or the former shorter, several-nerved. Fertile lemma coriaceous or indurate, smooth or rugose.

### KEY TO THE SPECIES.

Blades narrowly elliptic, plaited; bristles below only a part of the spikelets, rarely below all. Subgenus *PTYCHOPHYLLUM*.

Plants annual; blades usually less than 2 cm. wide.....1. *C. barbata*.

Plants perennial; blades usually more than 3 cm. wide.

Panicle of numerous approximate, more or less 1-sided racemes, spikelet-bearing to the base, 2 to 5 cm. long, rarely the lower much longer..2. *C. poiretiana*.

Panicle of more or less fascicled branches, not or scarcely 1-sided, some of them elongate and naked at base.

Branches of panicle as much as 10 cm. long; bristles usually not over twice as long as the spikelets, inconspicuous; blades as much as 6 cm. wide.

3. *C. palmifolia*.

Branches of panicle slender, finally spreading, as much as 20 cm. long; bristles as much as 15 mm. long; blades as much as 10 cm. wide..4. *C. sulcata*.

<sup>1</sup> See note at bottom of p. 208.

Blades linear-lanceolate to linear, narrow; bristles below all the spikelets.

*CHAETOCHLOA* proper.

Bristles below each spikelet numerous, at least more than 5. Panicle dense, cylindrical, spikelike.

Plants annual; spikelets 3 mm. long.....5. *C. lutescens*.

Plants perennial; spikelets mostly 2 to 2.5 mm. long.....6. *C. geniculata*.

Bristles below each spikelet 1, or, by the abortion of the spikelets, 2 or 3.

Bristles more or less retrorsely scabrous.

Plants perennial; spikelets globose or nearly so.....7. *C. tenax*.

Plants annual; spikelets not globose.

Spikelets about 2 mm. long.....8. *C. verticillata*.

Spikelets about 1.5 mm. long.

Panicles usually green, rarely as much as 8 cm. long, less than 5 mm. thick, the bristles 2 to 3 mm. long.....9. *C. scandens*.

Panicles usually purple, as much as 15 cm. long and 1 cm. thick, the bristles about 1 cm. long.....10. *C. tenacissima*.

Bristles antrorsely scabrous only.

Plants annual.

Fertile lemma at maturity finely cross-lined or nearly smooth.

Panicle loosely flowered, tapering above.....11. *C. grisebachii*.

Panicle compactly flowered, sometimes interrupted at base.

Plants as much as 3 meters tall. Bristles 1 to 2 cm. long; fertile lemma smooth or nearly so.....12. *C. magna*.

Plants mostly less than 1 meter tall.

Axis of panicle scabrous but not villous.....13. *C. ambigua*.

Axis of panicle villous.

Panicle cylindrical, tapering above, green; spikelet falling entire.

14. *C. viridis*.

Panicle lobed or interrupted, often large and heavy, purple or yellow; fruit deciduous from glumes and sterile lemma.

15. *C. italica*.

Fertile lemma coarsely transversely rugose.

Axis of panicle thickly clothed with white stiff hairs 2 mm. long.

16. *C. longipila*.

Axis of panicle villous, the hairs about 1 mm. long.

Panicle densely flowered, cylindrical. Sheaths scabrous.

17. *C. corrugata*.

Panicle loosely flowered.

Blades scabrous but not hispid.....18. *C. liebmanni*.

Blades sparsely hispid.....19. *C. latifolia*.

Plants perennial.

Spikelets 3 mm. long.

Blades scabrous.....20. *C. macrosperma*.

Blades villous.....21. *C. villosissima*.

Spikelets 2 to 2.5 mm. long.

Panicle attenuate at apex.

Blades linear-lanceolate, more than 5 mm. broad; panicle interrupted or branched, the branches 1 to 3 cm. long.....22. *C. setosa*.

Blades slender, mostly less than 5 mm. broad; panicle slender, very narrow.....23. *C. rariflora*.

Panicle often narrowed toward the summit but not attenuate.

Branches of primary panicle stiffly ascending, of about equal length except toward the summit; panicle yellowish or brownish, the bristles 1 to 2 cm. long.....24. *C. vulpiseta*.

Branches of panicle short or only the lower as much as 2 to 3 cm. long; panicle pale or greenish, the bristles irregular in length, the longer sometimes 1 to 1.5 cm. long.

Blades mostly less than 1 cm. wide, often folded; panicle usually loosely or interruptedly spikelike, the branches usually not over 1 cm. long.....25. *C. macrostachya*.

Blades flat, as much as 1.5 cm. wide; panicle tapering from near the base, the lower branches as much as 3 cm. long.

26. *C. scheelei*.

#### Subgenus **PTYCHOPHYLLUM** (A. Br.) Hitchc.

Mostly robust perennials (one species annual) with large flat plicate blades. Bristles single below only the terminal spikelet of the ultimate branchlets, or rarely below all the spikelets. Panicles simple or the secondary branchlets very short, the spikelets or branchlets more or less secund. Spikelets mostly narrower and less turgid than in *Chaetochloa* proper. Fertile lemma acute or apiculate, rugose or only obscurely cross-wrinkled. Confined to tropical regions of both hemispheres.

#### 1. *Chaetochloa barbata* (Lam.) Hitchc. & Chase.

*Panicum barbatum* Lam. Tabl. Encycl. 1: 171. 1791. "Ex Insula Franciae [Mauritius]." The type has not been examined.

*Panicum costatum* Roxb. Fl. Ind. ed. Carey 1: 314. 1820. "Introduced into the Botanic Garden from Mauritius, by Captain Tennant, in 1802." The type has not been examined.

*Panicum viaticum* Salzm.; Doell in Mart. Fl. Bras. 2<sup>2</sup>: 155. 1877. "Habitat in sepibus et ad vias prope Bahia (Salzmann n. 706)." A duplicate type is in the National Herbarium. Doell states that he has seen an authentic specimen of *Panicum barbatum* Lam., which he cites as a synonym under *P. viaticum*.

*Chamaeraphis viatica* Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum viaticum* Salzm.

*Chamaeraphis costata* Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Panicum costatum* Roxb.

*Chaetochloa barbata* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18: 348. 1917. Based on *Panicum barbatum* Lam.

*Chaetochloa barbata* is described by Grisebach<sup>1</sup> and Hooker<sup>2</sup> under *Panicum flavescens* Swartz.

#### DESCRIPTION.

Plants annual; culms decumbent, spreading, often rooting at the lower nodes, branching, glabrous, scabrous or villous near the pubescent nodes, as much as 2 meters long, but often much less; sheaths compressed, ciliate, glabrous or papillose-hispid; ligule about 1 mm. long, densely ciliate; blades narrowly elliptic, flat and rather thin, the upper narrowed to a somewhat truncate base, the lower gradually narrowed to a petiole, as much as 30 cm. long and 2.5 cm. wide, distinctly plicate in large specimens, obscurely so in dwarf ones; panicles long-exserted, green, as much as 20 cm. long, the rachis scabrous and villous, the branches ascending or spreading, as much as 4 cm. long; spikelets oblong-elliptic, glabrous, about 2.5 mm. long, tending to be in two rows along the branches, at least along the upper part, often clustered on branchlets on the lower part of the branches, the pedicels very short, the bristles flexuous, 5 to 10 mm. long, usually rather numerous; first glume circular, one-third the length of the spikelet, 3-nerved; second glume about two-thirds as long as the spikelet, ovate, acute, 7-nerved; sterile lemma as long as the fertile, acute, 7-nerved, the palea about as long and wide as the lemma; fertile lemma elliptic, acute, a little over 2 mm. long, strongly transverse-rugose, the palea inclosed to the tip.

<sup>1</sup> Griseb. Fl. Brit. W. Ind. 547. 1864.

<sup>2</sup> Hook. f. Fl. Brit. Ind. 7: 56. 1896.

As usual with annuals, this species varies greatly in the size of the plants. Vigorous plants may have numerous culms as much as 2 meters long, with correspondingly large blades and panicles; dwarf plants may be only 10 cm. tall, with obscurely plicate blades and few-flowered spikelike panicles.

## DISTRIBUTION.

A weed in cultivated ground and waste places from the West Indies to Brazil; a waif in Florida; introduced from tropical Asia.

FLORIDA: Apalachicola, *Biltmore Herb.* 8374 (in ballast). Miami, spontaneous on grounds of Subtropical Station.

JAMAICA: Constant Spring, *Hitchcock* 9270, 9277. Castleton Gardens, *Amer. Gr. Nat. Herb.* 603. Kingston, *Hitchcock* 9473; *Cockerell* in 1892. Bog Walk, *Hitchcock* 9308. Ewarton, *Hitchcock* 9412. Ramble, *Hitchcock* 9515. Gordon Town, *Harris* 11511. Ferry River, *Harris* 11782. Temple Hall, *Harris* 11360. Mavis Bank, *Harris* 11602. Montego Bay, *Hitchcock* 9694. Buff Bay, *Hitchcock* 9768. New Forest, *Hitchcock* 9834. Troy, *Hitchcock* 9793. Ipswich, *Hitchcock* 9604.

PORTO RICO: Mayaguez, *Chase* 6159; *Holm* in 1915; *Heller* 4373, 4488.

LEeward ISLANDS: Antigua, *Rose* 3391; *Wulschlaegel* 618. Guadeloupe, *Duss* 3175. Dominica, *Jones* 43.

WINDWARD ISLANDS: Martinique, *Duss* 544. Barbados, *Eggers* 7128. St. Lucia, *Glasgow* 10. Grenada, *Broadway* in 1904.

TRINIDAD: Port of Spain, *Hitchcock* 9965.

TOBAGO: *Broadway* 4335, 4737; *Hitchcock* 10225, 10251.

BRAZIL: Bahia, *Salzmann*.



FIG. 36.—*Chaetochloa barbata*. From *Amer. Gr. Nat. Herb.* 603, Jamaica.

## 2. *Chaetochloa poiretiana* (Schult.) Hitchc.

*Panicum elongatum* Poir. in Lam. Encycl. Suppl. 4: 278. 1816. Not *Panicum elongatum* Salisb. 1796, nor Pursh, 1814. "Cette plante croît au Brésil (V. s. in herb. Desfont.)." The type, in the Desfontaines Herbarium at Florence, consists of a portion of a blade and a nearly complete panicle.

*Panicum sulcatum* Bertol. Excerpt. 14. 1820. Not *Panicum sulcatum* Aubl. This citation has not been verified. The species is said to be from Brazil and apparently is described independently of *P. sulcatum* Aubl.

*Setaria sulcata* Raddi, Agrost. Bras. 50. 1823. Based on *Panicum sulcatum* Bertol.

*Panicum poiretianum* Schult. Mant. 2: 229. 1824. Based on *P. elongatum* Poir. not Pursh.

*Panicum speciosum* Nees, Agrost. Bras. 252. 1829. "Habitat in campis ad Almeirim provinciae Paraensis." The type, collected in Pará by Martius, is in the Munich Herbarium. The branches of the panicle are spreading and the spikelets are 4 to 5 mm. long.

*Panicum crus ardeae* Willd.; Nees, Agrost. Bras. 253. 1829. "Habitat in America meridionali." The type is in the Willdenow Herbarium at Berlin.

*Setaria poiretiana* Kunth, Rév. Gram. 1: 47. 1829. Based on *Panicum poiretianum* Schult.

*Setaria crus ardeae* Kunth, Rév. Gram. 1: Suppl. XII. 1830. Based on *Panicum crus ardeae* Willd.

*Panicum flabellatum* Steud. Syn. Pl. Glum. 1: 53. 1854. "Bahia." The type was collected in Bahia by Salzmann. A duplicate type, distributed as *Agrostis flabellata* Salzm., is in the National Herbarium.

*Agrostis flabellata* Salzm.; Steud. Syn. Pl. Glum. 1: 53. 1854, as synonym under *Panicum flabellatum* Steud.

*Setaria jurgensenii* Fourn. Mex. Pl. 2: 42. 1886. "(JURG. n. 692)" is cited, the locality other than Mexico being unknown. The type has not been examined but the description applies to *C. poiretiana*.

*Chamaeraphis crus ardeae* Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum crus ardeae* Willd.

*Chamaeraphis speciosa* Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum speciosum* Nees. Kuntze merely lists "*Chamaeraphis speciosa* (A. Br.)." This probably

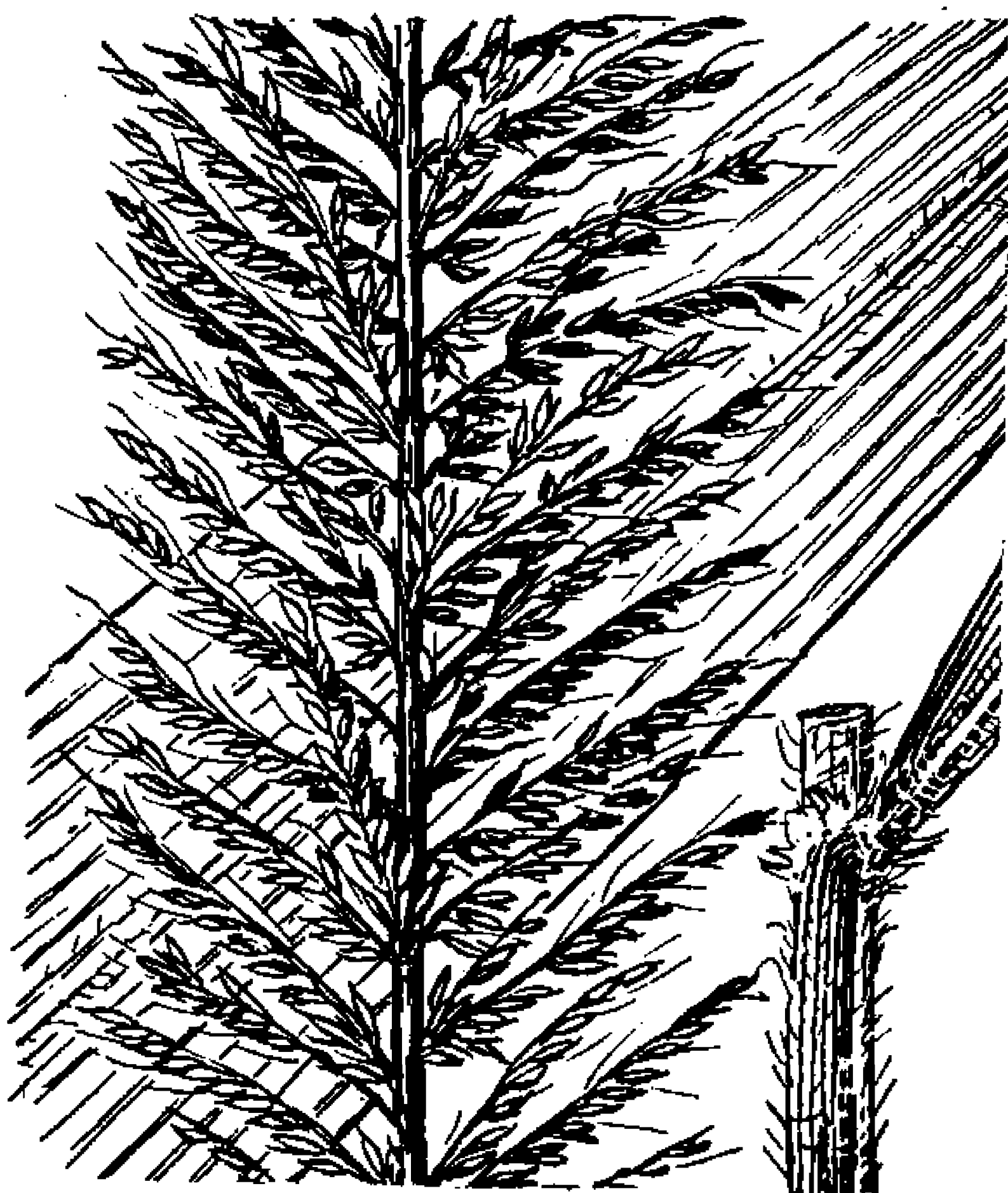


FIG. 37.—*Chaetochloa poiretiana*. From Pringle 3921, Mexico.

refers to *Panicum speciosum* Nees, which Braun placed in the subgenus *Ptychophyllum*.

*Chamaeraphis juergensii* [*jurgensenii*] Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Setaria jurgensenii* Fourn.

*Panicum jurgensenii* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 40. 1900. Based on *Setaria jurgensenii* Fourn.

In previous papers<sup>1</sup> the name *C. sulcata* was applied to this species. See note on the type of *Panicum sulcatum* p. 162.

#### DESCRIPTION.

Plants perennial, cespitose; culms erect, 1 to 1.5 meters tall, glabrous, or villous in the vicinity of the nodes; sheaths papillose-hispid, mostly longer than the inter-

<sup>1</sup> Contr. U. S. Nat. Herb. 17: 260. 1913, and op. cit. 18: 348. 1917.

nodes, the uppermost elongate, scabrous; ligule ciliate, about 2 mm. long; blades strongly plicate, scaberulous, sometimes sparsely hispid, flat, as much as 1 meter long and 10 cm. wide, narrowed toward each end, the base resembling a petiole; panicles erect, densely flowered, commonly purple, long-exserted, as much as 60 cm. long, and 10 cm. wide, the axis puberulent, the branches ascending, irregularly clustered, approximate, usually somewhat falcate, the lower usually 3 to 5 cm. but sometimes as much as 10 cm. or the distant lowermost even longer; spikelets secund on the branches, narrowly ellipsoidal, about 3 mm. long, the pedicels puberulent, usually very short, some or all on each branch subtended by somewhat flexuous bristles 5 to 10 mm. long; first glume half as long as the spikelet, oval, obtuse, 5-nerved; second glume similar to the first, two-thirds the length of the spikelet, 5-nerved; sterile lemma oblong-ovate, acutish, equaling the fertile one, obscurely 5-nerved, the palea wanting; fertile lemma somewhat coriaceous, ellipsoid, apiculate, very obscurely cross-wrinkled; palea similar to the lemma in texture and marking, the apex free.

## DISTRIBUTION.

Moist woods, Mexico to Brazil. Called gamalote in Trinidad.

SAN LUIS POTOSÍ: Las Canoas, *Pringle* 3921. Tamasopo Canyon, *Pringle* 3452.

VERACRUZ: Mirador, *Liebmann* 459, 460, 461. Jalapa, *Hitchcock* 6685.

OAXACA: Oaxaca, *Galeotti* 5856.

CHIAPAS: Turubula, *Nelson* 3359.

TRINIDAD: Port of Spain, *Hitchcock* 9978, 10171; *Amer. Gr. Nat. Herb.* 604. Cedros, *Hitchcock* 10150.

TOBAGO: *Hitchcock* 10282.

COLOMBIA: Icononzo, *Pennell* 2841 (N. Y. Bot. Gard. Herb.).

VENEZUELA: Río Macareo, *Eggers* 13259. Paparo, *Pittier* 6335.

BRAZIL: Minas Geraes, *Regnell* 459. Descanço, *Widgren* 926. Goyaz, *Gardner* 3519. Organ Mountains, *Wilkes Expl. Exped.* 15. Rio de Janeiro, *Glaziou* 17396. Campinas, *Campos Novaes* 1244. Bahia, *Rose* 19655; *Riedel*. Pará, *Martius* 562. Paraná, *Dusén* 11606.

PARAGUAY: Central Paraguay, *Morong* 444. Pilcomayo River, *Morong* 1572; *Lindman* 1899.

PERU: Santa Ana, *Cook & Gilbert* 1429, 1523. Peruvian Andes, *Poeppig* 968.

BOLIVIA: Ixiamas, *Williams* 991 (N. Y. Bot. Gard. Herb.).

ARGENTINA: Misiones, *Ekman* 608.

### 3. *Chaetochloa palmifolia* (Willd.) Hitchc. & Chase.

*Panicum plicatum* Willd. Enum. Pl. 1033. 1809. Not *Panicum plicatum* Lam. 1791. "Habitat in India orientali." A specimen in the Willdenow Herbarium in Berlin, cultivated in Calcutta by Roxburgh and sent by him to Willdenow, is probably the type.

*Panicum palmifolium* Willd.; Poir. in Lam. Encycl. Suppl. 4: 282. 1816. Poiret states that the native place of this is not known. He cites *Panicum plicatum* Willd. Enum. Pl. 2: 1033. 1809, not Lam. Encycl., and quotes the description, adding a description of his own. The locality given by Willdenow is "in India orientali." Poiret says that he saw a specimen in the Desfontaines Herbarium. This specimen was examined in Florence. *Panicum palmaefolium* Koen.<sup>1</sup> may be the same as *P. palmifolium* or it may be *P. plicatum* Lam., but it is a nomen nudum, being mentioned in a running account of travels.

*Panicum plicatum haitiense* Kunth; Griseb. Fl. Brit. W. Ind. 547. 1864, as synonym of *P. palmifolium* Poir. This name is credited to Kunth, but the latter appears not to have published it.

<sup>1</sup> Naturforsch. 23: 208. 1788.

*Chamaeraphis palmifolia* Kuntze, Rev. Gen. Pl. 2: 771. 1891. Based on *Panicum palmifolium* Willd.

*Setaria palmifolia* Stapf, Journ. Linn. Soc. Bot. 42: 186. 1914. Based on *Panicum palmaefolium* Koen.

## DESCRIPTION.

Plants perennial; culms 1 to 1.5 meters tall, glabrous or sparsely villous, the nodes puberulent; sheaths papillose-hispid or glabrate, hispid on the collar; ligule densely ciliate, about 2 mm. long; blades strongly plicate, flat, pubescent or glabrate, elliptic, narrowed to a petiole-like base, as much as 50 cm. long and 6 cm. wide; panicles



FIG. 38.—*Chaetochloa palmifolia*. From Hitchcock 9727, Jamaica.

rather loose and open, green, long-exserted, as much as 40 cm. long, the rachis scabrous, the branches ascending or spreading, scattered, somewhat distant, especially below, 5 to 10 cm. long, compound; spikelets lanceolate, acute, about 3 mm. long, closely arranged on short branchlets appressed along the main branches, forming interrupted compound racemes, the bristles inconspicuous, usually not over twice as long as the spikelets, often short and imperfectly developed; first glume one-third the length of the spikelet, obtuse, 5-nerved; second glume acutish, half the length of the spikelet, 7-nerved, the outer nerves obscure; sterile lemma 5-nerved, acute, exceeding the fertile lemma, the palea narrow, about half as long as the lemma; fertile lemma lanceolate, acute, somewhat apiculate, 2.5 mm. long, obscurely cross-wrinkled, the palea entirely included in the margins of the lemma.

## DISTRIBUTION.

Rocky woods and shady banks, often growing in large colonies, a native of southeastern Asia; introduced in Jamaica.

JAMAICA: Gordon Town, *Amer. Gr. Nat. Herb.* 605; *Hart* 815. Cinchona, *Hitchcock* 9719; *Harris & Lawrence* 15232. Buff Bay, *Hitchcock* 9762. Mount Hybla, *Harris* 11535. Catherines Peak, *Hitchcock* 9727. Hardware Gap, *Harris* 10911. Castleton, *Harris* 11286. Morces Gap, *Nichols* 37.

4. *Chaetochloa sulcata* (Aubl.) Hitchc.

*Panicum sulcatum* Aubl. Pl. Guian. 1: 50. 1775. In this work, the flora of French Guiana, Aublet states that this grows along rivers but gives no definite locality. The type has not been examined. Aublet's short diagnosis "*Panicum (sulcatum) latifolium foliis liratis*" is taken directly from Plumier's Catalogue,<sup>1</sup> "*Milium lati-*

<sup>1</sup> Plum. Cat. Pl. Amer. 10. 1703.



folium foliis liratis" which Aublet cites as a synonym. Aublet further cites *Milium latifolium sulcatum* Plum. mss. 4. t. 105. Lamarck<sup>1</sup> gives a more complete description, citing Plumier's Catalogue and the manuscript plate (105), and *P. sulcatum* Aubl. He states that the plant grows in Martinique where it was observed by Plumier, and that he has seen the specimen in Vaillant's herbarium. Urban<sup>2</sup> states that the species agrees with "Codex Boerh. II. tab. 641," a manuscript work. Urban unites with *Panicum sulcatum* the specimens which in this article are referred to *Chaetochloa palmifolia*.

*Panicum paniculiferum* Steud. Syn. Pl. Glum. 1: 54. 1854. "Oaxaca." The type specimen has not been definitely located. Galeotti's no. 5858 from Oaxaca, the only collection cited by Fournier under *Setaria paniculifera*, is in the Paris Herbarium. This specimen, which may be the type of *Panicum paniculiferum*, consists only of the inflorescence and a fragment of the culm; the lower panicle branches are as much as 20 cm. long, and the branchlets are appressed or ascending.

*Setaria effusa* Fourn. Mex. Pl. 2: 42. 1886. Several specimens from Veracruz and Oaxaca are cited, the first being *Bourgeau* 2599, from Orizaba. This specimen has spreading branches and branchlets, with less crowded spikelets and rather fewer bristles. Hitchcock's no. 6380 from Orizaba has a like panicle. These represent only an extreme form, connected by intergrades with the less open, more bristly form represented by Galeotti's no. 5858.

*Setaria paniculifera* Fourn. Mex. Pl. 2: 42. 1886. Based on *Panicum paniculiferum* Steud.

*Chamaeraphis effusa* Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Setaria effusa* Fourn.

*Chamaeraphis paniculifera* Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum paniculiferum* Steud.

*Chamaeraphis sulcata* Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum sulcatum* Aubl.

*Panicum mexicanum* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 40. 1900. Based on *Setaria effusa* Fourn.

*Chaetochloa sulcata* Hitchc. Contr. U. S. Nat. Herb. 17: 260. 1913. Based on *Panicum sulcatum* Aubl.

#### DESCRIPTION.

Plants perennial; culms robust, as much as 4 meters tall, glabrous, the nodes glabrous; sheaths papillose-hispid all over or only at the margin, hispid on the collar; ligule a ciliate membrane 1 to 2 mm. long; blades flat, strongly plicate, somewhat scabrous, as much as 1 meter long and 10 cm. wide at the middle, tapering toward each end, the lower into a long petiole-like base; panicles green or purplish, often very large, as much as 70 cm. long, the branches ascending, finally spreading, as much as 20 cm. long, these branching and rebranching, the panicle often becoming loose and open, the axis somewhat scabrous, the branches strongly scabrous-pubescent; spikelets usually loosely arranged, elliptic-lanceolate, about 3 mm. long, obscurely nerved, scabrous-pubescent, the flexuous bristles as much as 15 mm. long; first glume nearly half as long as the spikelet, obtuse, 3 to 5-nerved; second glume about two-thirds as long as spikelet, acutish, 5 to 7-nerved; sterile lemma about as long as the fertile, acute, 5-nerved, the palea narrow, shorter than the lemma; fertile lemma acute, slightly apiculate, closely but distinctly transverse-rugose, the palea inclosed to the tip.

<sup>1</sup> Encyl. 4: 746 bis. 1798.

<sup>2</sup> Repert. Nov. Sp. Fedde 16: 148. 1919.

## DISTRIBUTION.

Moist ground and shady banks, southern Mexico to northern South America and north in the Windward Islands to Guadeloupe. Called gamalote in Tobago.

VERACRUZ: Hacienda de Jovó, *Liebmann* 452. Zacuapan, *Purpus* 2904, 2907. Mirador, *Liebmann* 455, 456; *Mohr* in 1857. Córdoba, *Hitchcock* 6395; *Kerber* 110; *Ross* 551; *Bourgeau* 1457. Orizaba, *Hitchcock* 6380; *Botteri* 105, 1986.

OAXACA: Tonagua, *Liebmann* 454. Comaltepeque, *Galeotti* 5858.

TABASCO: Tamulté, *Rovirosa* 616.

CHIAPAS: Ocuilapa, *Nelson* 3059.

GUATEMALA: Puerto Barrios, *Hitchcock* 9155. Sepacuité, *Collins & Goll* 09. Cubilquitz, *Türckheim* 8030.

HONDURAS: San Pedro Sula, *Thieme* 5589.

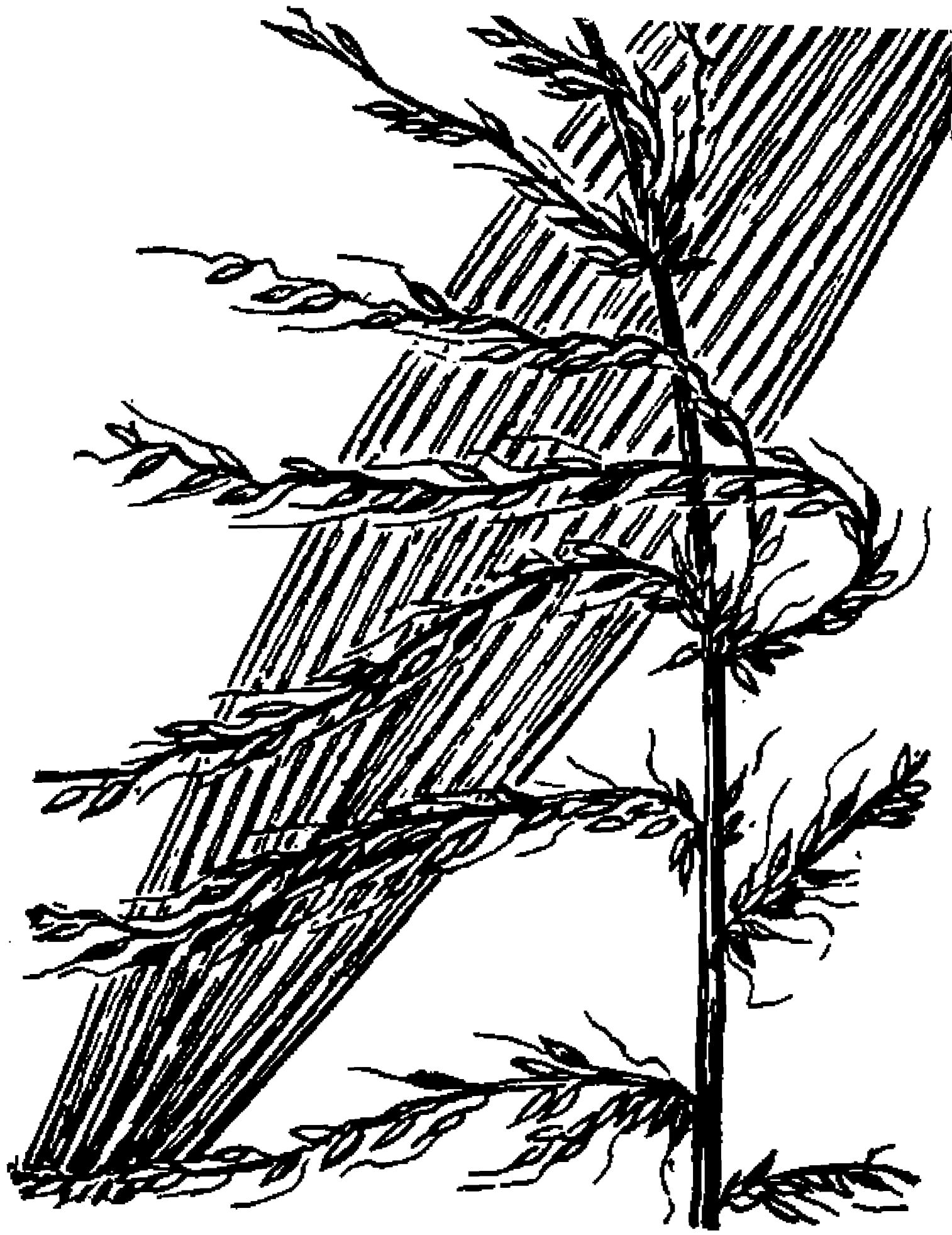


FIG. 39.—*Chaetochloa sulcata*. From *Collins & Goll* 09, Guatemala.

COSTA RICA: Alajuelita, *Jiménez* 402. Turrialba, *Tonduz* 9009. Río Tuís, *Tonduz* 11394. Limón, *Hitchcock* 8412. Alajuela, *Jiménez* 133. Río Segundo, *Jiménez* 410. Puntarenas, *Pittier* 470. Puerto Viejo, *Biolley* 7468.

PANAMA: Culebra, *Hitchcock* 7935, 8122. Bohío, *Hitchcock* 8391. Gamboa, *Pittier* 6800.

LEEWARD ISLANDS: Guadeloupe, *Duss* 3185. Dominica, *Jones* 3.

WINDWARD ISLANDS: Martinique, *Duss* 4656. Grenada, *Broadway* in 1905.

TOBAGO: *Hitchcock* 10276, *Eggers* 5682.

COLOMBIA: Santa Marta, *Smith* 115.

VENEZUELA: La Guaira, *Rose* 21696. Carayaca, *Jahn* 308, 330.

## CHAETOCHLOA PROPER.

Annual or perennial, low or moderately tall grasses with narrow blades (usually not over 2 cm. wide). Bristles usually below all the spikelets. Spikelets clustered on the short branches of the narrow or spikelike, rarely open panicle, the lower branches appressed or ascending, rarely more than 1 to 2 cm. long (the lower branches spreading and as much as 5 cm. long in some specimens of *C. setosa*). Fertile lemma obtuse or acutish, sometimes very turgid, cross-wrinkled or rugose, rarely smooth. Warm and temperate regions of both hemispheres.

Several annual species have been introduced from Europe and are now common weeds in fields and waste places through the cooler parts of the United States, and one (*C. verticillata*) extends well into the tropics. The perennial *C. geniculata*, a native of tropical America, is also a widely distributed weed in the same area and extends well into the southern states.

5. *Chaetochloa lutescens* (Weigel) Stuntz.

*Panicum lutescens* Weigel, Obs. Bot. 20. 1772. Described from Pommerania, Germany.

*Panicum glaucum* var. *flavescens* Ell. Bot. S. C. & Ga. 1: 113. 1816. "Everywhere except in inundated lands," probably in the vicinity of Charleston, South Carolina. Merrill,<sup>1</sup> who examined the specimen in the Elliott Herbarium, states that this is a yellow-awned form of *Chaetochloa glauca* [*C. lutescens*].

*Panicum compressum* Balb.; Steud. Nom. Bot. ed. 2. 2: 254. 1841, as synonym of *Panicum glaucum*. The type, from Santo Domingo, collected by Bertero, is *Chaetochloa lutescens*. In the Krug and Urban Herbarium there is a piece of the type, sent by Balbis to Sprengel.

*Chaetochloa lutescens* Stuntz, U. S. Dept. Agr. Bur. Pl. Ind. Inv. Seeds 31: 83. 1912. Based on *Panicum lutescens* Weigel.

*Setaria lutescens* Hubbard, Rhodora 18: 232. 1916. Based on *Panicum lutescens* Weigel.

This species has been commonly known as *Panicum glaucum*, *Setaria glauca*, and *Chaetochloa glauca*. Stuntz pointed out<sup>2</sup> that the name *Panicum glaucum* L. should apply to the species usually known as *Pennisetum americanum* (L.) Schum., *Pennisetum typhoideum* L. Rich., or *Penicillaria spicata* Willd., commonly called in the United States pearl millet. *Panicum glaucum* L.<sup>3</sup> is based on a description taken from Linnaeus's *Flora Zeylanica*, which refers to the species of *Pennisetum* mentioned. Linnaeus, in the *Species Plantarum*, describes two varieties,  $\beta$  and  $\gamma$ . Variety  $\beta$  is later separated under the name *Panicum viride* L.<sup>4</sup> Variety  $\gamma$ , as shown in a previous paper,<sup>5</sup> is based on Clayton's no. 579 from Virginia, which is the same as *Panicum lutescens* Weigel, that is, what has usually been called *Panicum glaucum*. In the *Systema*<sup>4</sup> Linnaeus describes *P. glaucum*, using the words found in the description taken from the *Flora Zeylanica*, but adding "Seminibus undulato-rugosis", and cites "Sp. pl. n. 2  $\gamma$ ." He has here apparently attached the name *glaucum* to what he had previously called *glaucum* var.  $\gamma$ , that is, to *P. glaucum* in the subsequent sense. In the second edition of the *Species Plantarum*, Linnaeus uses the emended diagnosis from the *Systema*, citing "Fl. zeyl. 44," and adds the citation from Gronovius, giving the habitat as "Indiis & Italia." The descriptive note appended includes the statement "Setae in spica longitudine flosculorum," which applies to pearl millet, and "semina striis undulatis notata," which applies to *Panicum lutescens*, thus indicating that he confused the two species, which are very unlike in appearance. Probably Linnaeus was not familiar with either species and was attempting to reconcile descriptions.

The following synonyms are based on *Panicum glaucum* L. as to name but refer to *Chaetochloa lutescens* as to plant. No attempt has been made to include synonymy from floras of the Old World.

*Pennisetum glaucum* R. Br. Prod. Fl. Nov. Holl. 1: 195. 1810.

*Setaria glauca* Beauv. Ess. Agrost. 51, 178. 1812.

*Chamaeraphis glauca* Kuntze, Rev. Gen. Pl. 2: 767. 1891.

*Ixophorus glaucus* Nash, Bull. Torrey Club 22: 423. 1895.

*Chaetochloa glauca* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897.

<sup>1</sup> U. S. Dept. Agr. Div. Agrost. Circ. 29: 3. 1901.

<sup>2</sup> Loc. cit.

<sup>3</sup> Sp. Pl. 56. 1753.

<sup>4</sup> Syst. Nat. ed. 10. 2: 870. 1759.

<sup>5</sup> Hitchcock, Types of American Grasses, Contr. U. S. Nat. Herb. 12: 117. 1908.

## DESCRIPTION.

Plant annual, erect, often much branched at base, the culms becoming geniculate below, or in open ground spreading or even prostrate-spreading; culms rather succulent below, as much as 1 meter tall or in rich soil even taller, compressed below, smooth, scabrous just below the panicle; sheaths smooth, compressed-keeled; ligule a ciliate membrane about 1 mm. long; blades as much as 25 cm. long and 1 cm. wide, flat, twisted in a loose spiral, the upper surface along the upper half facing downward, acuminate-pointed, often glaucous, scabrous on the upper surface, toward the base beset with long lax hairs, glabrous beneath; panicle dense, evenly cylindrical, spike-like, yellow at maturity, mostly 5 to 10 cm. long, sometimes longer, about 1 cm. thick, rounded at the summit, sometimes slightly interrupted at the base, the axis densely pubescent; branches very short, mostly less than 1 mm. long, pubescent like the axis, each branch bearing one developed spikelet and below this a cluster of short branchlets ending in bristles, sometimes a second small and undeveloped spikelet borne in one of these secondary clusters; branchlets irregular in length, mostly less than 1 mm. long, bearing 1 to several bristles, the whole cluster on each branch being usually more than 5 and sometimes more than 20; bristles antrorsely scabrous, yellow, irregular in length, the longer ones 2 to 3 times as long as the spikelet; spikelets about 3 mm. long, flat on one side, strongly convex on the other, oval in outline but slightly narrowed toward the apex; first glume ovate, about half as long as spikelet, pale, with 3 strong green nerves and an outer inconspicuous pair; second glume about two-thirds as long as the spikelet, with 5 strong nerves and 1 or 2 additional weaker pairs; sterile lemma about as long as the spikelet, 5-nerved, the base embracing the edges of the fertile lemma for about half way, containing a well-developed palea but no stamens; fertile floret strongly marked with numerous transverse ridges.

This species can be distinguished from *Chaetochloa geniculata*, its closest relative, by its annual duration, and by the thicker, more succulent base of the stem; and from *C. viridis*, a common accompanying weedy species, by the color and shape of the mature panicle, and by the twisted blades.

Commonly known as yellow foxtail, sometimes as pigeon grass.

## DISTRIBUTION.

A common weed in cultivated soil and waste places in the eastern states; introduced from Europe; now widely distributed in temperate regions, rare in the Tropics.

ONTARIO: Galt, *Herriot* 71. Kingston, *Fowler* in 1897.

NEW BRUNSWICK: Shediac Cape, *Hubbard* 759.

BRITISH COLUMBIA: Sicamous, *Macoun* 7.

MAINE: Westbrook, *Ricker* 579. East Auburn, *Merrill* 14. Bangor, *Knight* 20, 22. Orono, *Harvey* 1251. Augusta, *Scribner* in 1869.

NEW HAMPSHIRE: Jaffrey, *Robinson* 284.

VERMONT: Manchester, *Day* 208. Rutland, *Kirk* 1026.

MASSACHUSETTS: South Hadley, *Clark* in 1887. Townsend, *Fletcher*. Boston, *Hitchcock* in 1903. Barrington, *Pollard* in 1894.

CONNECTICUT: South Glastonbury, *Wilson* 1263.

NEW YORK: North Hannibal, *Pearce* in 1883. Shushan, *Dobbin* 6. Oxford, *Coville* in 1884.

NEW JERSEY: Weehawken, *Kearney* in 1894; *Van Sickle* in 1895. Camden, *Parker* in 1863.

PENNSYLVANIA: Easton, *Porter* in 1896. Conewago, *Small* in 1888. Philadelphia, *Scribner* in 1878. Lancaster, *Heller* 4818. Chester County, *Wendle* in 1901.

OHIO: Cincinnati, *Lloyd* 3614. Sandusky, *Morris* A140. Oberlin, *Ricksecker* in 1894.

INDIANA: Lafayette, *Dorner* 73.

ILLINOIS: Glasford, *Wilcox* 176. Jackson County, *French* in 1905. Naperville, *Umbach* in 1895. Chicago, *Gates* in 1905. Wady Petra, *V. H. Chase* 76.

WISCONSIN: Oshkosh, *Random* in 1896.

MINNESOTA: Duluth, *Hitchcock* 5090.

SOUTH DAKOTA: Highmore, *Carter* 6. Yankton, *Bruce* 11. Redfield, *Griffiths* 221.  
Frankfort, *Griffiths* 54. Bellefourche, *Griffiths* 366.

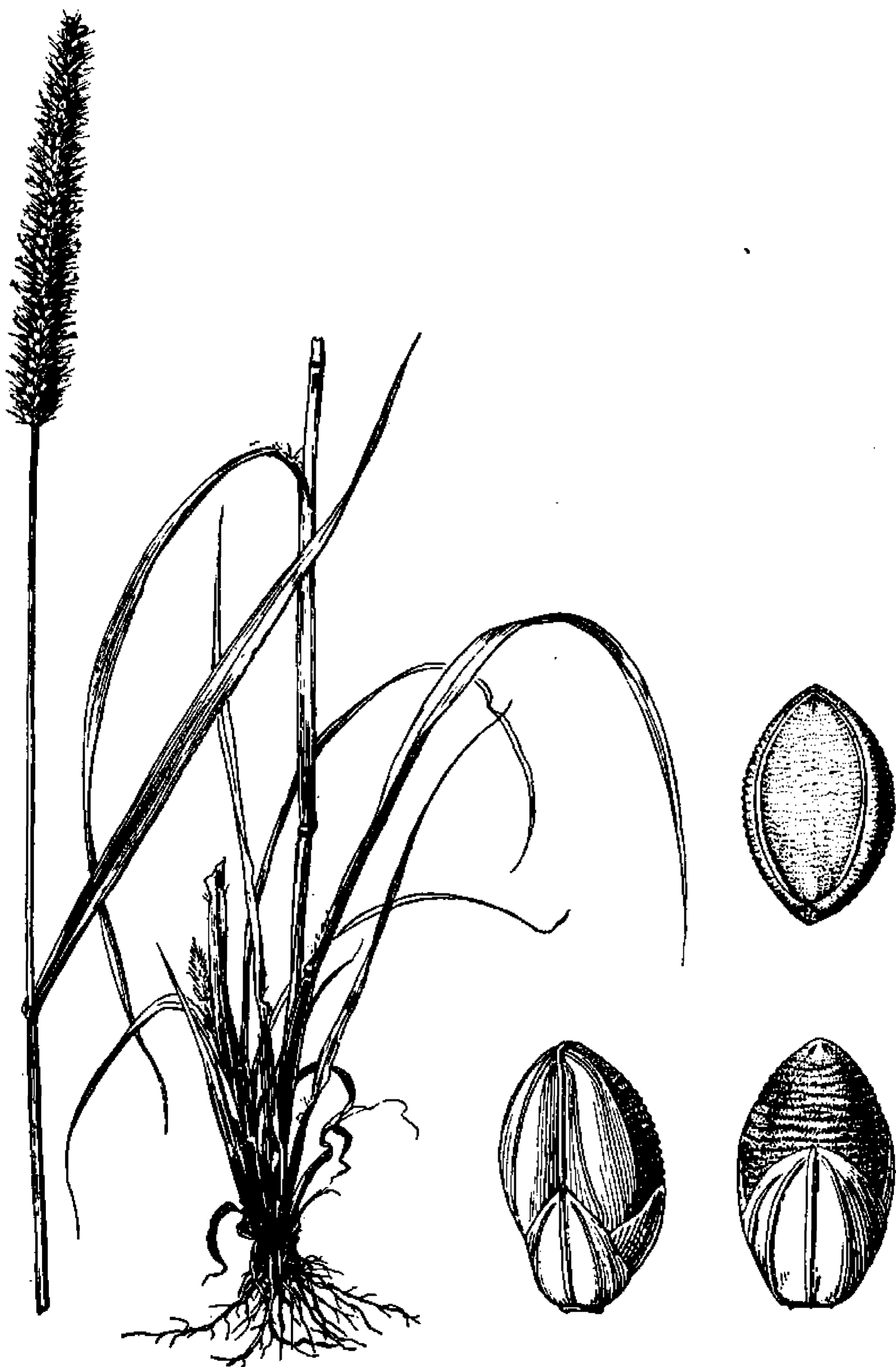


FIG. 40.—*Chaetochloa lutescens*. From *Chase* 2986, District of Columbia.

IOWA: Ames, *Pammel Amer. Weeds* 50; *Ball* 180. Keokuk, *Shimek* 52. Fayette County, *Fink* 274.

MISSOURI: St. Louis, *Eggert* 266. Aberdeen, *Davis* 934. Courtney, *Bush* 818, 1670. Springfield, *Standley* 8331.

KANSAS: Riley County, *Norton* 575.

DELAWARE: Stanton, *Commons* 146.

- MARYLAND: Garrett County, *Smith* in 1879. Hyattsville, *Scribner* in 1888.  
 DISTRICT OF COLUMBIA: *Merrill* 172; *Vasey* in 1885; *Chase* 2986.  
 VIRGINIA: Princess Anne County, *Kearney* 2158.  
 NORTH CAROLINA: Magnetic City, *Wetherby* 8.  
 SOUTH CAROLINA: Orangeburg, *Hitchcock* in 1905.  
 FLORIDA: Quincy, *Combs* 396.  
 TENNESSEE: Knoxville, *Scribner*.  
 ALABAMA: Selma, *McCarthy* in 1888. Eufaula, *McCarthy* in 1888.  
 LOUISIANA: Baton Rouge, *Hitchcock* in 1904. Alexandria, *Ball* 487. Burnside, *Combs* 1409. Shreveport, *Ball* 97. Rayville, *Ball* 23a. Calhoun, *Ball* 44.  
 TEXAS: Big Spring, *Hitchcock* 13406. Abilene, *Bentley* in 1899.  
 OKLAHOMA: Verdigris, *Bush* 743.  
 OREGON: Ontario, *Griffiths & Morris* 937. Albina, *Suksdorf* 2885. Linnton, *Suksdorf* 1684.  
 NEW MEXICO: Mesilla Park, *Standley* in 1906.  
 CALIFORNIA: Threerivers, *Jepson* 4718.  
 JAMAICA: Cinchona, *Hitchcock* 9702; *Harris* 11272, 11457; *Hart* 740.

#### 6. *Chaetochloa geniculata* (Lam.) Millsp. & Chase.

*Panicum geniculatum* Lam. Encycl. 4: 727 (err. typ. 737). 1798. "Je l'ai vue depuis dans un herbier fait aux Antilles, & particuliérement à la Guadeloupe." Lamarck distinguishes this from *Panicum glaucum* by the short bristles and glabrous leaves. The type has not been examined.

*Cenchrus parviflorus* Poir. in Lam. Encycl. 6: 52. 1804. "Cette plante croît à Porto Ricco. Elle a été communiquée à M. Lamarck par M. Ventenat." See remarks under *Setaria ventenatii*.

*Setaria geniculata* Beauv. Ess. Agrost. 51, 178. 1812. Based on *Panicum geniculatum*. Beauvois includes the latter name among the species of *Panicum* referred to *Setaria*. In the index, under *Setaria*, the name *geniculata* appears with a question.

*Pennisetum geniculatum* Jacq. Eclog. Gram. 3: pl. 26. 1815-1820. Based on *Panicum geniculatum* Hornem. Cat. Hort. Hafn. 28; Willd. Enum. Pl. 2: 1031. 1809. The name is not published as new by Hornemann or Willdenow.

*Setaria gracilis* H. B. K. Nov. Gen. & Sp. 1: 109. 1816. "Crescit locis alsis, opacatis inter Fusagasuga et Pandi inter 520 et 920 hexap. (Regno Novogranatensi)." The type has not been examined, but the description identifies it as a slender-panicled form of *C. geniculata*.

*Setaria purpurascens* H. B. K. Nov. Gen. & Sp. 1: 110. 1816. "Quitensis prope Chillo, in radicibus montis Turubamba." In the text this species is placed next to *S. glauca* [*lutescens*], but it is stated that it is allied to *S. viridis*. The description states that the bristles are "fuscescentes." A portion of the type has been examined at the Trinius Herbarium. It was marked "Ex herb. Humb."

*Panicum imberbe* Poir. in Lam. Encycl. Suppl. 4: 272. 1816. "In America septentrionali & Brasilia." The species is distinguished from "*P. glaucum*" [*lutescens*] by the absence of hairs on the leaves and at the mouth of the sheath. The type has not been examined.

? *Panicum pumilum* Poir. in Lam. Encycl. Suppl. 4: 273. 1816. The origin of the specimen, seen by Poiret in the Desfontaines Herbarium, is stated to be unknown. The type has not been examined by the writer and the name is referred to *Chaetochloa geniculata* with doubt.

*Panicum laevigatum* Muhl.; Ell. Bot. S. C. & Ga. 1: 112. 1816. "Grows on sea islands (on Edings' plentifully), along margins of the salt water." The type is in Muhlenberg's herbarium at the Philadelphia Academy.<sup>1</sup> Elliott's specimen, labeled

<sup>1</sup> U. S. Dept. Agr. Div. Agrost. Circ. 27: 2. 1900.

"*Panicum glaberrimum*. Hab. juxta littor. maritima," is a long-awned form without base.

*Panicum glaucum* var. *purpurascens* Ell. Bot. S. C. & Ga. 1: 113. 1816. This is stated by Merrill<sup>1</sup> to be a short-awned form of *Chaetochloa imberbis* [*C. geniculata*].

*Setaria imberbis* Roem. & Schult. Syst. Veg. 2: 891. 1817. Based on *Panicum imberbe* Poir.

*Pennisetum laevigatum* Nutt. Gen. Pl. 1: 55. 1818. Based on *Panicum laevigatum* Ell.

*Setaria laevigata* Schult. Mant. 2: 275. 1824. Based on *Panicum laevigatum* Muhl.

*Setaria affinis* Schult. Mant. 2: 276. 1824. Based on "Panicum n. 4. (sine nomine), Muhlenb. Descr. uber. p. 101." "Habitat in Georgia et Pennsylvania." The type is in the Muhlenberg Herbarium.

*Setaria berteroniana* Schult. Mant. 2: 276. 1824. The specimen was collected in Santo Domingo by Bertero. Schultes describes it in a note under *Setaria corrugata*. The type has not been examined but the description, "setis 9-12," together with the locality, leaves no doubt as to the identity of the species.

*Panicum flavum* Nees, Agrost. Bras. 238. 1829. "Habitat in campis graminosis provinciae Piauiensis, tum in campis ad Joazeiro provinciae Pernambucensis et Bahiensis." The Pernambuco specimen has been examined in the Munich Herbarium.

*Panicum imberbe*  $\beta$  *pumilum* Nees, Agrost. Bras. 240. 1829. Based on *Panicum pumilum* Poir., which is uncertain, but the plant described by Nees appears to be *Chaetochloa geniculata*.

*Panicum fuscescens* Willd.; Nees, Agrost. Bras. 241. 1829, as synonym under *P. purpurascens*. The type has been examined in the Willdenow Herbarium.

*Panicum dasyurum* Nees, Agrost. Bras. 241. 1829. "Habitat in Brasilia. (Comes a Hoffmannsegg) (Vidi in Herb. Willd.)—Ad Monte Video legit Sellow (Vidi in Herb. Reg. Berol.)." The first specimen has been examined in the Willdenow Herbarium. A specimen of the Sellow collection is in the National Herbarium.

*Panicum penicillatum* Willd.; Nees, Agrost. Bras. 242. 1829. Not *Panicum penicillatum* Nees, op. cit. 145. "In Brasilia, ad Rio de Janeiro (Raddi); in Monte Video (Sellow.) (Vidi in Herb. Willd.)." The bristles are described as being 4 times as long as the spikelets. A duplicate of the Sellow collection cited is in the National Herbarium. The label reads "*Panicum penicillatum* W. herb. N. v. E. Bras."

*Panicum tejuicense* Nees, Agrost. Bras. 243. 1829. "Habitat in districtu Adamantum prope Tejuco et aliis in locis provinciae Minarum generalium." The type has been examined at the Munich Herbarium.

*Setaria flava* Kunth, Rév. Gram. 1: 46. 1829. Based on *Panicum flavum* Nees.

*Setaria ventenatii* Kunth, Rév. Gram. 1: 251. pl. 37. 1830. "Crescit in Portorico et ? Hispaniola." Kunth gives as synonym *Cenchrus parviflorus* Poir., and states that he has not seen the original specimen of this, but as Poiret says he saw the specimen in the herbarium of Ventenat, "ou je n'ai trouvé parmi les *Cenchrus* qu'une seule plante originaire de Portorico, qui est mon *Setaria ventenatii*," it seems probable to him that the two names refer to the same specimen. The nodes are described by Kunth as pubescent, but in the plate they are glabrous. The bristles are described as long (5 times as long as the spikelets) and purple. The type specimen has been examined in the Berlin Herbarium. It is a narrow-leaved form with several rather small panicles.

*Setaria tejuensis* Kunth, Rév. Gram. 1: Suppl. xi. 1830. Based on *Panicum tejuicense* Nees.

*Setaria penicillata* Presl, Rel. Haenk. 1: 314. 1830. Based on *Panicum penicillatum* Willd.

*Panicum ventenatii* Steud. Nom. Bot. ed. 2. 2: 265. 1841. Based on *Setaria ventenatii* Kunth.

<sup>1</sup> U. S. Dept. Agr. Div. Agrost. Circ. 29: 3. 1901.

*Panicum berteronianum* Steud. Syn. Pl. Glum. 1: 50. 1854. Based on *Setaria berteroniana* Schult.

*Panicum psilocaulum* Steud. Syn. Pl. Glum. 1: 50. 1854. "*P. glaucum* var. Trin. Jc. t. 196 A. *P. imberbe* Poir sec. Trin. *Setaria gracilis* H.B. \* \* \* Am. austr." It is probable that the description is based on the Brazilian specimen which was the plant from which Trinius's plate is drawn. Trinius says that figure A is *Setaria gracilis* Kunth. The name is changed, doubtless, because of the earlier *Panicum gracile* R. Br.

*Setaria glauca* var. *laevigata* Chapm. Fl. South. U. S. 578. 1860. Based on *Panicum laevigatum* Ell.

*Setaria glauca*  $\beta$  *imberbis* Griseb. Fl. Brit. W. Ind. 554. 1864. Based on *Panicum imberbe* Poir.

*Setaria glauca*  $\gamma$  *penicillata* Griseb. Fl. Brit. W. Ind. 554. 1864. Based on *Panicum penicillatum* "W., Tr.," which is *P. penicillatum* Willd.

*Panicum imberbe*  $\beta$  *purpurascens* Doell in Mart. Fl. Bras. 2<sup>2</sup>: 157. 1877. Based on *Panicum purpurascens* H. B. K.

*Panicum imberbe*  $\gamma$  *latifolium* Doell in Mart. Fl. Bras. 2<sup>2</sup>: 157. 1877. Several specimens are cited, the first of which is Gardner 3516. One of the cited specimens (Regnell III. 1372) is in the National Herbarium.

*Panicum virescens* Salzm.; Doell in Mart. Fl. Bras. 2<sup>2</sup>: 157. 1877, as synonym of *P. imberbe*  $\gamma$  *latifolium*.

*Panicum glaucescens* Salzm.; Doell in Mart. Fl. Bras. 2<sup>2</sup>: 157. 1877, as synonym of *P. imberbe*  $\gamma$  *latifolium*.

*Panicum imberbe*  $\delta$  *dasyurum* Doell in Mart. Fl. Bras. 2<sup>2</sup>: 157. 1877. Based on *Panicum dasyurum* Nees.

*Setaria streptobotrys* Fourn. Mex. Pl. 2: 47. 1886. Several specimens are cited, the first being Galeotti 5832 from Real del Monte. This specimen has not been examined, but two of the others have been seen (Bourgeau 231, Liebmann 345).

*Chamaeraphis glauca* var. *penicillata* "Gris. (W.);" Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum penicillatum* Willd.

*Chamaeraphis glauca* var. *imberbis* "Trin. (Poir.);" Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum imberbe* Poir.

*Setaria perennis* Hall; Smyth, Check List Pl. Kans. 26. 1892; Trans. Kans. Acad. 13: 102. 1893. "Frequent in damp alkaline and saline bottoms in central and southwestern Kansas." The relation of Hall to this species is not clear. The name does not appear in E. Hall's *Plantae Texanae* (1873). The type specimen, now in the National Herbarium, was collected at Hutchinson, Kansas, by B. B. Smyth in 1890.

*Setaria gracilis*  $\beta$  *purpurascens* Arech. Anal. Mus. Nac. Montevideo 1: 164. 1894. Based on *Panicum purpurascens* H. B. K.

*Setaria gracilis*  $\gamma$  *latifolia* Arech. Anal. Mus. Nac. Montevideo 1: 165. 1894. Based on *Panicum imberbe*  $\gamma$  *latifolium* Doell, inasmuch as *Panicum virescens* and *P. glaucescens* Salzm. are given as synonyms (see notes on these names).

*Setaria gracilis*  $\epsilon$  *dasyura* Arech. Anal. Mus. Nac. Montevideo 1: 165. 1894. Based on *Panicum dasyurum* Nees.

*Chamaeraphis ventenatii* Beal, Grasses N. Amer. 2: 153. 1896. Based on *Setaria ventenatii* Kunth.

*Chamaeraphis glauca* var. *laevigata* Beal, Grasses N. Amer. 2: 155. 1896. Based on *Panicum laevigatum* Muhl.

*Chamaeraphis glauca* var. *perennis* Beal, Grasses N. Amer. 2: 156. 1896. "Florida, Curtiss 3614\*." Curtiss is given in parenthesis as author of the varietal name. Curtiss 3614\* bears a printed label with the name "*Setaria glauca* Beauv. var. *perennis*." No date is given. There is nothing to connect this with *S. perennis* Hall.

*Chamaeraphis glauca* var. *geniculata* Beal, Grasses N. Amer. 2: 156. 1896. Based on *Panicum geniculatum* Lam.



*Chaetochloa imberbis* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum imberbe* Poir.

*Chaetochloa penicillata* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum penicillatum* Willd.

*Chaetochloa flava* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum flavum* Nees.

*Chaetochloa versicolor* Bicknell, Bull. Torrey Club 25: 105. pl. 329. 1898. "Borders of salt and brackish marshes, Van Cortlandt Park and Kingsbridge, New York City." The type specimen, in the New York Botanical Garden Herbarium, was collected by Bicknell at Kingsbridge.

*Chaetochloa perennis* Bicknell, Bull. Torrey Club 25: 107. 1898. Based on "*C. glauca* var. *perennis* Curtiss in Beal's Grasses of North America 2: 156. 1896."

*Chaetochloa laevigata* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 21: 10. 1900, as synonym of *Chaetochloa imberbis* Scribn.

*Chaetochloa imberbis perennis* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 12. 1900. Based on *Setaria perennis* Hall.

*Chaetochloa imberbis geniculata* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 12. 1900. Based on *Panicum geniculatum* Lam.

*Chaetochloa imberbis streptobotrys* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 13. 1900. Based on *Setaria streptobotrys* Fourn.

*Chaetochloa purpurascens* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 13. 1900. Based on *Setaria purpurascens* H. B. K.

*Chaetochloa gracilis* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 15. 1900. Based on *Setaria gracilis* H. B. K.

*Chaetochloa corrugata parviflora* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 24. 1900. The name is based upon *Cenchrus parviflorus* Poir. (*Chaetochloa geniculata*). The plants cited all belong to *Chaetochloa corrugata*.

*Panicum glaberrimum* Ell.; Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Circ. 29: 3. 1901, as synonym of *Chaetochloa imberbis*.

*Chaetochloa ventenatii* Nash in Kearney, Contr. U. S. Nat. Herb. 5: 515. 1901. Based on *Setaria ventenatii* Kunth.

*Chaetochloa occidentalis* Nash in Britton, Man. 90. 1901. "In meadows, Kans. and Ind. Terr." The type is a different specimen of the same collection as the type of *Setaria perennis* Hall. The specimen is in the herbarium of the New York Botanical Garden.

*Setaria glauca*  $\gamma$  *geniculata* Urban, Symb. Antill. 4: 96. 1903. Based on *Panicum geniculatum* Lam.

*Setaria glauca*  $\delta$  *purpurascens* Urban, Symb. Antill. 4: 96. 1903. Based on *Setaria purpurascens* H. B. K.

*Chaetochloa geniculata* Millsp. & Chase, Field Mus. Bot. 3: 37. 1903. Based on *Panicum geniculatum* Lam.

*Chamaeraphis imberbis* Kuntze; Stuck. Anal. Mus. Nac. Buenos Aires 11: 76. 1904, footnote. Based on *Panicum imberbe* Poir. Stuckert says that Kuntze and Post affirm that the name *Chamaeraphis* has priority over *Setaria*. On the authority of those authors he lists his Argentine species under *Chamaeraphis*, giving Kuntze as author of the combination.

*Chamaeraphis gracilis* Kuntze; Stuck. Anal. Mus. Nac. Buenos Aires 11: 76. 1904, in footnote. Based on *Setaria gracilis* H. B. K.

*Chamaeraphis penicillata* Presl; Stuck. Anal. Mus. Nac. Buenos Aires 11: 76. 1904. Presumably based on *Setaria penicillata* Presl, though no synonym is cited.

*Panicum versicolor* Nieuwl. Amer. Midl. Nat. 2: 64. 1911. Not *Panicum versicolor* Doell, 1877. Based on *Chaetochloa versicolor* Bicknell.

*Panicum occidentale* Nieuwl. Amer. Midl. Nat. 2: 64. 1911. Not *Panicum occidentale* Scribn. 1899. Based on *Chaetochloa occidentalis* Nash.

## DESCRIPTION.

Plants perennial, producing short knotty branching rhizomes as much as 4 cm. long; culms erect, spreading, or prostrate, tufted or solitary, as much as 1 meter tall, sometimes dwarfed, glabrous, usually scabrous below the panicle, the base usually hard and wiry, often more slender than the upper part; sheaths compressed-keeled, glabrous, sometimes scabrous toward the summit; ligule very short, densely ciliate; blades flat, scabrous, often glaucous, and often more or less villous toward the base on the upper surface, glabrous or somewhat scabrous beneath, mainly straight (not twisted as in *C. lutescens*), as much as 20 cm. long and 8 mm. wide, usually narrower and shorter than this; panicle long-exserted, erect, evenly cylindric, densely flowered, rounded or truncate (not narrowed) at summit, 1 to 10 cm. long or in robust specimens longer, 4 to 8



FIG. 41.—*Chaetochloa geniculata*. From Chase 2981, Maryland.

mm. thick (excluding the bristles), yellow, purple, tawny, or greenish, the axis densely and softly pubescent; branches pubescent like the axis, very short, about 1 mm. long to the single spikelet, bearing about the middle a fascicle of irregular branchlets, almost immediately dividing into bristles; bristles several, mostly 8 to 12, yellow or purple, 1 to 3 times or even as much as 6 times as long as the spikelets, antrorsely scabrous; spikelets 2 to 2.5 or even 3 mm. long, ovoid, plano-convex; first glume about one-third as long as spikelet, 3-nerved; second glume half to two-thirds as long as spikelet, 5-nerved; sterile lemma staminate or neuter, as long as the spikelet, 5 to 7-nerved, the palea well developed; fertile lemma transversely rugose with close narrow ridges.

This species is exceedingly variable, but after study of a great amount of material and much field work it is impossible to segregate coherent groups. The culms are sometimes single, slender, and weak, sometimes cespitose, sometimes stout, much branched at base, spreading or prostrate; the blades vary in width, and the panicles in length. Much of the difference in general appearance is due to the

color and length of the bristles. The bristles are long early in the season and in cultivated soil. The differences appear not to be coordinated. In occasional specimens the sterile lemma is indurate and rugose like the fertile lemma (Fort Myers, Florida, *Hitchcock* 512; Virginia Beach, Virginia, *Hitchcock* 78).

Sometimes the blades are very narrow, only 2 to 3 mm. wide, but otherwise the form is not distinct (CALIFORNIA: Fresno, *Griffiths* 4717. Pomona, *Hitchcock* in 1903. Riverside, *Reed* 1186. MEXICO: Monterrey, *Hitchcock* 55603). This has been called *C. gracilis*.<sup>1</sup>

In *Funck & Schlim* 722 from Colombia (N. Y. Bot Gard. Herb.) the blades are densely pilose on the upper surface and sparsely so beneath.

<sup>1</sup> U. S. Dept. Agr. Div. Agrost. Bull. 21: 15. 1900; Hitchcock, Mexican Grasses. Contr. U. S. Nat. Herb. 17: 263. 1913.

## DISTRIBUTION.

Open ground, pastures, cultivated soil, salt marshes, and moist ground along the coast, Connecticut to Florida and Texas, in the interior north to Kansas, south through tropical America to Argentina and Chile.

CONNECTICUT: Groton, *Bissell* in 1905. Green Farms, *Bicknell* in 1897.

NEW YORK: Orient, *Dobbin* 9.

NEW JERSEY: Lambertville, *Fisher* in 1901 and 1904. Califon, *Fisher* in 1901.

PENNSYLVANIA: Chester County, *Windle* in 1901. Philadelphia, *Smith* 64.

MISSOURI: Alba, *Bush* 6071. Campbell, *Bush* 6294, 6294A, 6294C. Monteer, *Bush* 6090. Smithfield, *Bush* 6016, 6016A, 6016B. Webb City, *Bush* 6044, 6044A.

KANSAS: Comanche County, *Hitchcock* 885, 1544. Hutchinson, *Smyth* in 1890.

MARYLAND: West Chevy Chase, *Hitchcock* in 1905; *Chase* 2981. Riverdale, *Maxon & Norton* 14. Owings, *Hitchcock* 1620. Millstone, *Hitchcock* 7880. Bay Ridge, *Scribner* in 1897. Chesapeake Junction, *Hitchcock* 1645.

DISTRICT OF COLUMBIA: *Steele* in 1898; *Ball* 60, 63; *Chase* 2990.

VIRGINIA: Lynnhaven, *Chase* 2943. Dismal Swamp, *Chase* 3681; *McCarthy* in 1883. Alexandria, *House* 412. Jackson City, *Steele* in 1898. Virginia Beach, *Hitchcock* in 1905; *Kearney* 2035. Suffolk, *Kearney* 1735.

WEST VIRGINIA: Aurora, *Steele* in 1898.

NORTH CAROLINA: Ocracoke Island, *Kearney* 2277. Wilmington, *Chase* 7199. Biltmore, *Norton* 332; *Biltmore Herb.* 6026a. West Raleigh, *Stanton* 1290.

SOUTH CAROLINA: Orangeburg, *Hitchcock* 162. Beaufort, *Chase* 7118. Florence, *Ball* 685. Aiken, *Ravenel* in 1869.

GEORGIA: Brunswick, *Chase* 7090. Augusta, *Kearney* 200, 227. St. Simons Island, *Ricker* 961. Savannah, *Kearney* 186.

FLORIDA: Jacksonville, *Curtiss* 4745, 5411, 6646; *Combs* 13, 19. Bartow, *Combs* 1232. Madison, *Combs* 237, 264. Ellzey, *Combs* 826. Homosassa, *Combs* 924, 935½, 969. Manatee, *Biltmore Herb.* 6027. Fort Myers, *Hitchcock* 511, 512, 513, 514, 516, 901; *J. P. Standley* 147, 241; *Standley* 12860. Miami, *Hitchcock* 485, 498, 651, 709; *Chase* 3888. De Soto County, *Fredholm* 6225. Lake City, *Hitchcock* 2348; *Combs* 79, 179; *Rolfs* 862; *Bitting* 779. Hernando County, *Hitchcock* 2349. Jefferson County, *Hitchcock*, 2344, 2350. Levy County, *Hitchcock* 2346. Alachua County, *Hitchcock* 2347; *Combs* 702. Eustis, *Nash* 566; *Hitchcock* 2345. Washington County, *Combs* 659. Sanibel Island, *Hitchcock* 515. Pine Island, *Tracy* 7206. Manavista, *Tracy* 6696. Perico Island, *Tracy* 6707. Orange County, *Fredholm* 5440. Duval County, *Curtiss* 3614\*. Monticello, *Combs* 346. Old Town, *Combs* 877. Flamingo, *Eaton* 1324. Quincy, *Combs* 396. Hillsborough County, *Fredholm* 6398. Brevard County, *Fredholm* 6152. Marco, *Hitchcock* in 1900. St. Vincent Island, *McAtee* 1693, 1761, 1848A. Key Largo, *Chase* 3933. Apalachicola, *Kearney* 116. Cedar Key, *Combs* 775, 794; *Tracy* 7179. Archer, *Quaintance* 824. Orange Glade, *Eaton* 568. Punta Rassa, *Hitchcock* in 1900. Dade County, *Small, Mosier & Small* 6426, 6871, 6876. Pablo Beach, *Chase* 7045. St. Marks, *Harper* 214. Key West, *Hitchcock* 610. Fellsmere, *Tracy* 9256. Without locality, *Rugel* 293, 437.

TENNESSEE: Bluff City, *Hitchcock* in 1905. Bristol, *Hitchcock* in 1905. Vances Station, *Hitchcock* 96.

ALABAMA: Mobile, *Mohr* in 1881. Cullman County, *Eggert* 18. Mobile, *Kearney* 19, 42, 58; *Mohr* in 1885 and 1891. Sylacauga, *Pollard & Maxon* 217. Talladega Springs, *Pollard & Maxon* 245.

MISSISSIPPI: Chandelier Island, *Tracy* in 1897. Biloxi, *Tracy* 4532, 6467, 6468; *Kearney* 217. Petit Bois Island, *Tracy* in 1898. Starkville, *Chase* 4448; *Kearney* 22. Agricultural College, *Kearney* 34; *Ricker* 848. Ocean Springs, *Pollard* 1105. Morton, *Holt* 49.

- LOUISIANA: Alexandria, *Ball* 185. Calhoun, *Ball* 41. Coushatta, *Ball* 132. Houma, *Wurzlöw* in 1914. Isle au Pied, *Tracy & Lloyd* 456. Lake Charles, *Allison* 259; *Chase* 6092. New Orleans, *Kearney* 343. Oberlin, *Ball* 218. Pointe a la Hache, *Langlois* 54, 147. Port Eads, *Tracy & Lloyd* 458.
- TEXAS: Terrell, *Warburton* in 1904. Houston, *Fisher* 1721. Bexar County, *Jermy* 23, 207, 227. Clarksville, *Plank* 13. Galveston, *Bebb* 1098; *Hitchcock* in 1903; *Plank* 84. San Antonio, *Ball* 938; *Hitchcock* 5131, 5155. Dallas, *Reverchon* 1098. Columbia, *Bush* 926. Del Rio, *Hitchcock* 13624, 13656; *Plank* 61. Cold Creek, *Bigelow*, (Whipple's Expl.). Guadalupe Mountains, *Havard* in 1881. Brownsville, *Hitchcock* 5411. New Braunfels, *Hitchcock* 5232. Taylor, *Ball* in 1901. Corpus Christi, *Hitchcock* 5374; *Nealley* 27. Ennis, *Smith* in 1897. Huntsville, *Plank* 64. Hempsted, *Hall* 840 in part. Home Canyon, *Carleton* 423. Kingsville, *Tracy* 8883. Kerrville, *Heller* 1889. Pinto Creek, *Hill* 82.
- OKLAHOMA: Choctaw Agency, *Bigelow* (Whipple's Expl.). Fort Cobb, *Palmer* 374.
- NEW MEXICO: Kingston, *Metcalf* 1195.
- CALIFORNIA: Chico, *Ball* 1948. Fresno, *Griffiths* 4717. Los Angeles, *Davidson* 3260, 3261. Pomona, *Hitchcock* in 1903. Riverside, *Reed* 1186; *Wilder* 1043, 1127.
- LOWER CALIFORNIA: San José del Cabo, *Brandege* 15 in 1890; *Purpus* 325.
- SONORA: Hermosillo, *Hitchcock* 3586, 3587, 3618, 3625; *Maltby* 241; *Rose* 12496.
- CHIHUAHUA: Chihuahua, *Palmer* in 1885. Sánchez, *Hitchcock* 7691.
- COAHUILA: Jimulco Springs, *Pringle* 431. Saltillo, *Hitchcock* 5583, 5610, 5650; *Palmer* 383 and 384 in 1898.
- NUEVO LEÓN: Monterrey, *Hitchcock* 5560, 5570.
- TAMAULIPAS: Tampico, *Hitchcock* 5797; *Palmer* 149 in 1910. Victoria, *Palmer* 393 and 556 in 1907.
- SAN LUIS POTOSÍ: Cárdenas, *Hitchcock* 5720, 5722. Las Canoas, *Hitchcock* 5761. San Luis Potosí, *Hitchcock* 5669; *Schaffner* 171, 1041.
- DURANGO: Durango, *Hitchcock* 7593; *Palmer* 378, 381 and 539 in 1896. Tejamén, *Palmer* 499 and 539 in 1906. Tepehuanes, *Palmer* 263 in 1906.
- SINALOA: Lodiago, *Palmer* 1648 in 1891.
- TEPIC: Santa Teresa, *Rose* 3417.
- JALISCO: Colotlán, *Rose* 3607. Guadalajara, *Palmer* 293 in 1886. Río Blanco, *Palmer* 246 in 1886. San Nicolás, *Hitchcock* 7184. Zapotlán, *Hitchcock* 7128, 7142, 7239.
- AGUASCALIENTES: Aguascalientes, *Hitchcock* 7455.
- GUANAJUATO: Acámbaro, *Hitchcock* 6945, 6953. Irapuato, *Hitchcock* 7401.
- QUERÉTARO: Querétaro, *Arsène* 10271; *Basile* 45, 46; *Hitchcock* 5821, 5849.
- HIDALGO: Ixmiquilpan, *Rose* 9056. Pachuca, *Hitchcock* 6712, 6726; *Rose* 8723.
- VERACRUZ: Córdoba, *Finck* 5; *Hitchcock* 6398. Colipa, *Karwinsky* 959; *Liebmann* 360. Jalapa, *Hitchcock* 6593, 6594, 6623; *Smith* 1547. Mirador, *Liebmann* 354. Orizaba, *Botteri* 157, 631, 673; *Hitchcock* 6320, 6327, 6349, 6365, 6370; *Nelson* 33. Potrero de San Sebastián, *Liebmann* 352. Sanborn, *Orcutt* 3237. Veracruz, *Hitchcock* 6550, 6573; *Purpus* 6210. Morro de Boquilla, *Liebmann* 353.
- PUEBLA: Acatzingo, *Nicolás* in 1909. Chalchicomula, *Hitchcock* 6278. Puebla, *Arsène* 331; *Nicolás* in 1909. San Marcos, *Hitchcock* 6511. Tehuacán, *Hitchcock* 6042. Tochimilco, *Nelson* in 1893.
- FEDERAL DISTRICT: *Bourgeau* 231; *Hitchcock* 5883, 5923, 5944; *Holway* 7, 3126, 3556; *Orcutt* 3534, 3613; *Pringle* 6419, 7171, 11220. Toluca, *Hitchcock* 6898. Popo Park, *Hitchcock* 6016.
- MORELOS: Cuernavaca, *Hitchcock* 6832; *Pringle* 7172, 7173. Cuantla, *Pringle* 9587. El Parque, *Orcutt* 3861.
- MICHOACÁN: Morelia, *Arsène* in 1909. Uruapan, *Hitchcock* 6959, 6986.
- COLIMA: Alzada, *Hitchcock* 7076; *Orcutt* 4624. Colima, *Palmer* 17 in 1897.
- GUERRERO: Iguala, *Rose* 9388.
- OAXACA: Cuicatlán, *Nelson* 1652, 1907. Las Sedas, *Smith* 935. Oaxaca, *Conzatti & González* 342; *Hitchcock* 6147, 6157, 6176. Plunia, *Nelson* 2482. Sierra, *Galeotti*

5883. Tomellín, *Hitchcock* 6210, 6223; *Rose* 10063. Totontepec, *Nelson* 710. Chinantla, *Liebmann* 350, 351.

CHIAPAS: Ocuilapa, *Nelson* 3023a. Turubula, *Nelson* 3336.

YUCATÁN: Izamal, *Gaumer* 756. •

QUINTANA ROO: Chichankanab, *Gaumer* 1938.

MEXICO (Republic of): Without locality, *Liebmann* 349 and 355.

GUATEMALA: Copán, *Pittier* 1795, 1806a. Cubilquitz, *Türckheim* 7695. Escuintla, *Hitchcock* 9004. Finca Sepacuité, *Cook & Griggs* 659; *Collins & Goll* 04. Fiscal, *Deam* 6168. Gualán, *Deam* 422. Guatemala City, *Hitchcock* 9025; *Popenoe* 668. Patalul, *Kellerman* 5699. Puerto Barrios, *Kellerman* 4787. San Rafael, *Holway* 24. Santa Rosa, *Heyde & Lux* 3909.

HONDURAS: Point Triunfo, *Wilson* 340. Ruatán Island, *Gaumer* 115. San Pedro Sula, *Thieme* 311, 341.

SALVADOR: San Salvador, *Velasco* 6, 13.

NICARAGUA: Corinto, *Hitchcock* 8756½. Masaya, *Hitchcock* 8644.

COSTA RICA: Alajuela, *Jiménez* 523. Alajuelita, *Pittier* 2997; *Tonduz* 8817. Cañas Gordas, *Pittier* 11016. Cartago, *Cooper* 156; *Pittier* 6985. Zent, *Tonduz* 213. Guanacaste, *Jiménez* 737; *Pittier* 2700. Machuca, *Pittier* 2606. Poás, *Tonduz* 10752. Port Limón, *Hitchcock* 8423. Puntarenas, *Hitchcock* 8568. Río Tuís, *Tonduz* 11400. San José, *Cooper* 5993; *Hitchcock* 8463; *Pittier* 461, 646; *Tonduz* 765, 3008. San Pedro de la Calabaza, *Pittier* 2966. Siquires, *Pittier* 4205. Surubres, *Biolley* 17380. Talamanca, *Tonduz* 9215. Tucurrique, *Tonduz* 13326. Turrialba, *Tonduz* 4093.

PANAMA: Ancón, *Killip* 4016, 4021. Cerro Vaca, *Pittier* 5344. Corozal, *Killip* 4104. Culebra, *Hitchcock* 7921; *Pittier* 4444. El Boquete, *Pittier* 3042; *Hitchcock* 8171, 8285. Empire, *Pittier* 3719. Gamboa, *Pittier* 4792. Gatún, *Hitchcock* 9173. Matías Hernández, *Pittier* 6759. New Frijoles, *Pittier* 6840. Panama, *Gervais* 166. Taboga Island, *Hitchcock* 8062.

BERMUDA: *Brown & Britton* 5; *Millsbaugh* 45, 50.

BAHAMAS: Anguilla Isles, *Wilson* 7975, 8061.

CUBA: Chirigote, *Wright* 3472. Guanabacoa, *Hitchcock* in 1906. Guines, *Léon* 428. Habana, *Curtiss* 749; *Léon* 269, 832, 1964, 4182, 5212; *Tracy* 9112. Herradura, *Hitchcock* in 1906. Laguna Jovero, *Shafer* 10730. Los Palacios, *Shafer* 11795. Manacas, *Léon* 5835. Matanzas, *Wright* 3888. Punta Brava, *Baker* 4063. Sancti-Spiritus Mountains, *Léon* 6539. Guantánamo Bay, *Britton* 2172. San Diego de los Baños, *Palmer & Riley* 546. Santiago, *Léon* 833, 834. Santiago de las Vegas, *Baker* 522, 561; *Hitchcock* in 1906. Sumidero, *Shafer* 13681. Tricornia, *Hitchcock* in 1906. Woodfred, *Shafer* 3009. Isle of Pines, *Britton & Wilson* 15378; *Taylor* 45. Without locality, *Wright* in 1865, 3473 in part.

JAMAICA: Bath, *Maxon* 2368. Bog Walk, *Hitchcock* 9299. Bull Head Mountain, *Hitchcock* 9526. Castleton, *Harris* 11282. Castleton Gardens, *Hitchcock* 9399. Ewarton, *Hitchcock* 9431. Gordon Town, *Hart* 683, 684, 747. Hardware Gap, *Harris* 10902. Ipswich, *Hitchcock* 9612. Kellits, *Harris* 11156. Kingston, *Hitchcock* 9265. Lititz, *Harris* 11743, 12683. Mount Faraway, *Harris* 11382. New Forest, *Hitchcock* 9849. Port Antonio, *Maxon* 2003; *Fredholm* 3315. Ramble, *Hitchcock* 9490, 9491. Savoy, *Harris* 11617. Without locality, *March* 631.

SANTO DOMINGO: Rincón, *Fuertes* 1280. Azua, *Fuertes* 1876.

PORTO RICO: Adjuntas, *Sintenis* 4457. Aibonito, *Chase* 6342. Atola-teja, *Goll* 236. Cayo Muertos, *Britton, Cowell & Brown* 4989. Dorado, *Johnston* 893. Lares, *Chase* 6590. Lecheria, *Goll* 28. Maricao, *Britton, Cowell & Brown* 4532; *Chase* 6195, 6231½; *Sintenis* 208. Mayaguez, *Chase* 6166, 6304; *Sintenis* 6861. Mona Island, *Hess* 448. Ponce, *Chase* 6479; *Heller* 6240. San Juan, *Chase* 6374, 6377. Santurce, *Heller* 329. Sierra de Luquillo, *Chase* 6709, 6720. Without locality, *Eggers* 1327.

VIRGIN ISLANDS: St. Croix, *Ricksecker* 243, 383. St. Kitts, *Britton & Cowell* 744.

LEEWARD ISLANDS: Antigua, *Wulfschlaegel*. Guadeloupe, *Duss* 2694. Dominica, *Jones* 6.

WINDWARD ISLANDS: Barbados, *Bot. Sta. Herb.* 453. St. Lucia, *Glasgow*, 5. Grenada, *Broadway* 145, 1126, and in 1904; *Smith* 829.

TRINIDAD: *Bot. Gard. Herb.* 1380, 1679, 3208. St. Joseph, *Hitchcock* 10018.

TOBAGO: *Broadway* 4686; *Hitchcock* 10260.

COLOMBIA: Cauca, *Lehmann* 3284. Corinto, *Pittier* 1001. Huila, *Pittier* 1265. Palmira, *Pittier* 844, 848. Río Frío, *Pittier* 1585. Santa Marta, *Smith* 2186, 2187, 2189. Toribío, *Pittier* 1464.

VENEZUELA: Alto-Apure, *Jahn* 196. Caracas, *Pittier* 6165. Carayaca, *Jahn* 310. Dos Caminos, *Pittier* 6306. Island of Margarita, *Miller & Johnston* 181.

BRITISH GUIANA: Without locality, *Jenman* 4377; *Schomburgk* 552.

DUTCH GUIANA: Paramaribo, *Kuyper* in 1913.

BRAZIL: Bocaina, *Löfgren* 2367. Caldas, *Henschen* 1372; *Regnell* 1372. Campinas, *Campos Novaes* 1243. Franca, *Löfgren & Edwall* 2110. Goyaz, *Gardner* 3516. Jaguariahyva, *Dusén* 10965. Joazeiro, *Löfgren* 3740. Minas Geraes, *Widgren* 899 and in 1845. Monte Alegre, *Löfgren* 1167. Petropolis, *Binot* 24. Pratenhas, *Dorsett & Popenoe* 187b. Rio de Janeiro, *Wilkes Expl. Expd.* São João d'el Rey, *Dorsett & Popenoe* 285b. São João (São Paulo), *Löfgren* 3846; *Rabello & Barbosa* 736. Tamanduá, *Dusén* 7682. Without locality, *Gardner* 211, *Riedel* 1402.

PARAGUAY: Central Paraguay, *Morong* 540. Pilcomayo River, *Rojas* 54, 54a, 116, 134, 134a, 134b, 430. Sierra de Amambay, *Rojas* 9778, 10353.

URUGUAY: Montevideo, *Arechavaleta*; *Sellow* 247, 1918. Soriana, *Aplin* in 1892-93.

ECUADOR: Quito, *Hartweg* 1448; *Lehmann* 467. Without locality, *Jameson*.

BOLIVIA: Yungas, *Bang* 218, 273. Sorata, *Rusby* 222. Tarija, *Fries* 1116a.

ARGENTINA: Andalgalá, *Jorgensen* 1110. Córdoba, *Stuckert* 486, 5380, 12667, 12840, 12927. Posadas, *Ekman* 658. San Teodoro, *Stuckert* 188, 558.

CHILE: Valdivia, *Philippi*.

#### 7. *Chaetochloa tenax* (L. Rich.) Hitchc.

*Panicum tenax* L. Rich. Act. Soc. Hist. Nat. Paris 1: 106. 1792. "A Cayenna missarum a Domino Le Blond." The type is in the Florence Herbarium.

*Panicum impressum* Nees, Agrost. Bras. 247. 1829. "Habitat in sylvis ad Villam do Rio de Contas provinciae Bahiensis." The type, collected by Martius, is in the Munich Herbarium.

*Setaria impressa* Kunth, Rév. Gram. 1: Suppl. XII. 1830. Based on *Panicum impressum* Nees.

*Setaria tenax* Desv. Opusc. 78. 1831. Based on *Panicum tenax* L. Rich.

*Panicum sphaerocarpon* Salzm.; Steud. Syn. Pl. Glum. 1: 51. 1854. Not *Panicum sphaerocarpon* Ell. 1816. "Bahia, Paraguay." The type collection was by Salzmann in Bahia. Duplicates are in several herbaria.

*Panicum amphibolum* Steud. Syn. Pl. Glum. 1: 51. 1854. "*P. intermedium* Salzm. hrbr. Bahia."

*Panicum intermedium* Salzm.; Steud. Syn. Pl. Glum. 1: 51. 1854, as synonym of *P. amphibolum*. Not *Panicum intermedium* Vahl, 1813. The type was collected in Bahia by Salzmann. A duplicate has been examined in the Trinius Herbarium.

*Setaria biconvexa* Griseb. Fl. Brit. W. Ind. 555. 1864. "Hab. Trinidad, Cr., at S. Anne." The type, collected by Crueger, is in the Kew Herbarium, a fragment being in the National Herbarium.

*Chaetochloa salzmanniana* Hitchc. Contr. U. S. Nat. Herb. 17: 265. 1913. Based on *Panicum sphaerocarpon* Salzm., not Ell. 1816.

*Chaetochloa impressa* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18: 350. 1917. Based on *Panicum impressum* Nees.

*Setaria sphaerocarpa* Hubbard, Contr. Gray Herb. n. ser. 52: 60. 1917. Based on *Panicum sphaerocarpum* Salzm.

This was described by Grisebach<sup>1</sup> as *Setaria onurus* and by Hitchcock and Chase<sup>2</sup> as *Chaetochloa onurus*, but a reconsideration of the type leads to the conclusion that the original *Panicum onurus* Willd. from Montevideo (as described by Trinius)<sup>3</sup> is a different species, later described as *Setaria caespitosa* Hack. & Arech.<sup>4</sup> *Panicum onurus* was earlier mentioned as a synonym by Nees (see note under *Chaetochloa macrostachya*). The first valid publication of the name, however, was by Trinius (loc. cit.), his type collected at Montevideo by Sello.

## DESCRIPTION.

Plants perennial; culms glabrous, scabrous below the panicle, 1 to 1.5 meters tall, often geniculate at base; sheaths glabrous or usually scabrous toward the summit, villous on the margin, densely hispid on the collar; ligule densely pilose, 2 to 3 mm. long; blades flat, more or less scabrous, narrowed at base, acuminate at apex, as much as 35 cm. long and 2 cm. wide; panicles rather densely flowered, narrowed toward summit but not attenuate, somewhat interrupted or lobed below, 15 to 30 cm. long, 2 to 3 cm. wide, the branches ascending, the lower about 2 cm. long, the axis villous with hairs 1 to 2 mm. long; bristles 1 or 2 below each spikelet, 1 to 2 cm. long, flexuous, retrorsely scabrous and often also antrorsely toward the base, sometimes barblets directed both ways intermixed, pale or tawny, becoming implicate and somewhat one-sided with age; spikelets subspheric, about 2 mm. long, very turgid on one side and somewhat convex on the other; first glume about 1 mm. long or a little less, 5-nerved; second glume about two-thirds as long as the spikelet but at maturity pushed aside, exposing nearly half the fertile lemma, 7 to 9-nerved; sterile lemma as long as the fertile, 5 to 7-nerved, the nerves less distinct than those of the glumes, the palea well developed; fertile lemma very turgid, yellowish brown at maturity, rather indistinctly cross-wrinkled, the palea convex.



FIG. 42.—*Chaetochloa tenax*. From Tracy 9090, Cuba.

This species resembles *C. vulpisea*, but is less robust and has retrorsely scabrous bristles and subspheric spikelets.

Hitchcock's no. 9926, from Puerto Colombia, has pubescent sheaths and blades.

<sup>1</sup> Fl. Brit. W. Ind. 555. 1864.

<sup>2</sup> Contr. U. S. Nat. Herb. 18: 349. 1917.

<sup>3</sup> Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 226. 1834. See also Nees, Agrost. Bras. 251. 1829.

<sup>4</sup> Anal. Mus. Nac. Montevideo 1: 166. 1894.

## DISTRIBUTION.

- Brushy slopes, southern Mexico and West Indies to Brazil.  
 VERACRUZ: Córdoba, *Hitchcock* 6424.  
 PANAMA: Taboga Island, *Hitchcock* 8085; *Celestine* 87.  
 CUBA: Sancti Spiritus, *Léon* 828. Matanzas, *Rugel* 880. Madruga, *Léon* 3456.  
 Campo Florido, *Léon* 4145, Manatí, *Léon* 5684. Zaza del Sur, *Sergius* 2712.  
 Tricornia, *Tracy* 9090. Woodfred, *Shafe* 3020. Bahia Honda, *Wilson* 9411.  
 Guanavaca, *Wright* 3474. Without locality, *Wright* 3887.  
 JAMAICA: Two-mile Wood Pen, *Harris* 12065. New Forest, *Amer. Gr. Nat. Herb.* 608.  
 Lititz, *Harris* 11657. Yardley Chase, *Harris* 9673.  
 WINDWARD ISLANDS: Barbados, *Dash* 603.  
 TRINIDAD: St. Joseph, *Hitchcock* 10180. Port of Spain, *Hitchcock* 9991; *Amer. Gr. Nat. Herb.* 609.  
 COLOMBIA: Santa Marta, *Smith* 2499. Puerto Colombia, *Hitchcock* 9926.  
 BRITISH GUIANA: Without locality, *Schomburgk* 414.  
 DUTCH GUIANA: Zandery, *Samuels* in 1916.  
 BRAZIL: Bahia, *Salzmann*.  
 PARAGUAY: Central Paraguay, *Morong* 658.

8. *Chaetochloa verticillata* (L.) Scribn.

*Panicum verticillatum* L. Sp. Pl. ed. 2. 1: 82. 1762. "Habitat in Europa australi & Oriente."

*Pennisetum verticillatum* R. Br.; Roem. & Schult. Syst. Veg. 2: 488. 1817, as synonym of *Setaria verticillata*. Brown says<sup>1</sup> in a note, "Huc [*Pennisetum*] pertinent *Panicum viride, verticillatum, helvolum*," but he does not make the combination.

*Setaria verticillata* Beauv. Ess. Agrost. 51, 178. 1812. Based on *Panicum verticillatum* L.

*Setaria pseudoverticillata* Fourn. Mex. Pl. 2: 43. 1886. "San Luis de Potosi (VIRL. n. 1335 bis in herb. Mus. Paris)." This specimen has not been examined. The description appears to apply to *Chaetochloa verticillata*.

*Chamaeraphis italica* var. *verticillata* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Panicum verticillatum* L.

*Chamaeraphis verticillata* Porter, Bull. Torrey Club 20: 196. 1893. Based on *Panicum verticillatum* L.

*Ixophorus verticillatus* Nash, Bull. Torrey Club 22: 422. 1895. Based on *Panicum verticillatum* L.

*Chaetochloa verticillata* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum verticillatum* L.

Several other synonyms are given in European works.

Schinz and Thellung<sup>2</sup> have applied the name *Setaria panicea*, based on *Cynosurus paniceus* L. Sp. Pl. 73. 1753, to this species. The description given by Linnaeus is as follows:

8. CYNOSURUS panicula subspicata, flosculis simplicibus biaristatis. *paniceus*  
*Panicum* floribus conglomerato-spicatis laevibus arista dimidio  
 brevioribus. *Fl. suec.* 54.  
*Panicum* spica composita, aristis spica longioribus. *Virid. cliff.* 7.  
*Roy. lugdb.* 55.  
*Panicum* spiculis spicatis scabritie adhaerentibus. *Hor. cl.* 27.  
 Gramen paniceum, spica aspera. *Bauh. pin.* 8. *Scheuch. gram.* 47.  
*Habitat in Europae agris cultis.* [Sign for annual.]

<sup>1</sup> Prodr. Fl. Nov. Holl. 1: 195. 1810.

<sup>2</sup> Vierteljahrs. Naturf. Ges. Zurich 53: 519. 1903.



European botanists generally refer this to *Polypogon monspeliensis* (L.) Desf.<sup>1</sup> The synonym from the Flora Suecica refers to *Panicum viride* as stated by Schinz and Thellung and as is determined by the common name (Hund-hirs) given in the Flora Suecica.<sup>2</sup> Schinz and Thellung look upon *Cynosurus paniceus* as a composite species consisting of two elements of which Linnaeus himself separated one as *P. viride*<sup>3</sup> in 1759, and the other as *P. verticillatum*<sup>4</sup> in 1762. Following the International Code, which requires that the original name be retained for one of the elements of a composite species, the authors hold that the name must apply to the residue after *P. viride* had been segregated. They therefore replace *Setaria verticillata* by *Setaria panicea* (L.) Schinz & Thell.

The present author rejects this disposition of the name because Linnaeus's own description given at the beginning of the paragraph above quoted from the Species Plantarum, does not apply to either *Panicum viride* or *P. verticillatum*, the phrase "flosculis simplicibus biaristatus" appearing to apply to *Polypogon monspeliensis*. This version is strengthened by the fact that Linnaeus later<sup>5</sup> transfers the name to *Alopecurus* and alters the description to read "Alopecurus panicula subspicata glumis villosis, corollis aristatus." Hence the name is to be referred as a synonym to *Polypogon monspeliensis*, based upon *Alopecurus monspeliensis* L.<sup>6</sup> There is no specimen in the Linnaean Herbarium to support *Cynosurus* (or *Alopecurus*) *paniceus*.

The plants described under *Chaetochloa brevispica* Scribn. & Merr.<sup>7</sup> are *C. verticillata*. The name is based on *Panicum verticillatum parviflorum* Doell<sup>8</sup> (not *Cenchrus parviflorus* Poir.) from Brazil. The type of this has not been examined.

#### DESCRIPTION.

Plants annual, often much branched at base and geniculate-spreading; culms smooth, scabrous below the panicle, as much as 1 meter tall, usually less; sheaths glabrous, or rarely scabrous toward the summit, ciliate, keeled; ligule very short, densely ciliate; blades flat, rather thin, scabrous on both surfaces, often more or less pilose on one or both surfaces with short scattered hairs, usually 10 to 20 cm. long and 5 to 10 mm. wide; panicles erect but not stiff, cylindric or somewhat tapering upward, more or less lobate or interrupted, especially toward base, mostly 5 to 15 cm. long, 7 to 15 mm. wide, or in robust specimens as much as 2 cm., the axis scabrous

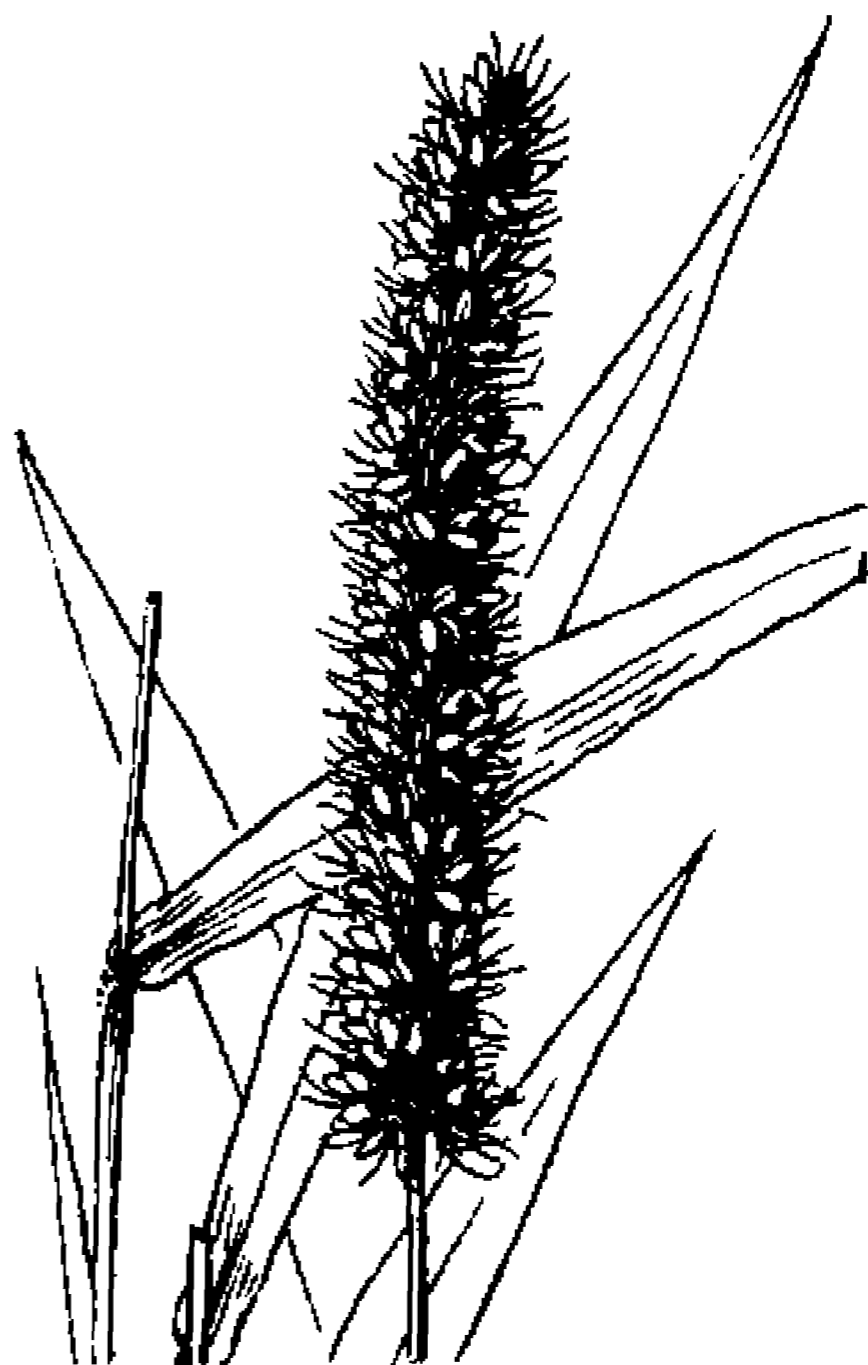


FIG. 43.—*Chaetochloa verticillata*. From Steele in 1898, District of Columbia.

<sup>1</sup> Richt. Pl. Europ. 1: 40. 1890; Aschers. & Graebn. Syn. Mitteleur. Fl. 2: 161. 1899. (*Alopecurus paniceus*).

<sup>2</sup> Hartm. Handb. Skand. Fl. ed. 10. 1: 275. 1870. *Cynosurus paniceus* is given as a synonym of *Setaria viridis*. Nathorst. Svenska Växtnamn. Ark. Bot. 2<sup>1</sup>: 79. 1904. Hundhirs is given as a common name of *Setaria viridis*.

<sup>3</sup> Syst. Nat. ed. 10. 2: 870. 1759.

<sup>4</sup> Sp. Pl. ed. 2. 1: 82. 1762.

<sup>5</sup> Sp. Pl. ed. 2. 1: 90. 1762.

<sup>6</sup> L. Sp. Pl. 61. 1753.

<sup>7</sup> U. S. Dept. Agr. Div. Agrost. Bull. 21: 15. f. 5. 1900.

<sup>8</sup> In Mart. Fl. Bras. 2<sup>2</sup>: 172. 1877.

or scabrous-hispid on the angles, more or less retrorsely so; branches closely many-flowered, scabrous-hispid on the angles like the axis, the cluster oblong, 3 to 10 mm. long, the branchlets very short, bearing 1 to 4 spikelets, a bristle below each spikelet; bristles 1 to 3 times as long as the spikelets, somewhat flexuous, retrorsely scabrous to base, this often flattened; spikelets about 2 mm. long, oblong-elliptic, not very turgid on the convex side; first glume about one-third as long as the spikelet, 3-nerved; second glume and sterile lemma as long as the spikelet, 5-nerved, the sterile palea usually partially developed; fertile lemma finely cross-wrinkled.

## DISTRIBUTION.

A weed in cultivated soil and waste places, here and there throughout the United States, especially in the eastern states, south to Guatemala and Cuba. Introduced from Europe; said by Stapf<sup>1</sup> to be native in "Africa and India to Malaya, elsewhere (Europe, Australia, America) only as a weed."

ONTARIO: Galt, *Herriot* in 1908.

MASSACHUSETTS: Boston, *Boott* in 1861; *Morong* in 1877. Salem, *Conant* in 1879.

CONNECTICUT: Hartford, *Bissell* in 1903.

NEW JERSEY: Woodport, *Fisher* in 1898. Camden, *Scribner* 117; *Martindale* in 1877.

PENNSYLVANIA: Philadelphia, *Burk*. Harrisburg, *Hitchcock* in 1902. Easton, *Porter* in 1895.

INDIANA: Bluffton, *Williamson* 20841. Lafayette, *Dorner* 75.

ILLINOIS: Oquawka, *Patterson* in 1874. Wady Petra, *V. H. Chase* 77.

MICHIGAN: Saugatuck, *Umbach* in 1898.

WISCONSIN: Oshkosh, *Random* in 1896.

SOUTH DAKOTA: Vermillion, *Over* 5093.

IOWA: Mount Pleasant, *Mills* 773. Mount Ayr, *Beard* 929. Iowa City, *Hitchcock* in 1887; *Somes* 3699.

MISSOURI: St. Louis, *Eggert* 267. Independence, *Bush* 776.

DELAWARE: Wilmington, *Commons* 145 in 1897.

DISTRICT OF COLUMBIA: *Ward* in 1882; *Steele* in 1898; *Merrill* 177; *Vasey* in 1878.

ALABAMA: Mobile, *Mohr* in 1891.

UTAH: Salt Lake City, *Hitchcock* in 1901.

NEW MEXICO: Mesilla Valley, *Wooton & Standley* in 1907.

CALIFORNIA: Upland, *Johnston* 1639.

COAHUILA: Saltillo, *Hitchcock* 5640. Parrás, *Palmer* 453 in 1898.

JALISCO: Tequila, *Palmer* 404 in 1886. Guadalajara, *Palmer* 484 in 1886.

GUANAJUATO: Irapuato, *Hitchcock* 7438.

QUERÉTARO: Querétaro, *Hitchcock* 5806, 5807; *Arsène* 10279, 10381; *Basile* 49, 50.

PUEBLA: Tehuacán, *Hitchcock* 6054, 6064, 6084½.

OAXACA: Oaxaca, *Pringle* 4920; *Hitchcock* 6118.

GUATEMALA: Antigua, *Kellerman* 4814. Ciudad Vieja, *Tejada* 311.

BERMUDA: *Collins* 161; *Brown & Britton* 116, 302; *Harshberger* in 1905; *Millspaugh* 99, 127.

CUBA: Habana, *Curtiss* 693; *Hitchcock* 491; *Léon* 555; *Liebmann* 348. Bejucal, *Liebmann* 347. Guanabatano, *Liebmann* 346.

9. *Chaetochloa scandens* (Schrad.) Scribn.

*Setaria scandens* Schrad.; Schult. Mant. 2: 279. 1824. The locality is not indicated. In the Trinius Herbarium is a specimen of "*Setaria scandens* Schrad. H. Gotting.," which is probably a part of the type material. "*Penniset. scandens* Jacq. fl. Cat. Sem. Hort. Vind. 1801" is cited as a synonym. This reference to a seed catalogue of the Vienna Garden has not been verified. The name there is doubtless a nomen nudum.

<sup>1</sup> In Thiselt.-Dyer, Fl. Cap. 7: 430. 1899.

*Panicum scandens* Trin. Gram. Pan. 166. 1826. Based on *Setaria scandens* Schrad.

*Panicum trinii* Kunth, Enum. Pl. 1: 151. 1833. Based on *Panicum scandens* Trin.

*Panicum scandens*  $\alpha$  *vulgare* Doell in Mart. Fl. Bras. 2<sup>2</sup>: 171. 1877. Based on *Panicum scandens* Trin.

*Panicum scandens*  $\gamma$  *longisetum* Doell in Mart. Fl. Bras. 2<sup>2</sup>: 171. 1877. One of the four collections cited, Burchell 4510, from São Paulo, is in the National Herbarium.

*Chaetochloa scandens* Scribn. in Donn. Smith, Enum. Pl. Guat. 5: 91. 1899. Based on *Setaria scandens* Schrad.

## DESCRIPTION.

Plants annual, much branched below, erect or soon geniculate-spreading; culms slender, sometimes rooting at the lower nodes, as much as 80 cm. long, glabrous, sometimes appressed-pilose at the nodes, especially below the margin of the sheath; sheaths glabrous or sparsely appressed-pilose, or the lowermost densely pilose, the margin and collar densely pilose; ligule densely ciliate, less than 1 mm. long; blades flat, linear-lanceolate, as much as 10 cm. long and 1 cm. wide, scabrous, especially on upper surface, usually sparsely, sometimes densely pilose on both surfaces; panicles slender, erect, cylindrical, densely flowered, sometimes slightly lobate or interrupted especially at base, often purplish, as much as 8 cm. long, mostly less than 5 mm. thick, the axis softly pubescent and also long-villous, the scattered hairs often longer than the spikelets; branches very short, pubescent and sparsely villous like the axis; clusters of bristles nearly sessile, divided into 3 to 5 short branchlets, each supporting a spikelet and 1 to 3 bristles; bristles somewhat flexuous but not becoming implicate, 1 to 2 times as long as the spikelets, antrorsely scabrous except near the tip, there more or less retrorsely scabrous; spikelets about 1.5 mm. long, ovoid, turgid on the convex side; first glume about half as long as the spikelet, very broad, enveloping the base of the spikelet, 3-nerved; second glume nearly as long as the spikelet, 5-nerved; sterile lemma as long as the spikelet or slightly exceeding the fertile lemma, 5-nerved, partly enveloping the fertile lemma, the first pair of nerves at the edges of the spikelet, the outer pair on the convex side of the spikelet; fertile lemma transversely striate or weakly rugose.

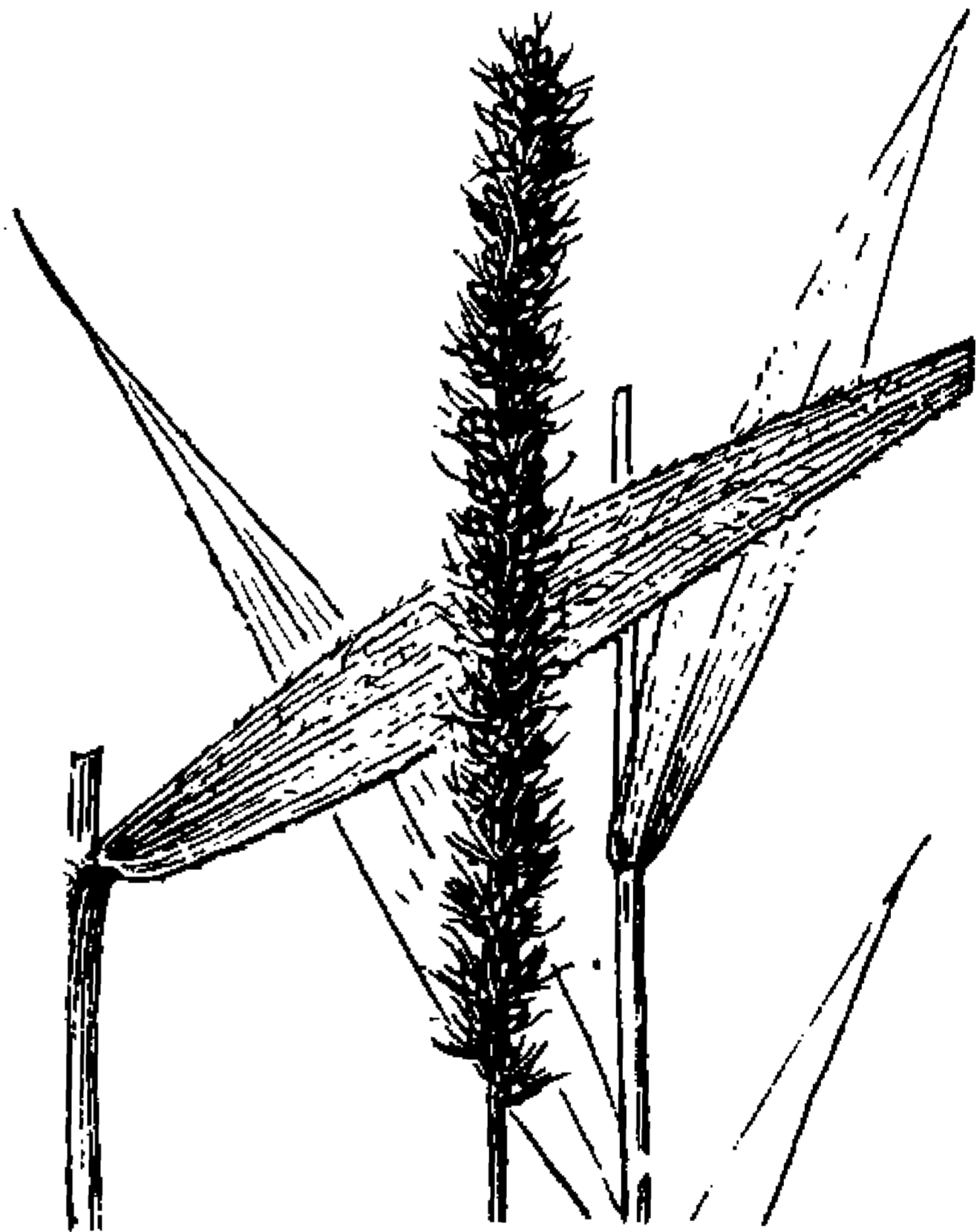


FIG. 44.—*Chaetochloa scandens*. From Hitchcock 9723, Jamaica.

## DISTRIBUTION.

Open ground, Guatemala to Paraguay; also Jamaica and Haiti. Often a weed in cultivated soil.

GUATEMALA: Finca Tres Aguas, Goll 80.

COSTA RICA: San José, Tonduz 765. San Juan, Tonduz 1755.

PANAMA: Alhajuela, Pittier 3463.

JAMAICA: Gordon Town, *Hart* 796, 1487. Kellits, *Harris* 11157. Mount Hybla, *Harris* 11380. Malvern, *Harris* 9739. Troy, *Hitchcock* 9812. Ewarton, *Hitchcock* 9408. Cinchona, *Hitchcock* 9718, 9723.

HAITI: Port au Prince, *Cook, Scofield & Doyle* 62, 67. Marmelade, *Nash* 693.

COLOMBIA: La Trinidad, Libano, *Pennell* 3359 (N. Y. Bot. Gard. Herb.).

BRAZIL: Goyaz, *Gardner* 3515. Campinas, *Campos Novas* 1240. Province Minas Geraes, *Widgren* 900. Rio de Janeiro, *Mertens*. Santarem, *Spruce*. Amazonas, *Capanema* 5441½. Without locality, *Burchell* 4356-2, 4510; *Riedel* (N. Y. Bot. Gard. Herb., ex Herb. Hort. Petrop., det. Trinius).

PARAGUAY: Sierra de Amambay, *Rojas* 10141. River Apa, *Hassler* 11901.

#### 10. *Chaetochloa tenacissima* (Schrad.) Hitchc. & Chase.

*Setaria tenacissima* Schrad.; Schult. Mant. 2: 279. 1824. "In Brasilia." The type has not been examined.

*Panicum tenacissimum* Nees, Agrost. Bras. 238. 1829. Based on *Setaria tenacissima* Schrad.

*Chaetochloa tenacissima* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18: 352. 1917. Based on *Setaria tenacissima* Schrad.

This was included with *Chaetochloa scandens* by Scribner and Merrill.<sup>1</sup> Schrader's descriptions of the two species are much alike, but the blades of *S. scandens* are described as subpilose, and those of *S. tenacissima* as scabrous. The bristles of *S. scandens* are said to be twice as long as the spikelets, and those of *S. tenacissima* much longer. These differences agree with the characters of the species as here segregated.

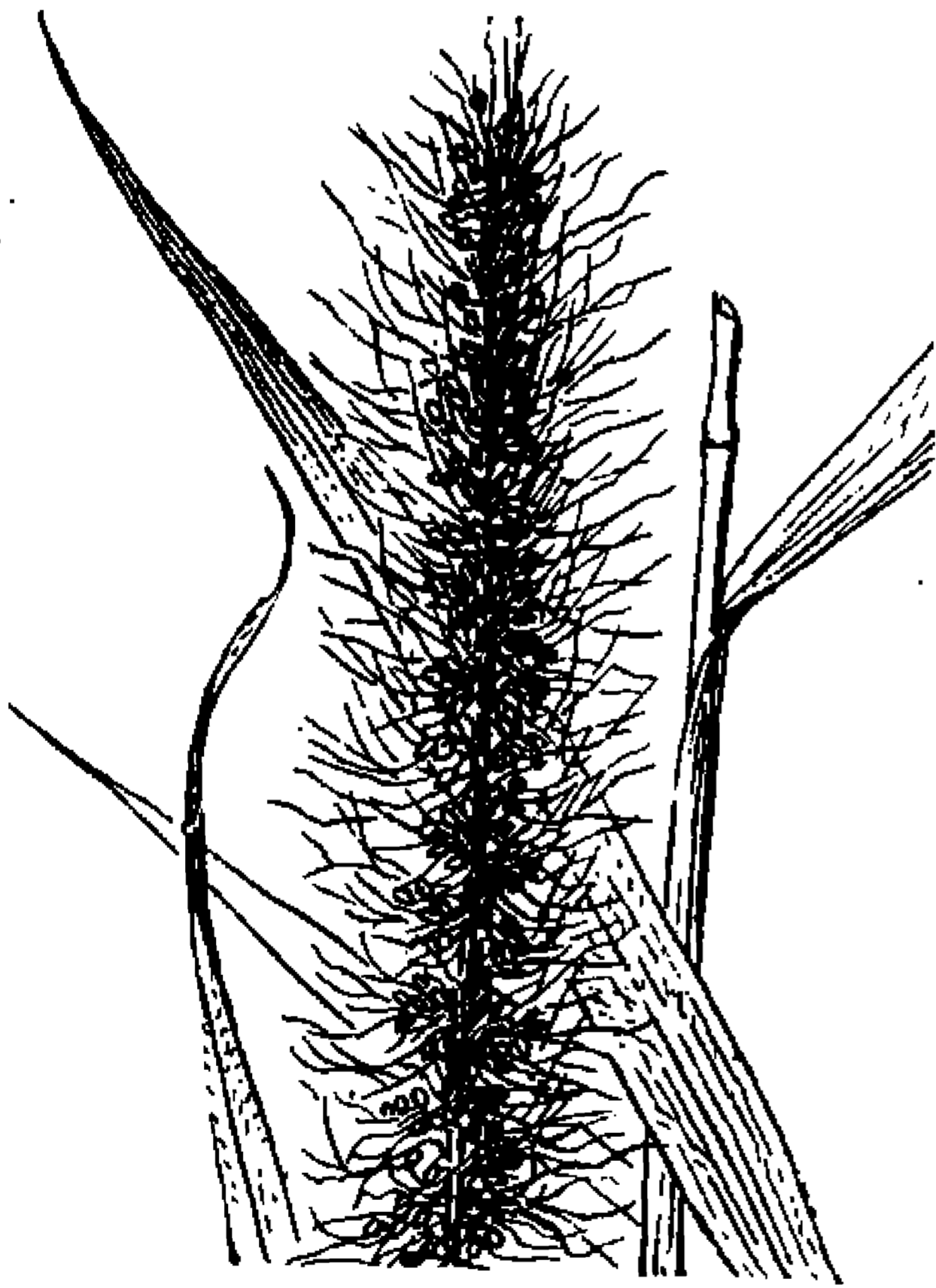


FIG. 45.—*Chaetochloa tenacissima*. From *Amer. Gr. Nat. Herb.* 610, Trinidad.

#### DESCRIPTION.

Plants annual, mostly simple or little branched; culms erect, slender, glabrous, scabrous below the panicle, 1 to 2 meters tall, leaning on or clambering over other vegetation; sheaths glabrous, antrorsely scabrous toward the summit, short-hispid on the margin and sparsely so on the surface above, more or less hispid on the collar; ligule very short, densely ciliate; blades flat, very scabrous on both surfaces and more or less pubescent especially beneath, mostly 10 to 15 cm., sometimes as much as 20 cm. long, mostly not over 8 mm. wide, gradually tapering from about the middle to the long-acuminate apex, rather abruptly narrowed at base; panicles somewhat nodding or flexuous, rather densely flowered above, somewhat interrupted toward the base, a little tapering toward the summit, as much as 15 cm. long and 1 cm. thick (excluding bristles), the axis densely pubescent and sparsely villous with long weak hairs; clusters of branchlets rather loose, 3 to 5 mm. long, dividing 2 or 3 times,

<sup>1</sup>U. S. Dept. Agr. Div. Agrost. Bull. 21: 17 1900.

each ultimate branchlet or pedicel bearing a bristle, the corresponding spikelet sometimes suppressed, the cluster bearing, therefore, usually not more than 8 spikelets and 8 bristles, the branchlet pubescent but not villous; bristle flexuous, becoming imbricate, about 1 cm. long, scabrous, antrorsely below, retrorsely above; spikelets about 1.5 mm. long, often dark purple; first glume about half as long as the spikelet, 3-nerved; second glume and sterile lemma about as long as the fertile lemma, 5-nerved, the sterile palea wanting; fertile lemma transversely rugose with numerous fine ridges.

On account of the retrorsely scabrous bristles, the panicles of this species readily become attached to the clothing.

## DISTRIBUTION.

Brushy hillsides, Guatemala to Brazil; also in Porto Rico.

GUATEMALA: Buena Vista, *Heyde & Lux* 4295.

HONDURAS: San Pedro Sula, *Thieme* 842, 5582 B.

COSTA RICA: San José, *Tonduz* 3122. Cañas Gordas, *Pittier* 7346, 11006.

PANAMA: El Boquete, *Hitchcock* 8291.

PORTO RICO: Utuado, *Sintenis* 6498.

TRINIDAD: Port of Spain, *Amer. Gr. Nat. Herb.* 610.

VENEZUELA: Tovar, *Fendler* 1644.

BRAZIL: Without locality, *Glaziou* 22614.

11. *Chaetochloa grisebachii* (Fourn.) Scribn.

*Setaria grisebachii* Fourn. Mex. Pl. 2: 45. 1886. Fournier cites as synonym, "*S. setosa* Beauv. var. *caudata* Griseb. in sched." Grisebach's idea of *S. setosa* var. *caudata* is based on a specimen collected in Antigua by Wulfschlaegel (no. 629). This name, published in the Flora of the British West Indian Islands,<sup>1</sup> is based on *Panicum caudatum* Lam., but Fournier's conception of Grisebach's idea is evidently based on two specimens in the Grisebach Herbarium which he considers to be conspecific, the one, *Wulfschlaegel* 629, collected in Antigua and labeled by Grisebach with the varietal name and cited under the variety, the other *Schaffner* 36, collected at Orizaba and labeled by Grisebach "*Setaria setosa*." This second specimen, one of several cited by Fournier, is taken as the type of *S. grisebachii*.

*Setaria laevis* Fourn. Mex. Pl. 2: 45. 1886. "Bernal (KARW. n. 961)." The type collection has been examined at the herbarium of the Botanical Garden at Petrograd.

*Chaetochloa grisebachii* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Setaria grisebachii* Fourn.

*Chaetochloa grisebachii ampla* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 36. f. 21. 1900. The range is given as "New Mexico; Mexico." No type is designated, but in the National Herbarium is the specimen from which the figure was drawn. This is *Pringle* 6470, from Federal District, Mexico. It is marked "Type" in Merrill's hand.

*Chaetochloa grisebachii mexicana* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 37. 1900. "*Setaria mexicana* Schaffner in Herb." The two specimens cited are "San Luis Potosi, 1044 *Schaffner*, 1876; *Schaffner*, Sept., 1877." The type is in the Gray Herbarium. A duplicate type has been examined in the herbarium of the New York Botanical Garden. It bears two numbers, 193 and 1044. There are three plants, all depauperate, with narrow few-flowered panicles mostly not exceeding the leaves. One plant has two larger panicles. This form appears to differ only in being depauperate.

*Setaria mexicana* Schaffn.; Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 37. 1900, as synonym.

<sup>1</sup> 555. 1864.

## DESCRIPTION.

Plants annual, branched at base, erect or spreading; culms as much as 1 meter tall but usually less, smooth, or scaberulous below the pubescent nodes and below the

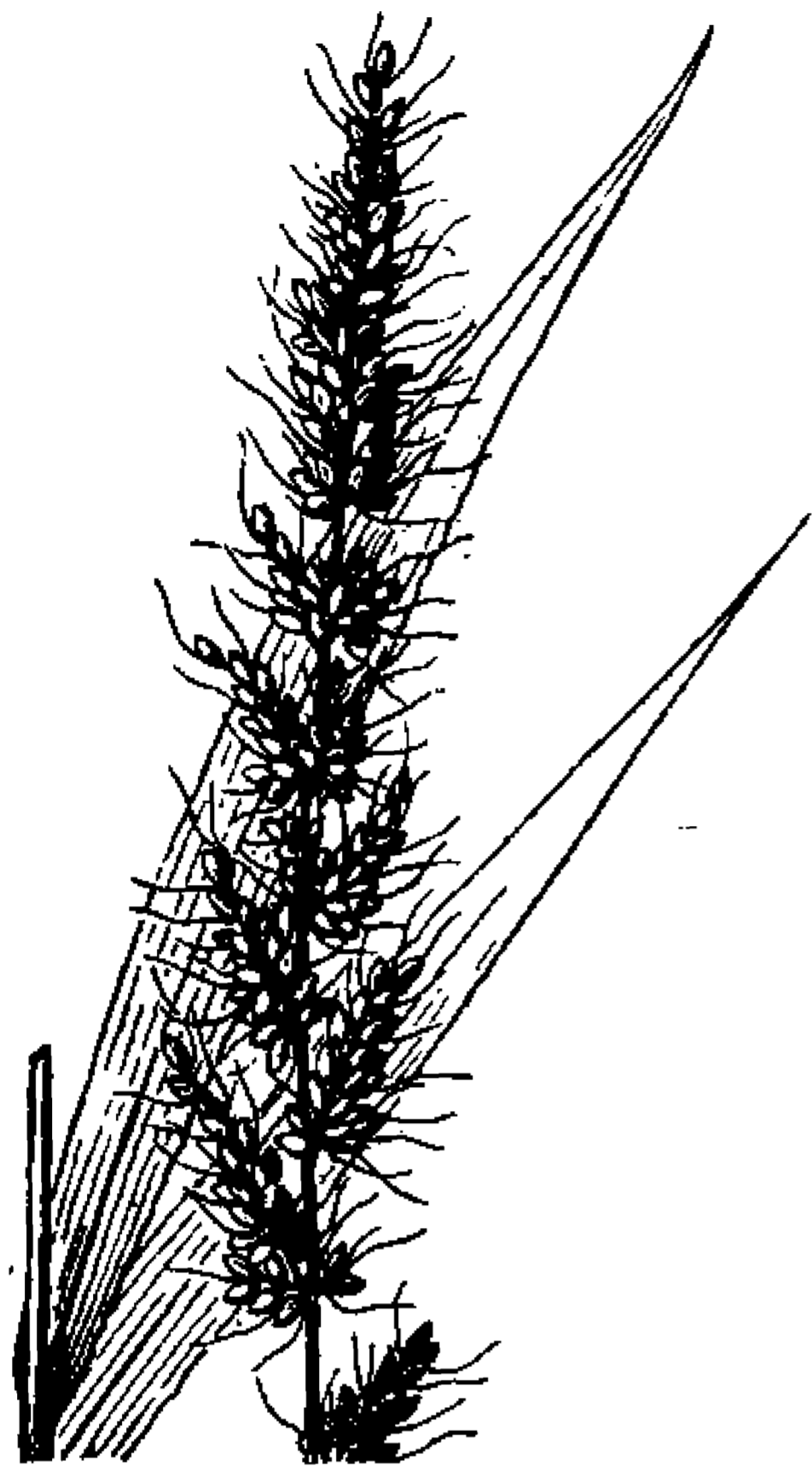


FIG. 46.—*Chaetochloa grisebachii*. From *Metcalf* 1262, New Mexico.

panicle; sheaths smooth, scabrous, or sparingly hispidulous, often papillose, densely-ciliate, pubescent or hispid on the collar; ligule a short, densely ciliate membrane scarcely 1 mm. long, blades flat, mostly rather lax, erect or ascending, straight, puberulent, and scabrous, as much as 25 cm. long and 1.5 cm. wide, usually less than 15 cm. long and 1 cm. wide; panicle loosely flowered, narrow, tapering toward apex, mostly less than 15 cm. long, the axis scabrous and, except the lower part, also villous; branches rather densely flowered, the lower somewhat distant, sometimes as much as 2 or 2.5 cm. long, spreading, usually 5 to 10 mm. long, and, except the lower, approximate; ultimate branchlets about 0.5 mm. long, bearing a single spikelet and a single bristle below, the spikelet sometimes rudimentary, thus bringing the bristles in pairs; bristles 5 to 15 mm. long, sometimes shorter, flexuous, antrorsely scabrous, green or purplish; spikelets about 2 mm. long, moderately turgid on the convex side; first glume one-fourth to one-third the length of the spikelet, 3-nerved; second glume a little shorter than the spikelet, 5-nerved; sterile lemma as long as the fertile lemma, 5-nerved, the palea small; fertile lemma acute, finely cross-wrinkled.

## DISTRIBUTION.

Open ground, often a weed in fields, Texas to Arizona, south to Oaxaca.

TEXAS: Kerrville, *Heller* 1897. Limpia Canyon, *Nealley* 130. Austin, *Hall* 841. New Braunfels, *Biltmore Herb.* 14922.

NEW MEXICO: Organ Mountains, *Hitchcock* 3786; *Wooton & Standley* in 1906. Mangas, *Smith* in 1897. Queen, *Hitchcock* 13520. Hillsboro, *Metcalf* 1262. Without locality, *Wright* 2096.

ARIZONA: Santa Rita Mountains, *Griffiths & Thornber* 141, 266; *Griffiths* 3428, 6075; *Wooton* in 1914. Beaver Creek, *MacDougal* 606. Bowie, *Jones* 4288. Southern Arizona, *Rothrock* 676. Gardiners Spring, *Pringle* in 1882. Tucson, *Hitchcock* 3514. Patagonia, *Hitchcock* 3662, 3679, 3681. Paradise, *Blumer* 1660, 1724. Sulphur Spring Valley, *Griffiths* 1901. Bisbee, *Goodding* 983. Clear Creek, *Toumey* 78 in 1891. San Bernardino Ranch, *Mearns* 2000.

CHIHUAHUA: Chihuahua, *Hitchcock* 7774; *Pringle* 381. Sierra Madre, *Nelson* 6299.

COAHUILA: San Lorenzo Canyon, *Palmer* 397 in 1904. Saltillo, *Palmer* 385 in 1898; *Hitchcock* 5626, 5641. Chojo Grande, *Palmer* 336 and 337 in 1904.

SAN LUIS POTOSÍ: San Luis Potosí, *Parry & Palmer* 957.

DURANGO: Torreón: *Hitchcock* 7546. Durango, *Hitchcock* 7573; *Palmer* 716 and 728 in 1896.

JALISCO: Guadalajara, *Hitchcock* 7338, 7369.

AGUASCALIENTES: Aguascalientes, *Hitchcock* 7461.

GUANAJUATO: Irapuato, *Hitchcock* 7427.

QUERÉTARO: Querétaro, *Arsène* 10275, 10346; *Basile* 47, 48.

VERACRUZ: Orizaba, *Schaffner* 36.

PUEBLA: Tehuacán, *Liebmann* 361; *Hitchcock* 6095. Puebla, *Nicolas* 314 and in 1909. San Marcos, *Hitchcock* 6512. Atlixco, *Nelson* in 1893.

MEXICO: Río Hondo, *Pringle* 7533; *Holway* 11, 3153.

FEDERAL DISTRICT: *Pringle* 6470, 9578, 9579; *Orcutt* 3697, 4342; *Holway* 3040, 3554; *Hitchcock* 5911, 5925, 7836; *Bourgeau* 441.

MICHOACÁN: Punguato, *Arsène* in 1912. Morelia, *Arsène* in 1909.

OAXACA: El Parián, *Pringle* 4937. Oaxaca, *Hitchcock* 6178, 6184; *Smith* 939; *Conzatti & González* 344.

## 12. *Chaetochloa magna* (Griseb.) Scribn.

*Setaria magna* Griseb. Fl. Brit. W. Ind. 554. 1864. "Jamaica!, *Pd.* [Purdie], along the lagoons behind the ferry." In the Grisebach Herbarium are some fragments of the type, the original being probably at Kew.

*Chamaeraphis magna* Beal, Grasses N. Amer. 2: 152. 1896. Based on *Setaria magna* Griseb.

*Chaetochloa magna* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Setaria magna* Griseb.

*Chaetochloa magna* was included by Elliott<sup>1</sup> under *Panicum italicum*.

### DESCRIPTION.

Plants annual, robust, erect, usually not branched at base, sparingly branched above, the branches erect; culms as much as 4 meters tall, rarely taller, and 2 cm. thick at base, smooth, scabrous below the panicle; sheaths smooth or scabrous at summit, hispid-ciliate on the margins; ligule a densely and stiffly hispid membrane, 1 to 2 mm. long; blades flat, scabrous, as much as 0.5 meter long and 3.5 cm. wide; panicles densely flowered, nodding, often interrupted at base, tapering at each end, as much as 40 cm. long and 3 cm. thick, those of the branches much smaller, the axis densely pubescent and also villous with ascending hairs about 1 mm. long; branches as much as 1.5 cm. long, many-flowered; bristles somewhat flexuous, 1 or 2 below each spikelet, 1 to 2 cm. long; spikelets about 2 mm. long, not very turgid on the convex side; first glume about one-third as long as the spikelet, 3-nerved; second glume about as long as the spikelet, 5-nerved; sterile lemma as long as the spikelet, 7-nerved, the sterile palea well developed; fertile lemma smooth.

Nash's no. 1279, from Eustis, Florida, is noted by the collector as being 8 to 20 feet tall.

### DISTRIBUTION.

Marshes and wet places along the coast, Delaware to Florida and Texas; also in the West Indies and Panama.

DELAWARE: Woodland Beach, *Commons* in 1892. Collins Beach, *Commons* in 1897

MARYLAND: Millstone, *Hitchcock* 7890; *Tidestrom* 5321.

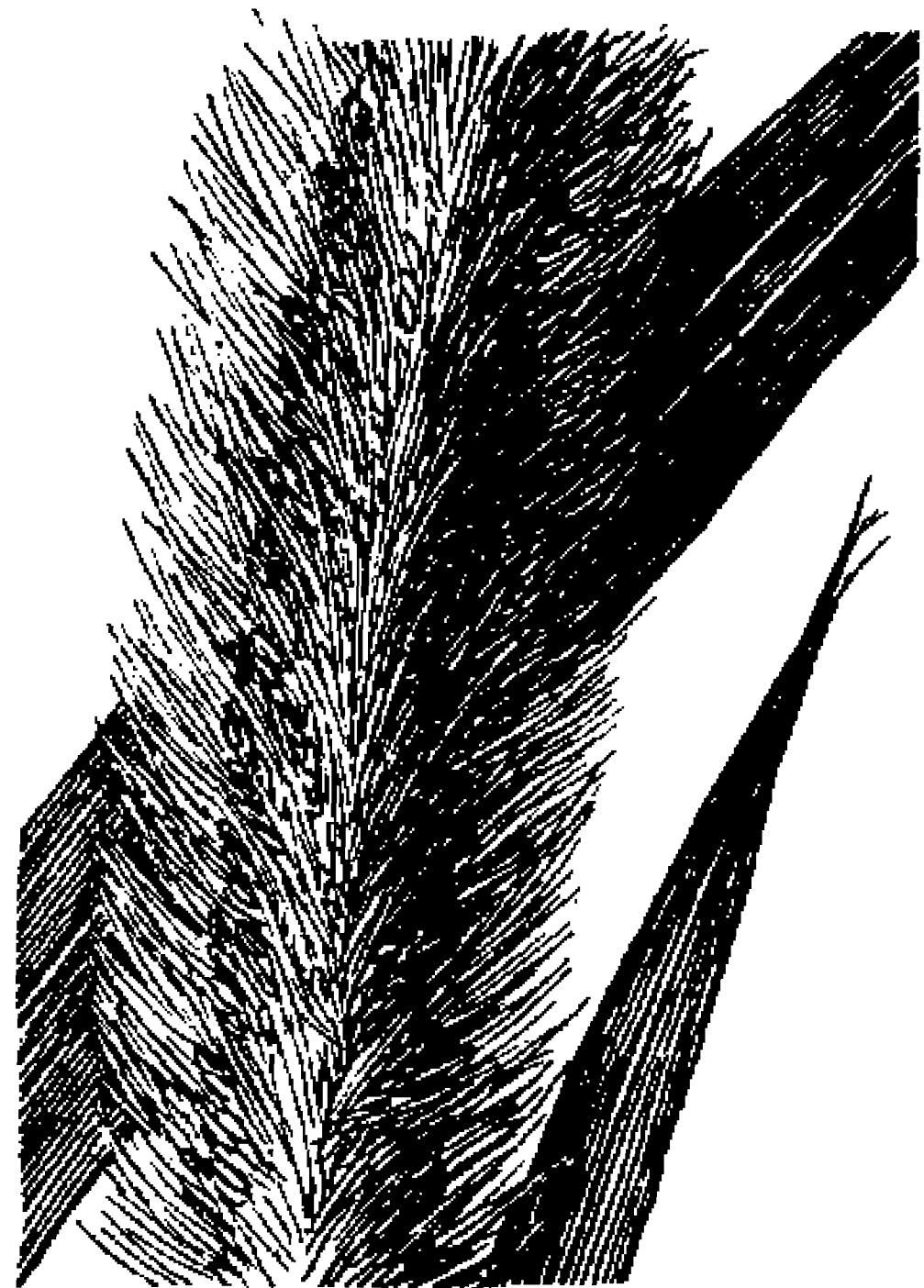


FIG. 47.—*Chaetochloa magna*. From Nash 1279, Florida.

<sup>1</sup> Bot. S. C. & Ga. 1: 113. 1816.

VIRGINIA: Virginia Beach, *Bradford* in 1900. Smiths Island, *Palmer* in 1897.

NORTH CAROLINA: Wilmington, *Hitchcock* in 1905.

SOUTH CAROLINA: Bluffton, *Mellichamp* in 1883.

GEORGIA: Experiment, *Redding* in 1895.

FLORIDA: Alachua, *Combs* 748. Grasmere, *Combs* 1054. Homosassa, *Combs* 964. Merritts Island, *Curtiss* 3618. Okeechobee region, *Fredholm* 6178. Palm Beach, *Curtiss* 5410. Eustis, *Nash* 1279. Clarcona, *Meislahn* 76. Manatee, *Rugel* 365. St. Vincent Island, *Pierce* in 1911; *McAtee* 1713A. Dania, *Eaton* 828. Apopka, *Baker* in 1897 and 1898. Bartow, *Combs* 1219. Deland, *Hill* in 1899.

ALABAMA: Mobile, *Mohr* in 1869.

LOUISIANA: Lake Charles, *Allison* 110. Pointe a la Hache, *Langlois* 56. Burton Island, *Tracy & Lloyd* 463. New Orleans, *Fisher* 133; *Biltmore Herb.* 3459a. Houma, *Wurzlów* in 1913.

TEXAS: Galveston, *Tracy* 7747. "Western Texas to El Paso," *Wright* 801. Eagle Lake, *Plank* in 1891.

COSTA RICA: Boca Zacate, *Pittier* 6825. Punta Mala, *Tonduz* 6825.

BERMUDA: *Munro* in 1864. (This locality is doubtful as the species is not known to grow in Bermuda now.)

JAMAICA: Black River, *Hitchcock* 9646. Ferry River, *Purdie* (in *Grisebach Herb.*).

PORTO RICO: Campo Alegre, *Chase* 6800. Without locality, *Eggers* 709.

LEEWARD ISLANDS: Guadeloupe, *Duss* 3918.

### 13. *Chaetochloa ambigua* (Guss.) Scribn. & Merr.

*Panicum verticillatum*  $\beta$  *ambiguum* Guss. Fl. Sic. Prodr. 80. 1827. Sicily.

*Setaria ambigua* Guss. Fl. Sic. Syn. 1: 114. 1842. Based on *Panicum verticillatum*  $\beta$  *ambiguum* Guss.

*Setaria verticillata* var. *ambigua* Parl. Fl. Palerm. 1: 36. 1845. Based on *Panicum verticillatum*  $\beta$  *ambiguum* Guss.

*Panicum ambiguum* Hausskn. Oesterr. Bot. Zeitschr. 25: 345. 1875. Based on *Setaria ambigua* Guss.

*Chamaeraphis italica* var. *ambigua* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on "*Panicum ambiguum* Guss."

*Chaetochloa ambigua* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 18. f. 7. 1900. Based on *Setaria verticillata* var. *ambigua* Guss.

A complete synonymy is given by Hubbard.<sup>1</sup>

#### DESCRIPTION.

Plants with the aspect of *Chaetochloa verticillata*, differing in the longer ligule, scabrous but not pilose blades, and the antrorsely scabrous bristles. The bristles are mostly 2 to 3 times as long as the spikelets and at maturity are spreading and more or less implicate.

This may be only a variety of *Chaetochloa verticillata* or of *C. viridis*, between which it seems to be intermediate. It is retained as a species because it can not be definitely referred to either of the two species mentioned.

#### DISTRIBUTION.

Central and southern Europe; sparingly introduced in the United States.

PENNSYLVANIA: Ballast ground near Philadelphia, *Scribner* in 1884.

DISTRICT OF COLUMBIA: A weed in the grass garden, *Merrill*, Sept. 20, 1900; *Merrill* 175, July 30, 1900.

ALABAMA: Waste places, Mobile, *Mohr* in 1884.

<sup>1</sup> Amer. Journ. Bot. 2: 179. 1915.



14. *Chaetochloa viridis* (L.) Scribn.

*Panicum viride* L. Syst. Nat. ed. 10. 2: 870. 1759. No locality is given. A reference is made to "Spec. pl. n. 2.  $\beta$ ." *Panicum* number 2 in the Species Plantarum is *P. glaucum*. No locality is given for variety  $\beta$ , but this is based on a citation from Scheuchzer,<sup>1</sup> describing a plant from Europe.

*Setaria viridis* Beauv. Ess. Agrost. 51, 178. 1812. *Panicum viride* is included as a species of *Setaria*, and *Setaria viridis* is given in the index.

*Pennisetum viride* R. Br.; Roem. & Schult. Syst. Veg. 2: 489. 1817, as synonym of *Setaria viridis*.<sup>2</sup>

*Setaria weinmanni* Roem. & Schult. Syst. Veg. 2: 490. 1817. Bohemia.

*Panicum viride*  $\beta$  *brevisetum* Doell. Rhein. Fl. 128. 1843. A form with bristles only a little longer than the spikelets.

*Panicum italicum* var. *viride* Koern. in Koern. & Wern. Handb. Getreid. 1: 277. 1885. Based on *Panicum viride* L.

*Chamaeraphis italica* var. *viridis* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum viride* L.

*Chamaeraphis viridis* Millsp. W. Va. Agr. Exp. Sta. Bull. [Fl. W. Va.] 2: 466. 1892. Based on *Panicum viride* L.

*Ixophorus viridis* Nash, Bull. Torrey Club 22: 423. 1895. Based on *Panicum viride* L.

*Chaetochloa viridis* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum viride* L.

*Setaria viridis* var. *weinmanni* Borbás, Math. Termesz. Közlem. 15: 310. 1878, an unverified citation; Brand in Koch, Syn. Deutsch. Schweiz. Fl. ed. 3. 3: 2690. 1905. Based on *Setaria weinmanni* Roem. & Schult.

*Setaria viridis* var. *breviseta* Hitchc. in A. Gray, Man. ed. 7. 119. 1908. Based on *Panicum viride* var. *brevisetum* Doell.

Several other synonyms are given in European botanies. Hubbard has given an extensive bibliography.<sup>3</sup>

## DESCRIPTION.

Plants annual, usually branched at base, sometimes geniculate-spreading; culms smooth, scabrous below the panicle, usually 20 to 40 cm. tall, sometimes as much as 1 meter; sheaths smooth, or scabrous toward the summit, ciliate on the margin and sometimes a little on the collar; ligule very short, densely ciliate; blades flat, linear-lanceolate, straight (not twisted), scabrous especially on the upper surface, usually less than 15 cm. long, commonly less than 1 cm. wide, sometimes as much as 15 mm. wide; panicle erect or somewhat nodding, densely flowered, green or purple, cylindric but tapering a little at the summit (the smaller ones ovate), rarely as much as 10 cm. long, usually less than 7 cm., commonly 5 to 8 mm. thick (excluding bristles),



FIG. 48.—*Chaetochloa viridis*. From Thompson 129, Kansas.

<sup>1</sup> Scheuchz. Agrost. Hist. 46. 1719.

<sup>2</sup> See note on *Pennisetum verticillatum*, p. 178.

<sup>3</sup> Amer. Journ. Bot. 2: 175. 1915.

the axis densely pubescent and also villous with numerous hairs about 1 mm. long; branches very short, bearing several (mostly 5 or 6) spikelets, the rachis pubescent; bristles 1 to 3 below each spikelet, mostly 3 to 4 times as long as the spikelet, antrorsely scabrous, greenish or rarely purplish; spikelets 2 to 2.5 mm. long, elliptic, not much turgid on the convex side; first glume one-third to one-fourth as long as the spikelet, 3-nerved; second glume and sterile lemma about as long as the spikelet or the former a little shorter, 5-nerved, the sterile palea not fully developed; fertile lemma finely transversely wrinkled or ridged.

Commonly known as green foxtail. In abnormal specimens the panicle may be forked or variously branched.

## DISTRIBUTION.

A weed in cultivated soil and waste ground, common throughout the cooler parts of the United States; rare in Mexico; introduced from Europe; widely distributed in Asia and northern Africa.

NEWFOUNDLAND: *Waghorne* in 1892.

NEW BRUNSWICK: Shediak Cape, *Hubbard* 761, 762. Campbellton, *Fowler* in 1905.

QUEBEC: Montreal, *Mohr* in 1882. Rivière du Loup Falls, *Eggleston* 3145. Cap-à-L'Aigle, *Eggleston* 2996.

ONTARIO: Hen Island, *Morris* 79. Ottawa, *Rolland* 56; *Fletcher* in 1891. Toronto, *Biltmore Herb.* 3453a. Kingston, *Fowler* in 1895.

BRITISH COLUMBIA: Lillooet, *Macoun* 91571. Sicamous, *Macoun* 8.

MAINE: Bangor, *Knight* 21, 23. Augusta, *Scribner* in 1869. Boundary Lake, *Eggleston & Fernald* in 1902.

NEW HAMPSHIRE: Peterboro, *Robinson* 236. Shelburne, *Deane* in 1915.

VERMONT: Manchester, *Day* 207. Rutland, *Kirk* 1015.

MASSACHUSETTS: Medford, *Boott* in 1866. Marthas Vineyard, *Harrison* in 1888. Melrose, *Morong* in 1876.

CONNECTICUT: South Glastonbury, *Wilson* 1264.

NEW YORK: Oxford, *Coville* in 1884. North Hannibal, *Pearce* in 1883. Union Springs, *Dudley* 37.

NEW JERSEY: Weehawken, *Kearney* in 1894.

PENNSYLVANIA: Harrisburg, *Small* in 1888; *Hitchcock* in 1903. Lancaster, *Heller* 4817. Easton, *Porter* in 1887. Philadelphia, *Scribner* in 1878. Binkleys Ridge, *Heller* 4823.

OHIO: Kipton, *Ricksacker* in 1894. Columbus, *Kellerman* 6836.

INDIANA: Lafayette, *Dorner* 72. Lake Gage, *Deam* in 1903.

ILLINOIS: Naperville, *Umbach* in 1895. Glasford, *Wilcox* 162. Wady Petra, *V. H. Chase* 74. Chicago, *Chase* 1611. East Mount Carmel, *Schneck* in 1904. Urbana, *Gates* 1962.

MICHIGAN: Keweenaw County, *Farwell* 629. Marquette County, *Barlow* in 1901.

WISCONSIN: Oshkosh, *Random* in 1896. Newbold, *Cheney* 1701.

MINNESOTA: Camp Douglas, *Mearns* 63. Fort Snelling, *Mearns* 62. Root River Valley, *Mearns* 64. Duluth, *Hitchcock* 5089.

NORTH DAKOTA: Leeds, *Lunell* in 1904 and 1909. Fargo, *Wright* 934.

SOUTH DAKOTA: Jamesville, *Bruce* 12. Bellefourche, *Griffiths* 365. Minnekahta, *Rydberg* 1102. Redfield, *Griffiths* 208. Hot Springs, *Hitchcock* 11167. Aberdeen, *Griffiths* 123. Brookings, *Griffiths* in 1892.

IOWA: Ames, *Pammel*, *Amer. Weeds* 16. Des Moines, *Ball* 28. Manchester, *Ball* 1007. Clinton, *Ball* 267, 268. Battle Creek, *Preston* 956. Fayette County, *Fink* 273. Iowa City, *Somes* 3637.

NEBRASKA: Kearney, *Holms* in 1889. Forest Station, *Hitchcock* 11032, 11033. Mullen, *Rydberg* 1568. Central City, *Rydberg* 2009; *Shear* 262. Wiegand, *Clements* 2684.

- MISSOURI: St. Louis, *Eggert* 268. Clarksville, *Davis* 1132, 1165, 1224, 1236. Courtney, *Bush* 1671. Springfield, *Standley* 8677.
- KANSAS: Riley County, *Norton* 576. Tribune, *Reed* in 1892. Syracuse, *Thompson* 129.
- DELAWARE: Stanton, *Commons* 147 in 1897.
- MARYLAND: Great Falls, *Painter* 470. Garrett County, *Smith* in 1879.
- DISTRICT OF COLUMBIA: *Hitchcock* 97; *Topping* in 1895; *Pollard* 532.
- NORTH CAROLINA: Magnetic City, *Wetherby* 9.
- FLORIDA: St. Vincent Island, *McAtee* 1720B.
- TENNESSEE: Knoxville, *Scribner*.
- ALABAMA: Mobile, *Mohr* in 1868. Tuskegee, *Carver* 15.
- MISSISSIPPI: Ocean Springs, *Forkert* in 1898.
- LOUISIANA: Alexandria, *Ball* 446.
- TEXAS: Paloduro, *Gardner* 19. Kerrville, *Heller* 1889; *Hitchcock* 5263. Chillicothe, *Ball* 967. Big Spring, *Hitchcock* 13362.
- OKLAHOMA: Cora, *Stevens* 762. Alva, *Stevens* 1606. Canton, *Stevens* 854. Tonkawa, *Stevens* 1898.
- MONTANA: Selish, *Griffiths & Lange* 14. Bozeman, *Blankinship* in 1898. Columbia Falls, *Hitchcock* 4934.
- WYOMING: Sundance, *Griffiths* 489. Sheridan, *Nelson* 305.
- IDAHO: Coeur d'Alene, *Rust* 370. St. Anthony, *Merrill* 47, 51; *Merrill & Wilcox* 432. New Plymouth, *Macbride* 286. Moscow, *Henderson* 2849.
- WASHINGTON: North Yakima, *Hunter* 593.
- OREGON: Portland, *Suksdorf* 1713. Milton, *Brown* 33.
- COLORADO: Fort Collins, *Cowen* 3381. Minnehaha (Pikes Peak), *Hitchcock* 2369. Colorado Springs, *Williams* 2158. Idaho Springs, *Shear* 746. Rocky Ford, *Griffiths* 3306. Glenwood Springs, *Shear & Bessey* 1304.
- UTAH: Cainville, *Jones* 5696. Elk Ranch, *Jones* 6034. Gunnison, *Ward* 688. Ogden, *Hitchcock* 10888.
- NEW MEXICO: South end of Black Range, *Metcalf* 1139, 1499. Cloudercroft, *Hitchcock* 13297. Farmington, *Standley* 6935. Pecos, *Standley* 5017. White Mountains, *Wooton & Standley* 3579. Sabinal, *Wooton* 1079. Deming, *Hitchcock* 3754. Las Vegas Hot Springs, *Cockerell* 11. Cedar Hill, *Standley* 7933. Shiprock Agency, *Standley* 7236. Mesilla, *Wooton* 89.
- ARIZONA: Verde Valley, *MacDougal* 532. Barfoot Park, *Blumer* 1588. Strawberry Creek, *MacDougal* 706. Tucson, *Griffiths* 1526. Tanner Canyon, *Goodding* 819. White Mountains, *Griffiths* 5375.
- CALIFORNIA: Rialto, *Parish* 2112. Los Angeles, *Davidson* 3257. Stanford Campus, *Abrams* 7333.
- SAN LUIS POTOSÍ: San Luis Potosí, *Hitchcock* 5664.
- VERACRUZ: Córdoba, *Hitchcock* 6450.
- MEXICO (Republic of): Without locality, *Liebmann* 349.
- COSTA RICA: Cartago, *Pittier* 9037.
- BERMUDA: *Collins* 159, 160.

15. *Chaetochloa italica* (L.) Scribn.

*Panicum italicum* L. Sp. Pl. 56. 1753. "Habitat in Indiis."

*Panicum germanicum* Mill. Gard. Dict. ed. 8. *Panicum* no. 1. 1768. No locality is given. Miller takes the specific name from Bauhin, whose phrase name he cites, "Panicum germanicum, sive panicula minore C. B. P. 27." [Caspar Bauhin, Pinax.] The type specimen, at the British Museum of Natural History, is the upper part of a culm with a panicle and two leaves. The panicle is 10 cm. long, 2 cm. wide, dense, the bristles not much exceeding the spikelets; the blades are 1.5 cm. wide.

*Panicum italicum* var. *germanicum* Koel. Descr. Gram. 17. 1802. Based indirectly on *Panicum germanicum* Mill. Bauhin's name (see above) is cited.

*Pennisetum italicum* R. Br. Prodr. Fl. Nov. Holl. 1: 195. 1810. Based on *Panicum italicum* L.

*Setaria italica*. Beauv. Ess. Agrost. 51, 170, 178. 1812. Based on "*Panicum italicum* Willd." [*P. italicum* L.].

*Setaria californica* Kellogg, Proc. Calif. Acad. 1: ed. 2. 26. 1873.<sup>1</sup> "From the head valley of the Sacramento River," California. Described as 10 to 12 feet high and "quite similar to *Setaria italica*." It was supposed to be native but the description points conclusively to *C. italica*.

*Chamaeraphis italica* Kuntze, Rev. Gen. Pl. 2: 767. 1891. Based on *Panicum italicum* L.

*Ixophorus italicus* Nash, Bull. Torrey Club 22: 423. 1895. Based on *Panicum italicum* L.

*Chaetochloa italica* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum italicum* L.

For complete synonymy see Hubbard's paper on *Setaria italica* and its allies.<sup>2</sup>

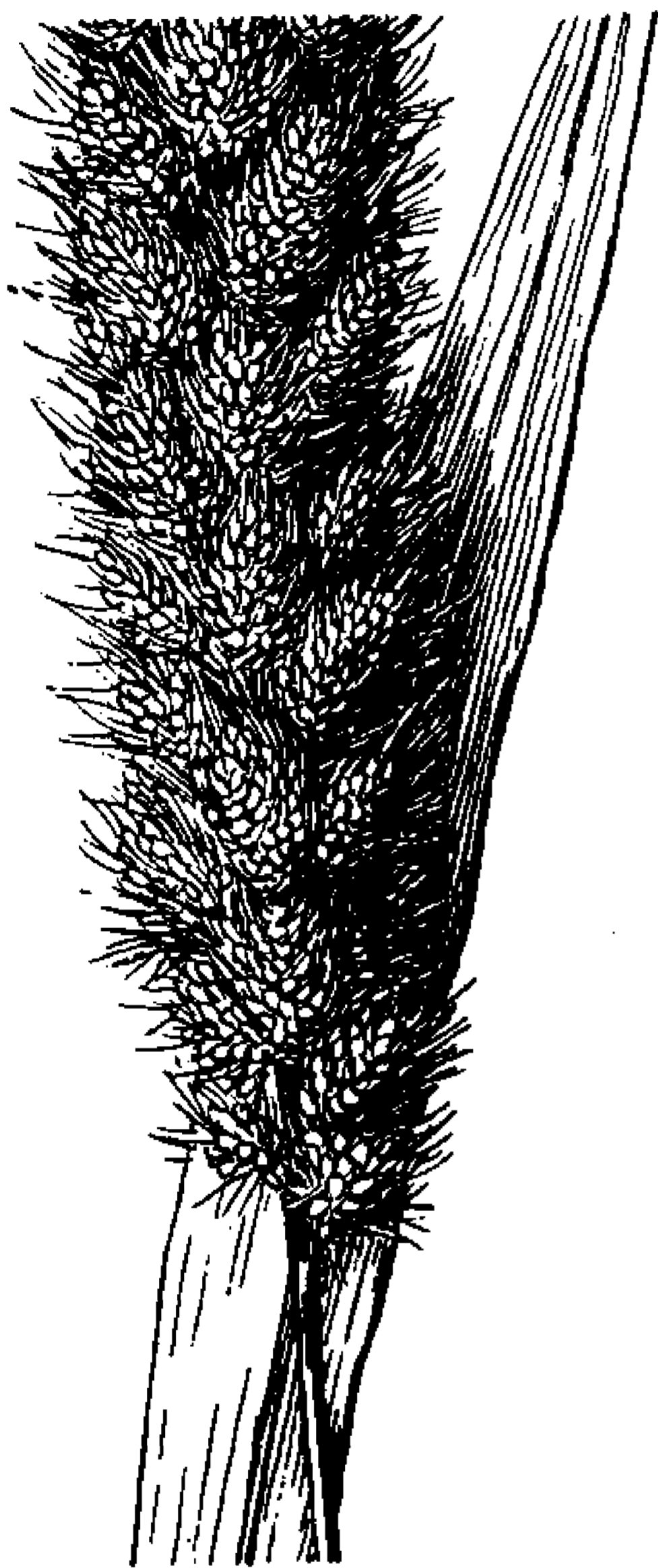


FIG. 49.—*Chaetochloa italica*. From Williams 82, District of Columbia.

#### DESCRIPTION.

A cultivated form of *C. viridis*, differing in being more robust, with broader blades, and larger lobate panicles, the fruit (fertile lemma and palea) at maturity falling away from the remainder of the spikelet.

Commonly known as millet, foxtail millet, and Hungarian grass. There are many varieties in cultivation, differing in the length and color of the bristles, the color of the fruit, and the size and degree of lobing of the panicle or head. The varieties are discussed by Koernicke<sup>3</sup> and by Hubbard.<sup>4</sup> The culm may be as much as 1 cm. thick, the blades as much as 3 cm. wide, and the heads as much as 30 cm. long. At maturity the fruit becomes very turgid and spreads apart the glumes and sterile lemma, and is distinctly longer than these. The head, in some forms, becomes heavy and nodding, and distinctly lobate. The color of the fruit varies from tawny to red, brown, and black. The

bristles are 1 to 3 times as long as the spikelet, and green, purple, or brown. The fruit is smooth or obscurely cross-wrinkled and may be as much as 3 mm. long.

In the cultivated forms the rachilla disarticulates above the sterile lemma, so that the fruit at maturity readily falls from the spikelet and hence shells out when the heads are threshed. The plants propagate themselves in fields and waste places and then tend to revert to a more primitive form. These uncultivated plants are often difficult to distinguish from forms of *Chaetochloa viridis*. This is especially true in immature specimens, as the disarticulation of the fruit is evident only at maturity and even then, in the uncultivated plants, is often less marked.

<sup>1</sup> The Proceedings were first published in a newspaper, "The Pacific," in 1854. Edition 2 is an exact reprint in book form.

<sup>2</sup> Amer. Journ. Bot. 2: 169. 1915.

<sup>3</sup> Koern. & Wern. Handb. Getreid. 1: 270-279. 1885.

<sup>4</sup> Amer. Journ. Bot. 2: 169. 1915.

## DISTRIBUTION.

Cultivated throughout the warmer parts of the Old World and in the United States, especially from Nebraska to Texas; escaped from cultivation, and appearing more or less as a waif in waste places throughout the United States.

16. *Chaetochloa longipila* (Fourn.) Scribn. & Merr.

*Setaria longipila* Fourn. Mex. Pl. 2: 47. 1886. "Absque loco (JURG. n. 722)." The type has not been examined, but the description appears to apply to the specimen cited below (Rose 2017). Fournier mentions the long white hairs on the rachis, the length of the first glume, and the rugose fertile lemma.

*Chaetochloa longipila* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 22. 1900. Based on *Setaria longipila* Fourn.

## DESCRIPTION.

Plants annual; culms erect, branching at base, glabrous, scabrous just below the panicle, 30 to 40 cm. tall, the nodes hispidulous; sheaths mostly glabrous, sometimes scaberulous at summit or sparsely hispid, densely ciliate on the margin, hispid on the collar; ligule a dense line of stiff white hairs 2 to 3 mm. long; blades flat, 7 to 10 cm. long, as much as 1 cm. wide, scabrous and sometimes sparsely hispidulous, narrowed toward each end; panicle spikelike, cylindrical, somewhat interrupted, rather densely flowered, narrowed toward the summit, 4 to 7 cm. long, about 5 mm. wide, the axis thickly beset with white, ascending, rather stiff flexuous hairs about 2 mm. long; branches short and ascending, the rachis somewhat villous like the main axis; bristles mostly one below each spikelet, mostly 3 to 5 cm. long, antrorsely scabrous; spikelets about 1.7 mm. long, turgid on the convex side; first glume about half as long as the spikelet, 3-nerved; second glume about as long as the fertile lemma or very slightly shorter, 5-nerved; somewhat pointed; sterile lemma as long as the fertile, 5-nerved, slightly pointed; fertile lemma sharply transversely rugose.



FIG. 50.—*Chaetochloa longipila*. From Rose 2017, Mexico.

This species is distinguished by the small spikelets and the densely villous axis of the panicle.

## DISTRIBUTION.

TEPIC: Woods, between Aguacata and Dolores, Rose 2017.

17. *Chaetochloa corrugata* (Ell.) Scribn.

*Panicum corrugatum* Ell. Bot. S. C. & Ga. 1: 113. 1816. "Sent to me from Savannah by Dr. Baldwin." The type, in the Elliott Herbarium, is the upper part of a culm with a panicle and one leaf.

*Pennisetum corrugatum* Nutt. Gen. Pl. 1: 55. 1818. A nomen nudum, but probably based on *Panicum corrugatum* Ell. The name is given as a synonym of *Setaria corrugata* by Schultes.<sup>1</sup>

<sup>1</sup> Mant. 2: 276. 1824.

*Setaria corrugata* Schult. Mant. 2: 276. 1824. Based on *Panicum corrugatum* Ell.

*Chamaeraphis corrugata* Kuntze, Rev. Gen. Pl. 2: 770. 1891. Based on *Panicum corrugatum* Ell.

*Chaetochloa corrugata* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Setaria corrugata* Ell., an error for *Panicum corrugatum* Ell.

*Chaetochloa hispida* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 25. f. 13. 1900. "In sandy pine woods. Type specimen in the Gray Herbarium, collected [at La Grifa, Pinar del Río, Cuba] by C. Wright in January, 1865, no number." This specimen agrees with *Chaetochloa corrugata*, except that the blades are somewhat hispidulous, as are also the sheaths. The sheaths are not infrequently appressed-pilose in Florida specimens. Hitchcock's no. 519 from Marco, Florida, with hispid sheaths, was identified by Merrill as *C. hispida*.

*Setaria hispida* Schum. Just's Bot. Jahresh. 28<sup>1</sup>: 417. 1902. Based on *Chaetochloa hispida* Scribn. & Merr.

The plants described by Scribner and Merrill<sup>1</sup> under *Chaetochloa corrugata* *pa. viliflora* are here included under *C. corrugata*, but the name is a synonym of *C. geniculata*.

#### DESCRIPTION.

Plants annual, branched at base, erect or geniculate-spreading; culms scabrous, or the lower part smooth, more or less appressed-hispid at the nodes, as much as 1 meter tall; sheaths compressed-keeled, scabrous at least toward the summit, villous on the margin or sometimes appressed-pilose all over; ligule a densely ciliate membrane about 1 mm. long; blades flat, gradually narrowed to the base and to the acuminate apex, scabrous on both surfaces, as much as 30 cm. long and 1 cm. wide, the middle culm blades commonly 15 to 25 cm.



FIG. 51.—*Chaetochloa corrugata*. From Pollard & Collins 253, Florida.

long and less than 5 mm. wide, rarely sparsely pilose; panicles densely flowered, cylindric, in larger specimens sometimes interrupted at base, as much as 15 cm. long, usually less than 10 cm., the axis densely hispid-scabrous, and also rather densely villous with ascending hairs about 1 mm. long; branches 1 to 3 mm. long, hairy, bearing several spikelets (mostly 5 or 6), and 1 to 3 bristles below each spikelet; bristles somewhat flexuous, antrorsely scabrous, mostly about 3 times as long as the spikelets, or as much as 2 cm. long, green, tawny, or purple spikelets about 2 mm. long, turgid on the convex side; first glume about half as long; as the spikelet, 3-nerved; second glume a little shorter than the spikelet, 5-nerved; sterile lemma as long as the spikelet, 5-nerved; fertile lemma coarsely transversely rugose.

#### DISTRIBUTION.

Sandy woods, along the coast and also a weed in cultivated fields and waste places, North Carolina to Florida and Mississippi; also in Cuba.

NORTH CAROLINA: Wilmington, Hitchcock 201. Newbern, Kearney 2221.

FLORIDA: Hillsborough County, Fredholm 6401. Eustis, Biltmore Herb. 10340; Nash 640, 1382; Hitchcock 2352. Jacksonville, Curtiss 3616, 4041, 5124. Miami, Pollard & Collins 253; Hitchcock 645; Eaton 337; Chase 3909, 3952. Lake City,

<sup>1</sup> U. S. Dept. Agr. Div. Agrost. Bull. 21: 24. f. 12. 1900.

*Combs* 83, 140; *Rolfs* 712, 760, 829, 845. Sneeds Island, *Tracy* 6704. Grasmere, *Combs* 1047. Cedar Key, *Combs* 795; *Tracy* 7179. Levy County, *Hitchcock* 2354. Titusville, *Chase* 3972. Palm Beach, *Hitchcock* 2351. Fort Myers, *Standley* 13055. Manivista, *Tracy* 6697. Gainesville, *Combs* 721, 723. East Pass, *Tracy* 6449. Homosassa, *Combs* 944, 945. Palmetto, *Tracy* 7040. Bartow, *Combs* 1177. Manatee, *Rugel* 366, 369. Alva, *Hitchcock* 517. Anastasia Island, *Kearney* 175. Apalachicola, *Kearney* 108. Jensen, *Hitchcock* 740. Old Town, *Combs* 865. Braidentown, *Combs* 1287, 1292. Dunnellon, *Combs* 914a. New River, *Hitchcock* 2353. Marco, *Hitchcock* 519. Duval County, *Fredholm* 187, 328.

ALABAMA: Mobile, *Hitchcock* in 1904.

MISSISSIPPI: Cat Island, *Tracy* 436.

CUBA: Isle of Pines, *Britton & Wilson* 14817. La Grifa, Pinar del Río, *Wright* (Gray Herb.).

18. *Chaetochloa liebmanni* (Fourn.) Scribn. & Merr.

*Setaria rariflora* Presl, Rel. Haenk. 1: 313. 1830. Not *Setaria rariflora* Mikan, 1821. "Hab. ad Acapulco." The type, in the herbarium of the German University at Prague, is the small form like the variety *pauciflora*. It is labeled "Mexico. H."

*Panicum rariflorum* Presl; Steud. Syn. Pl. Glum. 1: 51. 1854. Based on *Setaria rariflora* Presl.

*Panicum dissitiflorum* Steud. Syn. Pl. Glum. 1: 51. 1854, as synonym of *P. rariflorum* Presl.

*Setaria liebmanni* Fourn. Mex. Pl. 2: 44. 1886. "Manantial, agosto (LIEBM. n. 389)." The type specimen, in the Copenhagen Herbarium, consists of a culm with several broad blades and a panicle about 20 cm. long from which most of the spikelets have fallen. The label reads, "Pl. Mexic. Liebm. Gramineae n. 389. S. Liebmanni (scripsit Fournier) Manantial. 8/41." The locality is uncertain, but it must be in Veracruz since Liebmann did not go outside of that state during 1841.

*Chamaeraphis caudata pauciflora* Vasey; Beal, Grasses N. Amer. 2: 158. 1896. "California, Palmer 191." Palmer's no. 191 was not collected in California, but at Guaymas, Sonora. The type specimen is in the herbarium of the Michigan Agricultural College. This, like the duplicates of this collection, is a small form with blades 5 to 7 mm. wide, and panicles 5 to 9 cm. long, narrow, few-flowered, the branches mostly not over 5 mm. long, a few as much as 1 cm. long.

*Chaetochloa liebmanni* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 31. 1900. Based on *Setaria liebmanni* Fourn.

*Chaetochloa liebmanni pauciflora* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 33. 1900. Based on *Chamaeraphis caudata pauciflora* Vasey.

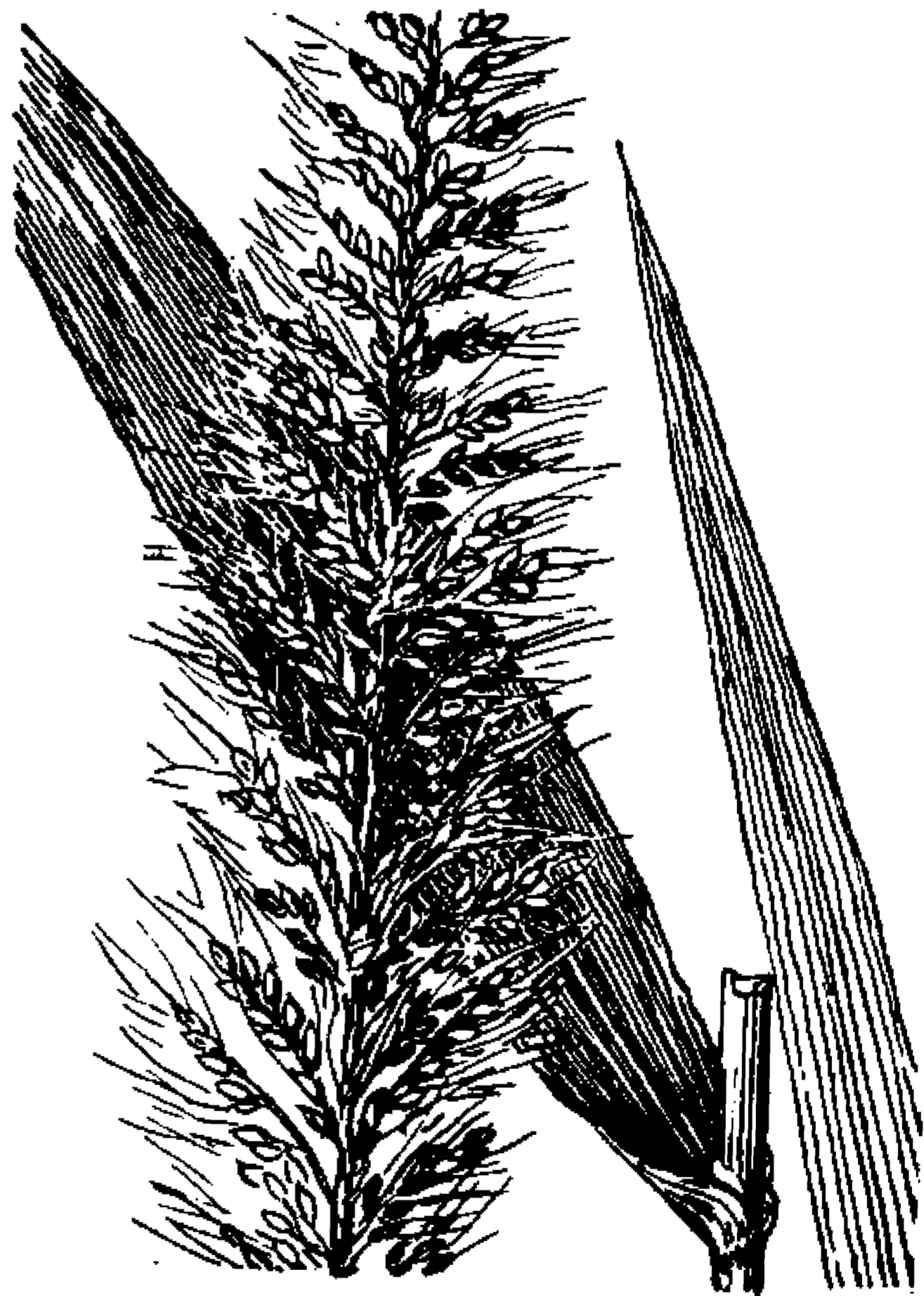


FIG. 52.—*Chaetochloa liebmanni*. From Palmer 52 in 1885, Mexico.

## DESCRIPTION.

Plants annual, often branched at base; culms as much as 1 meter tall, usually less than 50 cm., glabrous, scabrous just below the panicle, the nodes glabrous or puberulent; sheaths glabrous, the margin ciliate, the collar a more or less hispidulous ridge; ligule a short, densely ciliate membrane; blades flat, rather thin, as much as 20 cm. long and 2 cm. wide, usually about 1 cm. wide, narrowed toward both ends, scabrous, especially beneath; panicles loosely flowered, cylindrical, tapering at each end, often nodding or flexuous, as much as 30 cm. long, usually 10 to 20 cm., the axis angled or channeled, scabrous or scabrous-hispidulous; branches ascending, loosely arranged, scabrous like the axis, as much as 2.5 cm. long; branchlets less than 1 mm. long, bearing one bristle below each spikelet; bristles slender, flexuous, antrorsely scabrous, 7 to 15 mm. long; spikelets ovate, about 2 mm. long, rather turgid on the convex side, rather prominently nerved; first glume one-third or one-fourth as long as the spikelet, 3-nerved; second glume about four-fifths as long as the fertile lemma, 5-nerved, with an additional accessory pair on the outside; sterile lemma as long as the fertile, 5-nerved, with an accessory pair like the second glume, the palea wanting; fertile lemma somewhat pointed, gibbous, coarsely and strongly transversely rugose.

## DISTRIBUTION.

Open sandy or rocky soil, Arizona to Oaxaca.

ARIZONA: Tucson, *Thornber* 171 (N. Y. Bot. Gard. Herb.).

LOWER CALIFORNIA: Attoy San Lazaro, *Brandegee* in 1902. San José del Cabo, *Brandegee* 12 in 1890.

SONORA: Alamos, *Palmer* 686 in 1890. Guaymas, *Hitchcock* 3548; *Palmer* 191 in 1887. Hermosillo, *Hitchcock* 3607.

CHIHUAHUA: Batopilas, *Palmer* 52 and 110D in 1885.

SINALOA: Rosario, *Rose* 1840. Culiacán, *Palmer* 1541 in 1891; *Brandegee* in 1904. Topolobampo, *Palmer* 233 in 1897.

TEPIC: Acaponeta, *Rose* 3303.

VERACRUZ: Baños del Carrizal, *Purpus* 6211.

COLIMA: Colima, *Palmer* 8 and 142 in 1897. Manzanillo, *Hitchcock* 7026; *Orcutt* 4481.

GUERRERO: Balsas, *Hitchcock* 6774, 6786; *Orcutt* 4194.

OAXACA: Tomellín, *Hitchcock* 6191. Between San Gerónimo and La Venta, *Nelson* 2788.

NICARAGUA: Masaya, *Hitchcock* 8661. San Juan del Sur, *Hitchcock* 8599.

19. *Chaetochloa latifolia* Scribn.

*Chaetochloa latifolia* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 11: 44. pl. 3. 1898. "Growing under bushes in deep ravines, Durango, Mexico (No. 879, E. Palmer, 1896)." The type specimen, in the National Herbarium, is shown in plate 3, which, however, exaggerates the nerving and hispidity of the leaves. The type sheet includes two other specimens.

*Chaetochloa latifolia breviseta* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 31. 1900. The first specimen cited, "Mexico: Oaxaca, 347 *Conzatti & Gonzalez*, 1897," in the National Herbarium, is marked "type" in Merrill's hand. This form has shorter and fewer bristles but is otherwise the same as the typical form.

*Setaria latifolia* Herrm. Beitr. Biol. Pflanz. 10: 55. 1910. Presumably based on *Chaetochloa latifolia* Scribn. No synonym is cited, but Scribner's name is given in parentheses.

## DESCRIPTION.

Plants annual, branching at the base; culms erect or geniculate-spreading, 20 to 40 cm. tall, more or less scabrous, especially below the hispidulous or pubescent nodes and below the panicle; sheaths papillose-hispid, papillose only, or glabrate, densely



ciliate; ligule a densely ciliate membrane less than 1 mm. long; blades flat, mostly less than 10 cm. long, as much as 1.5 cm. wide, rounded or somewhat cordate at base, rather abruptly narrowed at the apex, scabrous and also sparsely papillose-hispid; panicles loosely cylindric, tapering above, more or less interrupted or lobed, mostly 5 to 8 cm. long, the axis scabrous or pubescent and also villous, the hairs weak and spreading, 1 mm. long; branches short, ascending, the longer as much as 5 mm. long; branchlets about 1 mm. long, bearing a single bristle below the spikelets; bristles flexuous, angled, antrorsely scabrous, 5 to 10 mm. long; spikelets about 2 mm. long or a little longer, moderately turgid on the convex side; first glume one-third the length of the spikelet, 3-nerved; second glume a little shorter than the fertile lemma, 5-nerved; sterile lemma as long as the fertile, 5-nerved, the palea well developed; fertile lemma strongly and coarsely transversely rugose.

## DISTRIBUTION.

Rocky hills and shady places, Durango to Oaxaca; also in Brazil.

DURANGO: Durango, *Palmer* 470 and 879 in 1896; *Hitchcock* 7643.

OAXACA: Oaxaca, *Conzatti & González* 343; *Hitchcock* 6105.

BRAZIL: Piauh, *Gardner* 2354.

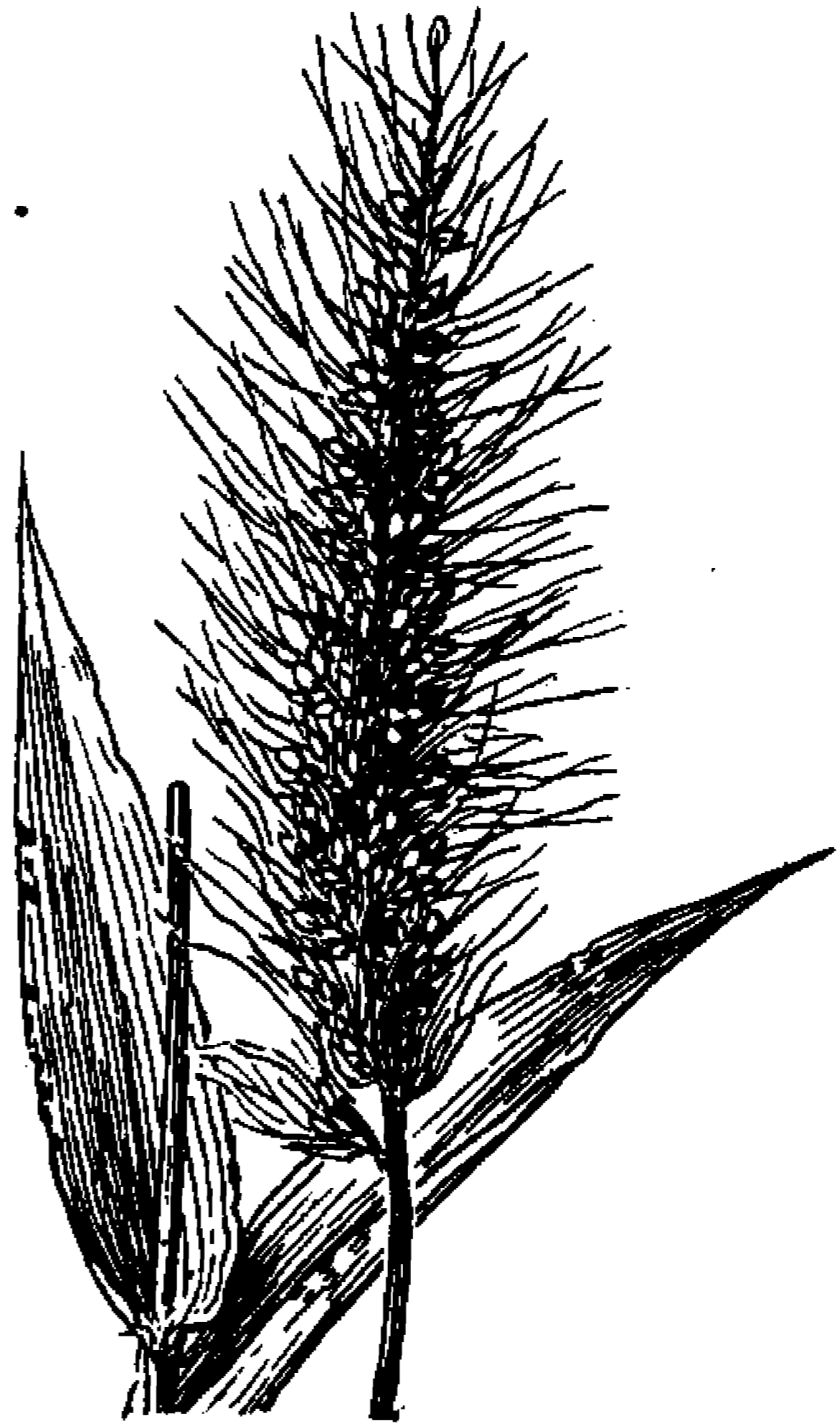


FIG. 53.—*Chaetochloa latifolia*. From type specimen.

20. *Chaetochloa macrosperma* Scribn. & Merr.

*Chaetochloa macrosperma* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 33. f. 18. 1900. "*Setaria composita* of Chapman's Fl. So. U. S. and of Bul. 7: 85. fig. 67, U. S. Dept. Agr., Div. Agros., not of H. B. K." No type is designated. In the National Herbarium is a specimen bearing the name and marked "type" and bearing also detailed drawings of the spikelet and a statement that the drawing (figure 18) was made from this plant. This specimen, *Curtiss* 3617, collected on "Shell mounds at the mouth of St. Johns River, Florida," is the first one cited by Scribner and Merrill and may be accepted as the type. If one looks upon the publication of *C. macrosperma* as a change of name only, it would be based upon *Setaria composita* of Chapman's Flora as cited above. In the National Herbarium is a specimen from Chapman without locality, marked *Setaria composita* S. Fl.!, which represents the latter species as understood by Chapman.

*Setaria macrosperma* Schum. Just's Bot. Jahresb. 28<sup>1</sup>: 417. 1902. Based on *Chaetochloa macrosperma* Scribn. & Merr.

## DESCRIPTION.

Plants perennial, often in large tufts; culms usually more or less geniculate at base, and often rooting at the lower nodes, smooth, scabrous below the panicle, rather stout, mostly 1 to 1.5 meters tall, the nodes glabrous; sheaths keeled, glabrous, villous

on the margin, usually hispidulous on the collar; ligule a ciliate membrane, 1 to 3 mm. long; blades flat, very scabrous on the upper surface, smooth or scaberulous beneath, narrowed at the base, as much as 50 cm. long and 2 cm. wide; panicles rather loose, tapering above, as much as 25 cm. long, the secondary panicles often much smaller and more compact, the branches ascending, as much as 2 cm. long, about equally distributed, the panicle thus not being interrupted or lobed, the axis scabrous-pubescent and also loosely or sparsely villous with hairs 1 to 2 mm. long, the hairs rarely wanting; bristles single below each spikelet but often seemingly in pairs because of the abortion of spikelets, straight or obscurely flexuous, antrorsely scabrous, 1.5 to 3 cm. long, greenish or yellowish; spikelets about 3 mm. long, lanceolate-ovate, not strongly turgid on the convex side, pale or greenish; first glume about one-third the length of the spikelet, 3-nerved; second glume two-thirds to three-fourths as long as the fertile lemma, mostly 5-nerved, sometimes 6 or 7-nerved; sterile lemma

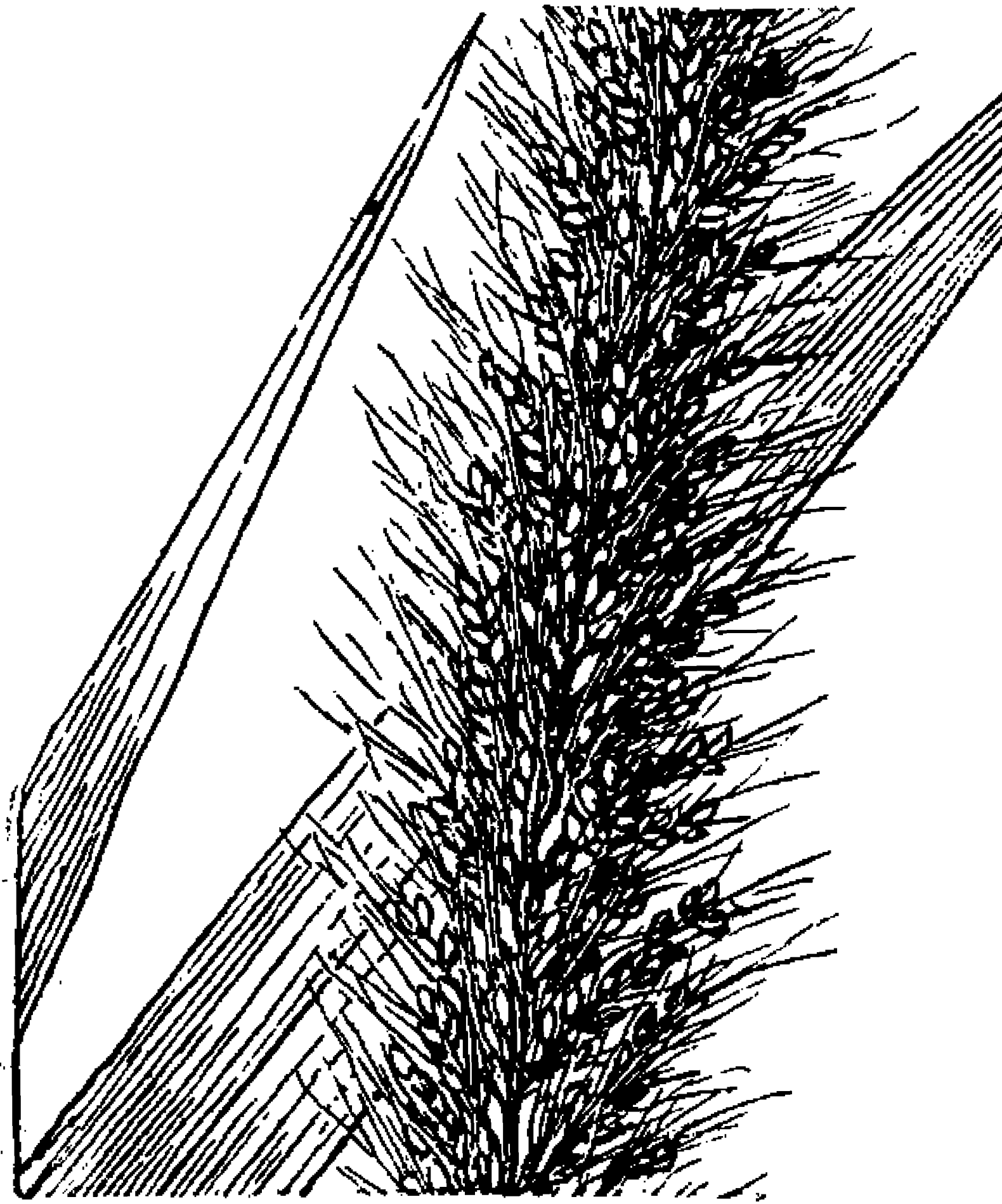


FIG. 54.—*Chaetochloa macrosperma*. From Curtiss 3617, Florida.

as long as the fertile, 5-nerved, concave or sulcate, the palea narrow, about half as long as its lemma; fertile lemma pale, acute or somewhat pointed, finely and not very distinctly cross-wrinkled, the surface appearing cellular.

The wider-leaved specimens of this species resemble *Chaetochloa vulpiseta*, but differ from that species in the larger spikelets. The latter character and the scabrous blades distinguish it from *C. scheelei* of Texas. From *C. villosissima* of Texas, with equally large spikelets, it is distinguished by the scabrous instead of villous blades.

#### DISTRIBUTION.

Open ground, mostly on coral rock or coral sand, Florida and the Bahamas.

FLORIDA: Homosassa, *Combs* 977. Orange, *Baker* in 1899. Apalachicola, *Chapman* in 1896. Mouth of St. Johns River, *Curtiss* 3617. Grasmere, *Combs* 1150. Brevard County, *Fredholm* 5559. Sneeds Island, *Tracy* 6462. Captiva, *Orrok* in 1915. Caloosa River, *Garber* 41 in 1878. Eustis, *Chase* 4123. Miami, *Tracy* 9053; *Chase* 3848; *Eaton* 337; *Hitchcock* in 1903. East Pass, *Tracy* 6459. Crystal, *Combs* 979½. Fort Myers, *Hitchcock* 518. Snapper Creek, *Small & Nash* 103. Ragged Keys, *Small & Carter* 2879. Howes Key, *Simpson* 263. Key Largo, *Curtiss* 5502. Key West, *Blodgett*.

BAHAMAS: Frozen Cay, Berry Islands, *Britton & Millspaugh* 2203 (N. Y. Bot. Gard. Herb.).

21. *Chaetochloa villosissima* Scribn. & Merr.

*Chaetochloa villosissima* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 34. f. 19. 1900. "Type specimen collected by J. G. Smith at San Diego, Tex., May, 1897. Limpia Canyon, Presidio Co., 115 (in part) Nealley 1892, a smaller undeveloped specimen, with much less pubescent leaves, otherwise as in the type." The type specimen, the original of the illustration, is in the National Herbarium.

*Setaria villosissima* Schum. Just's Bot. Jahresb. 28<sup>1</sup>: 417. 1902. Based on *Chaetochloa villosissima* Scribn. & Merr.

## DESCRIPTION.

Plants perennial; culms erect or decumbent at base, glabrous, as much as a meter tall, the nodes more or less pubescent; sheaths glabrous or somewhat hispidulous, often scabrous toward the summit, compressed-keeled, especially the lower, hispid on the collar, villous on the margin; ligule densely pilose, 2 to 3 mm. long; blades flat, scabrous and villous, or scabrous only, 15 to 30 cm. long, 5 to 8 mm. wide; panicles rather loose, more or less interrupted, tapering at the summit, as much as 23 cm. long, the branches ascending, the lower as much as 2 cm. long, the axis angled, scabrous, villous; bristles single below each spikelet, flexuous, antrorsely scabrous, 1.5 to 2.5 cm. long; spikelets lanceolate-ovate, acutish, not strongly turgid on the convex side, about 3 mm. long, pale or greenish; first glume one-third as long as the spikelet, 3-nerved; second glume nearly as long as the fertile lemma, 5-nerved (rarely 7-nerved); sterile lemma as long as the fertile, 5-nerved, convex or sulcate, the palea narrow, less than 1 mm. long; fertile lemma lanceolate, the tip rather pointed, incurved, the surface finely but sharply cross-wrinkled.

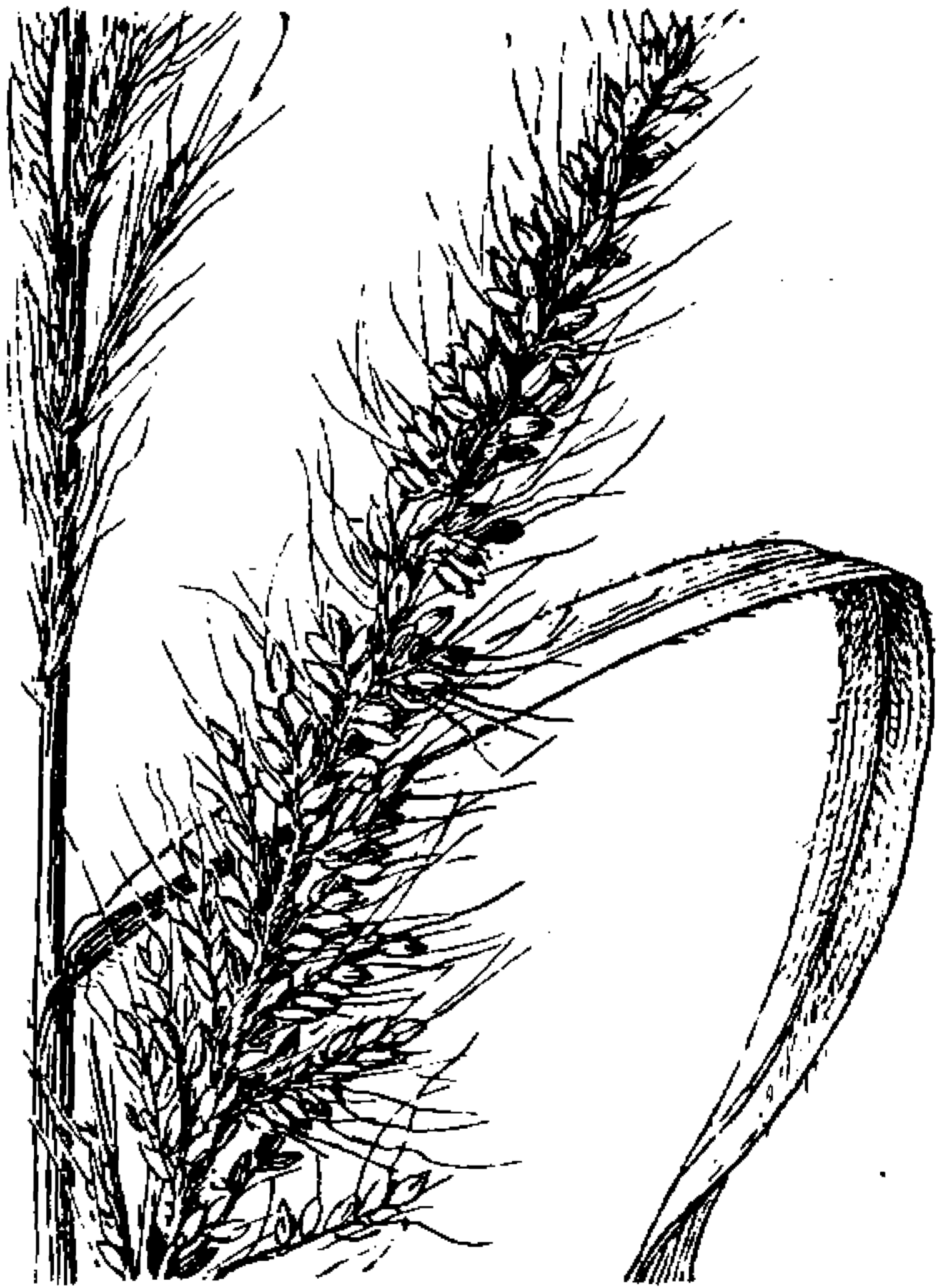


FIG. 55.—*Chaetochloa villosissima*. From type specimen.

This species is little known. The description is drawn chiefly from the type, in which the blades are villous on both surfaces. Nealley's no. 115 (Limpia Canyon, Presidio County, Texas), with only sparingly short-pilose blades, appears to be this species, though the plant is only 40 cm. tall and the panicle 10 cm. long and few-flowered, the branches very short. Two specimens from Arizona (no definite locality), *Emersley* 19 and 21 in 1890, may also belong to this species. The blades are scabrous but not villous, and only 3 to 5 mm. wide. The first glume is almost half as long as the spikelet and pubescent near the margins. A sterile specimen from Big Spring, Texas (open woods along stream, 8 miles west of Sterling, *Hitchcock* 13401), with pubescent blades 1.5 cm. wide, may also belong to this species.

22. *Chaetochloa setosa* (Swartz) Scribn.

*Panicum setosum* Swartz, Prodr. Veg. Ind. Occ. 22. 1788. "Jamaica." The type specimen in the Swartz Herbarium at Stockholm, has a narrow, rather close panicle.

*Panicum caudatum* Lam. Tabl. Encycl. 1: 171. 1791. "E Brasilio. Commers. & Cayenna. D. Richard." The species is more fully described in the Encyclopedia.<sup>1</sup> It is said here, concerning the locality, "Cette espèce croît à Cayenne, & m'a été communiquée par le citoyen Richard. Comerson l'a trouvée au Brésil. Elle y forme une variété à grappe très-grêle, à peine barbue sur le rachis." The Richard specimen, in the Lamarck Herbarium at Paris, taken as the type, is a culm with several leaves and a panicle 20 cm. long, the lower branches 2 cm. long. It is labeled "ex D. Richard" and comes from Cayenne. The identification of this specimen is somewhat uncertain. It resembles specimens of *Chaetochloa setosa* from the West Indies, rather than the specimens from Brazil that have been referred to *C. caudata* and which in this paper are placed under *C. rariflora*. As noted above, Lamarck states that his Brazilian specimen has a more slender panicle and is less bristly. In the National Herbarium there are no specimens of *C. setosa* from southeast of Trinidad. There may be an error as to the origin of Richard's specimen, said to come from Cayenne. It may have come from the West Indies.

*Setaria setosa* Beauv. Ess. Agrost. 51, 178. 1812. Based on *Panicum setosum* Swartz.

*Panicum brachiatum* Poir. in Lam. Encycl. Suppl. 4: 282. 1816. "Cette plante croît aux Antilles (V. s. in herb. Desfont.)." The type specimen, in the Desfontaines Herbarium at Florence, consists of a panicle and a fragment of a culm bearing a single leaf. The specimen is similar to Chase 6519, from Ensenada, Guanica Bay, Porto Rico, bearing the note "plant woody, main culm erect, branches divaricate, arid cleared limestone hillside." The plant is decumbent, sending up erect branches. The panicles are very open, bearing spreading or reflexed, distant branches, the lower as much as 4 cm. long. This specimen agrees with the type in having the axis of the panicle scabrous but not villous. Hitchcock's no. 9315, from dry woods along the coast east of Kingston, Jamaica, agrees with this in habit and shape of the panicle, but the axis is villous, as is usual in *C. setosa*. It was noted in both cases that other specimens in the vicinity showed gradations to the usual form of *C. setosa*. The open-panicled form, like the type of *Panicum brachiatum*, is found here and there, on dry brushy hillsides, but always associated with the more usual form. It is discussed further at the end of the description of *Chaetochloa setosa*.

*Setaria caudata* Roem. & Schult. Syst. Veg. 2: 495. 1817. Based on *Panicum caudatum* Lam.

*Setaria elongata* Spreng.; Schult. Mant. 2: 280. 1824. "In S. Domingo." Schultes states, "*Setaria elongata* Spreng. in litt. ad D. Balbis in Herb. Berteron." In the Berlin Herbarium is a specimen labeled "Hb. Sprengel. S. Domingo. Bertero lgt. Balbis ad Spr." (Herbarium Krug et Urban). This specimen, the type, is a somewhat open-panicled, short-bristled form of *Chaetochloa setosa*, intermediate between *Panicum brachiatum*, mentioned above, and the usual form of *Chaetochloa setosa*.

*Setaria brachiata* Kunth, Rév. Gram. 1: 47. 1829. Based on *Panicum brachiatum* Poir.

*Panicum paractaenoides* Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 219. 1834. "V. sp. e Krabbeneiland." The type specimen, collected in Crab Island (now called Vieques, near Porto Rico) by Hornemann, is in the Trinius Herbarium. It is a loose-panicled form much like the type of *Setaria elongata*, mentioned above, and similar to Britton & Wheeler 233, from Culebra.

*Panicum dumetorum* A. Rich.; Steud. Syn. Pl. Glum. 1: 49. 1854. "Ins. Antillae." The type specimen, from St. Croix, is the open-panicled form like the types of *Setaria elongata* and *Panicum paractaenoides*.

*Panicum restitutum* Steud. Syn. Pl. Glum. 1: 53. 1854. Based on *Setaria elongata* Spreng. (not *Panicum elongatum* Pursh, described by Steudel on page 71).

<sup>1</sup> Lam. Encycl. 4: 736. 1798.

*Setaria setosa*  $\beta$  *caudata* Griseb. Fl. Brit. W. Ind. 555. 1864. Based on *Panicum caudatum* Lam.

*Pennisetum swartzii* F. Muell. Fragm. Phyt. Austr. 8: 110. 1873. Based on *Panicum setosum* Swartz (not *Pennisetum setosum* L. Rich.).

*Chamaeraphis setosa* Kuntze, Rev. Gen. Pl. 2: 768. 1891. Based on *Panicum setosum* Swartz.

*Chamaeraphis setosa*  $\alpha$  *caudata* Kuntze, Rev. Gen. Pl. 2: 769. 1891. Based on *Panicum caudatum* Lam.

*Chamaeraphis caudata* Britton, Ann. N. Y. Acad. 7: 264. 1893. Based on *Panicum caudatum* Lam.

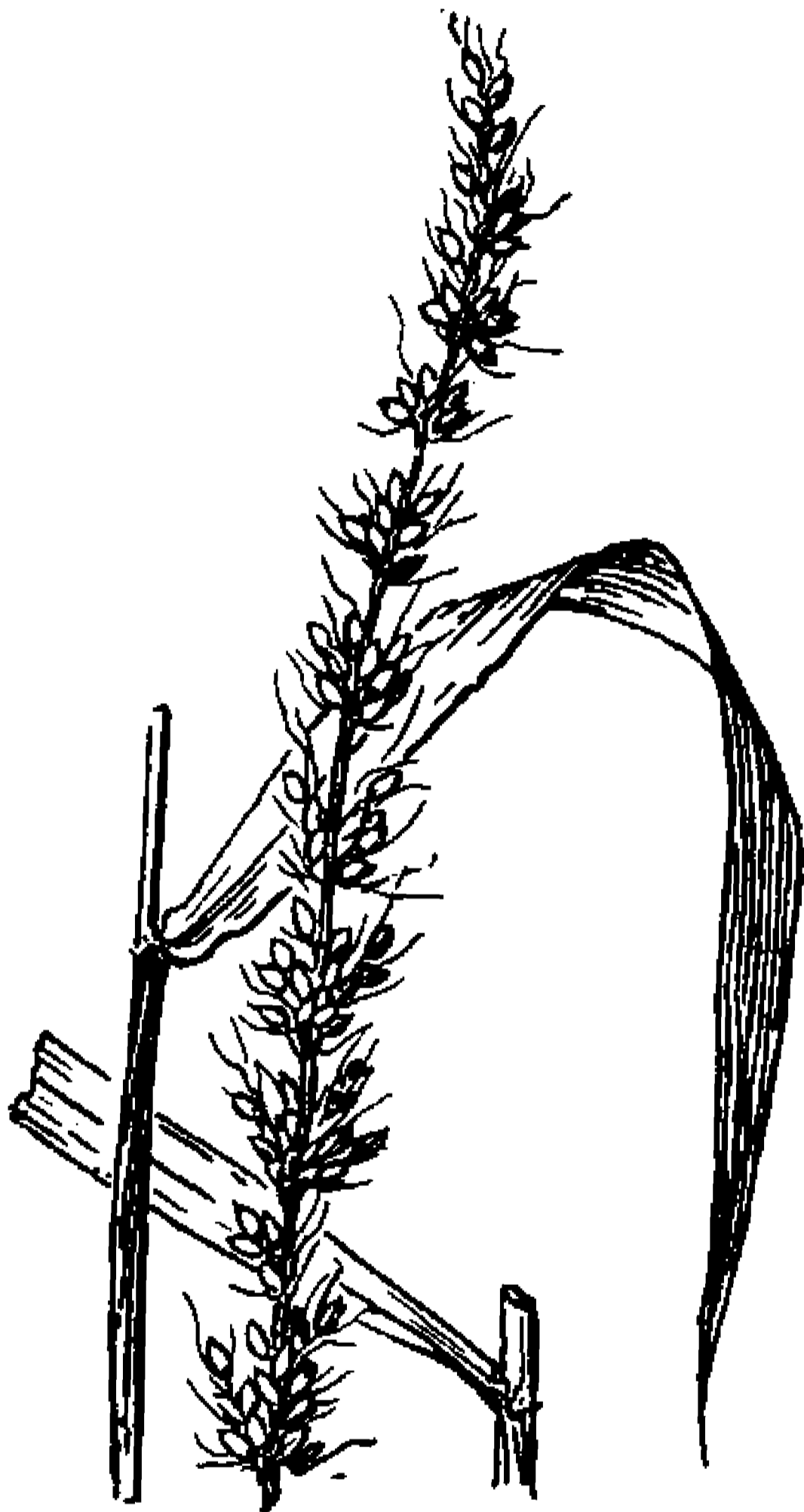


FIG. 56.—*Chaetochloa setosa*. From Hitchcock 9846, Jamaica; typical form.

FIG. 57.—*Chaetochloa setosa*. From Chase 6519, Porto Rico open-panicled form (*Panicum brachiatum*).

*Chaetochloa setosa* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Panicum setosum* Swartz.

*Chaetochloa caudata* Scribn. Rep. Mo. Bot. Gard. 10: 52. 1899. Based on *Panicum caudatum* Lam.

*Setaria paractaenoides* Urban, Repert. Nov. Sp. Fedde 15: 98. 1917. Based on *Panicum paractaenoides* Trin.

DESCRIPTION.

Plants perennial; culms erect, spreading, or decumbent at base, often wiry, sometimes prostrate and woody at base, with upright branches, glabrous, scabrous below the panicle, sometimes hispidulous about the nodes, mostly not over 1 meter tall; sheaths glabrous or rarely pubescent, the lower often keeled, often overlapping, ciliate, hispidulous or rarely glabrous on the collar; ligule densely ciliate, about 1 mm. long; blades flat or folded, usually rather firm and stiffly spreading, glabrous beneath, scabrous on upper surface, or often pubescent on both surfaces, usually 15 to 20 cm. long, sometimes as much as 30 cm. long, mostly 5 to 10 mm. wide, sometimes wider;

panicles mostly narrow, sometimes loosely spikelike, sometimes rather open, attenuate at summit, usually 10 to 20 cm. long, rarely as much as 40 cm., the branches short and crowded or ascending and 1 to 2 cm. long, approximate or, especially the lower, 1 to 3 cm. distant, these rarely spreading or somewhat reflexed, the axis villous with hairs as much as 1 mm. long; bristles mostly one below each spikelet, flexuous, antrorsely scabrous, mostly 5 to 10 mm. long, sometimes scarcely exceeding the spikelets; spikelets about 2 mm. long, rather strongly turgid on the convex side; first glume nearly half as long as the spikelet, 3-nerved; second glume about two-thirds as long as the fertile lemma, 5-nerved; sterile lemma about as long as the fertile, 5-nerved, the palea well developed; fertile lemma acutish, finely but strongly cross-ridged.

In habit this species is rather variable, the differences being due chiefly to the length of the bristles, the length and distance of the branches of the panicle, and the relative amount of foliage. The usual form has rather densely flowered panicles with short, ascending, approximate branches, and bristles 5 to 10 mm. long. An extreme form (*Panicum brachiatum* Poir.), growing on dry brushy hillsides, has wiry, often woody, sometimes decumbent and rooting stems, rather few and distant leaves, and loose panicles with distant, spreading, sometimes reflexed branches as much as 5 cm. long, and short bristles. However, there are all gradations to connect this with the usual form. This open-panicled form is represented by: JAMAICA, *Hitchcock* 9315; PORTO RICO, *Chase* 6519, 6536, *Britton, Cowell & Hess* 1604, *Britton & Wheeler* 233.

## DISTRIBUTION.

- Dry woods and rocky hills at low altitudes, West Indies to Colombia.
- NEW JERSEY: On ballast, Camden, *Parker* in 1879.
- BAHAMAS: Water Cay, *Geogr. Soc. Baltimore* 522.
- CUBA: Cayo Paloma, *Shafer* 2565. Nuevo Gerona, *Palmer & Riley* 1000. Guantánamo, *Léon* 3775, 3776; *Britton* 1930, 2105. Santiago de Cuba, *Léon* 829, 830, 831, 3946.
- JAMAICA: Spanish Town Road, *Harris* 9297, 12477. Kingston, *Hitchcock* 9315, 9745; *Amer. Gr. Nat. Herb.* 606; *Alexander* in 1855. Gordon Town, *Hart* 826, 829; *Hitchcock* 9325; *Harris* 11348, 11458. New Forest, *Hitchcock* 9846. Hope, *Harris* 11292. Long Mountain Road, *Harris* 11303, 11307. St. Andrew, *Harris* 11479. Without locality, *March*.
- SANTO DOMINGO: Rincón, *Fuertes* 1378. Santiago, *Eggers* 2378.
- PORTO RICO: Coamo, *Sintenis* 2987, 3197; *Chase* 6541. Cabo Rojo, *Sintenis* 853. Santa Rita, *Chase* 6536; *Johnston* 1027. Guanica, *Britton & Shafer* 1901. Desecheo, *Hess* 424, 426; *Britton, Cowell & Hess* 1604. Mona, *Hess* 447. Culebra, *Britton & Wheeler* 18, 233. Ensenada, *Amer. Gr. Nat. Herb.* 607; *Chase* 6519. Boqueron, *Chase* 6505. Ponce, *Chase* 6488.
- VIRGIN ISLANDS: St. Croix, *Ricksecker* 407. St. Thomas, *Eggers* in 1882. St. Jan, *Britton & Shafer* 631.
- LEEWARD ISLANDS: Guadeloupe, *Duss* 2698, 3188. Dominica, *Jones* 34.
- TRINIDAD: Chacachacare, *Hitchcock* 10059.
- COLOMBIA: Santa Marta, *Smith* 154, 2188.

23. *Chaetochloa rariflora* (Mikan) Hitchc. & Chase.

*Setaria rariflora* Mikan; Trin. in Spreng. Neu. Entd. 2: 78. 1821. "Hab. in Brasilia." Trinius adds, "(Ich bin ungeweiss, ob dieses Gras nicht vielleicht das *Panicum caudatum* Lam. sey.)". The type, in the Trinius Herbarium, has a spike-like few-flowered panicle. Trinius himself changed the name on the label to *Panicum caudatum* Lam.

*Setaria vaginata* Spreng. Syst. Veg. 4: Cur. Post. 33. 1827. "Rio grande Sello." A duplicate type has been examined in the Vienna Herbarium.

*Panicum triquetrum* Willd.; Doell. in Mart. Fl. Bras. 2<sup>3</sup>: 161. 1877, as synonym of *Panicum caudatum* Lam. The type is no. 18809 in the Willdenow Herbarium, sent by Vahl from "America" (probably Brazil).

*Chaetochloa rariflora* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18: 349. 1917. Based on *Setaria rariflora* Mikan.

## DESCRIPTION.

Plants perennial, tufted; culms erect, or decumbent at base, glabrous, mostly 30 to 60 cm. tall; sheaths pubescent with short ascending hairs or glabrate, keeled, mostly overlapping; ligule densely ciliate, less than 1 mm. long; blades elongate and narrow, pubescent on both surfaces, narrowed at base, usually 2 to 3 mm. wide, rarely over 5 mm.; panicles narrow, tapering above, 10 to 15 cm. long, often less, the axis loosely villous, the hairs mostly less than 1 mm. long; branches ascending, the lower 5 to 10 mm. long, or often shorter, rarely longer, the panicle then being loosely or interruptedly spikelike; bristles usually one below each spikelet, flexuous, antrorsely scabrous, 4 to 7 mm. long, or often scarcely exceeding the spikelets; spikelets about 2 mm. long, turgid on the convex side; first glume a little less than half the length of the spikelet, 3-nerved; second glume about two-thirds as long as the spikelet, 7-nerved; sterile lemma as long as the fertile, 5 to 7-nerved, the palea well developed; fertile lemma acutish, finely and sharply cross-ridged.

This species differs from *C. setosa* chiefly in the long narrow blades and the usually narrower and less bristly panicle. The second glume is shorter and usually 7-nerved. The two forms are given specific rank because the specimens from Brazil agree in having slender, rather lax blades and narrow, few-flowered, interruptedly spikelike panicles like the type of *C. rariflora*. *Chaetochloa setosa* is confined to the West Indies and adjacent parts of South America. There are no specimens known from Brazil. In Trinidad it is found only on the outlying islet Chacachacare. Because of the slightly different aspect and the different geographical range it seems better to recognize the two forms as species rather than varieties, though they are closely related.



FIG. 58.—*Chaetochloa rariflora*. From Ricksecker 67, St. Croix.

## DISTRIBUTION.

Dry hills, Porto Rico to Brazil.

ALABAMA: On ballast, Mobile, *Mohr* in 1892.

PORTO RICO: "Under cactus on cliff facing sea," *Boqueron*, *Chase* 6502.

VIRGIN ISLANDS: St. Croix, *Ricksecker* 67.

LEEWARD ISLANDS: Antigua, *Wulfschlaegel* 629.

BRAZIL: Bahia, *Dorsett & Popenoe* 433b. Rio de Janeiro, *Langsdorff*; *Widgren* in 1844; *Wilkes Expl. Exped.*; *Rose* 20188, 20214. Without locality, *Burchell* 1251; *Glaziou* 16574; *Gardner* 139; *Riedel*.

24. *Chaetochloa vulpiseta* (Lam.) Hitchc. & Chase.

*Panicum vulpisetum* Lam. Encycl. 4: 735 (err. typ. 745). 1798. "Ce beau panic croît à Saint-Domingue, où il a été recueilli par le citoyen Dutrone. (V. s. in herb. D. Desfontaines.)" The type, in the Desfontaines Herbarium at Florence, is labeled "*Panicum vulpisetum* Lam. Dict." A second label bears the note "Bosc. Am. Sept." The type is said to have been collected in Santo Domingo by Dutrone. There is, consequently, some uncertainty as to the origin of the specimen, but the label first quoted above is similar in form to those generally accompanying Lamarck's types; the other is in a different hand.

*Setaria composita* H. B. K. Nov. Gen. & Sp. 1: 111. 1816. "Crescit regione calidissima prope Cumana et Bordones, in Nova Andalusia," (Venezuela). The type has not been examined but the description, especially that of the panicle as nearly a foot long, the apex nodding, and the branches spreading, applies perfectly to *Jahn* 462 from Venezuela, as well as to the other specimens of *C. vulpiseta* from northern South America. The statement that the species is related to *Panicum italicum* strengthens this identification, for the large thick panicle and broad blades might easily suggest the cultivated millet. The description does not apply to the species of the southwestern states and Mexico which has been going under the name of *C. composita*. Neither is that species known from south of Mexico.

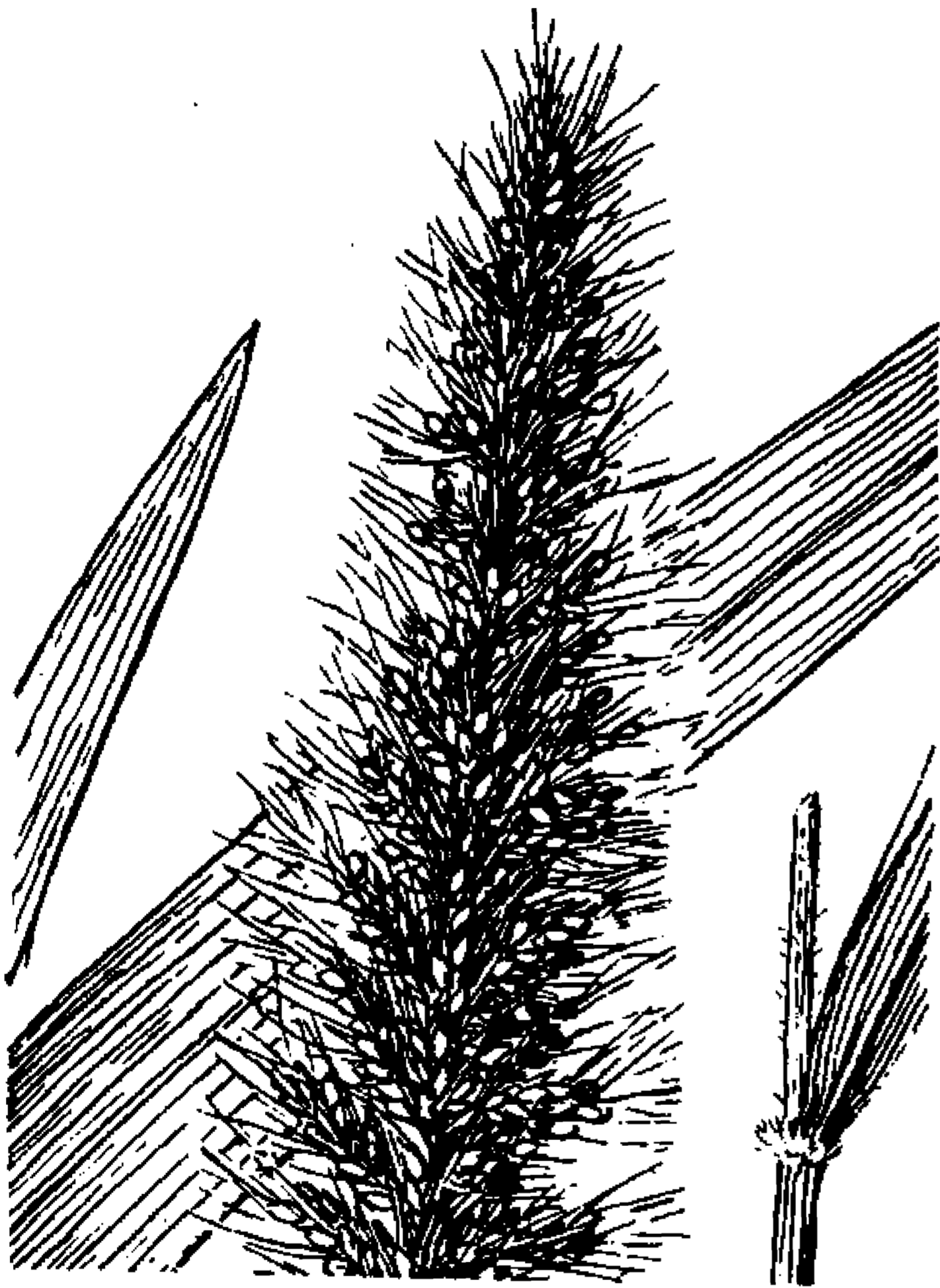


FIG. 59.—*Chaetochloa vulpiseta*. From *Stevenson* 3024, Porto Rico.

*Setaria vulpiseta* Roem. & Schult. Syst. Veg. 2: 495. 1817. Based on *Panicum vulpisetum* Lam.

*Setaria polystachya* Schrad.; Schult. Mant. 2: 277. 1824.

"In Brasilia. Sereniss. Princeps Maximil. Neowidensis." The type has not been examined, but the detailed description can apply only to this one of the known species of Brazil.

*Panicum compositum* Nees, Agrost. Bras. 244. 1829. Not *Panicum compositum* L. 1753. Based on *Setaria composita* H. B. K.

*Panicum macrourum* Trin. Mém. Acad. St. Pétersb. VI. 3<sup>2</sup>: 227. 1834. "V. spp. Bras." The type, in the Trinius Herbarium at the Academy of Sciences, Petrograd, was collected in Brazil by Sellow. This specimen is labeled also *Panicum macrostachyum*. Trinius indicated by his synonymy that he was applying the name *macrourum* to what had been called *macrostachyum*. A second specimen (Bahia, Riedel 183) bears Trinius's label "*Panicum macrourum* m.", but no synonymy is given.

*Setaria alopecurus* "hort. Gor."; Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 1: 227. 1834, as synonym of *Panicum macrourum*. The type, in the Trinius Herbarium, is from the garden at Gorenki.



*Panicum amplifolium* Steud. Syn. Pl. Glum. 1: 53. 1854. "*Setaria macrostachya* Hochst. in Hrbr. Kappleri nr. 1411. Surinam." A fragment of this collection is in the National Herbarium.

*Panicum subsphaerocarpum* Salzm.; Schlecht. Linnaea 31: 483. 1862. "Salzm. pl. exsicc. 'Bahia in fruticetis.'" Schlechtendal compares this with the preceding species (*P. macrostachyum*), pointing out slight differences in the size of the blades.

*Chamaeraphis setosa* var. *vulpiseta* Kuntze, Rev. Gen. Pl. 2: 769. 1891. Based on *Panicum vulpisetum* Lam.

*Chamaeraphis composita* Kuntze; Beal, Grasses N. Amer. 2: 154. 1896. Based on *Setaria composita* H. B. K.

*Chaetochloa composita* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4: 39. 1897. Based on *Setaria composita* H. B. K.

*Chaetochloa vulpiseta* Hitchc. & Chase, Contr. U. S. Nat. Herb. 18: 350. 1917. Based on *Panicum vulpisetum* Lam.

## DESCRIPTION.

Plants perennial, branching at base, often in large tufts; culms glabrous, stout, often decumbent at base, as much as 2 meters tall; sheaths keeled, glabrous, or scaberulous or hispidulous toward the summit or rarely all over, hispid on the margin and densely hispid on the well-marked ridge of the collar, the hairs yellowish, as much as 4 mm. long; ligule densely hispid like the collar, 2 mm. long; blades flat, gradually narrowed from the middle toward both ends, the larger somewhat plaited, scabrous, especially beneath, as much as 50 cm. long and 3 cm. wide; panicles rather densely and evenly flowered, tapering toward the apex and often somewhat tapering at base, as much as 30 cm. long and 4 or 5 cm. wide (secondary panicles much smaller, sometimes only 5 cm. long), the branches stiffly ascending or spreading, as much as 2 or 3 cm. long and of about equal length except toward the summit, the axis densely villous; bristles 1 or 2 at the base of each spikelet, slightly flexuous, brownish, antrorsely scabrous, mostly 1 to 2 cm. long, appearing secund on the branches after the fall of the spikelets; spikelets ovoid, 2 to 2.5 mm. long, pale, moderately turgid on the convex side; first glume about half as long as the spikelet, 3-nerved; second glume two-thirds to three-fourths as long as the fertile lemma, 7-nerved; sterile lemma as long as the fertile, 5-nerved, the palea well developed; fertile lemma lanceolate, acutish, strongly and rather coarsely cross-wrinkled.

The panicles sometimes resemble those of *C. magna* but are less densely flowered; the fertile lemma is cross-wrinkled instead of nearly smooth. From *C. macrosperma* it is distinguished by the smaller spikelets.

## DISTRIBUTION.

Open ground and brushy slopes, West Indies and southern Mexico to Argentina.

TABASCO: San Antonio, *Roviroso* 254 (N. Y. Bot. Gard. Herb.).

GUATEMALA: Neuton, *Seler* 2716.

HONDURAS: San Pedro Sula, *Thieme* 5582, 5582B. Without locality, *Thieme* 5574.

SALVADOR: San Salvador, *Renson* 296.

NICARAGUA: Jinotepe, *Hitchcock* 8683.

COSTA RICA: Colonia Carmona, *Jiménez* 368. Las Delicias del Reventazón, *Pittier* 16171.

PANAMA: Puerto Obaldía, *Pittier* 4332. Culebra, *Pittier* 2121; *Hitchcock* 7898, 7906, 8026. Gorgona, *Maxon* 4734. Las Cascadas, *Pittier* 3744. Taboga Island, *Hitchcock* 8093. Toro Point, *Hitchcock* 8046. Gatún Lake, *Pittier* 6850.

PORTO RICO: Jayuya, *Sintenis* 6335. San Juan, *Chase* 6371. Rio Piedras, *Stevenson* 3024.

TRINIDAD: Bot. Gard. Herb. 3304; *Crueger*

TOBAGO: *Broadway* 4898.

COLOMBIA: Santa Marta, *Smith* 501. Without locality, *Lehmann* 7688.

VENEZUELA: El Limón, *Jahn* 462.

DUTCH GUIANA: Paramaribo, *Samuels* in 1916.

BRAZIL: Tijuca, *Ball* in 1882. Rio de Janeiro, *Graham*; *Wilkes Expl. Expd.*; Corumbá, *Malme* 3077; *Anderson* in 1851. Bahia, *Löfgren* 3737. Goyaz, *Gardner* 3518. Campinas, *Campos Novaes* 1241. Espírito Santo, *Capanema* 5399. Tubarão, *Ule* 1367. Without locality, *Burchell* 1629; *Bot. Gard. Rio Jan.* 135, 993; *Capanema* 5405.

PARAGUAY: Central Paraguay, *Morong* 546, 658, 673. Pilcomayo River, *Morong* 1574; *Rojas* 84, 459.

PERU: Santa Ana, *Cook & Gilbert* 1548.

ARGENTINA: Misiones, *Ekman* 668.

### 25. *Chaetochloa macrostachya* (H. B. K.) Scribn. & Merr.

*Setaria macrostachya* H. B. K. Nov. Gen. & Sp. 1: 110. 1816. "Crescit in planitie montana Mexicana inter Salamanca et Zelaya [State of Guanajuato]." *Panicum*

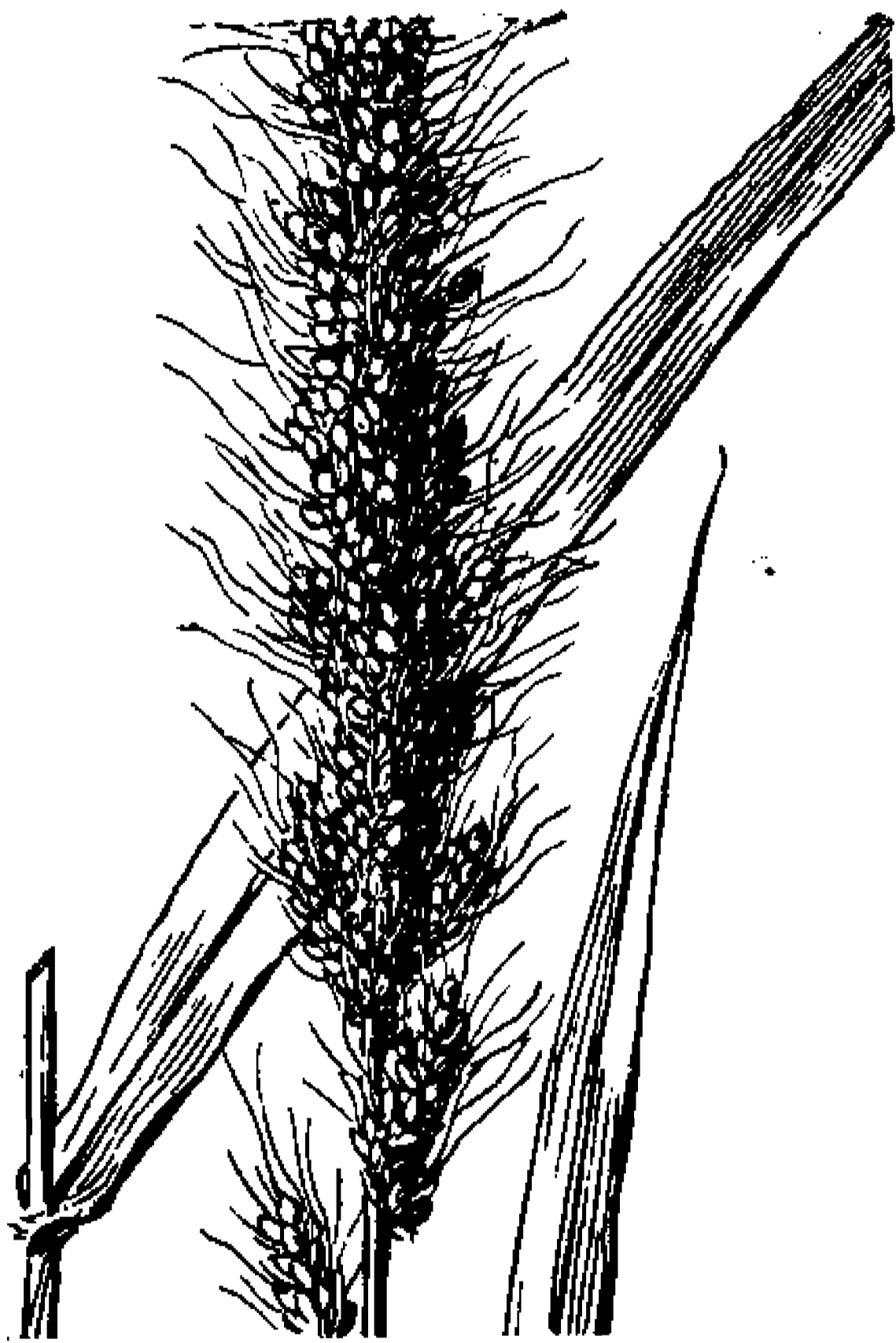


FIG. 60. — *Chaetochloa macrostachya*. From *Hitchcock* 5808, Mexico; typical form.

*setosum* is cited as a synonym. The type has not been examined, but from the highlands of central Mexico there is no species other than the one described below that corresponds to the original description of *Setaria macrostachya*.

*Panicum macrostachyum* Nees, *Agrost. Bras.* 245. 1829. Based on *Setaria macrostachya* H. B. K. Nees<sup>1</sup> based his concept of *Setaria macrostachya* on a specimen from Humboldt in the Willdenow Herbarium from "America merid." which is *Chaetochloa vulpiseta*. Nees's description applies to this species. Doell<sup>2</sup> follows Nees in this concept.

*Panicum onurus* Willd.; Nees, *Agrost. Bras.* 251. 1829. This is mentioned as a synonym under *Panicum caudatum* var.  $\beta$ , "culmo ramoso, racemis angustioribus depauperatis (*P. Onurus*, *Willd. Herb.*—ex Humboldtianis)." In the paragraph on distribution Nees says, " $\beta$  in regno Mexicano (ab Humb.—Vidi in *Herb. Willd.*)." The type specimen, no. 18813 in Willdenow Herbarium, was kindly sent to me for examination by Dr. Urban.

The specimen is in an unsatisfactory condition, as the panicles are immature. The foliage resembles that of *Chaetochloa setosa*, a West Indian species, to which the specimen was previously referred.<sup>3</sup> On reconsideration, this specimen is referred to *C. macrostachya*, a Mexican species. It is not *Setaria onurus* as described by Grisebach (see under *Chaetochloa tenax*, page 177).

*Chumaeraphis setosa* var. *macrostachya* Kuntze, *Rev. Gen. Pl.* 2: 769. 1891. Based on *Setaria macrostachya* H. B. K.

*Chaetochloa gibbosa* Scribn. & Merr. U. S. Dept. Agr. Div. *Agrost. Bull.* 21: 24. 1900. "Type specimen in Gray Herbarium, Cambridge, No. 528 (828?) 'Herbarium Ber-

<sup>1</sup> *Agrost. Bras.* 245. 1829.

<sup>2</sup> In *Mart. Fl. Bras.* 2<sup>2</sup>: 166. 1877.

<sup>3</sup> *Contr. U. S. Nat. Herb.* 18: 349. 1917.

landierianum Texano Mexicanum,' no locality or date." The type specimen bears 3 panicles, all past maturity and containing only a few spikelets. It resembles *Pringle* 1968 in the pilose blades but the panicles are shorter and more compact. The label bears the following, "de Santander a Victoria" (probably in Tamaulipas).

*Chaetochloa leucopila* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 26. f. 14. 1900. "Type specimen collected at Parras, state of Coahuila, Mexico, 1363 E. Palmer, June 1880." The type specimen, in the National Herbarium, in habit resembles the narrow-leaved form of *C. macrostachya*, with narrow slender panicles, a form common in Texas. It differs, however, in the pilose upper surface of the narrow folded blades.

*Chaetochloa macrostachya* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 29. f. 16. 1900. Based on *Setaria macrostachya* H. B. K.

*Chaetochloa rigida* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 30. 1900. "Lower California: La Paz, 125 E. Palmer 1890 (type)." Two other specimens are cited, Carmen Island, *Palmer* 857 in 1890 and San José del Cabo, *Brandege* 28 in 1890. See further notes at the end of the description of *C. macrostachya*.

*Setaria leucopila* Schum. Just's Bot. Jahresb. 28<sup>1</sup>: 417. 1902. Based on *Chaetochloa leucopila* Scribn. & Merr.

*Chamaeraphis macrostachya* Kuntze; Stuck. Anal. Mus. Nac. Buenos Aires 11: 76. 1904, in a footnote. Based on *Setaria macrostachya* H. B. K.

#### DESCRIPTION.

Plants perennial, tufted, usually pale or glaucous, more or less hirsute around the base; culms erect or geniculate at base, scabrous below the panicle and usually below the glabrous or hispidulous nodes, 40 to 120 cm. tall; sheaths more or less compressed-keeled, glabrous or usually scaberulous toward the summit, rarely pubescent, ciliate on the margin, the collar hispidulous or glabrous; ligule densely ciliate, 1 to 3 mm. long; blades flat or folded, scabrous on the upper surface, smooth or scabrous beneath, rarely pubescent on both surfaces, 15 to 40 cm. long, 3 to 5 mm. wide; panicles spikelike, 10 to 25 cm. long, or sometimes shorter, somewhat tapering above but not attenuate, more or less interrupted or lobed, sometimes rather open below, the branches usually short, the axis pubescent and often also villous with hairs 1 to 2 mm. long; bristles mostly single below each spikelet, 10 to 15 mm. long with shorter ones intermixed, flexuous, antrorsely scabrous; spikelets pale (the nerves usually pale), 2 to 2.5 mm. long, turgid on the convex side, sometimes strongly so at maturity; first glume about half as long as the spikelet, 3-nerved; second glume two-thirds to three-fourths as long as the spikelet, 5 to 7-nerved; sterile lemma as long as the fertile, 5-nerved, the palea narrow, a little shorter than the lemma; fertile lemma rather sharply but finely marked with cross-wrinkles.

The species is somewhat variable in habit and includes what Scribner and Merrill<sup>1</sup> and Hitchcock<sup>2</sup> referred to *Chaetochloa composita*. The typical form is rather robust



FIG. 61.—*Chaetochloa macrostachya*. From Hitchcock 13605, Texas; slender-panicled form.

<sup>1</sup> U. S. Dept. Agr. Div. Agrost. Bull. 21: 27. f. 15. 1900.

<sup>2</sup> Contr. U. S. Nat. Herb. 17: 263. 1913.

with flat blades 5 to 10 mm. wide, and large panicles 15 to 25 cm. long, the branches ascending, about 1 cm. long, or even as much as 2 cm. The commoner form of Texas and northern Mexico is less robust, the blades narrower, 3 to 4 mm. wide, often folded, the panicles more compactly flowered and spikelike. There are so many intermediate specimens that it seems impracticable to draw specific lines between the forms.

Certain specimens approach *C. rariflora* in habit (such as, TEXAS: *Bush* 1252, *Rose* 18051, *Hitchcock* 5178, *Chandler* 7085), but differ in the glabrous (but scabrous) blades, pubescent but not pilose rachis, and pale spikelets (in *C. rariflora* the green nerves are prominent).

The following specimens have pubescent sheaths and blades: TEXAS: *Hitchcock* 5337, *Ball* 1527, *Groth* 123, *Jermy* 38. SONORA: *Rose* 13004. SAN LUIS POTOSÍ: *Hitchcock* 5729. NUEVO LEÓN: *Hitchcock* 5542, *Pringle* 1968.<sup>1</sup> The first glume is 5-nerved in *Rose* 10116.

A few specimens from Lower California have the aspect of typical *Chaetochloa macrostachya* but have slender spikelike panicles and glabrous sheath margins. The specimens, which are in a fragmentary condition, were described by Scribner and Merrill as *Chaetochloa rigida*, but the differences mentioned do not appear sufficient to indicate a distinct species. The specimens are: *Palmer* 125, 857; *Brandege* in 1890; *Purpus* 227.

*Chaetochloa macrostachya* is closely related to *C. setosa*, but differs in having a more compact and much less tapering panicle. In *C. setosa* the panicle is attenuate at the summit.

#### DISTRIBUTION.

Open dry ground and dry woods, southwestern United States to Oaxaca.

TEXAS: Estelline, *Reverchon* 4262. Kingsville, *Piper* in 1906; *Tracy* 8882. Kinney County, *Hill* 83; *Mearns* 1216. San Antonio, *Hitchcock* 5132, 5162, 5178; *Bush* 1179, 1252; *Tweedy* in 1880. El Paso, *Hitchcock* 5337, 7825, 13320, 13426; *Chase* 5894, 5903; *Stearns* 179; *Rose* 17886. Chisos Mountains, *Bailey* 392. Corpus Christi, *Hitchcock* 5363; *Heller* 1480. New Braunfels, *Hitchcock* 5226. Laredo, *Hitchcock* 5508; *Mackenzie* 107; *Rose* 18051; *Havard* in 1884. Maravillas, *Havard* in 1883. Kent, *Tracy & Earle* 378. Del Rio, *Plank* 87; *Hitchcock* 13631. Big Spring, *Hitchcock* 13376, 13397. Robstown, *Hitchcock* 5388. Sarita, *Hitchcock* 5478. Rio Hondo, *Chandler* 7085. Bexar County, *Jermy* 38, 214. Bracken, *Groth* 123. Alpine, *Hitchcock* 13605. Uvalde, *Ball* 1527; *Reverchon* 1097 in 1885. Baylor County, *Reverchon* 1097 in 1879. Valverde County, *Nealley* 115. Western Texas, *Wright* 799, 800; *Havard* in 1881. Olmito, *Tracy* 8907. Bears Mountain, *Jermy* 783.

COLORADO: Canon City, *Eastwood* in 1892; *Jones* 780; *Shear* 979.

NEW MEXICO: Mangas Canyon, *Smith* in 1896. Mangas Springs, *Metcalf* 154. Dona Ana Mountains, *Standley* in 1906. Organ Mountains, *Hitchcock* 3796. Mesilla Valley, *Standley* 407; *Hitchcock* 3818; *Wooton* 60. Las Cruces, *Vasey* in 1881; *Wooton* 1081. Deming, *Hitchcock* 3757. Rincon, *Jones* 4163. Grant County, *Rusby* 455. Roswell, *Griffiths* 5738. Cimarron Canyon, *Griffiths* 5554. Jarilla Junction, *Cockerell* 19. Aden, *Wooton* in 1906. Albuquerque, *Tracy* 85 in 1887. White Water, *Mearns* 2313. Carlsbad, *Hitchcock* 13489. Tortugas Mountain, *Standley* 6418. Black Range, *Metcalf* 1147. Organ Mountains, *Vasey* in 1881; *Wooton* 438. Without locality, *Wright* 2094.

ARIZONA: Tucson, *Toumey* 805 and in 1894; *Griffiths* 1511, 3349, 3352; *Hitchcock* 3491; *Pringle* in 1884. Patagonia, *Hitchcock* 3659, 3660, 3678. Santa Rita

<sup>1</sup> This was referred to *Chaetochloa setosa* by Scribner and is the original of the figure so named (U. S. Dept. Agr. Div. Agrost. Bull. 21: 39. f. 24. 1900).

Mountains, *Griffiths & Thornber* 194; *Griffiths* 3925, 5910, 5993. Oracle, *Hitchcock* 13266. Bisbee, *Mearns* 858, 926. St. Johns, *Griffiths* 5196. Beaver Creek, *Purpus* 8271. Pantano, *Pringle* in 1881. Benson, *Griffiths* 2003. San Bernardino Ranch, *Mearns* 746, 771, 781. Grand Canyon, *Leiberg* 5938. Fort Verde, *MacDougal* 539. Gila Valley, *Rothrock* 334. Fort Huachuca, *Wilcox* in 1894. Pearse, *Griffiths* 1944. Without locality, *Palmer* in 1869.

LOWER CALIFORNIA: Ensenada, *Orcutt* in 1889. San Pablo Canyon, *Purpus* 227. Carmen Island, *Palmer* 857 in 1890. La Paz, *Palmer* 125 in 1890. San José del Cabo, *Brandegge* in 1890. Magdalena Bay, *Brandegge* 28 in 1889.

SONORA: Hermosillo, *Hitchcock* 3590. Alamos, *Rose* 13004. Guaymas, *Palmer* 53 and 340 in 1887.

CHIHUAHUA: San Luis Mountains, *Mearns* 2101. Casas Grandes, *Nelson* 6368. Chihuahua, *Hitchcock* 7775; *Pringle* 488.

COAHUILA: Saltillo, *Palmer* 378 in 1898; *Hitchcock* 5589, 5604, 5634. Sabinas, *Nelson* 6820. Torreón, *Palmer* 505 in 1898.

NUEVO LEÓN: Monterrey, *Hitchcock* 5534, 5542; *Pringle* 1968.

SAN LUIS POTOSÍ: San Luis Potosí, *Hitchcock* 5665. Cárdenas, *Hitchcock* 5729.

ZACATECAS: Concepción del Oro, *Palmer* 261 in 1904. Zacatecas, *Hitchcock* 7521.

DURANGO: Tlahualilo, *Pittier* 471. Torreón, *Hitchcock* 7728. Durango, *Hitchcock* 7623; *Palmer* 378 and 872 in 1896.

TEPIC: San Blas, *Nelson* 4341.

QUERÉTARO: Querétaro, *Hitchcock* 5808.

HIDALGO: Ixmiquilpan, *Rose* 8993.

VERACRUZ: Mirador, *Liebmann* 362.

PUEBLA: Tehuacán, *Rose* 10116; *Hitchcock* 6047.

OAXACA: Oaxaca, *Hitchcock* 6068. Tomellín, *Hitchcock* 6241.

## 26. *Chaetochloa scheelei* (Steud.) Hitchc.

*Setaria polystachya* Scheele, *Linnaea* 22: 339. 1849. Not *Setaria polystachya* Schrad. 1824. "Auf felsigen Boden nördlich von Neubraunfels: Lindheimer." The type collection is Lindheimer's no. 564 of fascicle III, *Flora Texana Exsiccata*,<sup>1</sup> collected in 1846. A specimen of this collection is in the National Herbarium. The culm is 1.2 meters tall, the sheaths minutely scaberulous, the blades flat, scabrous, 10 to 13 mm. wide; the panicle is rather loose, 22 cm. long, the axis villous.

*Panicum scheelei* Steud. *Syn. Pl. Glum.* 1: 51. 1854. Based on *Setaria polystachya* Scheele, not *Panicum polystachyum* Presl. Steudel spells the name "scheelii."

*Chaetochloa polystachya* Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21: 37. f. 22. 1900. Based on *Setaria polystachya* Scheele.

### DESCRIPTION.

Plants perennial; culms 60 to 120 cm. tall, erect or geniculate at base, compressed below, glabrous, the nodes often appressed-pilose; sheaths compressed-keeled, glabrous, or scabrous near summit or on the keel, or sometimes more or less hispid on the surface, the collar hispid; ligule densely hispid, 1 to 2 mm. long; blades flat, scabrous or more or less pubescent, 15 to 25 cm. long, as much as 1.5 cm. wide; panicle rather loose, 15 to 20 cm. long, tapering from near the base, the lower branches as much as 3 cm. long, ascending, the axis scabrous-pubescent and rather sparsely villous; bristles mostly 1 to 1.5 cm. long, rather numerous, flexuous, antrorsely scabrous; spikelets a little more than 2 mm. long, pale; first glume about one-third as long as the spikelet, 3-nerved; second glume a little shorter than the fertile lemma, 5-nerved; sterile lemma as long as the fertile, 5-nerved, the palea small and narrow; fertile lemma finely cross-wrinkled.

<sup>1</sup> See *Rep. Mo. Bot. Gard.* 18: 151. 1907.

This species is allied to *C. macrostachya*, from which it differs in the looser panicle with longer ascending lower branches. The broad flat blades distinguish it from the common form of *C. macrostachya* in Texas. A specimen (*Müller* 2051, in N. Y. Bot. Gard. Herb.) from Orizaba, Mexico, appears to be this species.



FIG. 62.—*Chaetochloa scheelei*. From *Bush* 1244, Texas.

#### DISTRIBUTION.

Open or rocky woods, southern Texas.

TEXAS: Burnet, *Plank* 4. Kerrville, *Smith* in 1897; *Hitchcock* 5299. San Antonio, *Bush* 1200, 1244; *Hitchcock* in 1903; *Hitchcock* 5245. Mouth of Pecos River, *Havard* 34 in 1883. Austin, *McAllister & Tharp* in 1914; *Biltmore Herb* 14922b. Brownsville, *Hitchcock* in 1904. Kingsville, *Piper* in 1906. Abilene, *Bentley* in 1899. New Braunfels, *Lindheimer* 564; *Hitchcock* 5203, 5237. Comanche Spring, *Lindheimer* 1251. On the San Marcos, *Wright*. Sabinal Canyon, *Reverchon* 1623. Bexar County, *Jermy* 783. Without locality, *Nealley* in 1888.

#### DOUBTFUL SPECIES.

SETARIA FALCIFOLIA Fourn. Mex. Pl. 2: 44, 1886. "Culmo recto, stramineo, oliato, e radice fibrosa orto; foliis longis, falciformibus, angustis, plicatis, acutis, cum vaginis villosis, ligula laciniato-pilosa; thyrso lineari, fasciculis remotis, paucifloris; chaetocladis scabrioribus parvis, paucis versus basim fasciculi; gluma inferiore minore quam dimidia spicula; superiore 2/3 floris aequante; flore hermaphrodito tenuiter striato. Absque loco (JURG. n. 622)."

NOTE ON SETARIA ACH.—*Stapf*<sup>1</sup> discusses the validity of the names *Setaria* Ach. and *Chaetochloa* Scribn. He shows that *Setaria* was used by Acharius as a subdivision of the genus *Lichen* and not as a distinct genus. The author of the present revision of *Chaetochloa* regards the genus *Setaria* as effectively published by Michaux, since it was based on the section or tribe of Acharius, therefore invalidating *Setaria* Beauv. *Stapf* rejects *Setaria* Ach. because it has not come into general use, and accepts *Setaria* Beauv. as valid.

<sup>1</sup> Kew Bull. Misc. Inf. 1920: 124. 1920.