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THE

FLORA OF THE PRESIDENCY OF BOMBAY.

BY

THEODORE COOKE, C.I.E.

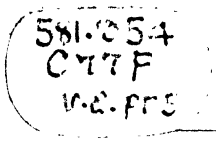
M.A., M.A.I., LL.D., F.L.S., F.G.S., M.INST.C.E.I.

FORMERLY PRINCIPAL OF THE COLLEGE OF SCIENCE AT POONA AND DIRECTOR OF THE BOTANICAL SURVEY OF WESTERN INDIA.

ARACEÆ to GRAMINEÆ.

WITH INDEX.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR INDIA IN COUNCIL.


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FLORA

OF

BOMBAY.

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THE

FLORA OF THE PRESIDENCY OF BOMBAY.

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VOL. II.

COMPOSITÆ TO GRAMINEÆ.

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Flowers 1-sexual, monœcious (often dioœcious in *Arisæma*).
- Water or marsh plants; spadix without a barren appendage.
  - Floating stemless herbs; leaves sessile in a rosette-like tuft ..... 1. PISTIA.
  - Submerged, aquatic or marsh herbs.
    - Ovaries in one whorl ..... 2. CRYPTOCORYNE.
    - Ovaries sp[illegible] ..... 3. LAGENANDRA.
- Terrestrial tuberous herbs.
  - Spadix with a barren terminal appendage; ovules not parietal.
    - Male flowers stipitate; flowers often dioœcious. 4. ARISÆMA.
    - Male flowers sessile or nearly so; flowers always monœcious.
      - Flowers and leaves present together.
        - Ovules 1–2, basal ..... 5. TYPHONIUM.
        - Ovules many, basal and apical ..... 6. THERIOPHONUM.
      - Flowers appearing before the leaves.
        - Ovules orthotropous; males and females remote; neuters present above the females ..... 7. SAUROMATUM.
        - Ovules anatropous; males and females contiguous; neuters 0 ... 8. AMORPHOPHALLUS.
  - Spadix without a barren appendage; ovules many, parietal.
    - Female inflorescence adnate to base of spathe; stigma stellate ..... 9. ARIOPSIS.
    - Spadix free from the spathe; stigma discoid . 10. REMUSATIA.
- Flowers hermaphrodite; stem scandent; spathe small ..... 11. POTHOS.

1. **PISTIA,** Linn.

A floating gregarious monœcious stoloniferous herb. Leaves sessile in a close spiral, obovate-cuneate, together forming a cup; veins parallel; stipulary sheaths small, membranous. Spathe small, shortly pedunculate, tubular below, open above; tube short; limb ovate, concave, spreading. Spadix adnate to the back of the tube of the spathe, free above. MALE INFLORESCENCE a whorl of a few sessile connate stamens below the apex of the spadix, with a whorl of minute neuters below it; anther-slits vertical. FEMALE INFLORESCENCE a solitary oblong 1-celled ovary, obliquely adnate to the spadix for nearly its whole length, the tip free, forming a conical style with a discoid stigma; ovules many, crowded on a parietal placenta, orthotropous. Fruit ovoid; pericarp thin, bursting irregularly. Seeds many, oblong or obovoid; testa ultimately rugose; albumen copious, floury; embryo minute, apical, cuneiform.—DISTRIB. Species 1, tropical.

1. **Pistia Stratiotes,** *Linn. Sp. Pl.* (1753) p. 963. A floating stemless stoloniferous herb with a peculiar muriatic odor; roots of tufted simple white fibres clothed with fibrillæ. Leaves 1¼–4 in. long, variable in breadth, obovate-cuneate, rounded or retuse at the apex, densely and closely pubescent on both surfaces; nerves few or many, flabellately arranged, converging within the margin. Spathe about ½ in. long, obliquely campanulate, white, gibbous and closed below, contracted about the middle, dilated and nearly orbicular above.—DISTRIB. Throughout India and Ceylon and the tropics generally. Fl. B. I. v. 6, p. 497; Grah. Cat. p. 200; Dalz. & Gibs. p. 281; Roxb. Cor. Pl. v. 3

(1819) p. 64, t. 268; Trim. Fl. Ceyl. v. 4, p. 345; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427; Prain, Beng. Pl. p. 1105; Watt, Dict. Econ. Prod. v. 6, part 1, p. 275.—Flowers: July–Nov.

Common in tanks throughout the Presidency.—DISTRIB. of the genus.

2. CRYPTOCORYNE, Fisch.

Herbs usually marsh or aquatic; stem short or 0 or a creeping rootstock. Leaves narrow or broad. Spathe tubular with connate margins and a transverse septum within below. Spadix very slender, its tip adnate to the septum of the spathe. MALE INFLORESCENCE cylindric. Stamens 1–2, distinct; anthers short, sessile, truncate, cells 2 with conic perforate tips, pollen vermiform. FEMALE INFLORESCENCE a single whorl of connate 1-celled ovaries with a few neuters; ovules many, erect, orthotropous; styles short, recurved. Fruit a fleshy syncarpium, of connate, coriaceous, many-seeded carpels, the valves stellately spreading. Seeds oblong; testa rugose; albumen copious; embryo axile; plumule sometimes germinating in the fruit.—DISTRIB. Species 26, tropical Asiatic.

Tube of spathe longer than the limb	1. *C. retrospiralis.*
Tube of spathe shorter than the limb.	
Limb of spathe transversely rugose or plicate within	2. *C. spiralis.*
Limb of spathe smooth within	3. *C. cognata.*

1. **Cryptocoryne retrospiralis,** *Kunth, Enum.* v. 3 (1841) p. 12. An herb usually submerged; root of fleshy fibres, stem 0. Leaves numerous, radical, 3–18 by ¼–¾ in., narrowly linear or linear-lanceolate, sessile or with a short stout petiole, acute or finely acuminate; midrib slender. Spathe subsessile, nearly as long as the leaves, deep green streaked with purple; tube narrow, longer than the limb, not or scarcely twisted; limb glabrous, closely twisted. Ovaries 5–6; ovules 3 or more; stigmas orbicular. Fl. B. I. v. 6, p. 493; Wight, Icon. t. 772; Engler, in DC. Monog. Phan. v. 2 (1879) p. 625; Engler, in Engl. & Prantl, Pflanzenf. v. 2, part 3 (1889) p. 152, fig. 99 A–C; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427; Prain, Beng. Pl. p. 1105. *Cryptocoryne Roxburghii,* Dalz. & Gibs. Bo. Fl. (1861) p. 259 (*not* of Schott).

KONKAN: Bombay, *Law*!; banks of the Pen River, *Law*!; beds of rivers in the Konkan, *Gibson*!; bed of the river near Mira, *Gibson*, 151! DECCAN: Poona on river banks, *Ranade*!, *Woodrow.*—DISTRIB. India (Bengal, Behar, Birma, W. Peninsula).

2. **Cryptocoryne spiralis,** *Fisch. in Linnæa,* v. 5 (1830) p. 428. A small grass-like herb growing on the margins of ditches and ponds, submerged during the rainy season only. Rootstock tuberous, soboliferous; roots vermiform. Leaves 3–8 by ⅓–⅔ in., linear-lanceolate, acute or acuminate, narrowed from the middle to both ends; nerves nearly parallel; petiole short, stout. Spathe subsessile, 3–5 in. long; tube very short, much shorter than the limb, linear-lanceolate, at first twisted, greenish outside, dark purple and transversely lamellate within. Ovaries 5–6; stigmas broadly elliptic. Fl. B. I. v. 6, p. 494; Wight, Icon. t. 773; Engler, in DC. Monog. Phan. v. 2 (1879) p. 628, and in Engl. & Prantl, Pflanzenf. v. 2, part 3 (1889) p. 152, fig. 99 D–G; Trim.

Fl, Ceyl. v. 4, p. 346; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427; Prain, Beng. Pl. p. 1105. *Arum spirale*, Retz. Obs. fasc. 1 (1779) p. 30; Bot. Mag. t. 2220; Grah. Cat. p. 228.

KONKAN: *Dalzell*!, *Stocks*!—DISTRIB. India (Bengal, W. Peninsula).

3. **Cryptocoryne cognata,** *Schott, in Bonplandia*, Jahrg. 5 (1857) p. 222. Root bulbous, with vermiform fibres. Leaf-blade 6–10 by $\frac{7}{8}$–$1\frac{1}{2}$ in., oblong-lanceolate, narrowed and acute at both ends, the margins undulate; midrib very broad; petioles stout, shorter than or equalling the blade. Spathe reaching 7 in. long, shortly pedunculate; limb much longer than the tube, narrowed into a long tail which (in the Kew specimens at least) is not twisted; tube of spathe reaching 2 in. long. Male inflorescence separated from the female by an interspace of about $1\frac{1}{4}$ in. Fl. B. I. v. 6, p. 494; Engler, in DC. Monog. Phan. v. 2 (1879) p. 629: Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427.

There are but 2 sheets in Herb. Kew., the specimens on both of which are from the KONKAN, one collected by *Stocks*, the other by *Law*.—DISTRIB. India (W. Peninsula).

DOUBTFUL SPECIES.

CRYPTOCORYNE DALZELLII, Schott, in Bonplandia, Jahrg. 5 (1857) p. 221. This singular plant, of which Dalzell says he can make nothing, is represented in Herb. Kew. by half a sheet of specimens, chiefly of fruit in various stages, and a drawing. Dalzell says in a note attached to the sheet: "The leaf is lanceolate, without petiole and apparently amplexicaul, the margin transparent and finally crenated; veins parallel; surface woolly as if covered densely with cobweb. No stamens; no ovarium; nothing but what is observed in the drawing. The perianth is fleshy and what appears as the pedicel is solid." The fruit is ovoid, about $\frac{1}{2}$ by $\frac{1}{3}$ in. on a solitary stalk. The seeds are 2-seriate, oblong, subtrigonous. The sheet is marked "*Bombay, Dalzell*," without further information as to locality. Fl. B. I. v. 6, p. 495; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427.

EXCLUDED SPECIES.

CRYPTOCORYNE UNILOCULARIS, Kunth, Enum. v. 3 (1841) p. 13; Wight, Icon. t. 774; Jackson, Index Kewen. v. 2, p. 661. *Cryptocoryne Roxburghii*, Schott, Prodr. Syst. Aroid. (1860) p. 18; Dalz. & Gibs. p. 257; Engler, in DC. Monog. Phan. v. 2 (1879) p. 629. *Ambrosinia unilocularis*, Roxb. Fl. Ind. v. 3 (1832) p. 493.

I can find no evidence of the occurrence of this (a Coromandel plant) in the Bombay Presidency. Dalzell [Bo. Fl. (1861) p. 257] mentions the plant as *common*, but he has supplied no specimens of it, and I am of opinion that the plant he has described (*l. c.*) as *C. Roxburghii* is *C. retrospiralis*, Kunth, of which there are specimens at Kew from the Konkan and Deccan. There is not a single specimen in Herb. Kew. of Roxburgh's plant, nothing but a drawing, and I believe that no specimen is extant. The plant noticed in Woodrow's list from Poona proves to be *C. retrospiralis*.

3. LAGENANDRA, Dalz.

Aquatic herbs with the characters of *Cryptocoryne*, but with many ovaries in close cycles at the base of the spadix.—DISTRIB. Species 5, India and Ceylon.

1. **Lagenandra toxicaria,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 289. Rootstock reaching 2 in. thick, creeping, simple, coriaceous, annulate; root-fibres vermiform. Leaves 6–15 by 2–5 in., elliptic-

oblong, obtuse or acute, margins undulate, entire, base acute or rounded; midrib very stout, with many slender veins diverging from it; petiole as long as the blade, semicylindric, ½ in. in diam.; stipular sheaths acuminate, 2-keeled. Peduncle shorter and more slender than the petiole, compressed. Spathe 3–9 in. long, tubular below; the limb ¾–1½ in. broad, ovate-lanceolate, caudate-acuminate, slightly twisted; tube much shorter than the long-tailed limb. Male inflorescence cylindric; anthers crowded, yellow, the cells with tubular tips. Female inflorescence of many ovaries, in many cycles, crowded in a globose head; stigma sessile, pulvinate, 5-angled; ovules 4–8 on a basal placenta. Syncarpium on a short decurved peduncle, globose, 1½–2 in. in diam.; carpels about ⅓ in. long, partially dehiscent. Seeds ⅜ in. long, narrowly oblong, furrowed. Fl. B. I. v. 6, p. 495; Dalz. & Gibs. p. 257; Engler, in DC. Monog. Phan. v. 2, p. 621; Trim. Fl. Ceyl. v. 4, p. 349; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427.—Flowers: Feb.–Mar. VERN. *Vatsanáb.*

KONKAN: in marshes, *Dalzell.* S. M. COUNTRY: Belgaum, *Dalzell.* KANARA: Koessi (N. Kanara), *Talbot*, 1813!—DISTRIB. India (W. Peninsula); Ceylon.

4. **ARISÆMA,** Mart.

Tuberous monœcious or diœcious herbs. Leaves 1–3, often coming up with the flowers but sometimes after them, trisect or pedate or verticillately 5- or more-sect. Spathe deciduous; tube convolute; limb often acuminate or tailed, usually incurved. Spadix included or exserted, always with a barren appendage which is often long and filiform. MALE INFLORESCENCE of many usually stipitate connate stamens; anthers 2–5, oblong or subglobose, the cells distinct or confluent, dehiscing by pores or vertical slits. FEMALE INFLORESCENCE: Flowers densely crowded; ovary ovoid, oblong or subglobose, 1-celled; ovules 2 or more, basal, orthotropous; style short or 0. NEUTER FLOWERS 0 or few, subulate, above the males or the females or on the appendage. Fruit a 1- or few-seeded berry. Seeds ovoid or globose; testa rather thick; albumen copious; embryo axile.—DISTRIB. Temperate and tropical Asia; N. America; species about 50.

Leaves pedatisect; appendage of spadix elongate, far-exserted	1. *A. tortuosum.*
Leaflets whorled.	
Leaflets sessile.	
Spathe 4–12 in. long with an obtusely acuminate tip; tube narrow, petiole 2 ft. long; peduncle short; appendage narrowly clavate	2. *A. Leschenaultii.*
Spathe 3–5 in. long with an acute (not caudate) tip; tube wide; petiole 1 ft. long; peduncle 1 ft. long; appendage tapering from the base to the tip	3. *A. Murrayi.*
Leaflets petiolate with thread-like tips which are 1–3 in. long; spathe 6 in. long with a caudate tip 3 in. long; petiole 10–14 in. long	4. *A. caudatum.*

1. **Arisæma tortuosum,** *Schott, in Schott & Endlich. Meletem.* (1832) p. 17. A tall plant reaching 3 ft. high; tubers spheroidal, up to 4 in. in diam. Leaves 2–3, pedatipartite; petioles 1–3 ft. long, the sheaths often mottled with purple; leaflets sessile or petiolate, 4–8 in. long, of variable breadth, ovate-lanceolate or linear-lanceolate,

subcaudately acuminate, distant or crowded or almost radiately arranged. Peduncle 2–4 ft. long. Spathe 4–6 in. long, green outside; tube about as long as the limb, subcylindric, gaping, gradually dilating into the limb, pale purplish inside; limb ovate or ovate-oblong acuminate, broadly cymbiform, incurved. Spadix 1- or 2-sexual; male flowers stalked; appendage very long, much exserted, tapering, like a rat's tail, quite smooth, usually erect at first, then porrect, and again erect. Ovaries ovoid, attenuated into a short style. Berry 4–5-seeded. Fl. B. I. v. 6, p. 502; Engler, in DC. Monog. Phan. v. 2 (1879) p. 545; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427; Prain, Beng. Pl. p. 1106; Watt, Dict. Econ. Prod. v. 1, p. 312. *Arisæma curvatum*, Dalz. & Gibs. Bo. Fl. (1861) p. 258 (*not* of Kunth); Hook. in Bot. Mag. (1871) t. 5931.

KONKAN: *Stocks!*; Western Ghâts, *Woodrow.*—DISTRIB. India (Manipur, Sikkim-Himalaya, Bengal, W. Peninsula).

2. **Arisæma Leschenaultii,** *Blume, Rumphia*, v. 1 (1835) p. 93. Monœcious or diœcious; tubers 2 in. in diam., globose; roots from the upper side of the tuber. Leaf solitary; petiole stout, 2 ft. long, usually mottled and banded with red and brown; leaflets 5–11, whorled, 4–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., sessile, lanceolate, caudate-acuminate, dark green above, paler beneath, base tapering; midrib stout. Peduncle short. Spathe 4–12 in. long, dark green, striped externally with purple; tube as long as the limb, cylindric, narrow, ribbed, erect, gradually dilated into the limb; limb slightly decurved, ovate-lanceolate, cymbiform, terminating in a straight obtusely acuminate tip of variable length. Spadix shorter than the spathe, about 3 in. long, gradually passing into a very narrowly clavate pale-green smooth appendage with a rounded, sometimes verruculose tip. Anthers 3–4-nate, sessile, with a few subulate neuters above them. Ovaries many, minute, densely crowded. Fl. B. I. v. 6, p. 504; Engler, in DC. Monog. Phan. v. 2 (1879) p. 552; Trim. Fl. Ceyl. v. 4, p. 352; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427; Watt, Dict. Econ. Prod. v. 1, p. 311. *Arum erubescens*, Dalz. & Gibs. Bo. Fl. (1861) p. 258 (*not* of Schott).

KONKAN: Western Ghâts, *Woodrow.* S. M. COUNTRY: between Râmghât and Belgaum in the rains, *Dalzell & Gibson.*—DISTRIB. India (Nipal, Khasia Hills, W. Peninsula); Ceylon.

3. **Arisæma Murrayi,** *Hook. in Bot. Mag.* (1848) t. 4388. Tubers of the size of small potatoes with root-fibres from the upper side. Leaf solitary, coming up after the flowers, peltate, divided to the base into 5–10 ovate-lanceolate acuminate segments 3–6 by 1–2 in.; petiole reaching 12 in. long. Peduncle 6–10 in. long, slender, reddish, round, smooth, coming up before the leaves. Spathe striate, 3–5 in. long, green at the base, forming a wide tube for more than $\frac{1}{3}$ its length; limb ovate, convex, acute, somewhat cucullate, pure white with a purple base. Spadix narrowed from the base upwards; appendage curved, narrowed from the base to the tip, included or exserted. Male flowers scattered, with a few neuters above them. Ovaries numerous, crowded, bright red when ripe, variously compressed. Heads in fruit conical. Fl. B. I. v. 6, p. 507; Dalz. & Gibs. p. 258; Engler, in DC. Monog. Phan. v. 2 (1879) p. 552; Woodr. in Journ. Bomb. Nat. v. 13 (1901)

p. 428; Watt, Dict. Econ. Prod. v. 1, p. 312. *Arum Murrayi*, Grah. Cat. Pl. Bo. (1839) p. 229.—Flowers: May–July. VERN. *Sápacha Kánda* (i. e. Snake root).

KONKAN: *Stocks*!; Matheran, *Cooke*! DECCAN: Mahableshwar, *Cooke*!, *Graham*, *Dalzell & Gibson*; Sinhagad, *Woodrow*; Purandhar, *Bhiva*!; Khandala, *Bhiva*! GUJARAT: Bansda Hill S.W. of Surat, *Law*.—DISTRIB. India (W. Peninsula).

Very common at Mahableshwar, where it is known to the residents as the *Cobra*- or *Snake*-Lily. It appears about the end of May or beginning of June all over the hill, its white flowers without leaves being conspicuous objects throughout the woods. It is equally common at Matheran.

4. **Arisæma caudatum,** *Engler, in DC. Monog. Phan.* v. 2 (1879) p. 559. Tuber depressed-globose. Leaf solitary; petiole stout and as well as the peduncle barred and streaked; leaflets 7, petiolulate, 5 by 2 in. (exclusive of the thread-like tips), cuneately elliptic, acuminate and with long capillary tips 1–3 in. long. Peduncle very short. Spathe 6 in. long (not including the 3 in. caudate tip); tube elongate, cylindric; limb incurved, ovate-lanceolate, rather abruptly narrowed into a very long subulate tail; margins below recurved. Spadix androgynous; appendage included, shorter than the flowering portion, not thickened below, the tip rounded. Fl. B. I. v. 6, p. 508; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428.

KONKAN: *Stocks* (Icon. in Herb. Kew.)!

The description given above is that of Sir Joseph Hooker, made from a drawing by Stocks which is in Herb. Kew. There are no specimens of the plant in Herb. Kew. Engler (*l. c.*) says that he has seen one badly dried specimen.

5. TYPHONIUM, Schott.

Tuberous herbs. Leaves entire, or 3–5-lobed, or pedatisect. Flowers monœcious. Tube of spathe short, convolute, with a constricted mouth, persistent; limb of spathe ovate-oblong, lanceolate, or linear, deciduous. Spadix usually exserted, with a long smooth barren appendage. Male and female inflorescences distant, with neuters above the females and sometimes also below the males. MALE INFLORESCENCE: Stamens 1–3; anthers subsessile, the cells contiguous, opening by pores or chinks; pollen globose. FEMALE INFLORESCENCE: Ovary 1-celled; placenta basal; ovules 1–2, erect; stigma sessile. Fruit of ovoid 1–2-seeded berries. Seeds globose; albumen copious; embryo axile.—DISTRIB. Tropics of the Old World; species about 17.

Leaves bearing bulbs; neuters above the female inflorescence linear	1. *T. bulbiferum.*
Leaves not bearing bulbs; neuters above the female inflorescence clavate or obovoid	2. *T. cuspidatum.*

1. **Typhonium bulbiferum,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 113. A small plant 4–8 in. high; tuber $\frac{1}{5}$–$\frac{1}{2}$ in. in diam. Leaves triangular-hastate, sagittate or cordate, 2–4 in. long and often as broad across the lobes, the angles acute; petiole 5–6 in. long, slender, usually with a pisiform tuber at the top. Peduncle 1–$2\frac{1}{2}$ in. long. Spathe slender, pale rose-colored, 3–5 in. long, convolute; tube $\frac{3}{8}$–$\frac{1}{2}$ in. long. Spadix as long as the spathe, slender, yellow; appendage filiform. Neuters above the female inflorescence linear, erect, yellow. Anthers

sessile, dehiscing by a terminal pore. Pollen rosy, hispid. Style 0. Fl. B. I. v. 6, p. 511; Dalz. & Gibs. p. 258; Engler, in DC. Monogr. Phan. v. 2 (1879) p. 611; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Watt, Dict. Econ. Prod. v. 6, part 4, p. 208.

KONKAN: *Stocks*!; S. Konkan, *Dalzell*, *Woodrow*.—DISTRIB. India (W. Peninsula).

2. **Typhonium cuspidatum,** *Decaisne*, *in Nouv. Ann. Mus. Par.* v. 3 (1834) p. 367. Tuber ¾–1 in. in diam., subglobose. Leaves 2–4½ in. long, of variable width, hastately or cordately oblong or lanceolate, acuminate; basal lobes short, subacute; sinus narrow or open; petiole 4–10 in. long. Peduncle slender, long or short. Spathe 4–7 in. long (including the tail), the lower portion lanceolate, produced into a slender tail which reaches as much as 5 in. long. Spadix shortly stipitate; appendage produced into a long filiform tail and as long as or longer than the spathe. Male inflorescence ¼ in. long, cylindric; female shortly cylindric. Neuters above the female inflorescence clavate or obovoid, purple-headed, those above the male subulate, white. Anthers minute, yellow. Ovary clavate, green. Fl. B. I. v. 6, p. 511; Engler, in DC. Monog. Phan. v. 2 (1879) p. 616; Trim. Fl. Ceyl. v. 4, p. 354; Prain, Beng. Pl. p. 1107. *Arum cuspidatum*, Blume, Cat. Hort. Buit. (1823) p. 101. *Arum flagelliforme*, Roxb. Hort. Beng. (1814) p. 65; Lodd. Bot. Cab. (1819) t. 396; Wight, Icon. t. 791.—Flowers: Aug.–Sept.

Rare. KONKAN: Parel near Bombay, *Ranade*!—DISTRIB. India (Bengal, Birma, W. Peninsula); Ceylon, Malay Peninsula and Islands.

6. THERIOPHONUM, Blume.

Tuberous monœcious herbs; stem 0. Leaves few, petiolate, always undivided, cordate or sagittate, appearing simultaneously with the flowers. Tube of spathe short, convolute, constricted at the mouth, persistent; limb deciduous. Spadix slender. Male and female inflorescences distant, the male with subulate neuters above and long narrow clavate ones immediately below it, the female of obconic ovaries at the base of the spadix, the interspace between the female inflorescence and lower neuters naked. Anthers sessile, globose. Ovary sessile, 1-celled; stigmas pulvinate; ovules many, some basilar and some pendulous from the apex of the cell, orthotropous. Berries ovoid or oblong.—DISTRIB. Species 5, all Indian.

1. **Theriophonum Dalzellii,** *Schott*, *Aroid.* (1853) p. 15. Tuber of the size of a walnut; stem 0. Leaves appearing with the flowers, 4–8 in. long, of variable breadth, elliptic, oblong, or linear, acute or subobtuse, base rounded or hastate, or sagittate; petiole 4–10 in. long. Peduncle stout, 3–6 in. long, from the sheathing base of the leaves, in fruit twisted and curved to the ground. Spathe 4–7 in. long, oblong-lanceolate; tube green when young, soon fading to white; limb flat, deep purple, rapidly fading. Appendage of spadix terete, elongate, purple at the base, greenish-yellow above. Anthers rosy-purple, opening by pores. Neuter flowers greenish-yellow. Ovary green; ovules 4–6, of which 1–3 are pendulous from the top of the cell of the ovary, the

remaining ones basal, erect. Fruit angular, 4–5-seeded. Fl. B. I. v. 6, p. 513; Engler, in DC. Monog. Phan. v. 2 (1879) p. 608; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428. *Tapinocarpus indicus*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 346; Dalz. & Gibs. p. 258. *Tapinocarpus Dalzellii*, Schott, Gen. Aroid. (1858) t. 15.—Flowers: July–Aug.

KONKAN: *Stocks*!, *Dalzell*!; Vingorla, *Dalzell*; moist grassy places in S. Konkan, *Dalzell & Gibson*; Kalyan, *Woodrow*! KANARA: Karwar, *Talbot*, 85!—DISTRIB. India (W. Peninsula).

7. **SAUROMATUM,** Schott.

Tuberous herbs leafing after flowering. Leaf solitary, pedatipartite with a long petiole. Flowers monœcious. Spathe with a short peduncle; tube cylindric, short, the margins connate below; limb very long, narrow, open, reflexed. Spadix sessile, very long, with a slender barren appendage as long as the spathe. Male and female inflorescences short, widely distant, dense-flowered, with a few large clavate neuters close above the females. MALE INFLORESCENCE: Anthers large, sessile, subcompressed, 4-lobed; cells contiguous, opposite, obovate-oblong, opening by terminal pores; connective at length prominent. FEMALE INFLORESCENCE: Ovary oblong, 1-celled, rounded at the apex; ovules 1–2, erect, basal; style very short or 0. Fruit of obpyramidal 1-seeded substipitate berries. Seeds globose or somewhat convex, with an obconic strophiole; albumen copious; embryo axile.—DISTRIB. Tropical Asia and Africa; species about 6.

1. **Sauromatum guttatum,** *Schott, in Schott & Endlich. Meletem.* (1832) p. 17. Tuber large. Leaf pedatisect, 6–12 in. broad; segments 7–15, variable, 2–15 by 1–3 in., elliptic, acuminate, deep green; midrib and veins impressed above, prominent beneath, the lower part of the midrib often spotted; petiole stout, 12–18 in. long, green or spotted. Peduncle rather short, stout, green or spotted. Spathe 12–28 in. long; tube ovoid or subglobose; limb linear-lanceolate, thick, green or yellowish, usually with dark purple spots or blotches, the margins generally purple and waved. Spadix shorter than the spathe; appendage 2–8 in. long, cylindric and obtuse, or narrowed from the base to a fine point, green or dark purple. MALE INFLORESCENCE ½ in. long, about 3 in. above the female. Anthers densely packed. FEMALE INFLORESCENCE ½ in. long. NEUTERS ½ in. long, spreading, close above the female. Fl. B. I. v. 6, p. 508; Engler, in DC. Monog. Phan. v. 2 (1879) p. 570; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1109. *Sauromatum punctatum*, C. Koch, in Wochenschr. v. 1 (1858) p. 263; N. E. Brown, in Gard. Chron. (1880) part 2, p. 134. *Arum sessiliflorum*, Roxb. Fl. Ind. v. 3 (1832) p. 507; Wight, Icon. t. 800.—Flowers: April. VERN. *Nurki.*

KONKAN: *Stocks*; Thana, *Law, Lisboa.* DECCAN: Máwal (Poona districts), *Woodrow*; Lanoli, *Woodrow*!—DISTRIB. India (Panjáb, Upper Gangetic Plain, Himalaya from Nipal to Simla, W. Peninsula).

The leaf figured as the leaf of *Pythonium Wallichianum* in the 'Journal of the Bombay Natural History Society' [v. 7 (1893) p. 312, plate D] is that of this plant. The inflorescence figured on the same plate is that of *Amorphophallus commutatus*, Engler.

8. **AMORPHOPHALLUS,** Blume.

Tuberous herbs flowering before or together with the leaves. Leaf solitary, 3-partite; segments pinnatisect. Flowers monœcious. Spathe with an open or convolute funnel-shaped or campanulate limb. Spadix exserted or included; appendage large, short or long. Inflorescence cylindric, dense-flowered; males and females contiguous; neuters 0. MALE INFLORESCENCE: Stamens 2–4; anthers sessile, the cells oblong, opening by apical pores. FEMALE INFLORESCENCE: Ovaries globose, 1–4-celled; ovules in each cell solitary, sub-basal, anatropous; style short or long; stigma entire or 2–4-lobed. Fruit of clustered subglobose or obovoid berries. Seeds large; albumen 0; embryo macropodous.—DISTRIB. Tropics of the Old World; species 30–40.

Leaves bulbiferous	1. *A. bulbifer.*
Leaves not bulbiferous.	
Spathe greenish-pink, 6–10 in. broad; appendage irregularly amorphous, dark-purple	2. *A. campanulatus.*
Spathe brownish-purple, 2–5 in. broad; appendage terete, smooth, cream-colored	3. *A. commutatus.*

1. **Amorphophallus bulbifer,** *Blume, Rumphia,* v. 1 (1835) p. 148. Tuber globose, 2–4 in. in diam. Leaf 12–18 in. in diam., ultimately bulbilliferous at the base, on the forks and on the nerves above; petiole 3–4 ft. long, spotted; leaflets 3–8 in. long, obovate or lanceolate, with purple edges. Peduncle 8–12 in. long, green and pink, streaked with green or black. Spathe 5–8 in. long, erect, pale-pink or yellowish shaded with pink, rose-pink inside. Spadix sessile; appendage 3–4 in. long, conoid or oblong, rounded at the top, pale flesh-colored or white. MALE INFLORESCENCE reaching 1½ in. long. Anthers short. FEMALE INFLORESCENCE 1 in. long. Stigma 2-lobed. Fl. B. I. v. 6, p. 515; Engler, in DC. Monog. Phan. v. 2 (1879) p. 317; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1109; Watt, Dict. Econ. Prod. v. 1, p. 225. *Arum bulbiferum,* Roxb. Hort. Beng. (1814) p. 65, Bot. Mag. t. 2072 & t. 2508; Grah. Cat. p. 229.—Flowers in April; leaves appear in June and July.

KONKAN: S. Konkan, *Graham.* S. M. COUNTRY: Londa, *Woodrow.* This is included on the authority of *Graham,* who gives the S. Konkan as its habitat, and of *Woodrow,* who reports its occurrence at Londa near Dharwar in the S. M. Country. I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew.—DISTRIB. India (Bengal, Sikkim, Khasia Hills, Birma, W. Peninsula).

2. **Amorphophallus campanulatus,** *Blume ex Decaisne, in Nouv. Ann. Mus. Par.* v. 3 (1834) p. 366. Tuber depressed-globose, 8–10 in. in diam., bulbiferous, dark brown. Leaves appearing long after the flowers, 1–3 ft. broad; segments spreading, simple or forked; petioles 2–3 ft. long, stout, warted, dark green, with paler blotches; leaflets 2–5 in. long, of variable width, obovate or oblong, acute, strongly many-veined, with green edges. Peduncle short, stout, elongating in fruit; sheaths linear-oblong. Spathe campanulate, pointed, 6–10 in. broad, strongly closely veined, with recurved undulate and crisped margins, greenish-pink externally with pale ocellated blotches, base within purple. Spadix as long as the spathe; appendage varying in size up to 8 by 5 in., globose, conoid or amorphous, sinuately lobulate,

dark red-purple, spongy within. MALE INFLORESCENCE subturbinate, about 3 in. long, 1–2 in. in diam. Anthers densely crowded, pale-yellow; pollen golden-yellow. FEMALE INFLORESCENCE 3 in. long or more, reaching 2½ in. in diam. Ovaries densely crowded, sessile, depressed-globose; style ½ in. long, stout, ascending, purple; stigma large, 2–3-lobed. Berries red, 2–3-seeded, obovoid. Fl. B. I. v. 6, p. 513; Dalz. & Gibs. p. 259; Engler, in DC. Monog. Phan. v. 2 (1879) p. 309; Trim. Fl. Ceyl. v. 4, p. 355; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1109; Watt, Dict. Econ. Prod. v. 1, p. 225. *Arum campanulatum*, Roxb. Cor. Pl. v. 3 (1819) p. 68, t. 272; Grah. Cat. p. 228; Wight, Icon. t. 785.—VERN. *Suran.*

Cultivated in Bombay gardens for the large tuberous roots which are eaten; also to a considerable extent in the Deccan and Gujarat. Dalzell says that it grows wild on the banks of rivers in the Southern Konkan.—DISTRIB. Cultivated largely throughout the plains of India and Ceylon.

3. **Amorphophallus commutatus,** *Engler, in DC. Monog. Phan.* v. 2 (1879) p. 319. Annual; tuber oblate-spherical, 4 by 2 in., depressed above. Leaf solitary, appearing a month or more after the flowers, about 2 ft. in expansion, 3-sect *, each primary division 2-sect; petiole reaching 2 ft. long by ¾ in. in diam., tapering upwards, solid, rough and variously spotted. Leaflets: 1 terminal 4½ by 2 in., 2 decurrent on each side and 2 below the bifurcation, reducing in size downwards. Peduncle 1–3 ft. long by about ¾ in. in diam. at the base, tapering upwards, variously spotted with purple and white and rough with minute spinules; cataphylls 2 (sometimes 3), sheathing the base of the peduncle, pale rose-colored, acute, the longest about 4 in. long. Spathe thick, brownish-purple outside, pinkish-purple inside, 6–10 by 2–5 in., ovate-lanceolate, acute or acuminate, broadest at the middle, rough inside at the base, obtuse at the tip. Spadix sessile, columnar; appendage as long as or longer than the spathe, cream-colored, terete, smooth, not contracted above the inflorescence, the tip obtuse. MALE INFLORESCENCE 1–2 in. long. Anthers sessile, at first round, straw-colored, changing to brownish-purple and becoming enlarged and irregularly quadrate in outline. FEMALE INFLORESCENCE: Ovaries numerous, 1-celled; ovule solitary; stigma sessile, discform, orange-red. Fl. B. I. v. 6, p. 515; Lisboa, in Journ. Bomb. Nat. v. 10 (1896) p. 527; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428. *Amorphophallus sylvaticus*, Dalz. & Gibs. Bo. Fl. (1861) p. 259 (*not* of Kunth). *Dracontium polyphyllum*, Grah. Cat. Pl. Bo. (1839) p. 229 (*not* of Denst.). *Pythonium Wallichianum*, Kirtikar, in Journ. Bomb. Nat. v. 7 (1893) p. 312 (*not* of Schott) the flower only.—Flowers: May–June. VERN. *Shevla.*

KONKAN: *Stocks, Graham*; S. Konkan, *Dalzell & Gibson*; Western Ghâts from Bombay to Kumpta, *Lisboa*; Marmagão, *Woodrow*!; Matheran, *Cooke*!, *Lisboa*; near Kalyan, *Woodrow*; Shevdi near Bombay, *Woodrow.*—DISTRIB. India (W. Peninsula).

The appearance of the leaves so long after the flowers has rendered it difficult to obtain authentic specimens of the former until the plant was grown by Woodrow in the Botanical Garden of the College of Science at Poona and specimens sent to Kew. The late Dr. Lisboa has described the plant at great length from Woodrow's

* Woodrow has sent to Herb. Kew. an abnormal 5-sect leaf from a tuber planted in the College of Science Bot. Garden at Poona.

specimens in the 'Journal of the Bombay Natural History Society,' v. 10 (1896) p. 527.

The plant is very common at Matheran, where its flowers appear about the end of May. When the anthers are ripe, the odor of the plant is most offensive, resembling carrion, and visitors to the Hill often complain of *defective conservancy* at this time.

9. **ARIOPSIS,** Nimmo.

A small tuberous herb. Leaves entire, peltate. Spathe small, cymbiform, open, persistent; tube 0. Spadix shorter than the spathe; appendage 0. Male flowers cylindric; female adnate to the base of the spathe. MALE INFLORESCENCE: Flowers imbedded in the tissue of the spadix. Anthers connate in groups of 3, each 2-celled, surrounding a pore into which they all open. FEMALE INFLORESCENCE: Ovaries few, oblong, 1-celled, secund; ovules many, orthotropous, 2-seriate, on 4–6 parietal placentas; stigma sessile, stellately 4–6-fid. Berries 3–6-angled, many-seeded. Seeds pendulous; albumen copious; embryo axile.—DISTRIB. Species 1, Indian.

1. **Ariopsis peltata,** *Nimmo, ex Grah. Cat. Pl. Bo.* (1839) p. 252. A small plant; tubers small, green, clustered, with many slender root-fibres. Leaf solitary, 1–6 in. in diam., membranous, peltate, orbicular or shallowly cordate, tip rounded or acute, glaucous beneath; petiole 3–8 in. long, slender. Peduncle 1½–4 in. long, very slender; cataphylls 2 or 3, white spotted with purple, ½–¾ in. long. Spathe ½–⅞ by ⅜–½ in., incurved, apiculate, violet with a green dorsal ridge, paler within. Spadix shorter than the spathe, decurved; appendage 0. Male flowers dark purple; female flowers green. Stigma yellow. Fl. B. I. v. 6, p. 519; Dalz. & Gibs. p. 259; Engler, in DC. Monog. Phan. v. 2 (1879) p. 528; Bot. Mag. t. 4222; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428. *Ariopsis protanthera,* N. E. Brown, in Rep. Roy. Gard. Kew (1877) p. 51. *Remusatia vivipara,* Wight, Icon. t. 900 (*not* of Schott). —Flowers: June–Sept.

KONKAN: *Stocks!, Dalzell & Gibson*; Neral below Matheran, *Woodrow.*—DISTRIB. India (W. subtropical Himalaya, Birma, W. Peninsula).

10. **REMUSATIA,** Schott.

Tuberous herbs, emitting long leafless bulbilliferous shoots from the crown of the tuber. Leaf solitary, entire, peltate, coming up after the flowers. Flowers monœcious. Spathe coriaceous, shortly stipitate; tube convolute, constricted at the mouth, accrescent over the fruit; limb broad or narrow, erect, or spreading and reflexed, deciduous. Spadix very short, sessile; appendage 0. Male and female inflorescences distant, with interspersed neuters. MALE INFLORESCENCE forming a clavate mass of densely packed flat-topped anthers mixed with neuters, the individual stamens with a fleshy connective bearing 2–3 small immersed anther-cells opening by terminal slits. FEMALE INFLORESCENCE short, cylindric. Ovaries closely packed, ovoid, 1-celled; ovules many, on parietal placentas, orthotropous; stigma sessile, discoid. Fruit of small clustered berries. Seeds small; albumen copious; embryo axile.—DISTRIB. Species 2, Indian.

1. **Remusatia vivipara,** *Schott, in Schott & Endlich. Meletem.* (1832) p. 18. Tubers 1–1½ in. in diam., clustered, depressed, rooting from the crown; bulbilliferous shoots 6–12 in. long, as thick as a goose-quill, simple or shortly branched, ascending, flexuous, bearing at the nodes clusters of oblong, squarrosely scaly bulbils $\frac{1}{10}$–$\frac{1}{4}$ in. long. Leaves peltate, 5 by 3½ to 18 by 12 in., membranous, orbicular-ovate or -cordate, acute or acuminate, with strong main nerves and fine venation between them; petiole 6–12 in. long, with a short sheath. Spathe 4–5 in long, coriaceous; tube 1-2 in. long, oblong or ovoid, green; limb 2–3 in. long, broadly orbicular-ovate or ovate-cordate, 2–3 in. broad, golden-yellow. Spadix 1–1½ in. long; the male inflorescence ¼ in. long. The plant rarely flowers, but sends up long bulbilliferous shoots from the crown of the tuber. Fl. B. I. v. 6, p. 521; Dalz. & Gibs. p. 259; Engler, in DC. Monog. Phan. v. 2 (1879) p. 496; Trim. Fl. Ceyl. v. 4, p. 358; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1113. *Arum viviparum*, Roxb. Fl. Ind. v. 3 (1832) p. 496; Grah. Cat. p. 228; Wight, Icon. t. 798.

KONKAN: both Konkans, *Nimmo* ex *Graham*; in the clefts of trees in Ghát jungles, *Dalzell & Gibson*; Neral below Matheran, *Bhiva*! DECCAN: Lanoli, *Woodrow*; Khandala, *Woodrow*; Koina Valley below Mahableshwar, *Cooke*!—DISTRIB. India (subtropical Himalaya, Khasia Hills, Chota Nagpur, W. Peninsula); Ceylon, Java.

11. POTHOS, Linn.

Evergreen branching shrubs, climbing by aerial roots. Leaves distichous, obliquely linear to ovate, the blade sometimes obsolete; petiole winged or leaf-like, sheathing at the base. Flowers hermaphrodite, all fertile. Peduncles axillary or infra-axillary, leafy, or sheathed, or naked. Spathe small, ovate or concave, coriaceous, persistent. Spadix shorter than the spathe, stipitate. Perianth of 6 segments with hooded tips. Stamens 6; filaments short or long, linear or dilated; anthers terminal, dehiscing by extrorse chinks. Ovary ovoid, oblong, or depressed, 3-celled; ovule solitary in each cell, anatropous, adnate to the inner angle; stigma small, sessile, hemispheric. Berries ellipsoid, often compressed; testa thick; albumen 0; embryo macropodal.—DISTRIB. Tropical Asia, Australia and the Pacific Islands, one species in Madagascar; species about 50.

1. **Pothos scandens,** *Linn. Sp. Pl.* (1753) p. 968. A climbing plant clothing trees and walls like ivy; stem as thick as the little finger, much branched, tough, terete, smooth, leafy; internodes ½–1 in. long. Leaves very variable, 2–4 by ½–2 in., obovate, elliptic or lanceolate, acute, acuminate or apiculate, coriaceous, bright green, base cuneate or rounded; petiole broadly winged, 1–3 by ¼–⅔ in., the base ½-amplexicaul. Peduncles ⅛–⅜ in. long, the base clothed with ovate acute imbricating cataphylls about ⅛ in. long. Spathe ⅛–¼ in. long, cymbiform, cuspidate, green. Spadix yellow, as long as the spathe, stipitate, globose, ovoid, or shortly oblong, the stipes as long as the inflorescence. Anthers terminal, minute, the cells divaricate. Ovary 3-celled, truncate; stigma minute, lobulate. Berries ½–⅔ in. long, oblong, scarlet, few ripening. Fl. B. I. v. 6, p. 551; Grah. Cat. p. 229; Dalz. & Gibs. p. 257; Engler, in DC. Monog. Phan. v. 2 (1879) p. 84; Trim. Fl. Ceyl. v. 4, p. 364; Woodr.

in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1115.—Flowers: May–July.

KONKAN: *Stocks*!; in dense jungles, *Graham*; Goa jungles, *Dr. Lush* ex *Graham*; Ghát jungles, pretty common, *Dalzell & Gibson*; ravines about Pár (below Mahableshwar), *Graham*; Marmagão, *Bhiva*! KANARA: Kadgal (N. Kanara), *Woodrow*.—DISTRIB. Throughout India; Ceylon, Malay Islands, China.

Pothos aurea, Linden ex André, in Illustr. Hortic. v. 27 (1880) p. 69, t. 381. A showy plant. Leaves 15 by 10 in., ovate, cordate, acute, thick, fleshy, strikingly variegated, of a dark green, boldly and irregularly marked by bands or fantastic-shaped blotches of yellow varying in intensity from cream to orange. Introduced into England from the Salomon Isles in 1880. In the cemetery in Sewree, Bombay, which is close to the sea, very fine specimens may be seen (*Woodrow*). Woodr. Gard. in Ind. ed. 5, p. 545.

Pothos nitens, Bull, Cat. (1887) p. 11. A native of the Eastern Archipelago, grown in conservatories and gardens. Leaves ovate, acute, slightly and unequally cordate at the base, of a dark shining bronzy-purplish green. Woodr. Gard. in Ind. ed. 5, p. 545.

EXCLUDED SPECIES.

SYNANTHERIAS SYLVATICA, Schott, Gen. Aroid. (1858) t. 28. Tuber 1–2½ in. in diam., bulbilliferous. Leaves 1½–2½ ft. in diam.; petiole 1–2 ft. long, pale green with darker streaks. Leaflets few, ovate-lanceolate or oblanceolate. Spathe 1–4 in. long, pale pink spotted with green, purple within towards the base. Appendage of spadix reaching 7 in. long, purple, smooth. Male and female inflorescences distant, with interposed neuters. Fl. B. I. v. 6, p. 518; Trim. Fl. Ceyl. v. 4, p. 357.

I cannot find any satisfactory evidence of the occurrence of this as a Bombay plant. Engler [DC. Monog. Phan. v. 2 (1879) p. 320] gives Bombay as its habitat from the specimens in the Herbarium of Hooker and Thomson, which were however obtained from the Nilghiri Hills and Kurg, localities quite outside the Bombay Presidency. There is in Herb. Kew. a solitary specimen which was presented to the Glasgow Botanic Garden by Mrs. Nimmo, but this is accompanied by no authentic note of locality and may have been collected anywhere. Woodrow gives Marmagão in his list, but the Marmagão plant is *Amorphophallus commutatus*, Engl., which, though quite distinct, has often been mistaken for this.

The plant occurs in S. India and is common in the drier parts of Ceylon.

The following non-indigenous plants not belonging to any of the foregoing genera are more or less cultivated:—

Colocasia Antiquorum, Schott, in Schott & Endlich. Meletem. (1832) p. 18. Rootstock tuberous. Leaves large, ovate, with a broad triangular basal sinus. Spathe 8–18 in. long, caudate-acuminate, erect, pale yellow. Cultivated throughout the hotter parts of India and in all warm regions. All parts of the cultivated plants are eaten, but especially the starch from the tubers which attain 6 in. in diam. Fl. B. I. v. 6, p. 523; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1112; Watt, Dict. Econ. Prod. v. 2, p. 509. *Arum Colocasia*, Linn.

Sp. Pl. (1753) p. 965; Roxb. Fl. Ind. v. 3 (1832) p. 494; Grah. Cat. p. 228. *Caladium ovatum*, Grah. Cat. p. 229 (*not* of Vent.). —VERN. *Alu.*

Alocasia indica, Schott, in Oestr. Bot. Wochenbl. (1854) p. 410. A stout herb; rootstock suberect, large, 3–8 ft. long, 3–8 in. thick with few soboli. Leaves large, ovate, deeply sagittately cordate; lobes rounded, the sinus narrow. Spathe 8–12 in. long, pale yellowish-green. Fl. B. I. v. 6, p. 525; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1111; Watt, Dict. Econ. Prod. v. 1, p. 178. *Arum indicum*, Roxb. Fl. Ind. v. 3 (1832) p. 498; Wight, Icon. t. 794.

Cultivated in native gardens. The stems and rootstocks are eaten. In Bengal they form an important article of food.

Alocasia macrorhiza, Schott, in Schott & Endlich. Meletem. (1832) p. 18. A very stout herb; rootstock suberect, very large, 6–16 ft. long and as thick as a man's arm. Spathe 6–10 in. long, fragrant. A native of Tropical Asia, Australia, and the Pacific Islands. Occasionally grown in native gardens. Fl. B. I. v. 6, p. 526; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1111. *Alocasia odora*, Watt, Dict. Econ. Prod. v. 1, p. 178.

Alocasia metallica, Hook. in Bot. Mag. (1860) t. 5190 (*not* of Schott). A slow-growing plant with leaves 12–18 in. long of a rich bronze color on the upper, purple on the lower side, a native of Borneo, often grown in conservatories; a very ornamental plant.

Alocasia Lowii, Hook. in Bot. Mag. (1863) t. 5376. A very ornamental plant when well grown, a native of Borneo. Leaves 14–16 in. long, cordate-sagittate, olive-green, with thick white ribs, deep purple beneath. Woodr. Gard. in Ind. ed. 5, p. 532.

Caladium. The plants of this genus, which contains perhaps 10 true species all natives of South America, have been so hybridized chiefly from *Caladium bicolor*, Vent., that the florists' varieties have become very numerous. Bull of Chelsea in a list of Caladiums quoted by Woodrow (Gard. in Ind. ed. 5, p. 535) gives about 90 varieties of *Caladium*, several of which have been introduced into Indian gardens, where their ornamental leaves are striking objects between May and October.

Anthurium. Several varieties of this genus have been recently introduced into gardens and conservatories. Some of the hybrids are extremely handsome.

Acorus Calamus, Linn. Sp. Pl. (1753) p. 324. Rootstock as thick as the middle finger, creeping and branching, very aromatic. Leaves 3–6 ft. by $\frac{3}{4}$–$1\frac{1}{4}$ in. Cultivated in native gardens and easily established, though not indigenous. Throughout Asia, Europe, and N. America: known as the *Sweet Flag* in England; formerly used to strew the floors of apartments. Fl. B. I. v. 6, p. 555; Grah. Cat. p. 230; Dalz. & Gibs. Suppl. p. 96; Trim. Fl. Ceyl. v. 4, p. 365; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Watt, Dict. Econ. Prod. v. 1, p. 99. —VERN. *Yekand.*

The root is used medicinally and to keep insects from clothes.

Rhaphidophora pertusa, Schott, in Bonplandia, Jahrg. 5 (1857) p. 45. A lofty epiphytic climber; stem cylindric, reaching 1½ in. in diam., green, smooth, leafy. Leaves 8–18 by 6–10 in., broadly ovate, cuspidate, dark green, often with oblong holes at one side. Spathe shortly pedunculate, yellow. A native of S. India, Ceylon (rare), and the Malay Islands, grown in gardens. Fl. B. I. v. 6, p. 546; Trim. Fl. Ceyl. v. 4, p. 361; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428. *Scindapsus pertusus*, Schott, in Schott & Endlich. Meletem. (1832) p. 21; Wight, Icon. t. 781. *Pothos pertusa*, Roxb. Hort. Beng. (1814) p. 83; Grah. Cat. p. 230.

Order CXLII. LEMNACEÆ.

Small or minute gregarious aquatic herbs, scale-like or globular, without roots or with capillary ones, propagated by buds or bulbils, rarely by seed. Fronds smooth above, spongy below. Flowers monœcious, 1–3, naked or enclosed in a membranous spathe. Perianth 0. Male flowers: Stamens 1 or 2; anthers 1- or 2-celled, the cells superposed, dehiscing by transverse slits. Female flowers: Ovary sessile, 1-celled, narrowed into a funnel-shaped style; ovules 1–7, basal, erect or horizontal; stigma simple. Fruit a minute flask-shaped utricle indehiscent or opening circumscissilely. Seeds erect or horizontal, 1–7; testa coriaceous; albumen fleshy or 0; embryo cylindric, axile.—Distrib. Species about 20, cosmopolitan.

Fronds flat, with 1 or more roots, bearing the flowers in marginal clefts; anthers 2-celled; filaments slender	1. Lemna.
Fronds minute, like grains of sand, rootless, proliferous, bearing the flowers on the upper surface; anthers sessile, 1-celled	2. Wolffia.

1. LEMNA, Linn.

Small herbs; fronds with one or more capillary roots rising from the side or the base. Flowers in marginal clefts of the frond, at first enclosed in a small spathe. Male flowers in pairs, one of each pair opening before the other. Stamen solitary; filaments filiform or enlarged in the middle, recurved; anthers 2-celled, globose, the cells dehiscing by transverse slits; pollen muricate. Female flower: a solitary ovary close to the male; ovules 1–7, anatropous, semianatropous, or orthotropous. Fruit a utricle, 1–7-seeded. Seeds erect or horizontal; embryo conic or ovoid.—Distrib. Species 17, cosmopolitan.

Root solitary.	
Fronds tailed, translucent, thin, the young hastate, set crosswise to the parent frond; seed horizontal	1. *L. trisulca.*
Fronds not tailed, opaque, thick, the young fronds sessile; seed erect	2. *L. gibba.*
Roots many	3. *L. polyrhiza.*

1. **Lemna trisulca,** *Linn. Sp. Pl.* (1753) p. 970. Fronds submerged, ¼–¾ in. long (not including the tail, which often attains ½ in. long), translucent, thin, flat, elliptic-lanceolate or oblanceolate, crenate-serrate near the apex, the young fronds hastate, at length tailed and attenuated into a stalk by which they remain attached to the parent frond, each frond giving rise to a single root-fibre; root-cap acute. Ovule solitary. Seed semianatropous, horizontal; testa rough, grooved.

The young fronds rise at right angles from one or both sides of the parent frond and remain connected with it crosswise. Fl. B. I. v. 6, p. 557; Dalz. & Gibs. p. 281; Engler, in Engl. & Prantl, Pflanzenf. v. 2, part 3, p. 160, fig. 104; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 17, t. 1394; Boiss. Fl. Orient. v. 5, p. 29; Prain, Beng. Pl. p. 1116; Watt, Dict. Econ. Prod. v. 4, p. 620.

In ponds and tanks in the Konkan, not common.—DISTRIB. Temperate and tropical regions.

2. **Lemna gibba,** *Linn. Sp. Pl.* (1753) p. 970. Fronds floating, suborbicular or obovate, entire, not tailed, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., opaque, thick, flat above, at length very convex beneath, the young fronds sessile, each giving rise to a single root-fibre, the under surface at length spongy and greatly swollen; root-sheath elongate, cylindric; root-cap acute. Stamens 2. Utricle opening circumscissilely. Seeds erect, anatropous; albumen scanty or 0. Fl. B. I. v. 6, p. 556; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Boiss. Fl. Orient. v. 5, p. 30; Watt, Dict. Econ. Prod. v. 4, p. 620; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 22, t. 1396.—Flowers: Sept.

DECCAN: Boshri near Poona, *Woodrow.*—DISTRIB. Cosmopolitan.

3. **Lemna polyrhiza,** *Linn. Sp. Pl.* (1753) p. 970. Fronds herbaceous, not tailed, floating, opaque, thick, flat above, slightly convex below, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., dark green above, usually purplish beneath, 7-veined; epidermal cells with sinuous walls; young fronds sessile, each frond giving rise to a tuft of root-fibres. Spathe 2-lipped. Stamens 2. Ovules 1–2, semianatropous. Fl. B. I. v. 6, p. 557; Trim. Fl. Ceyl. v. 4, p. 367; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1117; Watt, Dict. Econ. Prod. v. 4, p. 620; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 23, t. 1397. *Spirodela polyrhiza,* Schleid. in Linnæa, v. 13 (1839) p. 392; Engler, in Engl. & Prantl, Pflanzenf. v. 2, part 3, p. 154, fig. 101 A.—Flowers: Sept.

DECCAN: Poona, *Woodrow.*—DISTRIB. Cosmopolitan.

2. **WOLFFIA,** Horkel.

Very minute herbs, flattish, globose or conically produced below, rootless. Flowers inserted in a groove on the upper surface of the plant. Spathe 0. MALE FLOWER solitary. Stamen solitary; filament short or long; anther globose, 1-celled; pollen smooth. FEMALE FLOWER solitary, close to the male. Ovary globose or ovoid; ovule solitary, orthotropous. Fruit a spherical utricle. Seed globose, erect; testa thick; albumen scanty.—DISTRIB. Europe, East Indies, Tropical Africa, Tropical and Temperate America; species 12.

1. **Wolffia Michelii,** *Schleid. Beitr. Bot.* (1844) p. 233. A minute floating annual herb. Fronds opaque, ovate-oblong or subglobose, $\frac{1}{20}$ in. long or less, convex on both surfaces, not tailed, rootless; young fronds solitary and sessile from the very base of the parent frond. Jackson, Index Kewen. v. 4 (1895) p. 1233. *Wolffia arrhiza,* Hork. ex Wim. Fl. Schles. ed. 3 (1857) p. 140; Hook. f. Fl. B. I. v. 6, p. 557; Woodr.

in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1117. *Lemna globosa*, Roxb. Hort. Beng. (1814) p. 66; Grah. Cat. p. 252; Dalz. & Gibs. p. 281. *Lemna arrhiza*, Linn. Mantiss. 2 (1771) p. 294; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 24, t. 1398.

Tanks throughout the Presidency common, covering the water like a green scum.

Order CXLIII. ALISMACEÆ.

Aquatic or marsh herbs, usually erect, sometimes floating. Leaves radical or clustered at the nodes of floating stems, entire, petiolate, often pellucid-dotted or lineolate. Flowers pedicellate, regular, 1-sexual or hermaphrodite, in umbellate or paniculate whorls, usually white or pink; bracts 3 or more, membranous; bracteoles small. Perianth-segments 6 in 2 series, the 3 outer (*sepals*) herbaceous, the inner whorl petaloid, rarely obsolete. Stamens 6 or more (rarely 3), hypogynous or perigynous; anthers erect, basifixed, 2-celled, dehiscing by lateral or dorsal longitudinal slits. Carpels 3–6 or more, 1-celled, sessile or stipitate on a flat or raised receptacle; ovules 1 or more in each carpel; placentas on the inner angle (rarely ovule solitary and basal); style long or short (rarely 0) subterminal or ventral; stigma simple. Fruit of small achenes or follicles. Seeds small or minute; albumen 0; embryo straight or conduplicate.—Distrib. Genera 12; species about 60, cosmopolitan.

Fruit indehiscent of 3 or more achenes.	
Flowers polygamous; stamens 6; receptacle flat	1. Limnophyton.
Flowers 1-sexual; stamens usually many (rarely as few as 6); receptacle globose or oblong	2. Sagittaria.
Flowers monœcious; stamens 3; receptacle small, tumid	3. Wisneria.
Fruit dehiscent of 6–7 follicles; stamens 8–12; flowers hermaphrodite	4. Butomopsis.

1. LIMNOPHYTON, Miquel.

A scapigerous stemless palustrine perennial herb with milky juice. Leaves sagittate, erect. Flowers polygamous (male and hermaphrodite), white, in paniculate whorls. Scapes stout. Receptacle flat. Sepals 3, herbaceous, persistent. Petals 3, membranous, deciduous. Stamens 6 in 2 series, largest in the male flowers; filaments compressed. Carpels 15–20, obsolete in the male flowers; ovule solitary, anatropous, basal; stigma small on a ventral style. Fruit of several compressed or turgid hard achenes. Seeds erect, basal; testa membranous; embryo horseshoe-shaped.—Distrib. Asia and Tropical Africa; species 1.

1. **Limnophyton obtusifolium,** *Miq. Fl. Ind. Bat.* v. 3 (1855) p. 243. Rootstock short, stout, with numerous long root-fibres. Leaves all radical, 6–12 by 4–8 in. (sometimes as broad as long), reniformly or deltoidly sagittate or triangular, acute or subobtuse, or with rounded tip; basal lobes long, tapering to a fine point, spreading, as long as the rest of the blade, the sinus very broad, open; primary nerves 6–8 pairs, radiating from the top of the petiole, with irregular reticulate venation between them; petiole 1–3 ft. long, stout, striate, channelled above. Panicle with a stout angular scape 2–4 ft. long; branches long, erecto-patent, the lower branches usually in 4 whorls; bracts whorled, broadly ovate-lanceolate, acuminate, with many parallel

nerves, the lower reaching 1 in. long. Flowers many, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., white, in whorls at the nodes of the branches of the panicle 4–15 in a whorl, the upper whorls mostly male, the lower hermaphrodite; pedicels 1–3 in. long, those of the male flowers more slender than the female. Sepals 3, orbicular-ovate, concave, ribbed, green. Petals 3, broadly obovate, $\frac{1}{6}$ in. long and broad. Filaments 6, flattened, with dilated bases. Achenes in a globose head $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., obovoid, turgid, wrinkled. Fl. B. I. v. 6, p. 560; Micheli, in DC. Monog. Phan. v. 3 (1881) p. 39; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1119. *Sagittaria obtusifolia*, Linn. Sp. Pl. (1753) p. 993; Grah. Cat. p. 199; Dalz. & Gibs. p. 249.—Flowers: Feb. VERN. *Nalkut.*

KONKAN: *Stocks!*; tanks throughout the Konkans, *Graham.* KANARA: Halyal tank, *Ritchie*, 1390! GUJARAT: *Dalzell & Gibson*: Ankleshwar near Broach, *Woodrow.*—DISTRIB. India (W. Peninsula); Ceylon, Tropical Africa, Madagascar.

2. **SAGITTARIA,** Linn.

Erect, stemless, usually perennial aquatic herbs. Leaves with long petioles, elliptic, cordate or sagittate. Flowers 1-sexual or polygamous, in paniculate or spicate whorls. Sepals 3, herbaceous, persistent. Petals 3, membranous, deciduous. Stamens in male flowers about 24 with only staminodes in the female flowers, or 6–10 in the male flowers with 9–12 in the hermaphrodite; filaments filiform, compressed. Carpels very many, crowded on a large globose or oblong receptacle, flattened laterally. Ovary solitary, basal; style ventral or apical; stigma papillose. Fruit a globose or oblong head of flattened crested or winged achenes. Seed erect, basal; testa thin; embryo horseshoe-shaped.—DISTRIB. Species about 15, temperate and tropical.

1. **Sagittaria sagittifolia,** *Linn. Sp. Pl.* (1753) p. 993. Rhizome thick, tuberous, stoloniferous. Leaves radical, 2–8 in. long, very variable, the first leaves of the young plants very slender and very acute, the next one or two simply cordate-oblong, the rest sagittate, acute, smooth, with more or less divergent basal lobes which are 2–3-nerved and narrower than the upper part of the blade, which latter is oblong or lanceolate, acute, 5-nerved, the nerves extending from the top of the petiole to the apex of the leaf; petioles sometimes reaching nearly 2 ft. long, 3-gonous. Scape 6–18 in. long. Flowers $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., white, often with a purple claw, in 3–5 whorls along the scape with 3-5 (usually 3) flowers in each whorl, the lower whorls female, the upper male, with longer pedicels (hermaphrodite flowers occur sometimes, but rarely); bracts narrowly ovate, membranous. Sepals ovate, acute, much smaller than the petals. Petals large, broadly obovate. Filaments in the male flowers very many, absent in the female flowers; anthers sagittate. Achenes obliquely obovate, flattened, apiculate, winged, the wings broad, entire or subcrenate. Fl. B. I. v. 6, p. 561; Grah. Cat. p. 199; Buchenau, in Engl. & Prantl, Pflanzenf. v. 2, part 1, p. 231, fig. 176; Micheli, in DC. Monog. Phan. v. 3 (1881) p. 66; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1120; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 68, t. 1436; Watt, Dict. Econ. Prod. v. 6, part 2, p. 383.—Flowers: Sept.

Rare in the Bombay Presidency. KONKAN: *Stocks!*; Malwán, *Woodrow.*—DISTRIB. Europe, Asia, N. America.

3. **WISNERIA,** Micheli.

Scapigerous marsh herbs. Leaves radical, long-petiolate, narrowly lanceolate. Flowers monœcious, in remote involucrate whorls on a slender rhachis; involucre campanulate, truncate, membranous. Sepals 3, equal or one longer, persistent. Petals 2–4, equalling or smaller than the sepals. MALE FLOWERS: Stamens 3. Pistillodes subulate. FEMALE FLOWERS: Staminodes 3, setaceous. Carpels 3–6, erect, ovoid; receptacle small, tumid; ovule solitary, basal; style 0 or terminal; stigma minute. Achenes and seed subglobose or compressed; testa thin; embryo horseshoe-shaped.—DISTRIB. Asia, Africa, and Madagascar; species 3.

1. **Wisneria triandra,** *Micheli, in DC. Monog. Phan.* v. 3 (1881) p. 82. A herb about 1 ft. high; root fibrous. Leaves glabrous, long-petiolate, longer than the scape, reaching with the petiole 9–15 in. long, the blade less than ½ in. broad, narrowly linear-spathulate, obtusely keeled on the back; midrib stout, penninerved, the lateral nerves slender, submarginal; petioles terete, sheathing at the base, twice as long as the leaf-blade. Scape erect, simple, terete, 5–6 in. high, floriferous at the apex, obtusely 3-gonous. Whorls of flowers 6–8, of which the 1–2 lower consist of females, the upper of males. Flowers white, usually 3 in a whorl; pedicels short, longer than the bracts; bracts connate, sheathing, obtuse. Sepals 3, linear-oblong. Petals 3, shorter than the sepals. MALE FLOWERS: Stamens 3, opposite the sepals; anthers didymous; filaments short. FEMALE FLOWERS: Achenes few, subglobose or obovoid, smooth. Fl. B. I. v. 6, p. 562; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429. *Sagittaria triandra,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 144; Dalz. & Gibs. p. 249.—Flowers: Aug.

KONKAN: Malwán, *Dalzell!, Woodrow.*—DISTRIB. India (W. Peninsula).

4. **BUTOMOPSIS,** Kunth.

An annual scapigerous marsh herb with milky juice. Leaves radical, elliptic, acute. Flowers hermaphrodite, umbellate on a scape; whorls sometimes superposed, bracteate. Sepals 3, herbaceous, persistent. Petals 3, membranous, deciduous, white, larger than the sepals. Stamens 8–12 (usually 9), hypogynous; 6 outer in pairs opposite the sepals, sometimes one of a pair obsolete; 3 inner single, opposite the petals, sometimes one or more replaced by a pair; filaments filiform; anthers oblong. Carpels 6–9, whorled, on a flat receptacle, sessile, shortly connate below, 1-celled; ovules many, small, on reticulate parietal placentas, ascending, anatropous; style short. Fruit of 6–7 erect membranous follicles. Seeds numerous, minute, parietal, smooth; embryo conduplicate, horseshoe-shaped.—DISTRIB. Asia, Africa, Tropical Australia; species 2.

1. **Butomopsis lanceolata,** *Kunth, Enum.* v. 3 (1841) p. 165. Rhizome small, sending out leaves above, fibrous roots below. Leaves 2–6 by ⅝–2¼ in., elliptic-lanceolate, acute, membranous, quite entire, attenuated into the petiole; main nerves 5–7; petioles dilated at the base, reaching 8 in. long. Scape usually longer than the leaves, stout,

bearing an umbel of 3–20 flowers at its apex; bracts below the umbel scarious, ½–⅝ in. long, ovate, acute; pedicels very variable in length, 1–6 in. long in the same umbel. Sepals 3, herbaceous, ⅓ by ¼ in., elliptic, obtuse, reticulately veined, persistent. Petals white, fugacious. Follicles 6–7, reticulately veined, tapering into short beaks. Seeds very numerous, oblong, with rounded ends, about $\frac{1}{10}$ in. long, dark brown, shining. Fl. B. I. v. 6, p. 562; Dalz. & Gibs. p. 249; Micheli, in DC. Monog. v. 3 (1881) p. 87; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1120. *Butomus lanceolatus*, Roxb. Hort. Beng. (1814) p. 89; Grah. Cat. p. 251.—Flowers: Nov.

Rare in the Bombay Presidency. GUJARAT: tank at Chikli near Surat, *Law* ex *Graham*; Godra, *Woodrow*.—DISTRIB. Plains of India; Tropics of the Old World, Australia.

ORDER CXLIV. NAIADACEÆ.

Aquatic or marsh herbs of various habit; rootstock stout or slender, sometimes tuberous, often creeping or 0; stem floating or rooted in the ground. Leaves entire or serrate, submerged or floating, sheathing at the base, sometimes stipulate. Flowers 1- or 2-sexual, green, usually inconspicuous, in spikes, racemes, or terminal or axillary pedunculate spadices; bracts small or 0. Perianth 0, or of 3–4 inferior valvate segments, or tubular and very delicate. Stamens 1–6, hypogynous, free in 2-sexual flowers, solitary or connate in male flowers; anthers 1–2-celled. Carpels 1–6; ovules 1 or more in each carpel, erect or pendulous; style long or short; stigma usually simple, sometimes stigmas 2–3 capillary. Fruit various. Seeds erect, pendulous, or laterally peltate; testa coriaceous or somewhat fleshy; albumen 0; embryo fleshy, straight.—DISTRIB. Genera 16; species about 150, temperate and tropical.

Flowers 2-sexual.	
Perianth of sepals present; carpels sessile.	
Sepals 1-3, white, pink or pale blue, membranous; stamens 6 or more	1. APONOGETON.
Sepals 4, green, herbaceous; anthers 4, sessile	2. POTAMOGETON.
Perianth wanting; carpels stipitate; anthers 2, sessile	3. RUPPIA.
Flowers 1-sexual.	
Style long, slender; stigma oblique, peltate; achenes 2–9; male perianth wanting	4. ZANNICHELLIA.
Style wanting; stigmas 2–4, slender; achene solitary; male perianth double	5. NAIAS.

1. APONOGETON, Linn. f.

Scapigerous fresh water herbs; rootstock tuberous, crowned by numerous root-fibres. Leaves oblong, floating or submerged, membranous. Flowers 2-sexual, on long scapes bearing solitary or geminate, often unilateral spikes, which when young are enclosed in a conical quickly deciduous sheath. Perianth of 1–3 equal or unequal pink, white, or pale blue segments or obsolete. Stamens 6 or more; filaments subulate, unequal, persistent; anthers didymous. Carpels 3–6; ovules 2 or more in each carpel, basal, anatropous; style short or 0; stigma discoid or decurrent, persistent. Seeds erect; testa thick or thin; albumen 0; embryo straight.—DISTRIB. Species 22, Asiatic, African, and Australian.

1. **Aponogeton monostachyon,** *Linn. f. Suppl.* (1781) p. 214. An aquatic herb; rootstock $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., stoloniferous, edible. Leaves floating, $2\frac{1}{2}$–8 by $\frac{3}{4}$–$1\frac{1}{2}$ in., oblong or linear-oblong, acute or obtuse, base cuneate, rounded, or cordate, 3–5-nerved and with numerous distinct cross nervules between them; petioles varying with the depth of the water, often very long, subtrigonous. Scape varying with the depth of the water; spike solitary, 1–6 in. long, dense- or lax-flowered; flowers white, pink or pale blue. Sepals 2, obovate or suborbicular, $\frac{1}{10}$ in. long and broad. Stamens 6, as long as or longer than the perianth-segments; anthers bluish-purple. Carpels 3. Follicles subglobose; style subulate. Seeds 4–8, oblong; testa lax, 6–8-ribbed. striate. Fl. B. I. v. 6, p. 564; Grah. Cat. p. 200; Dalz. & Gibs. p. 248; Trim. Fl. Ceyl. v. 4, p. 372; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1122; Watt, Dict. Econ. Prod. v. 1, p. 277.—Flowers: July–Dec.

KONKAN: *Stocks!*, *Graham*; Salsette, *Graham*. S. M. COUNTRY: tanks in the Dharwar and Belgaum Collectorates, *Dalzell & Gibson*; Samasji (Dharwar districts), *Woodrow*! GUJARAT: Godra, *Woodrow*.—DISTRIB. Throughout India; Ceylon, Tropical Asia, and Australia.

2. POTAMOGETON, Linn.

Aquatic submerged herbs with creeping rootstock. Leaves submerged or floating, opposite or alternate, entire or toothed; stipules interfoliaceous. Flowers minute, hermaphrodite, spicate on a short or long axillary or leaf-opposed peduncle arising from a sheath; bracts 0. Perianth of 4 concave green valvate segments. Stamens 4; anthers sessile at the base of the segments of the perianth, didymous. Carpels 4, free, sessile, 1-celled and 1-ovulate; ovule campylotropous, adnate to the inner angle of the carpel; stigma subsessile or decurrent, persistent. Fruit of small coriaceous or spongy drupelets. Seed subreniform; embryo macropodal.—DISTRIB. Species about 80, cosmopolitan.

Upper or all leaves floating	1. *P. indicus.*
Leaves all submerged.	
Leaves amplexicaul, ovate, cordate, entire, translucent, 5–9-nerved; stem stout; peduncle short; spike dense-flowered	2. *P. perfoliatus.*
Leaves semiamplexicaul, linear-oblong, crisped, serrulate, translucent, 3-nerved; stem slender; peduncle long; spike few-flowered	3. *P. crispus.*
Leaves filiform, opaque; stem filiform; flowers in distant whorls on the peduncle	4. *P. pectinatus.*

1. **Potamogeton indicus,** *Roxb. Fl. Ind.* v. 1 (1832) p. 452. Stem terete, branched, smooth, its length depending on the depth of the water. Leaves petiolate; the upper floating, $2\frac{1}{2}$–4 by 1–$1\frac{1}{2}$ in., alternate or uppermost opposite, oblong or elliptic-lanceolate, acute, obtuse or acuminate, thinly coriaceous, opaque, glossy, many-nerved, base acute or rounded, the petioles variable in length with stipules 1–$1\frac{1}{2}$ in. long, free; the lower submerged leaves reaching 8 in. long, membranous, undulate, with petioles shorter than the blade. Peduncles axillary or leaf-opposed, 1–2 in. long, stout or slender, not thickened upwards. Spike $1\frac{1}{2}$ in. long, dense-flowered, green. Sepals 4, clawed, $\frac{1}{10}$ in. long,

including the claw which is nearly as long as the limb; limb suborbicular, $\frac{1}{16}$–$\frac{1}{12}$ in. broad, concave. Drupelets $\frac{1}{8}$ in. long, obliquely truncate, shortly beaked. Fl. B. I. v. 6, p. 565; Grah. Cat. p. 200; Dalz. & Gibs. p. 248; Trim. Fl. Ceyl. v. 4, p. 373; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1122.—Flowers: Dec.

Pretty common in tanks and ponds. DECCAN: water-holes of the high hill forts of the Western Deccan, *Dalzell & Gibson*; Poona, *Woodrow*!, *Cooke*!—DISTRIB. Throughout the plains of India; Ceylon, Malay and Sandwich Islands.

2. **Potamogeton perfoliatus,** *Linn. Sp. Pl.* (1753) p. 126. Stem stout, terete, slightly branched. Leaves 1–2½ by $\frac{5}{8}$–1 in., sessile, ovate-lanceolate, obtuse, membranous, translucent, amplexicaul, base cordate, 5–9-nerved; stipules small, caducous. Peduncle stout, short, not thickened upwards. Spikes dense-flowered, $\frac{1}{4}$–$\frac{7}{8}$ in. long. Sepals with long claws, elliptic-obovate. Drupelets $\frac{1}{8}$ in. long, obliquely ovoid, hardly keeled, slightly compressed, with a short usually curved beak. Fl. B. I. v. 6, p. 566; Dalz. & Gibs. p. 248; Reichb. Icon. Fl. Germ. v. 7 (1845) p. 19, t. 29; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 42, t. 1412; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429.—Flowers: Dec.–Feb.

DECCAN; in the stream round Dapuri garden near Poona, *Dalzell & Gibson*; Poona, *Cooke*!, *Woodrow*! SIND: Jemadar ka Landa near Karachi, *Stocks*, 380!—DISTRIB. India (W. Himalaya, W. Tibet, W. Peninsula); N. temperate regions, Australia.

3. **Potamogeton crispus,** *Linn. Sp. Pl.* (1753) p. 126. Stem branched, compressed. Leaves 1–3 by $\frac{1}{8}$–$\frac{3}{8}$ in., all submerged, semi-amplexicaul, linear or linear-oblong, obtuse, with crisped and finely serrulate margins, 3-nerved, translucent; stipules small, caducous. Peduncle long, often curved, tapering upwards. Spike $\frac{1}{4}$–$\frac{1}{3}$ in. long, few-flowered; flowers small. Sepals clawed, $\frac{1}{10}$ in. long including the claw; limb suborbicular. Drupelets obliquely ovoid, $\frac{1}{8}$ in. long, terminated by a slightly recurved compressed beak. Fl. B. I. v. 6, p. 566; Dalz. & Gibs. p. 248; Reichb. Icon. Fl. Germ. v. 7 (1845) p. 18, tt. 29, 30; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 43, t. 1413; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1123; Watt, Dict. Econ. Prod. v. 6, part 1, p. 331. *Potamogeton tuberosus*, Roxb. Hort. Beng. (1814) p. 12; Grah. Cat. p. 200.

KONKAN: tanks in the Konkans, *Dalzell & Gibson*. DECCAN: Poona, *Woodrow*.—DISTRIB. Plains of India and temperate Himalaya; North and South temperate and subtropical regions.

4. **Potamogeton pectinatus,** *Linn. Sp. Pl.* (1753) p. 127. Stem filiform, copiously distichously branched, forming with the leaves tassel-like masses when taken out of the water. Leaves all submerged, alternate, 1–6 by $\frac{1}{25}$–$\frac{1}{10}$ in., narrowly linear or filiform, acute, opaque, 1–3-nerved or the lower sometimes 5-nerved; stipules adnate to the leaf-sheaths, the tips free. Peduncle with the spike 2–3 in. long, filiform, usually longer than the leaves, not thickened upwards; flowers few in few distant whorls, minute, green. Sepals suborbicular. Drupelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, turgid, dimidiate-obovoid, slightly compressed, shortly beaked, rounded and obscurely 3-keeled on the back, with a very

short straight beak. Fl. B. I. v. 6, p. 567; Dalz. & Gibs. p. 248; Trim. Fl. Ceyl. v. 4, p. 374; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1123.—Flowers: Aug.

Dalzell without locality in Herb. Kew.! DECCAN; Poona, *Woodrow*. GUJARAT: tank at Gogo (Kathiawad) plentiful, *Dalzell & Gibson*. SIND: Jemadar ka Landa, near Karachi, *Stocks*, 375!; Manchar Lake, *Stocks*!—DISTRIB. Plains of India, the Himalayas, and Western and Eastern Tibet; Ceylon, most regions.

3. **RUPPIA,** Linn.

Submerged plants growing in brackish water; rootstock creeping, much-branched; stems slender, dichotomously branched. Leaves alternate or subopposite, filiform, formed of two parallel tubes; sheath elongate, narrow. Flowers minute, hermaphrodite, 2–6 together within a leaf-sheath on an ultimately elongating straight or spirally coiled peduncle. Perianth 0. Stamens 2; anthers sessile, 2-celled. Carpels 4; ovule solitary in each carpel, pendulous; stigma peltate. Fruit of 4 stipitate ovoid obtuse or beaked achenes. Seed pendulous, uncinate; embryo macropodal.—DISTRIB. Species 2 or 3, temperate and subtropical.

1. **Ruppia rostellata,** *Koch, ex Reichb. Icon. Pl. Crit.* v. 2 (1824) p. 66, t. 174, fig. 306. A submerged aquatic herb growing in brackish water, forming tangled masses of filiform leafy flaccid stems and branches; stems 2 ft. long or more. Leaves filiform, 2–4 in. long, dull olive-green. Peduncles ¼–1 in. long, not spirally coiled. Flowers minute, in pairs, enclosed in a leaf-sheath. Stipes of carpels rapidly lengthening after flowering up to 1 in. long, spreading and forming an umbellate head of achenes. Achenes $\frac{1}{12}$–$\frac{1}{10}$ in. long, beaked; endocarp hard. Fl. B. I. v. 6, p. 568; Reichb. Icon. Fl. Germ. v. 7 (1845) p. 10, t. 17, fig. 25; Trim. Fl. Ceyl. v. 4, p. 374; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 59, t. 1428; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1124. ? *Zostera marina*, Dalz. & Gibs. Bo. Fl. (1861) p. 277 (*not* of Linn.).

Stocks without locality in Herb. Kew.! KONKAN: Salt-works at Nathay, *Stocks*!; Mahim near Bombay, *Woodrow*.—DISTRIB. Throughout India in brackish water; Ceylon, Temperate Europe and Tropical Asia.

4. **ZANNICHELLIA,** Linn.

Aquatic submerged herbs growing in brackish or fresh water; rootstock slender; stem slender. Leaves linear, with stipular sheaths. Flowers minute, monœcious, both sexes in one membranous sheath. MALE FLOWERS: Perianth 0. Stamen solitary; filament filiform; anther linear, 2–3-celled. FEMALE FLOWERS: Perianth cupular, hyaline. Carpels 2–9, sessile; ovule solitary in each carpel, pendulous, orthotropous; style rather long, slender; stigma oblique, peltate. Fruit of sessile or stipitate subreniformly incurved achenes usually 4 in number. Seed pendulous; testa thin; embryo subcylindric, with the cotyledonary end folded twice on itself.—DISTRIB. Species 4–5, but probably all forms of one species.

1. **Zannichellia palustris,** *Linn. Sp. Pl.* (1753) p. 969. Sub-sp. **pedicellata,** *Syme, Eng. Bot.* ed. 3, v. 9 (1869) p. 57, t. 1426. Stems very slender, filiform. Leaves 1–3 in. long, all submerged, alternate or opposite, narrowly linear or filiform. Flowers minute, subsessile, enclosed in the leaf-sheaths. Filament of the male flowers at first short, afterwards elongating. Peduncles in the Sind specimen (the only specimen from the Bombay Presidency that I have seen) reaching $\frac{1}{10}$ in. long. Achenes distinctly stipitate, about $\frac{1}{8}$ in. long including the beak (which is about half as long as the body of the achene), subreniformly incurved, crested on the back. Fl. B. I. v. 6, p. 568; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1124.

Rare. Deccan: Poona, Mula River, *Woodrow.* Sind: *Dalzell!* Dalzell does not state whether his specimens grew in brackish or fresh water. His specimens merely bear the ticket "*Zannichellia* Scinde."—Distrib. Salt-marshes and less commonly in fresh water, throughout India; most temperate and subtropical regions.

5. **NAIAS,** Linn.

Annual submerged herbs growing in fresh or brackish water; stems rooting from the nodes, branched, filiform, smooth or muricate. Leaves sessile, opposite, alternate or whorled, narrowly linear, sinuate-dentate or serrulate. Flowers minute, axillary, 1-sexual, monœcious (rarely dioecious). Male flowers: Perianth double, the outer tubular or inflated, entire or 4-fid, the inner hyaline. Stamen solitary, adnate to the inner perianth-tube; anther apiculate or cuspidate, usually 4 (rarely 1)-celled. Female flowers: Perianth 0, or hyaline and adnate to the carpel. Carpel solitary, sessile, 1-ovulate; ovule basal, erect, anatropous. Fruit an oblong achene. Seed erect; testa very thin; embryo straight.—Distrib. Throughout the world except in Arctic regions; species 31.

1. **Naias minor,** *All. Fl. Pedem.* v. 2 (1785) p. 221. A small plant, growing in fresh water, $1\frac{3}{4}$–10 in. high; stem slender, much dichotomously branched; internodes short, smooth. Leaves $\frac{3}{8}$–$\frac{7}{8}$ in. long, scarcely $\frac{1}{20}$ in. broad, narrowly linear, the upper recurved, with 6–12 spreading teeth on each margin; sheaths truncate, rounded. Flowers fasciculate, monœcious, the male and female often found in successive leaf-axils. Male flowers about $\frac{1}{16}$ in. long. Anthers 1-celled. Female flowers about $\frac{1}{10}$ in. long. Style long; stigmas 2, unequal. Achenes $\frac{1}{12}$–$\frac{1}{8}$ in. long. Seed narrowly ellipsoid, pitted. Fl. B. I. v. 6, p. 569; Trim. Fl. Ceyl. v. 4, p. 376; Rendle, in Trans. Linn. Soc. ser. 2, v. 5, p. 410 (1899), & in Engler, Pflanzenreich, v. 4, part 12 (1901) p. 14 and p. 2, fig. 1, D–F; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1124. *Naias indica,* Cham. in Linnæa, v. 4 (1829) p. 501; Dalz. & Gibs. p. 277.

Deccan; Poona, *Woodrow.*

This has been included on the authority of Woodrow, who gives Poona as the habitat of the plant. I have seen no specimens from Bombay; there are none in Herb. Kew.—Distrib. More or less throughout India in still fresh water; Ceylon, Old World generally.

Order CXLV. ERIOCAULACEÆ.

Annual or perennial scapigerous marsh (rarely aquatic) herbs. Leaves narrow, with sheathing bases; veins parallel. Flowers 1-sexual, usually monœcious, minute, mostly white, densely aggregated in a solitary globose or hemispheric head at the apex of a peduncle with a tubular basal sheath; heads androgynous (rarely 1-sexual), with an involucre of short 2–many-seriate imbricate scarious or chartaceous bracts, often radiating beyond the circumference of the flowering part of the head; the florets often more or less hoary with short white hairs, and closely packed on a flat, convex, hemispheric, or conical receptacle, each floret solitary in the axil of a cuneiform bract which equals or exceeds its floret, and is usually dorsally hoary near the apex (rarely absent). Corolla usually separated from the calyx by a distinct stipes, sometimes rudimentary, especially in the male flowers (rarely absent). Male flowers: sepals usually 3, free or connate, deciduous (rarely 2 or 0). Petals usually 3, connate in a stipitate funnel-shaped minutely 3-lobed corolla, one lobe sometimes longer than the others. Stamens 6 or fewer, inserted on the corolla; filaments short, often unequal; anthers didymous, 2-celled, usually black. Pistillode 0 or reduced to minute glands. Female flowers sessile or stipitate. Sepals 2–3 (rarely 1 or 0), unequal, usually concave, deciduous. Petals usually 3, unequal, broad or narrow, often ciliate or hairy, frequently with a dark glandular spot on the inner face. Ovary superior, sessile or stipitate, globose, 2–3-celled; ovary solitary in each cell, pendulous; style-branches 2–3, filiform. Fruit a small membranous 2–3-celled loculicidal capsule. Seeds minute, oblong, ellipsoid or globose, smooth, striate, or ribbed; albumen floury; embryo minute.—Distrib. Genera 9, according to Ruhland [Monog. Eriocaul. in Engler, Pflanzenreich, v. 4, part 30 (1903)]; species about 370, in the warmer regions of both hemispheres, most numerous in Tropical America, few in temperate regions.

1. ERIOCAULON, Linn.

Marsh or aquatic herbs; stem usually very short or 0, rarely elongate. Leaves linear, membranous, often fenestrate. Male and female flowers generally mixed in the same, rarely in separate heads. Male flowers: Sepals 2–3, free or often more or less united into a split spathe (rarely absent). Petals 2–3, at the apex of the tube, sometimes with a black gland on the inner face, sometimes rudimentary or absent. Stamens twice as many as the petals or by abortion fewer; anthers 2-celled, usually black. Female flowers: Sepals usually free, mostly unequal, concave, boat-shaped or flattened, often bearded on the apical part or ciliate. Petals 2–3, always free (rarely absent), often with a black gland on the inner face a little below the apex.—Distrib. Warmer parts of both hemispheres in marshy places, North Asia, China, Japan, N. America, Africa, Australia, one species in the British Isles, otherwise absent from Europe; species about 200.

Aquatics; stems elongate, floating, branched.
Leaves capillary, 1-nerved ..... 1. *E. setaceum.*
Leaves linear, 4–7-nerved... ..... 2. *E. rivulare.*

Terrestrial or marsh plants; stems short or 0.
- Petals of male flowers 3, one much the largest and protruded beyond the floral bracts; involucral bracts orbicular; floral bracts bearded.
  - Receptacle villous; heads snowy-white; anthers black; plant with an odor of chamomile ..... 3. *E. odoratum.*
  - Receptacle glabrous or nearly so; heads white at apex, dark in lower half; anthers white; plant inodorous ..... 4. *E. breviscapum.*
- Petals of male flowers subequal or one rather larger, none produced beyond the floral bracts.
  - Involucral bracts woolly or hairy; receptacle villous.
    - Leaves linear, 3½–8 in. long; peduncles conspicuously 7-ribbed, usually twisted; petals of male flowers unequal ..... 5. *E. Wightianum.*
    - Leaves lanceolate, 1–2½ in. long; peduncles slightly 6-ribbed, scarcely twisted; petals of male flowers subequal ..... 6. *E. lanceolatum.*
  - Involucral and floral bracts both glabrous or nearly so.
    - Receptacle glabrous or nearly so; peduncles glabrous, 5-ribbed ..... 7. *E. Sieboldianum.*
    - Receptacle more or less villous.
      - Plant reaching 8 in. high; peduncles 4-ribbed, hairy ..... 8. *E. stellatulum.*
      - Plant 1–2½ in. high; peduncles obsoletely ribbed, glabrous ..... 9. *E. minutum.*
  - Involucral bracts alone glabrous; floral bracts bearded or pubescent.
    - Peduncles 3–10 in. high.
      - Receptacle sparsely hairy or glabrous.
        - Receptacle sparsely hairy; leaves 4 in. and more long; peduncles 5-ribbed; sepals 3. 10. *E. sexangulare.*
        - Receptacle glabrous; leaves less than 4 in. long; peduncles 7-ribbed; sepals 2 ..... 11. *E. cuspidatum.*
      - Receptacle villous.
        - Seeds closely transversely (microscopically) ridged.
          - Involucral bracts erect or spreading, never reflexed; heads pale grey, hemispheric, with truncate base; floral bracts subacute ..... 12. *E. luzulæfolium.*
          - Involucral bracts at first radiating beyond the head, at length reflexed; heads dark grey, subglobose; floral bracts subacute ..... 13. *E. trilobum.*
        - Seeds smooth, not transversely ridged; involucral bracts reflexed; heads pale grey or snowy white, globosely ovoid; floral bracts acuminate ..... 14. *E. quinquangulare.*
    - Peduncles less than 3 in. high; involucral bracts longer than the flowering part of the head, shining, pale yellow or nearly white ..... 15. *E. Xeranthemum.*

1. **Eriocaulon setaceum,** *Linn. Sp. Pl.* (1753) p. 87. A submerged aquatic; stem 1–3 ft. long, usually simple, stout or slender, densely clothed throughout its length with capillary flexuous glabrous, pellucid, 1-nerved leaves 1½–2 in. long; tips of stems floating. Peduncles numerous, umbellately fasciculate on the apex of the stem, 1½–4 in. high, slender, unequal, glabrous, 6-sulcate, more or less twisted; sheath ¾–1 in. long, obliquely split at the apex, membranous. Heads subglobose, ⅛–⅙ in. in diam., greenish-white, often quite white at the

apex; involucral bracts $\frac{1}{16}$ in. long, broadly obovate or suborbicular, obtuse, concave; floral bracts obovate-cuneate, hairy on the back below the apex, membranous; receptacle villous. MALE FLOWERS: Sepals usually connate into a spathe split open in front. Corolla-tube with 3 small subequal petals at its apex, hairy with white hairs. Stamens 6, the 3 opposite the petals a little larger than the others. FEMALE FLOWERS shortly stipitate. Sepals $\frac{1}{16}$–$\frac{1}{12}$ in. long, obovate-cymbiform, hairy on the back at the apex. Corolla shortly stipitate; petals 3, linear or linear-spathulate, narrow, ciliate with white hairs, usually with a black glandular spot on the inner face below the apex. Ovary 3-lobed; style-branches 3, filiform. Seeds $\frac{1}{60}$ in. long, oblong, smooth, brown. Linn. Fl. Zeyl. (1747) p. 20, n. 50 (*Eriocaulon* without specific name); Rheede, Hort. Mal. v. 12, p. 129, t. 68; Kœrn. in Linnæa, v. 27 (1856) p. 603; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 89. *Eriocaulon Capillus-naiadis*, Hook. f. Fl. B. I. v. 6 (1893) p. 572; Trim. Fl. Ceyl. v. 5, p. 2; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1126.—Flowers: Oct.–Dec.

KONKAN: *Stocks*!, *Dalzell*!, *Woodrow*.—DISTRIB. India (Bengal, Khasia Hills, Birma, W. Peninsula); Ceylon, Cochinchina.

I have followed Ruhland (*l. c.*) in making *E. Capillus-naiadis*, Hook. f., conspecific with *E. setaceum*, Linn. In the 'Flora of British India' (*l. c.*) *E. Capillus-naiadis*, Hook. f., is made conspecific with *E. setaceum* of Kœrnicke, which is certainly that of Linnæus. Ruhland restores *E. intermedium*, Kœrn., which is the *E. setaceum* of many authors, but not of Linnæus.

2. **Eriocaulon rivulare,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 280. Stem simple, elongate, submerged, densely leafy. Leaves linear, flat, all along the stem, somewhat crowded at its apex, 4–9 by $\frac{1}{12}$ in., attenuated into a subulate acumen, dilated at the base, fenestrately 4–7-nerved, opaque, rigid. Peduncles numerous, umbellately fasciculate on the top of the stem, 7–18 in. high, 8–10-sulcate, glabrous, twice as long as the leaves; sheaths tubular, 2–3 in. long, multi-striate, glabrous, shortly split at the apex. Heads globose, reaching $\frac{1}{4}$ in. in diam., snowy-white; involucral bracts $\frac{1}{10}$ in. long, broadly obovate-oblong, lacerate at the apex; floral bracts $\frac{1}{10}$–$\frac{1}{8}$ in. long, oblanceolate-oblong, subacute, hyaline, hairy on the back below the apex; receptacle columnar, hairy. MALE FLOWERS: Sepals 3, all free, $\frac{1}{10}$–$\frac{1}{12}$ in. long, or connate into a spathe split in front. Corolla-tube $\frac{1}{16}$ in. long; petals 3, spathulate, about $\frac{1}{20}$ in. long, subequal, with a black glandular spot, densely hairy. Stamens 6, those opposite the petals the longest; anthers white. FEMALE FLOWERS: Sepals 3, linear, acute, puberulous on the back. Petals 3, linear-spathulate, $\frac{1}{12}$–$\frac{1}{10}$ in. long, obtuse, white, with a black spot below the apex, hairy. Ovary 3-lobed; style-branches 3, filiform. Seeds globose, smooth. Dalz. & Gibs. p. 280; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 91. *Eriocaulon Dalzellii*, Kœrn. in Linnæa, v. 27 (1856) p. 605; Dalz. & Gibs. p. 316; Hook. f. Fl. B. I. v. 6, p. 580; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429.—Flowers: Oct.–Dec.

KONKAN: *Stocks*!; Malwân in streams, *Dalzell*!—DISTRIB. India (W. Peninsula).

The specific name *rivulare* originally given to the plant by Dalzell (1851) was changed into *Dalzellii* by Kœrnicke (*l. c.*) on account of the name *rivulare* having been preoccupied by Don (1849). But Don's plant is now *E. latifolium*, Smith (1809), so that Dalzell's name has been restored.

3. **Eriocaulon odoratum,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 280. Stemless or nearly so. Leaves 1–3 by $\frac{1}{12}$–$\frac{1}{8}$ in., linear-subulate, cæspitose, erect or recurved, fenestrately 6–9-nerved, glabrous, translucent. Peduncles few or many, unequal, 4–8 in. high, slender, glabrous, twisted, 5–6-ribbed; sheaths 1–2½ in. long, close, obliquely split. Heads subglobose, $\frac{1}{6}$–$\frac{1}{5}$ in. in diam., snowy-villous; involucral bracts $\frac{1}{16}$ in. long, broadly obovate-cuneate, glabrous, at length lacerate at the apex; floral bracts $\frac{1}{16}$ in. long, rhomboid-obovate, cuneate, acuminate, hairy on the upper part of the back with opaque white hairs; receptacle pilose. MALE FLOWERS: Sepals 3, cuneate-oblong, narrow, subobtuse, free or often connate into a spathe split in front, white-hairy on the upper part of the back. Corolla-tube $\frac{1}{12}$ in. long; petals very unequal, hairy, each with a black spot. Anthers black. FEMALE FLOWERS stipitate. Sepals 2, lanceolate, acute, boat-shaped, $\frac{1}{10}$ in. long, pilose. Petals 3, one larger than the other two, $\frac{1}{20}$–$\frac{1}{16}$ in. long, narrow, linear-spathulate, hairy with white opaque hairs and with a black spot on each. Style-branches 3, long, filiform. Fl. B. I. v. 6, p. 574; Dalz. & Gibs. p. 280; Kœrn. in Linnæa, v. 27 (1856) p. 683; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 110.—Flowers: Sept.

KONKAN: *Stocks*!, *Woodrow*; Malwán in stagnant water, *Dalzell*! KANARA: Kulgi (N. Kanara), *Talbot*, 1837!; Karwar, *Talbot*, 2949!; Supa on the Kála naddi, *Talbot*, 2948!—DISTRIB. India (W. Peninsula).

The plant is described by Dalzell as smelling strongly of chamomile.

4. **Eriocaulon breviscapum,** *Kœrn. in Linnæa*, v. 27 (1856) p. 676. Plant 6–15 in. high, growing in still water; root of numerous glabrous slender white fibres; stem almost 0. Leaves cæspitose (? floating), 6–15 by $\frac{1}{8}$–$\frac{1}{5}$ in., linear, subobtuse, glabrous, flat, opaque, conspicuously 7–11-nerved. Peduncles shorter or longer than the leaves, solitary (? or few), 6–8 in. high, glabrous, erect, not or scarcely twisted; sheaths 2–4 in. long, obliquely split. Heads globose or hemispheric, $\frac{1}{4}$–$\frac{3}{8}$ in. in diam., densely white-villous at the apex, the lower portion of the head dark brown; involucral bracts $\frac{1}{12}$ in. long, broadly ovate or obovate, obtuse, glabrous, membranous; floral bracts $\frac{1}{8}$ in. long, linear-oblong, acute, very hairy on the upper part with white hairs. MALE FLOWERS stipitate. Sepals 3, obovate-oblong, obtuse, $\frac{1}{12}$ in. long, slightly unequal, hairy at the top. Corolla-tube $\frac{1}{20}$ in. long; petals slightly unequal, the longest $\frac{1}{16}$ in. long, very hairy, each with a black spot. Stamens 6, those opposite the petals the longest; anthers white or pale yellow. FEMALE FLOWERS very shortly stipitate. Sepals 3, oblong, concave, truncate, $\frac{1}{12}$ in. long, pilose. Petals 3, narrowly linear-spathulate, slightly unequal, the longest $\frac{1}{10}$ in. long, all densely hairy with white hairs and with a black spot. Ovary 3-lobed, shortly stipitate; style-branches 3, filiform. Seeds subglobose, pale yellow, shining. Fl. B. I. v. 6, p. 575; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 70.—Flowers: Dec.–Feb.

Rare. KANARA: Tinai Ghát (2000 ft.), *Talbot*, 1379!; Anmod (N. Kanara), *Talbot*, 1609!—DISTRIB. India (W. Peninsula).

There are only 2 sheets in Herb. Kew., both from N. Kanara.

5. **Eriocaulon Wightianum,** *Mart. in Wall. Pl. As. Rar.* v. 3 (1832) p. 28. Stem short or elongate, often as thick as the thumb. Leaves cæspitose, 3½–8 by ¼–⅝ in., linear, obtuse or subobtuse, glabrous or nearly so, flat, many-nerved, scarcely fenestrate. Peduncles strict, aggregated, 6–15 in. high, conspicuously about 7-ribbed, glabrous or sparsely hairy, usually twisted; sheaths 2–4 in. long, obliquely and deeply split, sparsely hairy, ribbed. Heads ¼–½ in. in diam., globose, densely white-villous; involucral bracts ⅛–⅙ in. long, cuneate-obovate, the outer obtuse, the inner subacute, hairy at the back in the upper part, ultimately reflexed; floral bracts ⅛ in. long, rhomboid-cuneate or obovate-cuneate, acuminate, densely clothed with white hairs in the upper part; receptacle pilose. MALE FLOWERS stipitate. Sepals 3, obovate-oblong, cuneate at the base, free or connate into a spathe, hyaline, the tips pubescent. Corolla-tube ⅕₀ in. long; petals all densely hairy at the apex and without a black spot, one slightly larger than the other 2, about ⅓₀ in. long. Stamens 6; anthers black. FEMALE FLOWERS sessile or very shortly stipitate. Sepals 3, free, slightly unequal, linear-obovate, bearded towards the tip. Petals ⅒ in. long, narrowly linear-spathulate, villous with long white hairs and with a minute black spot. Ovary sessile, 3-lobed; style-branches 3, filiform. Seeds about ⅕₀ in. long, ellipsoid, dark reddish-brown, smooth, minutely papillose. Fl. B. I. v. 6, p. 576; Wall. Cat. 6067; Kœrn. in Linnæa, v. 27 (1856) p. 658; Trim. Fl. Ceyl. v. 5, p. 8; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429: Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 75.—Flowers: Oct.–Nov.

Dalzell without locality in Herb. Kew. KONKAN: *Stocks*! KANARA: Falls of Gairsoppa, *Talbot*, 771!—DISTRIB. India (Birma, W. Peninsula); Ceylon.

6. **Eriocaulon lanceolatum,** *Miq. ex Steud. Syn. Pl. Cyp.* part 2 (1855) p. 271. Plant 4–8 in. high; stem very short. Leaves cæspitose, erect, 1–2½ by ¼–½ in., oblong-lanceolate, subacute, glabrous, thinly membranous, translucent, many-nerved. Peduncles few, 3–8 in. high, slender, slightly 6-ribbed, scarcely twisted, glabrous; sheaths lax, 1–2¼ in. long, obliquely split, glabrous. Heads subglobose, white-villous; involucral bracts ⅒ in. long, broadly obovate or quadrate, obtuse, scarious, not reflexed, hairy on the back in the upper part, ciliate at the apex; floral bracts cuneate-oblong, obtuse, hairy on the back; receptacle villous. MALE FLOWERS: Sepals 3, boat-shaped, ⅕₀–⅒ in. long. Corolla-tube ⅓₀ in. long; petals 3, minute, subequal, each with a black spot. Stamens 6; anthers black. FEMALE FLOWERS sessile. Sepals 3, of which 2 are deeply boat-shaped, ⅒–⅛ in. long, the other flat, one of the sepals sometimes winged at the back. Petals 3, unequal, ⅒ in. long, linear-lanceolate, acute, with a small spot, pubescent. Ovary deeply 3-lobed; style-branches 3, slender. Seeds ⅓₀ in. long, slightly ribbed, broadly oblong, reddish-brown. Fl. B. I. v. 6, p. 577; Kœrn. in Linnæa, v. 27 (1856) p. 656; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 78.—Flowers: Oct.–Nov.

Rare. KONKAN: *Stocks*! KANARA: Supa, *Talbot*, 2947!—DISTRIB. India (W. Peninsula).

7. **Eriocaulon Sieboldianum** (*Sieboldtianum*), *Sieb. & Zucc. ex Steud. Syn. Pl. Cyp.* part 2 (1855) p. 272. A low stemless tufted

annual scarcely reaching 6 in. high. Leaves 1–2½ by $\frac{1}{30}$–$\frac{1}{10}$ in., narrowly linear, subulate, glabrous, opaque or translucent, few-nerved. Peduncles numerous, aggregated, glabrous, 3–6 in. high, slender, 5-ribbed; sheaths $\frac{1}{5}$–1 in. long, obliquely split, glabrous, shorter than the leaves. Heads small, $\frac{1}{8}$–$\frac{1}{5}$ in. in diam., whitish or purplish, globose or ovoid; involucral bracts $\frac{1}{10}$–$\frac{1}{8}$ in. long, the outer oblong, obtuse, the tip often lacerate, the inner narrower, all scarious, spreading or ascending, glabrous, pale; floral bracts $\frac{1}{10}$–$\frac{1}{8}$ in. long, linear-oblong or oblong-lanceolate, obtuse or subacute, closely imbricating, hyaline, glabrous, shining, often with a broad central purplish band; receptacle columnar, glabrous or nearly so. MALE FLOWERS stipitate. Sepals connate into a glabrous cucullate spathe, split in front, 3-toothed at the apex. Corolla-tube $\frac{1}{30}$ in. long; petals minute, narrow, subequal. Stamens 6; anthers rotund, white. FEMALE FLOWERS stipitate. Sepals usually 2, free, narrowly linear, acute, hyaline, glabrous, deciduous. Petals 0. Ovary stipitate, the stipes with a node at the position of the petals, 3-lobed; style-branches 3, filiform. Seeds about $\frac{1}{60}$ in. long, ellipsoid, smooth, reddish-brown, shining. Fl. B. I. v. 6, p. 577; Trim. Fl. Ceyl. v. 5, p. 10; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 111; Prain, Beng. Pl. p. 1126. *Eriocaulon sexangulare*, Mart. in Wall. Pl. As. Rar. v. 3 (1832) p. 28 (*not* of Linn.); Grah. Cat. p. 231; Dalz. & Gibs. p. 279; Kœrn. in Linnæa, v. 27 (1856) p. 613.—Flowers: Sept.

Rare. KONKAN: *Stocks*! KANARA: Karwar, *Talbot*, 1290!—DISTRIB. Throughout India; Ceylon, China, Japan.

8. **Eriocaulon stellatulum,** *Kœrn. in Linnæa*, v. 27 (1856) p. 620. Plant reaching 8 in. high; stem scarcely any. Leaves 1–3 by $\frac{1}{4}$–$\frac{1}{2}$ in., broadly linear, subacute, tapering from the base to the tip, many-nerved, flat, glabrous, membranous. Peduncles 2–8 in. high, slender, 4-sulcate, hairy with spreading hairs; sheaths 1–1½ in. long, obliquely split, with a long acuminate tip, glabrous or slightly hairy near the base. Heads $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., globose, stellately echinulate from the long spreading bracts, glabrous, white; involucral bracts $\frac{1}{8}$–$\frac{1}{6}$ long, ovate, acuminate, scarious, glabrous, at length reflexed; floral-bracts $\frac{1}{6}$–$\frac{1}{5}$ in. long, narrowly lanceolate, hyaline, glabrous, stellately spreading, much exceeding the flowers; receptacle pilose. MALE FLOWERS scarcely stipitate. Sepals 2, free or connate, $\frac{1}{16}$–$\frac{1}{12}$ in. long, obliquely obovate, acute, glabrous, hyaline. Corolla-tube scarcely $\frac{1}{20}$ in. long; petals minute, subequal, with a dark spot. Stamens 6; anthers black. FEMALE FLOWERS sessile. Sepals 3, falcately ovate, $\frac{1}{10}$ in. long, with a long subulate ultimately recurved acumen, dorsally crenately winged, glabrous, white. Petals 3, linear-spathulate, $\frac{1}{20}$ in. long, obtuse, hairy, usually with a black spot. Ovary sessile, 3-lobed; style-branches 3, filiform. Seeds $\frac{1}{30}$ in. long, globosely ellipsoid, smooth, shining, chestnut-brown. Fl. B. I. v. 6, p. 579; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 97.—Flowers: Feb.

KONKAN: *Stocks*! KANARA: Darsinguda (3200 ft.), *Talbot*, 1598!—DISTRIB. India (W. Peninsula).

9. **Eriocaulon minutum,** *Hook. f. Fl. B. I.* v. 6 (1893) p. 579. A small densely tufted herb 1–2½ in. high. Leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long, subulate

or filiform, acute or obtuse, compressed, opaque, 3–5-nerved, base dilated and sparsely woolly within. Peduncles 1–2½ in. high, capillary, flexuous, numerous, aggregated, obsoletely ribbed, slender, glabrous, slightly twisted; sheaths rather lax, ¼–⅜ in. long, obliquely split. Heads $\frac{1}{10}$ in. in diam., white, shining, glabrous; involucral bracts $\frac{1}{10}$ in. long, erect, ovate-lanceolate, acuminate; floral bracts shorter, oblanceolate, acute or cuspidate; receptacle small, columnar, glabrous or sparsely villous. MALE FLOWERS: Sepals connate into a spathe split in front, irregularly 3-toothed, pale, glabrous. Petals minute, almost 0. Stamens 3–6; anthers black. FEMALE FLOWERS subsessile. Sepals 2, with rarely a filiform third one, boat-shaped, concave, falcately curved, acute, winged or keeled on the back, glabrous, the keel or wing spinulose. Petals 0. Ovary 2–3-lobed, subsessile; style-branches 3, very short. Seeds oblong. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 111.

Rare. KONKAN: *Stocks*!—DISTRIB. India (W. Peninsula).

10. **Eriocaulon sexangulare,** *Linn. Sp. Pl.* (1753) p. 87. A tall stout herb; stem as thick as the little finger or less, short (rarely elongate). Leaves erect, cæspitose, 4–12 in. long by ¼–¾ in. wide at the base, linear, narrowed from the base to the subacute or acuminate tip, thin, many-nerved, opaque, drying brown. Peduncles many, stiff, up to 18 in. high, 5-ribbed, more or less twisted; sheaths 3–6 in. long, obliquely split, herbaceous, with a long green acumen. Heads ⅛–⅜ in. in diam., globose, hemispherical or cylindric-ovoid (sometimes viviparous), hard, hoary, with truncate base; bracts imbricate, closely appressed, concealing the flowers, those of the involucre $\frac{1}{5}$ in. long, subquadrate, orbicular or obovate, acute, glabrous, yellow, shining, the floral bracts $\frac{1}{8}$ in. long, cuneate-obovate, with a sudden short triangular acumination; receptacle globose, columnar or hemispheric, sparsely hairy. MALE FLOWERS quite flat. Sepals free or connate, $\frac{1}{12}$ in. long, boat-shaped, winged, glabrous. Corolla-tube $\frac{1}{20}$ in. long; petals minute, triangular, ciliate, usually with a small black spot. Stamens 6; anthers black. FEMALE FLOWERS sessile. Sepals 3, free, 2 of which are large, boat-shaped, acute, $\frac{1}{10}$–⅛ in. long, dorsally broadly winged, the third small, linear, flat, all glabrous. Petals filiform, terminated by a pencil of long hairs. Ovary subsessile; style-branches 3, filiform. Seeds subglobose, ribbed, the ridges papillose. Fl. B. I. v. 6, p. 580; Trim. Fl. Ceyl. v. 5, p. 5; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 110. *Eriocaulon Wallichianum,* Mart. in Wall. Pl. As. Rar. v. 3 (1832) p. 27, t. 249; Kœrn. in Linnæa, v. 27 (1856) p. 687; Dalz. & Gibs. p. 280.—Flowers: Sept.

KONKAN: *Stocks*!, *Dalzell*!, *Woodrow*; W. Ghâts, *Woodrow.*—DISTRIB. India (W. Peninsula); Ceylon, Tropical Asia, Madagascar.

11. **Eriocaulon cuspidatum,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 281. Stemless. Leaves cæspitose, erect, 1–3½ by ⅛–¼ in., linear-oblong, rounded and cuspidate at the apex, glabrous, translucent, fenestrately 7–9-nerved. Peduncles 6–12 in. high, fasciculate, few or many, 7-sulcate; sheaths reaching sometimes 4 in. long, obliquely split, glabrous. Heads ⅛–¼ in. in diam., hemispheric or subglobose, white-puberulous; involucral bracts $\frac{1}{10}$ in. long, broadly obovate-cuneate,

obtuse, concave, glabrous; floral bracts similar; receptacle glabrous. MALE FLOWERS: Sepals 2, free, $\frac{1}{16}$ in. long, obovate-lanceolate, acute, deeply concave, hyaline, slightly winged and puberulous on the back. Corolla-tube $\frac{1}{16}$ in. long; petals small, unequal, with a conspicuous black spot, hairy. Stamens 6; anthers black. FEMALE FLOWERS: Sepals 2, elliptic-lanceolate, acute, $\frac{1}{12}$–$\frac{1}{10}$ in. long with a pubescent rounded crest-like wing on the back. Petals 3, unequal, narrowly linear-lanceolate, fimbriately villous towards the tip and with a conspicuous black spot. Ovary 3-lobed; style-branches 3, filiform. Seeds oblong, quite smooth. Fl. B. I. v. 6, p. 581; Dalz. & Gibs. p. 280; Kœrn. in Linnæa, v. 27 (1856) p. 684; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 104; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429.—Flowers: Nov.

KONKAN: *Stocks*!, *Law*!, *Dalzell*!; between Vingorla and Malwán, *Dalzell*! KANARA: Siddapur in rice-fields, *Talbot*, 1083!—DISTRIB. India (W. Peninsula).

12. **Eriocaulon luzulæfolium,** *Mart. in Wall. Pl. As. Rar.* v. 3 (1832) p. 28. A herb 4–10 in. high; stems stout or slender, sometimes as thick as a swan's quill, with many fibrous glabrous whitish roots. Leaves cæspitose, 1–3 by $\frac{1}{16}$–$\frac{1}{8}$ in. in the middle, linear-lanceolate, narrowed from the base to the tip, subacute, glabrous, flat, opaque or translucent, fenestrately 10–12-nerved near the base. Peduncles 3–10 in. high, numerous, erect, glabrous, 5-sulcate, twisted; sheaths 1–2 in. long, obliquely split, at length lacerate at the mouth, glabrous, more or less striate. Heads $\frac{1}{8}$–$\frac{1}{6}$ in. in diam., hemispheric, hard, pale grey, pubescent, base truncate; involucral bracts about $\frac{1}{10}$ in. long, conspicuous, oblong-obovate, cuneate, obtuse, concave, subcoriaceous, glabrous, shining, never reflexed; floral bracts narrower, $\frac{1}{10}$ in. long, spathulate-oblong, subacute, shortly pubescent at the apex; receptacle conical or columnar, villous with long hairs. MALE FLOWERS stipitate. Sepals 3, oblong-obovate, concave, $\frac{1}{20}$–$\frac{1}{16}$ in. long, obtuse or subacute, ciliate at the tips, free or two connate. Corolla-tube about $\frac{1}{20}$ in. long; petals minute, equal, without a glandular spot. Stamens 6; anthers black. FEMALE FLOWERS shortly stipitate. Sepals 3, linear-oblong, falcate, concave, acute, dorsally tipped with bristly hairs. Petals 3, linear-lanceolate, $\frac{1}{12}$ in. long, ciliate, without a glandular spot. Ovary subsessile, 3-lobed; style-branches 3, filiform. Seeds ellipsoid, orange-yellow, faintly ribbed and very closely microscopically transversely ridged. Fl. B. I. v. 6, p. 582; Trim. Fl. Ceyl. v. 5, p. 7; Kœrn. in Linnæa, v. 27 (1856) p. 636; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1126; Ruhl. in Engler, Pflanzenreich, v. 4, part 30, p. 88.

KONKAN: *Stocks*!—DISTRIB. Throughout India; Ceylon.

13. **Eriocaulon trilobum,** *Buch.-Ham. in Wall. Cat.* (1828) 6072, D. A stemless herb of rice-fields and wet places. Leaves erect, cæspitose, green, $1\frac{3}{4}$–$4\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{4}$ in., linear, narrowed towards an acute or subobtuse apex, glabrous, flat, fenestrately 9–11-nerved, not drying red. Peduncles numerous, 3–8 in. high, glabrous, 5–6-ribbed, twisted; sheaths $\frac{3}{4}$–2 in. long, obliquely split, somewhat lax, striatulate. Heads $\frac{1}{8}$–$\frac{1}{5}$ in. in diam., subglobose, dark grey; involucral bracts $\frac{1}{8}$ by $\frac{1}{20}$ in., linear-oblong, obtuse, glabrous, at first radiating beyond the head,

afterwards reflexed, pale, shining; floral bracts $\frac{1}{12}$ in. long, cuneate-obovate, obtuse or subacute, not acuminate, ciliate at the apex, concave; receptacle villous. MALE FLOWERS shortly stipitate. Sepals 3, oblong, obtuse, $\frac{1}{16}$ in. long, connate into a spathe, glabrous. Corolla-tube $\frac{1}{25}$ in. long; petals minute. Stamens 6; anthers black. FEMALE FLOWERS subsessile. Sepals 3, oblanceolate, boat-shaped, $\frac{1}{16}$ in. long, hairy on the back. Petals 3, free, narrowly spathulate, hairy above and with a black spot. Ovary subsessile, 3-lobed; style-branches 3, filiform. Seeds about $\frac{1}{60}$ in. long, ellipsoid, microscopically closely transversely ridged, pale yellow. Fl. B. I. v. 6, p. 583; Kœrn. in Linnæa, v. 27 (1856) p. 645; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1127 Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 74. *Eriocaulon Sollyanum*, Royle, Illustr. (1839) p. 409, t. 97, fig. 1. Seems scarcely to differ from *E. infaustum*, N. E. Brown, in Dyer, Fl. Trop. Africa, v. 8 (1902) p. 253.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*!, *Law*! SIND: *Stocks*! —DISTRIB. Throughout India.

14. **Eriocaulon quinquangulare,** *Linn. Sp. Pl.* (1753) p. 87. Stems very short. Leaves 1–4 by $\frac{1}{10}$–$\frac{1}{3}$ in., linear, attenuated towards the apex, acute or acuminate, glabrous, flat, membranous, fenestrately 5–11-nerved, opaque or subtranslucent, green above, often purplish beneath, frequently drying red. Peduncles many, 3–9 in. high, glabrous, 5-ribbed, scarcely twisted; sheaths 1–2$\frac{1}{4}$ in. long, obliquely split, glabrous, often purplish. Heads globosely ovoid, $\frac{1}{6}$–$\frac{1}{4}$ in. in diam., grey or snow-white; involucral bracts $\frac{1}{12}$ in. long, linear-oblong or obovate-oblong, subcuneate at the base, very obtuse, scarious, glistening, at length reflexed and concealed under the head; floral bracts $\frac{1}{10}$ in. long, subrhomboid or oblanceolate, acuminate, dorsally hairy, base cuneate; receptacle globose or columnar, sparsely villous. MALE FLOWERS: Sepals 3, all or 2 only connate into a spathe, $\frac{1}{16}$ in. long, oblong-spathulate, obtuse, penicillate at the tips. Corolla-tube about $\frac{1}{20}$ in. long; petals minute, pilose. Stamens 6; anthers black. FEMALE FLOWERS stipitate. Sepals 3, free, $\frac{1}{16}$ in. long, narrowly linear-spathulate, obtuse, pilose towards the apex, white. Petals 3, free, $\frac{1}{20}$ in. long, linear-spathulate, villous, usually with a black spot. Ovary stipitate or subsessile, 3-lobed; style-branches 3, long, filiform. Seeds $\frac{1}{50}$ in. long, ellipsoid or subglobose, pale yellow, quite smooth. Fl. B. I. v. 6, p. 582; Grah. Cat. p. 230; Dalz. & Gibs. p. 280; Kœrn. in Linnæa, v. 27 (1856) p. 641; Trim. Fl. Ceyl. v. 5, p. 9; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 85; Prain, Beng. Pl. p. 1127; Linn. Fl. Zeyl. (1747) n. 48 (*Eriocaulon* without specific name).

Stocks without locality in Herb. Kew.! KONKAN: Salsette, in rice-fields, frequent, *Jacquemont*, 742!—DISTRIB. Throughout India; Ceylon.

15. **Eriocaulon Xeranthemum,** *Mart. in Wall. Pl. As. Rar.* v. 3 (1832) p. 29. A small stemless plant 1–2$\frac{1}{2}$ in. high. Leaves cæspitose, $\frac{3}{4}$–1$\frac{1}{2}$ by $\frac{1}{16}$–$\frac{1}{6}$ in., linear-lanceolate, acute or acuminate, flat, glabrous, translucent, fenestrately 7–11-nerved, often recurved. Peduncles $\frac{1}{2}$–2$\frac{1}{2}$ in. high, few or many, stout, striate, more or less twisted; sheaths reaching 1 in. long, obliquely split, glabrous. Heads (including the involucral bracts) $\frac{1}{6}$–$\frac{1}{5}$ in. long; involucral bracts longer than the

flowering part of the head, lanceolate, acuminate, glabrous, glistening, scarious, pale yellow or nearly white; floral bracts $\frac{1}{10}$–$\frac{1}{8}$ in. long, oblong-obovate, obtuse, cuneate at the base, hairy at the apex. Receptacle glabrous or nearly so. MALE FLOWERS subsessile. Sepals $\frac{1}{20}$ in. long, obovate-cuneate, obtuse or truncate, hairy at the apex, free or all or 2 connate into a spathe split in front. Corolla-tube short; petals minute, glabrous. Stamens 6; anthers yellow (*Dalzell*). FEMALE FLOWERS subsessile. Sepals 2 (rarely 3, the third capillary), $\frac{1}{20}$–$\frac{1}{16}$ in. long, unequal, lanceolate, narrower than the male sepals, hairy at the tip. Petals $\frac{1}{20}$ in. long, linear or oblanceolate, hairy at the tip and with a minute glandular spot which is yellow (*fide* Dalzell). Ovary sessile, 3-lobed; style-branches 3, filiform. Seeds narrowly oblong, yellow, papillose. Fl. B. I. v. 6, p. 584; Kœrn. in Linnæa, v. 27 (1856) p. 624; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1127; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 96. *Eriocaulon pygmœum*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 281; Dalz. & Gibs. p. 280.

KONKAN: *Stocks*!; near Malwán in marshy places, *Dalzell*. KANARA: Karwar, *Talbot*, 2945!— DISTRIB. Throughout India.

IMPERFECTLY KNOWN SPECIES.

ERIOCAULON BOMBAYANUM, Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 104. Stem very short. Leaves linear-lanceolate, acute, $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{12}$–$\frac{1}{8}$ in. Peduncles many, 3½–4 in. high; sheaths as long as the leaves. Heads globose or globosely cylindric, densely snowy-puberulous; involucral bracts always conspicuous, lanceolate or oblong-obovate, acute, green, glabrous; floral bracts oblong-obovate, acute, ciliate, dark-colored. Flowers heteromerous. MALE FLOWERS: Sepals 2, connate into a spathe to the apex, ciliate, obtuse, olive-green. Petals 3, very small, glandular. Stamens 6; anthers black. FEMALE FLOWERS: Sepals 2, linear, winged or keeled, acute, concave, dark-colored, ciliate. Petals 3, linear-oblanceolate, with a glandular spot, ciliate, white. Ovary 3-lobed. The above is Ruhland's description.

KONKAN: Bombay, *Warburg*, 867, in Herb. Berol. ex Ruhland. I have seen no specimens; there are none in Herb. Kew.

ERIOCAULON RITCHIEANUM, Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 73. Stem very short. Leaves 1½–2¼ by $\frac{1}{16}$ in., linear. Peduncle solitary, about 6½ in. high, scarcely twisted; sheaths lax, glabrous, 1½ in. long. Heads subglobose, white-villous at the top, ⅛–⅓ in. in diam.; involucral bracts obovate, obtuse, glabrous; floral bracts similar, acute, greyish-yellow puberulous on the back near the apex. MALE FLOWERS: Sepals connate into a spathe, very obtuse. Petals small, with a gland. Anthers white. FEMALE FLOWERS: Sepals ovate, acute, free, lax, grey-green, puberulous on the back. Petals oblong-spathulate, white, subobtuse, with a gland. Ovary 3-lobed. The above is Ruhland's description.

S. M. COUNTRY: Belgaum, *Ritchie*, 1248, in Herb. Boiss.-Barb. I have seen no specimens; there are none in Herb. Kew.

ERIOCAULON ROBUSTO-BROWNIANUM, Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 77. Stem very short. Leaves cæspitose, lanceolate, very obtuse, fenestrate at the base, glabrous, 8–10 in. long by 1 in. broad at the base. Peduncles numerous, twisted, subrobust, 12–16 in. high; sheaths rather loose, obliquely split, 3¼–4½ in. long. Heads globose, snowy-white, puberulous, nearly ½ in. in diam.; involucral bracts broadly obovate, the exterior obtuse, the inner acute, pale straw-colored, puberulous at the back near the apex, then glabrous, at length concealed by the flowers; floral bracts obovate, acuminate, rather rigid, greyish-white, a little longer than the flowers. Flowers trimerous. MALE FLOWERS: Sepals spathaceo-connate,

obtuse, ciliate, gland-bearing. Anthers black. FEMALE FLOWERS: Sepals obovate, acute, keeled, ciliate, grey, subequal. Petals narrowly oblong, gland-bearing, ciliate. The above is Ruhland's description.

KANARA: Dharwar and Bellary district (*Saw.* according to Ruhland, but probably a misprint for *Law*). I have seen no specimens; there are none in Herb. Kew.

ERIOCAULON ROUXIANUM, Steud. Syn. Pl. Cyp. part 2 (1855) p. 270. Stemless. Leaves 1–1½ in. long from a broad base, linear-lanceolate, subobtuse, 9–11-nerved, subpellucid, twice as long as the tumid sheaths, which are whitish, submembranous, entire or 2-fid at the apex. Heads ⅛ in. in diam., snowy-villous; involucral bracts longer than the heads, herbaceous, erect, linear-oblong, obtuse, entire; floral bracts ovate, subobtuse, ciliate at the apex. Kœrn. in Linnæa, v. 27 (1856) p. 626; Dalz. & Gibs. p. 316; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 116. Collected in Bombay by Polydore Roux (*fide* Steudel). Kœrnicke, who has not seen any specimens, considers the species somewhat doubtful and, as far as may be judged from the meagre description, to approach near to *E. Thwaitesii*, an identification which Ruhland considers doubtful.

Dalzell, who has collected and described many of the Bombay Eriocaulons, has seen neither this plant nor *E. heterolepis*. There are no specimens in Herb. Kew. Roux's specimens, collected in Bombay in 1832, are said to be in Delessert's Herbarium (Lasegue, in Deless. Mus. Bot. (1845) p. 156).

EXCLUDED SPECIES.

ERIOCAULON HETEROLEPIS, Steud. Syn. Pl. Cyp. part 2 (1855) p. 271. Stemless, tufted. Leaves lanceolate from a broad base, subobtuse. Involucral bracts 2-seriate, scarious, the exterior oblong-lanceolate, deciduous, the interior ovate, obtuse, much shorter than the head; floral bracts cuneate-ovate. Sepals linear, ciliate at the apex. Fl. B. I. v. 6, p. 585; Kœrn. in Linnæa, v. 27 (1856) p. 652; Dalz. & Gibs. p. 316; Ruhl. in Engler, Pflanzenreich, v. 4, part 30, p. 74.

Plant collected by Polydore Roux near Bombay (*fide* Steudel). The species depends altogether on the description by Steudel, who may or may not have had Roux's specimens. Kœrnicke states (*l. c.*) that he has seen no specimens of the plant and considers the species a very doubtful one which may have been described under another name, but, curiously enough, he has made a *variety* to this doubtful species in Miq. Ann. Mus. Lugd. Bat. v. 3 (1867) p. 239, which he names var. *nigricans*, a Java plant, which he fully describes. Ruhland (*l. c.*) copies Kœrnicke's description of the Java plant (var. *nigricans*), and assigns it to *E. heterolepis* as a typical description of that species.

ERIOCAULON EURYPEPLON, Kœrn. in Linnæa, v. 27 (1856) p. 685; Hook. f. Fl. B. I. v. 6, p. 585; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 104.

Kœrnicke gives "East Indies" as the habitat of the plant which is stated to have been collected by Huegel no. 1886 (Hb. Vindob. et Zuccarini), no precise locality having been mentioned. Ruhland (*l. c.*) gives East Indies, Malabar, Konkan, &c. as the habitat, and Stocks, Huegel, &c. as the collectors, but there is no mention of the whereabouts of the specimens said to have been collected by Stocks. None of these are to be found in Herb. Kew., and as Stocks almost invariably sent his collections to the Kew Herbarium, I think it probable that Ruhland has made a mistake in his citation. There is, as far as I know, no evidence of the existence of the species in the Bombay Presidency.

ORDER CXLVI. CYPERACEÆ.

Perennial (rarely annual) herbs with the habit of grasses; roots fibrous; stem terete or 3-angled, usually simple. Leaves grass-like, (rarely 0), 3-ranked, mostly crowded at the base of the stem (the upper fewer), with tubular sheaths which are more or less closed or the lower split to the base; ligule 0 or a short prolongation of the mouth of the

sheath opposite to the blade. Inflorescence of solitary, fasciculate, paniculate or spicate spikelets, composed of small distichously or spirally imbricate scales (glumes); flowers minute, 1–2-sexual, in the axils of the glumes. Perianth 0, or of 2 or more hypogynous bristles or scales (ovary enclosed in a utricle in *Carex*). Stamens 1–3; filaments flattened; anthers basifixed, linear. Ovary 1-celled; ovule solitary, basal, erect, anatropous; style short or long; stigmas 2–3. Fruit a compressed or trigonous nut. Seed erect, free; embryo minute, within the base of the floury albumen.—DISTRIB. Genera about 65; species about 3000, universally distributed.

Nut not enclosed in a utricle.
- Flowers 2-sexual, solitary in the glumes of a simple spikelet.
  - Flowering glumes all distichous.
    - Fruit-bearing glumes not winged on the keel.
      - Spikelets many-flowered ..... 1. CYPERUS.
      - Spikelets 1–2-flowered ..... 2. KYLLINGA.
    - Fruit-bearing glumes with winged keels ..... 3. COURTOISIA.
  - Flowering glumes all spirally imbricate or the lower only distichous.
    - Spikelets many-flowered.
      - Hypogynous bristles or scales 0.
        - Style-base swollen, disarticulating from the nut ..... 4. FIMBRISTYLIS.
        - Style-base persistent, leaving a tumour on the nut ..... 5. STENOPHYLLUS.
      - Hypogynous bristles or scales present.
        - Nut with hypogynous bristles.
          - Style-base swollen ..... 6. ELEOCHARIS.
          - Style-base not swollen ..... 7. SCIRPUS.
        - Nut with hypogynous scales.
          - Hypogynous scales 6, divided to the base into linear segments; stigmas 3 ..... 8. ERIOPHORUM.
          - Hypogynous scales not divided into segments.
            - Hypogynous scales 6 or 3 or 0, petal-like; stigmas 3 ..... 9. FUIRENA.
            - Hypogynous scales 2, lateral, bracteole-like; stigmas 2 ... 10. HYPOLYTRUM.
    - Spikelets few-flowered.
      - Stigmas 2 ..... 11. RHYNCHOSPORA.
      - Stigmas 3 ..... 12. REMIREA.
- Flowers 1-sexual; nut stipitate, bony; scales or bristles 0. 13. SCLERIA.

Nut enclosed in a bottle-shaped utricle with an entire or notched or shortly slit mouth ..... 14. CAREX.

1. CYPERUS, Linn.

Perennial (rarely annual) glabrous herbs; rhizome creeping, short or long or 0. Leaves mostly towards the base of the stem, occasionally reduced to sheaths. Spikelets in solitary globose or umbellate heads or spikes; involucral bracts 1 or more, foliaceous; bracteoles under the secondary divisions of the inflorescence; rhachilla usually persistent, not or in a few species disarticulating towards the base, sometimes with membranous wings derived from the persistent glume-bases. Glumes distichous, the 2 lowest empty, those above 2-sexual, all nearly equal, deciduous from below upwards, the uppermost 1–3 sterile or empty; hypogynous scales or bristles 0. Stamens 1–3; anthers linear or oblong.

Ovary compressed; style short or long or obsolete; stigmas 2 or 3. Fruit trigonous, triquetrous, obovoid, or plano-convex.—DISTRIB. All warm and temperate regions; species about 360.

I have followed Boeckeler in including under the genus *Cyperus* the genera *Pycreus*, *Juncellus*, and *Mariscus*, a course followed by Pax (Engl. & Prantl, Pflanzenf.). The late Dr. Trimen in his 'Flora of Ceylon' continued by Sir Joseph Hooker includes the first two genera in *Cyperus*, but retains *Mariscus* as a distinct genus. The generic distinction in that genus, however, viz. the disarticulation of the rhachilla of the spikelets above the 2 lowest glumes, cannot be applied in the field, but may be said to be limited to herbarium specimens. In a recently published pamphlet by Dr. N. L. Britton, Director-in-Chief of the New York Botanical Gardens, "The Sedges of Jamaica" [Bulletin of the Department of Agriculture of Jamaica, vol. 5, Supplement 1 (1907)], that botanist makes the following remarks on page 1:—"I have accepted the generic limits outlined by Mr. Clarke with the exception of his treatment of *Cyperus* and its segregates, where I have accepted the view of previous authors in taking *Cyperus* in its broad sense rather than recognizing the genera *Pycreus*, *Mariscus*, and *Torulinium*, as I believe the characters depended on by Mr. Clarke for the maintenance of these genera are too vague for satisfactory use."

Stigmas 2.
- Fruit a laterally compressed nut.
  - Superficial cells of the nut longitudinally oblong or elliptic. Nut often appearing zonate or muricate by reason of the thickened ends of the cells running into an undulating or broken horizontal line.
    - Spikelets lanceolate, 20–60-flowered; nut obovoid black ..... 1. *C. latespicatus.*
    - Spikelets linear-oblong with exactly parallel sides, 20-flowered; nut globosely ovoid, brown ..... 2. *C. malabaricus.*
  - Superficial cells of the nut nearly square. Nut often appearing regularly dotted by reason of the light reflected from the convex surface of each cell.
    - Stems often clothed for ¼–¾ of their length by leaf-sheaths, decumbent at the base; rhizome creeping, 4–10 in. long ..... 3. *C. sanguinolentus.*
    - Stems enveloped in leaf-sheaths only a little way above the base, erect; roots fibrous.
      - Annuals.
        - Stems tufted.
          - Spikelets 6–10-flowered; rhachilla winged; stamens 2–3 ..... 4. *C. hyalinus.*
          - Spikelets 20–50-flowered; rhachilla not winged.
            - Stamen 1; nut $\frac{1}{10}$ in. long ..... 5. *C. pumilus.*
            - Stamens 2; nut $\frac{1}{15}$ in. long ..... 6. *C. globosus.*
        - Stem robust, solitary or subsolitary.
          - Nut $\frac{1}{10}$ in. long, rounded at the apex; glumes with conspicuous white margins; bracts reaching 16 in. long; stamens usually 3 ..... 7. *C. albomarginatus.*
          - Nut $\frac{1}{18}$ in. long, obcordate at the apex; margins of glumes not conspicuously white; bracts reaching 9 or 10 in. long; stamens 3 ..... 8. *C. puncticulatus.*
      - Perennial; nut $\frac{1}{10}$ in. long; stamens usually 2. 9. *C. odoratus.*
- Fruit a dorsally compressed nut.
  - Spikelets many, densely packed in a terminal head; stems reaching 10 in. long; bracts 1–6 in. long; a dwarf annual herb ..... 10. *C. pygmæus.*
  - Spikelets 1–30 in 1 apparently lateral head; stems reaching 2 ft. long; bracts 1–3 in. long ..... 11. *C. lævigatus.*
  - Spikes umbellate; stems reaching 3 ft. long; bracts reaching 18 in. long; a stout perennial herb ..... 12. *C. alopecuroides.*

Stigmas 3; fruit a trigonous or triquetrous nut.
Rhachilla of spikelets persistent.
Inflorescence usually umbellate, rarely capitate.
Spikelets digitate or clustered, not spicate or racemose.
Annuals (except *C. Haspan*).
Glumes mucronate.
Nut $\frac{1}{10}$ in. long.
Nut oblong, pale brown or yellow; style shorter than the nut; stamens 1–2; margins of glumes hyaline ..... 13. *C. castaneus.*
Nut obovoid, dark-brown; style longer than the nut; stamens 3; margins of glumes hyaline ..... 14. *C. Teneriffæ.*
Nut $\frac{1}{8}$ in. long, obovoid, dark-brown; style shorter than the nut; stamens 1–2; margins of glumes hyaline ..... 15. *C. uncinatus.*
Glumes not mucronate.
Nut white when ripe, $\frac{1}{8}$ in. long, globosely obovoid; stamen 1 (rarely 2); whole plant yellowish ..... 16. *C. flavidus.*
Nut brown.
Nut nearly as long as the obovate-oblong glume; stamen 1 (rarely 2) ..... 17. *C. difformis.*
Nut $\frac{2}{3}$ the length of the glume; glumes with crisped incurved tips; stamens 1–2 ..... 18. *C. pulcherrimus.*
Nut $\frac{1}{3}$ the length of the glume; stamens 2–3; flowering in the first season but often biennial or perennial ..... 19. *C. Haspan.*
Perennials with a woody rootstock; stamens usually 3.
Inflorescence of 1 head (sometimes umbellate in *C. conglomeratus* and *C. Atkinsoni*).
Rhizome very short; rootlets wiry.
Stems slender, close-set, nodose at the base.
Stems closely 1-seriate; spikelets 3–12 in a lax head; stamens 3; glumes $\frac{1}{8}$ in. long ..... 20. *C. niveus.*
Stems cæspitose with 1 dense head; stamen 1; glumes $\frac{1}{12}$ in. long ..... 21. *C. leucocephalus.*
Rhizome creeping; rootlets thick.
Rootlets not woolly.
Stem solitary, distant on a much-divided, elongate, creeping rhizome. 22. *C. arenarius.*
Stems cæspitose, on a short rhizome (inflorescence sometimes umbellate) 23. *C. Atkinsoni.*
Rootlets woolly (inflorescence sometimes umbellate) ..... 24. *C. conglomeratus.*
Spikelets spicately, rarely subracemosely disposed; stamens usually 3.
Rhachilla of spikelets not or scarcely winged.
Annuals with tufted stems.
Stems 4–16 in. long; spikelets $\frac{1}{2}$–$1\frac{1}{2}$ in. long; nut about $\frac{1}{2}$ as long as the glume ..... 25. *C. compressus.*
Stems 3–6 in. long; spikelets $\frac{1}{3}$–$\frac{1}{2}$ in. long; nut less than $\frac{1}{2}$ the length of the glume ... 26. *C. aristatus.*
Stems 14–20 in. long; nut nearly as long as the glume ..... 27. *C. Iria.*
Perennials with woody rhizome and often long stolons.
Spikelets compressed; rootstock with elongate stolons; bracts divaricate ..... 28. *C. procerus.*

Spikelets spicate.
Leaves more than 1 ft. long.
Glumes remote; nut nearly as long as the glume ..... 29. *C. nutans.*
Glumes not remote; nut ½ as long as the glume; bracts never divaricate; no true stolons ..... 30. *C. eleusinoides.*
Leaves not more than 6 in. long ..... 31. *C. malaccensis.*
Rhachilla of spikelets distinctly winged.
Leaves short, rarely ½ as long as the stem.
Glumes approximate; stolons long, stout.
Spikelets pale straw-colored; bracts very short, rarely half as long as the umbel-rays; stem not articulate when dry ... 32. *C. tegetiformis.*
Spikelets rusty-brown; bracts more than half as long as the umbel-rays; stem more or less articulate when dry ..... 33. *C. corymbosus.*
Glumes remote, in fruit scarcely imbricating; stolons 0 ..... 34. *C. tegetum.*
Leaves long, more than half as long as the stem or longer.
Rhizome stoloniferous.
Leaves arising from the stem at some distance above the base and below its middle; stems 4–12 in. long ..... 35. *C. bulbosus.*
Leaves radical.
Stolons 4–8 in. long, bearing hard black fragrant tubers; stems 4–30 in. long ..... 36. *C. rotundus.*
Stolons not or rarely tuberiferous; stems 2–4 ft. long ..... 37. *C. tuberosus.*
Rhizome not stoloniferous.
Spikelets much compressed, ascending; wings persistent ..... 38. *C. exaltatus.*
Spikelets terete, spreading horizontally; wings deciduous ..... 39. *C. digitatus.*
Rhachilla of spikelets disarticulating above the 2 lowest glumes.
Stems less than 1 ft. long; spikelets bearing 1 nut ..... 40. *C. Clarkei.*
Stems much more than 1 ft. long.
Spikelets distant along the rhachis, bearing 1–2 nuts; margins of glumes not hyaline; nut oblong, not curved, ⅛ in. long, pale-brown; style more than ½ as long as the nut; rhizome not stoloniferous ..... 41. *C. konkanensis.*
Spikelets closely packed along the rhachis.
Spikelets bearing 1 nut; margins of glumes hyaline; nut ⅛ in. long, oblong, curved, pale-brown; style not ½ the length of the nut; rhizome stoloniferous ..... 42. *C. paniceus* var. [*Roxburghiana.*
Spikelets bearing 3–6 nuts; nut $\frac{1}{16}$ in. long, ellipsoid, not curved, black; margins of glumes hyaline; style more than ½ as long as the nut; rhizome stoloniferous ..... 43. *C. pennatus.*
Spikelets bearing 4–14 nuts; margins of glumes not hyaline; rhachilla with oblong persistent wings ..... 44. *C. dilutus.*

1. **Cyperus latespicatus,** *Boeck. in Flora*, v. 42, p. 433 (of no. 28, July 1859, not of no. 27). Usually annual; rhizome not creeping;

stems 4–12 in. high, erect, slender, stiff, obscurely angled, striate. Leaves shorter than the stem, linear, rather rigid, very acute, $\frac{1}{16}$–$\frac{1}{8}$ in. broad. Umbel simple, sometimes reduced to one head; bracts 3, unequal, the longest sometimes reaching 4 in. long, similar to the leaves. Spikelets straw-colored, shaded with chestnut-brown, oblong-lanceolate, compressed, $\frac{3}{8}$–$\frac{5}{8}$ in. long, 20–60-flowered. Glumes $\frac{1}{8}$ in. long, boat-shaped, when opened out broadly ovate, acute, $\frac{1}{10}$ in. broad, leaving a scar on the rhachilla after falling. Nuts obovoid, black, $\frac{1}{20}$ in. long, very shortly apiculate, slightly compressed, microscopically longitudinally striatulate and irregularly subreticulate; style $\frac{1}{30}$–$\frac{1}{20}$ in. long; stigmas 2, filiform, longer than the style. Boeck. in Linnæa, v. 35 (1868) p. 467; Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 40. *Pycreus latespicatus*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 590; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1136.—Flowers: Sept.

KONKAN: *Stocks!*, *Law!* DECCAN: Máwal (Poona districts), *Woodrow!*—DISTRIB. More or less throughout India.

2. **Cyperus malabaricus,** *C. B. Clarke, in Journ. Linn. Soc.* v. 34 (1898) p. 12 (*Pycreus*). Root fibrous; stems cæspitose, slender, 1 ft. high. Leaves about $\frac{2}{3}$ as long as the stem, $\frac{1}{12}$ in. broad, weak. Inflorescence about 1 in. long and broad, composed of 6–12 spikelets arranged upon 2–3 sessile branchlets; involucral bracts 3, similar to the leaves, the longest reaching $3\frac{1}{2}$ in. long. Spikelets 20-flowered, distant, $\frac{1}{4}$–$\frac{5}{8}$ by $\frac{1}{8}$ in., linear-oblong, subacute, the sides exactly parallel. Glumes $\frac{1}{10}$ in. long, boat-shaped, dark brown with narrow white margins, when opened out broadly ovate, acute, and $\frac{1}{16}$ in. wide. Nut globosely ovoid, slightly compressed, very shortly apiculate, brown, microscopically longitudinally striatulate and faintly transversely ribbed; style $\frac{1}{16}$ in. long; stigmas 2, rather shorter than the style, filiform. *Pycreus malabaricus*, C. B. Clarke (*l. c.*), Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

DECCAN: Lanoli, *Woodrow!*; Khandala, *Cooke!*, *Woodrow!*—DISTRIB. India (W. Peninsula), apparently endemic.

3. **Cyperus sanguinolentus,** *Vahl, Enum.* v. 2 (1806) p. 351. Rhizome creeping, as thick as a crow-quill, 4–10 in. long; stems 4–20 in. long, stout, decumbent at the base, often clothed $\frac{1}{3}$ of their length with leaf-sheaths. Leaves few, many or 0, as long as the stem or shorter, $\frac{1}{10}$–$\frac{1}{8}$ in. broad, acuminate, 1-nerved; midrib often red. Umbel small, simple; bracts 3–5, up to 5 in. long, foliaceous. Spikelets 3–6 (sometimes contracted into a single head), $\frac{1}{4}$–$\frac{3}{8}$ by $\frac{1}{8}$ in., flat, linear or oblong, 6–24-flowered, reddish-brown. Glumes $\frac{1}{10}$ by $\frac{1}{16}$ in., boat-shaped, broadly ovate, obtuse, nearly as broad as long, greenish-yellow and with 3 green nerves at the back, the sides reddish-brown. Anthers linear, muticous. Nuts $\frac{1}{20}$ in. long, suborbicular, laterally compressed, shortly apiculate, biconvex, brown; style $\frac{1}{20}$–$\frac{1}{16}$ in. long; stigmas 2, capillary, about as long as the style. Nees, in Wight, Contrib. (1834) p. 75; Trim. Fl. Ceyl. v. 5, p. 20. *Pycreus sanguinolentus*, Nees, in Linnæa, v. 9 (1835) p. 283; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 590; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1136.

KONKAN: *Law!*; Kalyan, *Woodrow*, 11! DECCAN: Khandala, *Woodrow*. SIND: *Pinwill!*—DISTRIB. Throughout India; Ceylon, warm parts of the Old World.

4. **Cyperus hyalinus,** *Vahl, Enum.* v. 2 (1806) p. 329. Annual; stems tufted, 2–8 in. long. Leaves as long as the stem or longer, $\frac{1}{8}$ in. broad, narrowly linear, acuminate, flat, flaccid, 1-nerved. Umbels simple, with 3–7 rays reaching 2 in. long or sometimes reduced to clusters of sessile few-flowered spikelets; bracts 3–4, leaf-like, reaching 6 in. long, the largest reaching $\frac{1}{5}$ in. broad. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ by $\frac{1}{10}$–$\frac{1}{6}$ in., yellowish-green, 6–10-flowered, oblong, much compressed; rhachilla stout, winged. Glumes $\frac{1}{6}$ by $\frac{1}{16}$ in., narrowly ovate-oblong, boat-shaped; keel herbaceous, brown, 3-nerved, produced into a long slightly recurved cuspidate point beyond the rounded tip; the sides hyaline, each with 2 strong nerves. Stamens 2–3. Nut $\frac{1}{12}$ by $\frac{1}{20}$ in., somewhat obliquely oblong-obovate, laterally flattened, truncate or slightly retuse at the apex, brown; style $\frac{1}{25}$ in. long; stigmas 2, longer than the style, capillary. Boeck. in Linnæa, v. 35 (1868) p. 482; Trim. Fl. Ceyl. v. 5, p. 19. *Cyperus pumilus,* Nees, in Wight, Contrib. (1834) p. 74 (*not* of Linn.). *Pycreus pumilus,* Nees, in Linnæa, v. 9 (1835) p. 283; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 591.—Flowers: Sept.

Rare. Bombay Presidency without locality, *Dr. Leith,* 25! KONKAN: Sion (Bombay), *Woodrow.*—DISTRIB. India (W. Peninsula); Ceylon, Timor.

5. **Cyperus pumilus,** *Linn. Sp. Pl.* ed. 2 (1762) p. 69. Annual; stems tufted, 1–12 in. long, slender. Leaves shorter or longer than the stems, $\frac{1}{20}$–$\frac{1}{8}$ in. broad, linear, 1-nerved, acute. Heads of spikelets $\frac{1}{4}$–$\frac{1}{2}$ in. diam., sometimes broken up into pedunculate spikes or clusters of spikelets, sometimes umbellate, the rays of the umbel 1–6, occasionally though rarely reaching 3 in. long, usually much less; bracts 3–4, leaf-like, up to $4\frac{1}{2}$ in. long. Spikelets $\frac{1}{8}$–$\frac{3}{8}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., 20–50-flowered, much compressed; rhachilla stout, not winged. Glumes $\frac{1}{10}$ in. long by about $\frac{1}{25}$ in. broad in the widest place, ovate, boat-shaped, 2-fid at the tip with a narrow herbaceous keel which is cuspidately produced at the apex, with 3–5 conspicuous brown nerves and with rounded hyaline nerveless sides. Stamen usually 1. Nut ellipsoid-oblong or subobovoid, scarcely $\frac{1}{10}$ in. long, very minutely apiculate, biconvex, laterally compressed, brown; style about equalling the nut, very slender; stigmas 2, capillary, about equalling the style. Trim. Fl. Ceyl. v. 5, p. 19; Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 43. *Cyperus nitens,* Vahl, Enum. v. 2 (1806) p. 331. *Pycreus nitens,* Nees, in Nov. Act. Acad. Cur. v. 19, Suppl. (1843) p. 53; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 591; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1136.—Flowers: Sept.

KONKAN: *Stocks!, Law!* DECCAN: Máwal (Poona districts), *Woodrow*; Lanoli, *Woodrow.* KANARA: *Woodrow.* SIND: *Pinwill!*—DISTRIB. Throughout India; Ceylon, Malaya, China, Tropical Africa, Tropical Australia.

6. **Cyperus globosus,** *All. Auct. Fl. Pedem.* (1789) p. 49. A glabrous very variable annual; root fibrous; stems tufted, 4–25 in. long, very slender, trigonous. Leaves shorter than the heads, very slender, almost filiform. Umbel simple, with 3–5 rays 1–2 in. long, very slender, terminated by solitary or few spikes of 5 or more spreading spikelets, or the spikes capitate; bracts 2–3, leaf-like, the longest sometimes reaching 3 in. long, narrow, almost filiform. Spikelets crowded, $\frac{3}{8}$–$\frac{3}{4}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., linear with parallel sides, much compressed,

20–50-flowered, brown or sometimes almost black; rhachilla stout, tetragonous, not winged, often spotted with red. Glumes $\frac{1}{10}$ by $\frac{1}{25}$ in. long, closely imbricate, ovate-oblong, obtuse; keel greenish-yellow with brownish-red veins; the sides brown with hyaline margins. Stamens 2. Nuts $\frac{1}{30}$ in. long, broadly or narrowly obovoid, rounded and apiculate at the apex, laterally compressed, biconvex, dark chestnut-brown, slightly papillose; style about $\frac{1}{30}$ in. long; stigmas 2, as long as the style, capillary. Trim. Fl. Ceyl. v. 5, p. 21. *Cyperus ater*, Dalz. & Gibs. Bo. Fl. (1861) p. 283 (*not* of Vahl). *C. capillaris*, Kœn. ex Roxb. Fl. Ind. v. 1 (1832) p. 194; Dalz. & Gibs. p. 283. *Pycreus capillaris*, Nees, in Linnæa, v. 9 (1835) p. 283; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 591; Prain, Beng. Pl. p. 1136. *Pycreus capillaris* var. *nilagirica*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 592.

KONKAN: *Stocks!*, *Law!* DECCAN: *Dalzell & Gibson*; Mahableshwar, *Woodrow*; Poona, *Jacquemont*, 409!, *Cooke!*; Soos, 8 miles north-west of Poona, *Bhiva!*; Hura, *Dalzell* ex *C. B. Clarke*.—DISTRIB. Throughout India; Ceylon, temperate and tropical regions of the Old World.

Mr. Clarke describes a variety of this which he has called var. *nilagirica* and founds it on the width of the spikelets, which are, he says, narrower than in the type. I cannot find that the character is at all a reliable one, and I have carefully examined many specimens, both Indian and European. The color of the spikelets in Peninsular specimens is usually darker than that of the Himalayan and European ones, but Mr. Clarke has very distinctly stated in Dyer's 'Flora of Tropical Africa,' v. 8, p. 300, that he has founded the variety not on the color, which he considers accidental, but on the width of the spikelets.

7. **Cyperus albomarginatus,** *Mart. & Schrad. ex Nees*, *Fl. Bras.* v. 2, part 1 (1842) p. 9. A glabrous annual; stem solitary, erect, 1–3 ft. high, triquetrous above. Leaves shorter than the stem, $\frac{1}{3}$ in. broad. Umbel with 4–12 rays reaching sometimes 7 in. long; secondary umbels with 1–7 rays up to $1\frac{1}{4}$ in. long; bracts large, the longest sometimes reaching 16 by $\frac{1}{4}$–$\frac{1}{3}$ in., linear, acuminate, striate, leaf-like; bracteoles of secondary umbels up to $1\frac{3}{4}$ in. long, very slender, almost filiform. Spikes $1\frac{1}{4}$–$2\frac{1}{2}$ in. long. Spikelets 8–20, distant, spreading, acute, $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., pale brown; rhachilla stout, slightly winged. Glumes $\frac{1}{6}$ by $\frac{1}{16}$ in., elliptic-oblong, rounded and hyaline at the apex, scarcely keeled, compressed, the back 5–7-nerved, the sides yellow or brown with conspicuous white margins chiefly near the apex. Stamens usually 3; anthers linear-oblong. Nut $\frac{1}{10}$ in. long, obovoid, apiculate, rounded at the apex, laterally compressed, granulate, black. *Cyperus Hochstetteri*, Nees ex Krauss, in Flora, v. 28 (1845) p. 755 *in note*; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 69. *Pycreus albomarginatus*, Nees, in Mart. Fl. Bras. v. 2, part 1 (1842) p. 9; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 594; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

KONKAN: *Stocks!*; N. & S. Konkan, *Law!*; Bombay, ex Herb. Hook. in Herb. Kew. S. M. COUNTRY: Londa, *Woodrow*.—DISTRIB. India (W. Peninsula, Rangoon); Ethiopia, N. Australia.

8. **Cyperus puncticulatus,** *Vahl, Enum.* v. 2 (1806) p. 348. A glabrous annual; stems robust, subsolitary, 1–2 ft. high, erect from a thickened base, trigonous or triquetrous above, the angles smooth. Leaves as long as the stem or shorter, $\frac{1}{8}$–$\frac{1}{2}$ in. broad, rather thick, 1-nerved, pale beneath; margins smooth; sheaths long. Umbel simple or compound, with many slender rays reaching 6 in. or more, terminated

by few or many slender spikes of widely spreading pale or dark brown spikelets; bracts 3–4, the longest sometimes reaching 9 in. or more long and $\frac{1}{8}$–$\frac{1}{6}$ in. broad, leaf-like. Spikelets distant on the slender rhachis, $\frac{1}{4}$–$\frac{3}{4}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., linear or linear-oblong, compressed, soft, 7–30-flowered; rhachilla slender, undulate, slightly winged. Glumes closely imbricate, thin, $\frac{1}{8}$ by $\frac{1}{16}$ in., oblong, obtuse, cymbiform; keel 5-nerved; sides broadly hyaline. Stamens 3. Nut $\frac{1}{16}$ in. long, obovoid, obcordate at the apex, granulate, apiculate, laterally compressed, dark brown; style $\frac{1}{30}$–$\frac{1}{20}$ in. long; stigmas 2, longer than the style, filiform. Dalz. & Gibs. p. 283; Trim. Fl. Ceyl. v. 5, p. 21. *Pycreus Baccha*, Nees, in Linnæa, v. 9 (1835) p. 283; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430. *Pycreus puncticulatus*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 593.

KONKAN: *Dalzell*! S. M. COUNTRY: Londa, *Cooke*!—DISTRIB. India (W. Peninsula); Ceylon, China.

9. **Cyperus odoratus,** *Linn. Sp. Pl.* (1753) p. 46. Perennial; stems tufted, 12–30 in. long, slender, trigonous, thickened at the base, sometimes 0. Leaves shorter than the stem, $\frac{1}{10}$–$\frac{1}{6}$ in. broad; sheath short. Umbel simple, of 2–7 slender rays $\frac{1}{8}$–2 in. long, each terminated by short ternate spikes of 4–8 narrow spikelets; bracts 3–6, spreading, the longest up to 6 in. long or more, leaf-like. Spikelets $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{16}$–$\frac{1}{10}$ in., linear, acuminate, flat, reddish-brown, 20–50-flowered. Glumes $\frac{1}{10}$–$\frac{1}{8}$ by $\frac{1}{30}$ in., closely imbricate, ovate-lanceolate, mucronulate; keel straight, obscurely 3-nerved; the sides yellow streaked with brown with hyaline margins. Stamens usually 2; anthers small, oblong. Nut $\frac{1}{20}$ in. long, oblong-ellipsoid, rounded at the apex, apiculate, laterally compressed, biconvex, faintly granulate, brown; style $\frac{1}{20}$ in. long; stigmas 2, filiform, as long as the style. *Cyperus polystachyos*, Rottb. Descrip. et Icon. (1773) p. 39, t. 11, fig. 1; Grah. Cat. p. 231; Dalz. & Gibs. p. 281; Trim. Fl. Ceyl. v. 5, p. 20. *Pycreus polystachyos*, Beauv. Fl. Ow. v. 2, p. 48, t. 86, fig. 2; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 592; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1136.

The specific name *odoratus*, Linn., has priority over *polystachyos*, Rottb.

KONKAN: Malwán, *Woodrow*. GUJARAT: Surat, *Woodrow*. SIND: *Pinwill*!—DISTRIB. Throughout India near the coast; Ceylon, all warm countries especially near the sea.

10. **Cyperus pygmæus,** *Rottb. Descrip. et Icon.* (1773) p. 20, t. 14, fig. 5. An annual dwarf herb; stems 1–10 in. long, densely tufted. Leaves numerous, as long as or shorter than the stem, $\frac{1}{16}$–$\frac{1}{10}$ in. broad, flaccid, green, acuminate. Spikelets very many (often 100), sessile, densely packed in a terminal head $\frac{1}{4}$–$\frac{2}{3}$ in. in diam., ovate, $\frac{1}{8}$ by $\frac{1}{10}$ in., compressed, 8–20-flowered, green or pale brown; bracts 2–6, dilated at the base, 1–6 in. long, acuminate, leaf-like; rhachilla slender, not winged, often curved or twisted. Glumes closely imbricate, $\frac{1}{10}$–$\frac{1}{8}$ by $\frac{1}{30}$ in., oblong-lanceolate cuspidate, the back streaked with brown, the sides with broadly hyaline margins. Stamen 1 (rarely 2); anthers linear-oblong, muticous. Nut $\frac{1}{25}$ in. long, ellipsoid, plano-convex or trigonous, orange-brown; style $\frac{1}{30}$ in. long; stigmas 2, capillary, about as long as the style. Boeck. in Linnæa, v. 35 (1868) p. 493; C. B.

Clarke, in Journ. Linn. Soc. v. 21, p. 81; Trim. Fl. Ceyl. v. 5, p. 18. *Cyperus squarrosus*, Roxb. Hort. Beng. (1814) p. 81 (*not* of Linn.); Grah. Cat. p. 231. *Juncellus pygmæus*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 596; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1138.—Flowers: Oct.

KONKAN: *Law*! DECCAN: Poona, *Woodrow*. GUJARAT: Surat, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Malaya, N. Trop. Africa, China, Japan, Australia, Europe (Mediterranean regions).

11. **Cyperus lævigatus,** *Linn. Mantiss.* (1771) p. 179. Glabrous; rhizome creeping horizontally, $\frac{1}{6}$ in. in diam., long and with solitary distant stems, or short and with crowded stems, their bases enclosed by imbricate shining chestnut-red scales; stems 4–24 in. long, round, somewhat fleshy. Leaves usually short or scarcely any, sometimes as long as the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, the upper part often terete. Spikelets 1–30 in one apparently lateral head, solitary or clustered, straw-colored; bracts 2, the lower as though a continuation of the stem 1–3 in. long, the other much shorter or wanting. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$ in., ovate, subacute, compressed but thick, straw-colored dotted with brown spots, 12–30-flowered; rhachilla stout, quadrangular, dotted with brown spots. Glumes $\frac{1}{10}$–$\frac{1}{8}$ by $\frac{1}{20}$–$\frac{1}{16}$ in., ovate or oblong, acute, mucronulate, closely imbricate, dotted with brown spots, the sides with hyaline margins. Stamens 3; filaments ligulate, membranous; anthers linear, $\frac{1}{16}$ in. long, yellow with a reddish-brown acute tip. Nut $\frac{1}{20}$ in. long, obovoid, plano-convex; style about as long as the nut; stigmas 2, short. Boeck. in Linnæa, v. 35 (1868) p. 486; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 77. *Juncellus lævigatus*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 596; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

Dalzell without locality in Herb. Kew.! KONKAN: Salt-marshes near Bombay, *Woodrow*. GUJARAT: Kathiawar, *Woodrow*. SIND: *Pinwill*.—DISTRIB. India (Kashmir, Panjáb, W. Peninsula); Europe (Mediterranean region), Africa, W. Asia, Australia, S. America.

VAR. *junciformis*, C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 79. Rigid; spikelets 1–6, rigid, shining, chestnut or black. *Juncellus lævigatus* var. *junciformis*, C. B. Clarke, in Fl. B. I. v. 6, p. 597. *Cyperus junciformis* (sp.), Desfont. Fl. Atlant. v. 1 (1798) p. 42, t. 7, fig. 1.

SIND: *Stocks*, 751!

12. **Cyperus alopecuroides,** *Rottb. Descrip. et Icon.* (1773) p. 38, t. 8, fig. 2. A large glabrous perennial herb; root fibrous; stems 2–3 ft. high, stout, often 1 in. or more in diam. at the base, trigonous above, the angles smooth. Leaves many, as long as the stem or shorter, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, coriaceous, acute. Umbel large, compound, with 4–6 primary rays up to 4 in. long, slender; secondary rays up to 1 in. long bearing clusters of oblong, sessile and pedunculate spikes $\frac{2}{3}$–$1\frac{1}{4}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., densely covered with small spikelets; rhachis of spike stout; bracts reaching 18 in. long by $\frac{1}{2}$ in. broad at the base, leaf-like; bracteoles 3–4, linear, acute, slender, sometimes wanting. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ by $\frac{1}{10}$ in., elliptic-lanceolate or ovate-oblong, subacute, compressed, straw-colored; rhachilla stout, subtetragonous, not winged. Stamens 3;

anthers long, linear, muticous. Glumes $\frac{1}{10}$ by $\frac{1}{30}$ in., not keeled, obscurely nerved, ovate-oblong, mucronulate, with broad hyaline margins, the sides and back streaked with brown. Nut $\frac{1}{20}$ in. long, ellipsoid, plano-convex or biconvex, sometimes subtrigonous, pale yellow when young, ashy-brown in age. Grah. Cat. p. 232; Dalz. & Gibs. p. 282; Trim. Fl. Ceyl. v. 5, p. 38; Boeck. in Linnæa, v. 36 (1870) p. 321; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 74. *Juncellus alopecuroides*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 595; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

Dalzell without locality in Herb. Kew.! KONKAN: Bombay, *Jacquemont*, 438! DECCAN: *Woodrow*; between Ellora and Poona, *Jacquemont*, 279! GUJARAT: Panch Mahâls, *Woodrow*. SIND: *Stocks*!—DISTRIB. Throughout India; Ceylon, Africa, Tropical Australia.

13. **Cyperus castaneus,** *Willd. Sp. Pl.* v. 1 (1797) p. 278. A low herb 1–7 in. high; stems few or many, tufted, slender. Leaves as long as or shorter than the stem, $\frac{1}{16}$–$\frac{1}{2}$ in. broad; sheaths often purple. Umbel usually simple, consisting of a central sessile head and few or many unequal spreading rays $\frac{1}{4}$–$1\frac{1}{2}$ in. long (rarely again divided, sometimes reduced to a terminal head); rays terminated by heads of 3–20 stellately spreading spikelets; bracts 3–5, the longest sometimes reaching 6 in. long, narrowly linear, leaf-like, dilated at the base, cuspidate at the apex, spreading. Spikelets $\frac{1}{6}$–$\frac{3}{4}$ by $\frac{1}{20}$–$\frac{1}{10}$ in. long, oblong or linear, compressed, usually dark chestnut-brown, many-flowered. Glumes $\frac{1}{16}$–$\frac{1}{2}$ in. long (excluding the mucro) by $\frac{1}{30}$ in. broad; keel greenish-yellow, produced beyond the rounded tip into a long recurved mucro; sides usually chestnut-brown, the margins not hyaline; rhachilla rather stout, scarcely winged. Stamens 1–2; anthers small. Nut $\frac{1}{20}$ in. long, oblong, trigonous, shortly apiculate, narrowed at the base, pale brown or yellow, granulate; style shorter than the nut; stigmas 3, filiform. Fl. B. I. v. 6, p. 598; Boeck. in Linnæa, v. 35 (1868) p. 496; Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 87; Trim. Fl. Ceyl. v. 5, p. 25; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers: Oct.–Dec.

Rare. KONKAN: *Cooke*!; Bombay, *Woodrow*; Laddapur, *Bhiva*!—DISTRIB. India (Nepal, Sikkim, Pegu, W. Peninsula); Ceylon, Tonkin, Central Australia.

14. **Cyperus Teneriffæ,** *Poir. Encyc. Méthod.* v. 7 (1806) p. 245. A low glabrous annual of a reddish-brown color; root fibrous; stems 2–8 in. long, tufted. Leaves usually shorter than the stem, $\frac{1}{6}$ in. broad, linear, acute; sheaths reddish, inflated. Head solitary, of 3–20 sessile spikelets; bracts 2, the longest $\frac{3}{4}$–$1\frac{1}{2}$ in. long, narrowly linear, acute, leaf-like. Spikelets $\frac{1}{3}$–$\frac{5}{8}$ by $\frac{1}{5}$–$\frac{1}{4}$ in., much compressed, reddish-brown. Glumes $\frac{1}{8}$ in. long (including the mucro) by $\frac{1}{15}$ in. broad, boat-shaped, keeled; keel produced into a conspicuous recurved mucro; sides with 4–5 conspicuous ribs on each, the margins hyaline. Stamens 3; anthers oblong, muticous. Nut $\frac{1}{20}$ in. long, obovoid, obtuse, shortly apiculate, triquetrous, dark brown; style longer than the nut; stigmas 3, shorter than the style. I have not found any of the nuts reticulate black and white as stated in the 'Flora of British India.' Fl. B. I. v. 6, p. 601; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430. *Cyperus Wightii*, Nees, in Wight, Contrib. (1834) p. 78; Boeck. in Linnæa, v. 35

(1868) p. 507. *C. rubicundus*, Kunth, Enum. v. 2 (1837) p. 49 (*not* of Vahl); Boeck. in Linnæa, v. 35 (1868) p. 507; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 104.—Flowers: Sept.

Rare. DECCAN: Poona, *Woodrow*, 143!—DISTRIB. India (W. Peninsula); Teneriffe, Africa.

15. **Cyperus uncinatus,** *Poir. Encyc. Méthod.* v. 7 (1806) p. 247. A glabrous annual; stems 3–6 in. long, tufted, slender. Leaves as long as or shorter than the stem, filiform, flexuous. Umbel simple, consisting of a central sessile head and few or many filiform spreading unequal rays ¼–1 in. long, each terminated by a head of stellately spreading spikelets; bracts 3–5, filiform, much longer than the rays, the longest sometimes reaching 3 in. long. Spikelets ⅕–½ by ⅛ in., 5–12 in a cluster, compressed, 12–24-flowered, reddish-brown; rhachilla scarcely winged, slender. Glumes $\frac{1}{16}$ in. long (not including the mucro, which is nearly as long as the limb), oblong, obtuse, about $\frac{1}{30}$ in. broad; keel 3-nerved, produced into a long recurved mucro; sides usually brown, hyaline. Stamens 1–2; anthers short, oblong. Nut about $\frac{1}{30}$ in. long, obovoid, trigonous, shortly apiculate, dark brown, faintly granulate; style shorter than the nut, very slender; stigmas 3, capillary, about equalling the style. Distinguished from *C. castaneus*, which it much resembles, by the nuts which are obovoid, those of *C. castaneus* being oblong and longer. C. B. Clarke, in Dyer's Fl. Trop. Africa, v. 8 (1902) p. 328. *Cyperus cuspidatus*, H. B. & K. Nov. Gen. & Sp. v. 1 (1815) p. 204; Boeck. in Linnæa, v. 35 (1868) p. 496; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 88 & in Hook. f. Fl. B. I. v. 6, p. 598; Trim. Fl. Ceyl. v. 5, p. 26; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1139.

DECCAN: Lanoli, *Woodrow*. SIND: *Pinwill*!—DISTRIB. Throughout India; Ceylon, Tropical Africa, Java, China, Australia, America.

16. **Cyperus flavidus,** *Retz. Obs.* fasc. 5 (1789) p. 13. Annual; root fibrous, dark purple (*Dalz. & Gibs.*); stems tufted, 6–8 in. high, weak, obtusely trigonous. Leaves shorter or longer than the stem, $\frac{1}{16}$–⅛ in. broad, linear, acute. Umbel compound or decompound, when mature yellow or finally blackening; rays many, the primary 1–2 in. long, the secondary ½–1 in. long, bearing heads of stellately spreading minute spikelets; bracts 2–3, the longest reaching 6 in. long; bracteoles 0. Spikelets ⅛–¼ by $\frac{1}{16}$ in., linear-lanceolate. Glumes $\frac{1}{25}$ in. long, oblong, rounded (not mucronate) at the tip, with a green obscurely 3-nerved back, the sides with hyaline margins. Stamen 1 (rarely 2); anthers linear, muticous. Nut $\frac{1}{50}$ in. long, globosely obovoid, trigonous, rounded, shortly and stoutly stipitate, at first pale-yellow, becoming white when quite ripe. Dalzell & Gibson (Bo. Fl. p. 285) say that the plant is easily recognized by its yellow hue. Fl. B. I. v. 6, p. 600; Dalz. & Gibs. p. 284; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 122; Trim. Fl. Ceyl. v. 5, p. 27; Prain, Beng. Pl. p. 1139. *Cyperus Haspan* var. *a indicus*, Boeck. in Linnæa, v. 35 (1868) p. 574.

DECCAN: *Dalzell & Gibson*.—DISTRIB. More or less throughout India in rice-fields; Ceylon, warm regions of the Old World.

17. **Cyperus difformis,** *Linn. Cent. Pl. part* 2 (1755), *in Amœn. Acad.* v. 4 (1788) p. 302. A glabrous annual; root fibrous; stems 4–

20 in. long, tufted, weak, triquetrous towards the top. Leaves few, usually shorter than the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, linear, acuminate, obscurely nerved, flaccid. Spikes in a simple or compound umbel or contracted into a head; rays of the umbel 3–6, slender, up to $1\frac{1}{2}$ in. long; bracts 2–4, the lowest 2–10 in. long, leaf-like. Spikelets many, in dense heads, dusky or brown, $\frac{1}{8}$–$\frac{1}{5}$ by $\frac{1}{25}$ in., oblong, obtuse, 10–30-flowered; rhachilla slender, not winged. Glumes $\frac{1}{30}$–$\frac{1}{25}$ in. long, closely imbricate, obovate-oblong, obtuse, concave, 3-nerved and rounded on the back; sides broadly hyaline. Stamen 1 (less commonly 2); anthers small, oblong, muticous, yellow. Nut $\frac{1}{30}$ in. long, ellipsoid, obtusely trigonous, rounded and apiculate at the apex, smooth, yellow or brown; style much shorter than the nut; stigmas 3, linear, short. Fl. B. I. v. 6, p. 598; Grah. Cat. p. 232; Dalz. & Gibs. p. 282; Boeck. in Linnæa, v. 35 (1868) p. 586; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 133; Trim. Fl. Ceyl. v. 5, p. 25; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1139.—Flowers: Oct.–Jan.

KONKAN: Matheran, *Woodrow*. DECCAN: Chinchwad, near Poona, *Woodrow*; Khandala, *Woodrow*; between Ellora and Poona, *Jacquemont*, 275!—DISTRIB. More or less throughout India; Ceylon, the Old World generally in warm regions.

18. **Cyperus pulcherrimus,** *Willd. in Kunth, Enum.* v. 2 (1837) p. 35. Rhizome short, creeping; root-fibres slender; stems 12–18 in. long, slender, trigonous. Leaves as long as the stem or longer, narrowly linear, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, weak, 1-nerved. Umbel compound, contracted; rays very many, reaching $1\frac{1}{2}$ in. long, bearing crowded umbellules whose subglobose heads of innumerable spikelets conceal the secondary rays which are $\frac{1}{4}$–$\frac{3}{8}$ in. long; bracts 3–6, leaf-like, the longest reaching 6 in. long. Spikelets 8–12, small, not reaching $\frac{1}{4}$ in. long, about $\frac{1}{25}$ in. broad, densely crowded, oblong-lanceolate, 12–30-flowered; rhachilla not winged, slender. Glumes ovate-oblong, obtuse, with crisped incurved tips, the sides hyaline with 2 broad reddish-brown bands. Stamens 1–2; anthers linear. Nut minute, half as long as the glume, shortly and stoutly stipitate, globosely trigonous, acute at both ends, granulate; style nearly as long as the nut; stigmas 3, capillary. Fl. B. I. v. 6, p. 600; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 132; Boeck. in Linnæa, v. 35 (1868) p. 573; Trim. Fl. Ceyl. v. 5, p. 27.

SIND: *Pinwill!*—DISTRIB. India (Assam); Ceylon, Penang, Java, Borneo.

19. **Cyperus Haspan,** *Linn. Sp. Pl.* (1753) p. 45. Perennial, glabrous; rhizome creeping, clothed with ovate triangular scales, giving off solitary or tufted stout or slender trigonous or triquetrous often compressed stems 4–24 in. long. Leaves usually shorter (sometimes longer) than the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, acute, erect (occasionally very short and subulate); sheaths inflated. Umbel simple or compound, of 4–12 very unequal rays up to 3 in. long; secondary rays bearing 3–8 slender stellately spreading spikelets; bracts 2–3, variable, narrow and shorter than the rays, or broader than the leaves and 3 in. long. Spikelets $\frac{1}{8}$–$\frac{1}{3}$ by $\frac{1}{16}$–$\frac{1}{12}$ in., linear, acute, flat, 10–40-flowered, pale or chestnut-brown; rhachilla narrow, scarcely winged. Glumes $\frac{1}{16}$ by $\frac{1}{50}$ in., ovate-oblong, rounded on the back, not or obscurely mucronate by the excurrent midrib; sides hyaline, usually brown. Stamens 2 or 3;

anthers linear-oblong. Nuts $\frac{1}{30}$ in. long, globosely obovoid, rounded and shortly apiculate at the apex, trigonous, on a short thick stipes, yellow or pale-brown; style longer than the nut; stigmas 3, capillary. Fl. B. I. v. 6, p. 600; Grah. Cat. p. 231; Dalz. & Gibs. p. 282; Boeck. in Linnæa, v. 35 (1868) p. 574; Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 119; Trim. Fl. Ceyl. v. 5, p. 26; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1139; Watt, Dict. Econ. Prod. v. 2, p. 684.—Flowers: Oct.–Dec.

KONKAN: Ratnagiri, *Woodrow*. DECCAN: Lanoli, *Woodrow*.—DISTRIB. Throughout India, common in rice-fields; Ceylon, Malaya, Indo-China, Tropical Africa and Australia.

20. **Cyperus niveus,** *Retz. Obs.* fasc. 5 (1789) p. 12. Glabrous, glaucescent; rhizome woody, short, the rootlets wiry; stems 8–16 in. long, nodose at the base, closely 1-seriate. Leaves much shorter than the stem, narrowly linear, setaceo-acuminate, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, weak. Spikelets 3–12 in one head, reaching $\frac{3}{4}$ by $\frac{1}{4}$ in., oblong-elliptic, compressed, pale, sometimes almost white, 20–40-flowered; rhachilla not winged; bracts usually 2, the longest reaching $2\frac{1}{2}$ in. long, finely acuminate, not dilated at the base, leaf-like. Glumes $\frac{1}{5}$ by $\frac{1}{16}$ in., ovate-lanceolate, compressed; keel produced into a very short mucro; sides whitish or whitish-brown, multistriate, with narrow hyaline margins. Stamens 3; filaments long, persistent; anthers linear, muticous, exserted from the glume. Nut $\frac{1}{12}$ in. long, obovoid, triquetrous, dark brown; style $\frac{1}{16}$ in. long; stigmas 3, rather shorter than the style. Fl. B. I. v. 6, p. 601; Boeck. in Linnæa, v. 35 (1868) p. 530; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 108; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1139; Watt, Dict. Econ. Prod. v. 2, p. 686.—Flowers: Nov.

SIND: *Pinwill*; Hyderabad, *Woodrow*.—DISTRIB. More or less throughout India; Afghanistan, China.

21. **Cyperus leucocephalus,** *Retz. Obs.* fasc. 5 (1789) p. 11. A glabrous herb; rhizome very short, woody, with long fibrous rootlets; stems cæspitose, very slender, nodose at the base, each carrying one head. Leaves shorter than the stem, narrow, $\frac{1}{20}$–$\frac{1}{16}$ in. broad, many-nerved. Heads dense, globose, white, $\frac{1}{4}$–$\frac{3}{8}$ in. in diam., containing 8–50 spikelets; bracts 3 (rarely 4), the longest reaching $2\frac{1}{2}$ in. long, narrowly linear, long-acuminate, many-nerved. Spikelets $\frac{1}{6}$–$\frac{1}{5}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., compressed, elliptic, 10–18-flowered. Glumes $\frac{1}{12}$ by $\frac{1}{40}$ in., oblong-lanceolate, subobtuse, whitish or pale-brown, with hyaline margins. Stamen 1; anthers oblong, muticous. Nut $\frac{1}{30}$ in. long, oblong-ellipsoid, trigonous, shortly apiculate, granulate, black; style $\frac{1}{16}$ in. long; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 602; Boeck. in Linnæa, v. 35 (1868) p. 590; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 107; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

KONKAN: N. & S. Konkan, *Law*!—DISTRIB. Tropics generally.

22. **Cyperus arenarius,** *Retz. Obs.* fasc. 4 (1786) p. 9. Whole plant pale or glaucous-green; rhizome elongate, creeping, striate, rigid, dichotomously branched, clothed with lanceolate chestnut-brown sheaths; rootlets thick, glabrous; stems solitary, 4–12 in. long, distant, stout, rigid, terete, attenuated at the base into the rhizome, clothed below

with long withered sheaths. Leaves longer or shorter than the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, linear, spreading and recurved, rigidly coriaceous, terete and grooved above, or broader with complicate sides, not keeled, almost nerveless. Heads solitary on the summit of the stems, globose, $\frac{1}{2}$–$1\frac{1}{2}$ in. in diam., of many sessile radiating spikelets; bracts 2–3, leaf-like, rigid, the lowest 2–4 in. long, erect, simulating a continuation of the stem, the others much shorter. Spikelets $\frac{3}{8}$–$\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., elliptic-lanceolate, straw-colored, becoming ultimately brown, 8–16-flowered; rhachilla stout, not winged. Glumes $\frac{1}{6}$–$\frac{1}{5}$ by $\frac{1}{10}$ in., ovate-oblong, boat-shaped, obtuse, minutely mucronate, dorsally rounded, streaked with brown, the sides with many strong nerves and hyaline margins. Stamens 3; filaments elongate, ligulate, persistent; anthers narrowly linear, muticous, exserted from the glume. Nut $\frac{1}{16}$ in. long, obovoid, rounded at the apex, trigonous, black; style $\frac{1}{16}$–$\frac{1}{10}$ in. long; stigmas 3, capillary, exserted from the glume. Fl. B. I. v. 6, p. 602; Dalz. & Gibs. p. 284; Boeck. in Linnæa, v. 35 (1868) p. 536; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 106; Trim. Fl. Ceyl. v. 5, p. 23; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers: Oct.–Nov.

KANARA: Karwar, *Talbot*, 553! GUJARAT: Domas near Surat on the sea-coast, *Dalzell*!; Ahmedabad, *Woodrow*, 21! SIND: *Pinwill*!, *Stocks*!; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (sea-coast from Sind to Ceylon and Orissa, Panjáb); Ceylon, Persia, Arabia.

23. **Cyperus Atkinsoni,** *C. B. Clarke, in Journ. Linn. Soc.* v. 21 (1884) p. 109. Rhizome short, woody; roots not woolly; stems cæspitose, 2–7 in. long, trigonous below, terete above, thickened at the base. Leaves as long as or shorter than the stem, rigid, $\frac{1}{10}$–$\frac{1}{8}$ in. broad at the base, tapering towards the finely cuspidate apex. Umbel simple, often contracted into a head; rays 3–4, reaching $\frac{3}{8}$–$1\frac{1}{8}$ in. long; bracts 2–3, the longest 2–3 in. long. Spikelets $\frac{3}{8}$–$\frac{7}{8}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., 20–30-flowered, narrowly linear, subacute; rhachilla not winged. Glumes oblong-lanceolate, cymbiform, $\frac{1}{8}$–$\frac{1}{6}$ by $\frac{1}{20}$ in., with a strong sharp slightly recurved mucro $\frac{1}{50}$ in. long beyond the subacute tip; the back pale, the sides pale or cinnamon-colored, multistriate, the margins hyaline. Stamens 3; filaments $\frac{1}{8}$ in. long, ligulate, persistent; anthers $\frac{1}{16}$ in. long, linear, yellow. Nut $\frac{1}{16}$ in. long, obovate, trigonous, yellow; style $\frac{1}{20}$–$\frac{1}{16}$ in. long; stigmas 3, much longer than the style, capillary. Fl. B. I. v. 6, p. 603; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

Dalzell without locality in Herb Kew.! SIND: *Stocks*!; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Kashmir, N.W. Himalaya, W. Peninsula).

24. **Cyperus conglomeratus,** *Rottb. Descrip. et Icon.* (1773) p. 21, t. 15, fig. 7. Glabrous, glaucous-green; rhizome short or long, woody, creeping, $\frac{1}{8}$–$\frac{1}{6}$ in. in diam.; roots of stout woolly fibres; stems stout, 6–20 in. long, terete below, trigonous above, thickened at the base, clothed with brown ovate acuminate scales. Leaves as long as the stem or shorter, $\frac{1}{10}$–$\frac{1}{6}$ in. broad, coriaceous, dorsally rounded (not keeled), shortly cuspidate at the tip, the margins involute when dry; nerves obscure. Umbel simple, often contracted into one head 1–$1\frac{1}{2}$ in. diam. of densely crowded spreading spikelets; bracts 3–4, elongate, narrower than the leaves, shortly cuspidate. Spikelets $\frac{1}{2}$–1 by $\frac{1}{8}$–$\frac{1}{6}$ in., oblong-lanceolate, compressed, 10–24-flowered; rhachilla stout, scarred, not winged. Glumes reaching $\frac{1}{3}$ by $\frac{1}{16}$ in., oblong-lanceolate, cymbiform,

with a short stout mucro extending beyond the rounded tip, with many reddish-brown nerves and hyaline margins. Stamens 3; filaments $\frac{1}{10}$ in. long, ligulate; anthers yellow, $\frac{1}{8}$ in. long, narrowly linear, muticous. Nut (immature) $\frac{1}{10}$ in. long, obovoid, compressed, trigonous, yellow; style reaching $\frac{1}{8}$ in. long, flattened; stigmas 3, capillary, much longer than the style. Fl. B. I. v. 6, p. 602; Trim. Fl. Ceyl. v. 5, p. 23; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430. *Cyperus pungens*, Boeck. in Linnæa, v. 35 (1868) p. 537; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 113.—Flowers: Nov.-Feb.

GUJARAT: Ahmedabad, *Woodrow*. SIND: *Pinwill*!; Sibi, *Lace*, 3462!—DISTRIB. India (W. Peninsula); Ceylon, Trop. Africa, Mediterranean region.

VAR. *pachyrhizus*, Trimen MSS. ex Hook. f. in Trim. Fl. Ceyl. v. 5 (1900) p. 23. More slender; leaves narrower; heads 2 in. in diam.; spikelets smaller and narrower; glumes muticous. *C. pachyrhizus* (sp.), Nees ex Boeck. in Linnæa, v. 35 (1868) p. 545; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 111 & in Hook. f. Fl. B. I. v. 6, p. 603; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers: Nov.-Dec.

KONKAN: *Law*! GUJARAT: (Kathiawar) Verawal, *Woodrow*!; Porbander, *Woodrow*. —DISTRIB. India (W. Peninsula); Ceylon, Laccadive Isles.

25. **Cyperus compressus,** *Linn. Sp. Pl.* (1753) p. 46. A glabrous annual; root fibrous; stems tufted, 4–16 in. long, erect, slender, trigonous, with rounded smooth angles. Leaves shorter or longer than the stem, $\frac{1}{16}$–$\frac{1}{6}$ in. broad, finely acuminate, 1-nerved. Umbel simple, often with a sessile head at the fork or occasionally altogether reduced to a sessile head; rays 3–6, reaching 3 in. long, bearing 4–8 terminal spikelets; bracts 3–5, finely acuminate, leaf-like, the longest reaching $4\frac{1}{2}$ in. long. Spikelets $\frac{1}{2}$–$1\frac{1}{4}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., much compressed, yellow when ripe, linear-oblong, 20–40-flowered; rhachilla stout, angular, closely scarred, scarcely winged. Glumes $\frac{1}{5}$ in. long (including the mucro), oblong-lanceolate, closely imbricate; keel produced into a slightly recurved, laterally compressed mucro $\frac{1}{20}$–$\frac{1}{16}$ in. long, beyond the obtuse tip; sides membranous, green or yellow, striate, with short hyaline margins. Stamens 3; filaments nearly $\frac{1}{4}$ in. long, ligulate; anthers $\frac{1}{12}$ in. long, yellow, linear, muticous. Nut $\frac{1}{10}$ in. long, broadly obovoid, triquetrous, black; style $\frac{1}{16}$ in. long; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 605; Grah. Cat. p. 231; Dalz. & Gibs. p. 282; Boeck. in Linnæa, v. 35 (1868) p. 517; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 97; Trim. Fl. Ceyl. v. 5, p. 33; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1140; Watt, Dict. Econ. Prod. v. 2, p. 683.

DECCAN: *Dalzell & Gibson*; Poona, *Woodrow*. SIND: *Pinwill*!—DISTRIB. Throughout India; Ceylon, Tropical Africa, Asia, and America.

26. **Cyperus aristatus,** *Rottb. Descrip. et Icon.* (1773) p. 23, t. 6, fig. 1. A small glabrous annual 3–6 in. high; roots fibrous; stems tufted, stout or slender, trigonous. Leaves usually shorter than the stem, erect, $\frac{1}{20}$–$\frac{1}{10}$ in. broad, acuminate, flat, 1-nerved, flaccid. Umbel with 2–5 rays, or capitate with numerous spikelets crowded into a globose or oblong head $\frac{1}{4}$–$\frac{1}{2}$ in. long; bracts 2–5, the longest reaching in well-developed specimens $3\frac{1}{2}$ in. long, broader than the leaves at the

base, gradually tapering to a fine point. Spikelets $\frac{1}{5}$–$\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., oblong, flat, 6–20-flowered, usually brownish; rhachilla not winged. Glumes $\frac{1}{8}$ in. long (including the mucro) by $\frac{1}{30}$ in. broad, oblong; keel strong, produced into a recurved beak as long as the limb; sides many-nerved up to near the margin, pale or brown. Stamen 1; filaments $\frac{1}{12}$ in. long; anthers small, oblong. Nut $\frac{1}{20}$ in. long, narrowly obovoid, rounded and apiculate at the apex, tapering towards the base, trigonous, reddish-brown; style $\frac{1}{30}$ in. long; stigmas 3, about as long as the style, capillary. Fl. B. I. v. 6, p. 606; Boeck. in Linnæa, v. 35 (1868) p. 500; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 91; Trim. Fl. Ceyl. v. 5, p. 24; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1140.—Flowers: Sept.

Deccan: Poona, *Jacquemont*, 315!, *Woodrow*.—Distrib. More or less throughout India, Ceylon, Trop. Africa, Australia, America.

27. **Cyperus Iria,** *Linn. Sp. Pl.* (1753) p. 45. A glabrous annual; root fibrous; stems tufted, 14–20 in. long, triquetrous, striate. Leaves as long as the stem or shorter, $\frac{1}{6}$–$\frac{1}{5}$ in. broad, multistriate, finely acuminate, flaccid. Umbel decompound, of many primary rays 1–5 in. long, bearing irregularly fascicled umbellules formed of narrow interrupted spikes of 5–20 small few-flowered spikelets; bracts 3–5, the longest sometimes reaching 8 in. long. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., linear-oblong, obtuse, compressed, 6–20-flowered, yellow or pale brown; rhachilla not winged. Glumes $\frac{1}{10}$ by $\frac{1}{16}$ in., elliptic-obovate, obtuse, muticous or very minutely apiculate, loosely or scarcely imbricate, 3–5-nerved, with broad hyaline margins. Stamens 2 or 3; anthers small, oblong, muticous, yellow. Nut $\frac{1}{12}$ in. long, obovoid, triquetrous, brown or black; style very short, scarcely $\frac{1}{50}$ in. long; stigmas 3, very short, slightly exserted from the glume. Fl. B. I. v. 6, p. 606; Grah. Cat. p. 232; Dalz. & Gibs. p. 282; Boeck. in Linnæa, v. 35 (1868) p. 595; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 137; Trim. Fl. Ceyl. v. 5, p. 18; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1140; Watt, Dict. Econ. Prod. v. 2, p. 685.—Flowers: Dec.

Konkan: Neral (below Matheran), *Bhiva*! Deccan: *Dalzell & Gibson*; Poona, *Jacquemont*, 344!; Matheran, *Woodrow*; Khandala, *Woodrow*.—Distrib. Throughout India in rice-fields; Ceylon, Indo-China, Australia, Mediterranean region.

Var. *paniciformis*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 607. Spikelets bearing 2–4 nuts; spikes often drawn out into nearly linear racemes. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430. *Cyperus paniciformis* (sp.), Franck. & Savat. Pl. Japon. v. 2 (1879) p. 103 and p. 537. *C. parviflorus*, Nees, in Wight, Contrib. (1834) p. 87 (exclud. all syn.).—Flowers: Sept.

Konkan: Neral (below Matheran), *Cooke*!, *Bhiva*! Deccan: Khandala, *Woodrow*.—Distrib. India (Kashmir, W. Peninsula, Andamans); China, Japan, Malaya, Polynesia.

28. **Cyperus procerus,** *Rottb. Descrip. et Icon.* (1773) p. 29, t. 5, fig. 3. Perennial; rootstock short, stout, stoloniferous, the stolons elongate, clothed with long acuminate scales, bulbilliferous; stems 2–3 ft. long, acutely triquetrous. Leaves very long, often exceeding the stems, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, acuminate, thickly coriaceous or spongy; sheaths broad,

compressed, membranous. Umbel compound; primary rays 3–7, stout, 1–4 in. long; secondary rays bearing loosely corymbose spikes of 5–10 spreading compressed spikelets; rhachis of spikes rather stout, angular, glabrous; bracts 2–5, the longest reaching sometimes 15 in. long, divaricate, leaf-like. Spikelets remote, ½–1 by ⅛ in., linear-oblong, 10–50-flowered, straw-colored or red; rhachilla scarcely winged or winged here and there, tetragonous. Glumes ⅛–⅙ in. long, rather loosely imbricate, cinnamon-red or straw-colored, boat-shaped; back with 5 or more nerves; sides and tip with hyaline margins. Stamens 3; anthers $\frac{1}{10}$ in. long, oblong, muticous, yellow. Nut $\frac{1}{16}$ in. long, broadly obovoid, trigonous, apiculate, tapering towards the base, yellow; style $\frac{1}{20}$ in. long; stigmas 3, longer than the style, capillary. Fl. B. I. v. 6, p. 610; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 152; Trim. Fl. Ceyl. v. 5, p. 34; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1140. *Cyperus Heynei*, Boeck. in Linnæa, v. 35 (1868) p. 600.

Rare. KONKAN: Goa, *Woodrow*.—DISTRIB. More or less throughout India, chiefly near the sea; Ceylon, Tonkin, Java.

29. **Cyperus nutans,** *Vahl, Enum.* v. 2 (1806) p. 363. A tall perennial; rhizome tuberous, thicker than the thumb in old plants, creeping; root-fibres matted; stems 2–3½ ft. long, stout, trigonous, with smooth angles. Leaves as long as the stem, linear, ¼–½ in. broad, coriaceous in old plants, multistriate. Umbel very large, decompound; primary rays reaching 10 in. long, slender, trigonous, bearing numerous bracteate umbellules with secondary rays 1–2 in. long, each secondary ray terminated by many unequal simple or paniculate lax spikes 1–1½ in. long, forming tassel-like clusters; rhachis slender; bracts 4–8, the longest up to 12 by ½ in. Spikelets erect, ¼–⅓ by $\frac{1}{10}$ in., 6–10-flowered, pale reddish-brown; rhachilla slender, scarcely winged, with long internodes between the glumes about ⅓ the length of the glume. Glumes $\frac{1}{12}$ by $\frac{1}{30}$ in., oblong, distant, erect, obtuse, shortly apiculate, rounded on the back, obscurely nerved, with narrow hyaline margins. Stamens 3; anthers linear-oblong. Nut $\frac{1}{16}$ in long, narrowly obovoid or oblong, tapering towards the base, triquetrous, apiculate, yellow when ripe; style $\frac{1}{30}$ in. long; stigmas 3, longer than the style, capillary. Fl. B. I. v. 6, p. 607; Boeck. in Linnæa, v. 35 (1868) p. 597; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 143 (exclud. syn.); Trim. Fl. Ceyl. v. 5, p. 31; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1140. *Cyperus distans*, Grah. Cat. p. 232 (*not* of Linn.); Dalz. & Gibs. p. 283.—Flowers: Sept.

Dalzell without locality in Herb. Kew.! DECCAN: Khandala, *Woodrow*.—DISTRIB. More or less throughout India.

30. **Cyperus eleusinoides,** *Kunth, Enum.* v. 2 (1837) p. 39. Perennial; rootstock woody, with short lateral shoots but no true stolons; stems 1½–4 ft. long, stout, triquetrous, with smooth angles. Leaves usually shorter than the stem, rigid, flat, reaching ⅓ in. broad with a stout midrib. Umbel erect, compound, with 5–8 stout, trigonous rays 4–8 in. long; spikes sessile or pedunculate, ½–1½ by ¼–⅓ in. in diam., green or brown, bracteolate, ascending, never divaricate; bracts 3 or 4, the longest sometimes more than 1 ft. long and ½ in. broad, leaf-

like; bracteoles filiform or subulate. Spikelets densely imbricate, $\frac{1}{4}$-$\frac{1}{3}$ by $\frac{1}{12}$-$\frac{1}{8}$ in., linear-oblong, erect, flat, 8–12-flowered; rhachilla slightly winged. Glumes $\frac{1}{8}$ by $\frac{1}{30}$ in., oblong, obtuse, apiculate, rounded on the back, about 5-nerved, with hyaline margins. Stamens 3; anthers small, oblong, obtuse. Nut $\frac{1}{16}$ in. long, oblong or obovoid-oblong, trigonous, apiculate, shortly stipitate, yellowish-brown; style scarcely $\frac{1}{30}$ in. long; stigmas, 3 twice as long as the style, capillary. Fl. B. I. v. 6, p. 608; Boeck. in Linnæa, v. 35 (1868) p. 596; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 142; Trim. Fl. Ceyl. v. 5, p. 37; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers: Sept.

KONKAN: *Lambert*! DECCAN: Máwal (Poona districts), *Woodrow*. SIND: *Pinwill*!—DISTRIB. India (Kashmir, Moradabad, Darjeeling, Panjáb, W. Peninsula); Ceylon, Tropical Africa, China, Malaya, Queensland.

31. **Cyperus malaccensis,** *Lam. Illustr.* v. 1 (1791) p. 146. Glabrous, green or glaucescent; rhizome creeping, rather thick, clothed with dark brown scales. Stems 1½–3 ft. long, acutely triquetrous, $\frac{1}{6}$-$\frac{1}{5}$ in. in diam., much compressed. Leaves few, the uppermost 2–6 in. long, erect, green, ensiform, shortly caudate; sheaths often enclosing the stem. Umbel 2–6 in. in diam., simple, compound or congested, with 3–12 rays 1–3 in. long, the longer corymbosely branched at the apex; bracts 2–5, divaricate, subequal, spreading, flat, up to 6 by $\frac{1}{3}$ in.; umbellules simple; bracteoles small. Spikes of 4–10 spikelets; rhachis glabrous. Spikelets $\frac{3}{8}$-$\frac{5}{8}$ by $\frac{1}{16}$-$\frac{1}{12}$ in., linear, 20–40-flowered. Glumes $\frac{1}{10}$ by $\frac{1}{30}$ in., oblong, obtuse, scarcely keeled, straw-colored or pale brown. Stamens 3; anthers linear-oblong, not crested. Nut $\frac{1}{12}$ in. long, narrowly oblong, obtusely trigonous, tapering at either end, shortly apiculate; style $\frac{1}{30}$ in. long; stigmas 3, longer than the style, capillary. Fl. B. I. v. 6, p. 608; Boeck. in Linnæa, v. 35 (1868) p. 603; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 147; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1140; Watt, Dict. Econ. Prod. v. 2, p. 685. *Cyperus Pangorii*, Roxb. Hort. Beng. (1814) p. 6; Fl. Ind. v. 1 (1832) p. 202; Grah. Cat. p. 232.

KONKAN: Goa, *Woodrow*; Kalyan, *Woodrow*. SIND: *Pinwill*!—DISTRIB. India (Bengal, Circars, W. Peninsula); Persia, Malyan Peninsula, Japan, China, Borneo, Australia.

32. **Cyperus tegetiformis,** *Roxb. Hort. Beng.* (1814) p. 6. Stolons thick, rather long, round, with ovate dark-colored scales; stems 1½–5 ft. long, trigonous, often triquetrous near the top. Leaves scarcely any; sheaths many, up to 6 in. long. Umbel compound or decompound; rays 10–15, up to 5 in. long, slender; secondary rays about 8, reaching 2¼ in. long, terminated by spikes or corymbs of 4–16 spikelets; bracts short (rarely ½ the length of the umbel). Spikelets ½–1 in. long, 10–30-flowered, slightly compressed, pale straw-colored; rhachilla winged. Glumes $\frac{1}{12}$ in. long, elliptic, obtuse or emarginate; back rounded, 5–9-nerved; sides pale, marked with yellow or red. Stamens 3; anthers muticous, reddish. Nut $\frac{1}{20}$ in. long, oblong, trigonous, black; style shorter than the nut; stigmas 3, much longer than the style. Fl. B. I. v. 6, p. 612; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 157; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1140; Watt, Dict. Econ. Prod. v. 2, p. 688.

KONKAN: Kalyan, *Woodrow.*—DISTRIB. India (Bengal, Assam, Bandelkand, W. Peninsula); China, Japan.

Woodrow gives Kalyan as the habitat of the plant, but I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew. It is possible that the plant collected by Woodrow may have been *C. corymbosus*, which is scarcely separable from *C. tegetiformis* and which is also reported from Kalyan.

33. **Cyperus corymbosus,** *Rottb. Descrip. et Icon.* (1773) p. 42, t. 7, fig. 4. A tall glabrous rush-like herb; rhizome creeping, clothed with dark brown scales; root-fibres stout; stems 2–3 ft. long, reaching $\frac{1}{3}$ in. in diam., spongy, appearing pseudo-septate and somewhat articulate when dry, terete below, obscurely trigonous above. Leaves 0, or a short blade reaching 5 in. long terminating a long loose membranous sheath. Umbel compound, narrow; rays 6–8, erect or suberect, very unequal, the longest reaching 4 in. long; secondary rays terminated by spikes or corymbs of 4–8 very slender spikelets; bracts 3, rarely as long as the umbel, keeled, green; bracteoles setaceous. Spikelets variable in length, $\frac{1}{4}$–1 by $\frac{1}{20}$–$\frac{1}{16}$ in., linear, subterete, rusty-brown; rhachilla slender, winged. Glumes erect, closely appressed to the rhachilla, $\frac{1}{8}$ by $\frac{1}{30}$ in., oblong, obtuse, rounded and 3-nerved on the back; sides pale, nerveless, scarious. Stamens 3; anthers $\frac{1}{20}$ in. long, muticous, brownish-yellow. Nut $\frac{1}{16}$ in. long, narrowly obovoid, tapering towards the base, apiculate, trigonous; style $\frac{1}{30}$ in. long; stigmas thrice as long or longer. Fl. B. I. v. 6, p. 612; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 158; Trim. Fl. Ceyl. v. 5, p. 29; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1141; Watt, Dict. Econ. Prod. v. 2, p. 683. *Cyperus diphyllus*, Retz. Obs. fasc. 5 (1789) p. 11 (*not* of Benth.); Boeck. in Linnæa, v. 36 (1870) p. 272.

KONKAN: Kalyan, *Woodrow.*—DISTRIB. More or less throughout India; Ceylon. Tropical Africa, America. Used in S. India and Ceylon for mat-making and occasionally in Ceylon grown for that purpose.

34. **Cyperus tegetum,** *Roxb. Fl. Ind.* v. 1 (1832) p. 208. Glabrous; rhizome woody, stout, horizontal; root-fibres wiry, clothed with branched hairs; stems solitary or approximate, 2–4 ft. high, trigonous or triquetrous. Leaves usually short or 0, but sometimes with long leaves 1 ft. or more long, $\frac{1}{8}$–$\frac{3}{8}$ in. broad, linear, acuminate; sheaths long, lax. Umbel compound or decompound; rays many, 1–5 in. long; secondary rays bearing corymbs or spikes, each with 4–10 slender spikelets; bracts sometimes reaching 15 in. long by $\frac{1}{3}$ in. broad, erecto-patent, with a strong midrib and scaberulous margins which are usually recurved in dried specimens. Spikelets $\frac{3}{8}$–$\frac{3}{4}$ by $\frac{1}{10}$ in., 10–30-flowered, usually reddish-brown; rhachilla with large ovate acute dark-brown deciduous wings. Glumes $\frac{1}{8}$ by $\frac{1}{30}$ in., narrowly oblong, obtuse, 3–5-nerved on the back, scarcely keeled; sides red-brown, nerveless, with narrow scarious margins incurved in dried specimens. Stamens 3; anthers $\frac{1}{30}$ in. long, yellowish-brown, muticous or minutely crested. Nut $\frac{1}{16}$ in. long, narrowly obovoid-oblong, tapering towards the base, minutely apiculate, trigonous, yellowish-brown; style $\frac{1}{25}$ in. long; stigmas 3, longer than the style, capillary, not or scarcely exserted. Fl. B. I. v. 6, p. 613; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 160; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1141; Watt, Dict. Econ. Prod. v. 2, p. 688. *Cyperus dehiscens*, Nees, in

Linnæa, v. 9 (1835) p. 286 (*nomen nudum*); Kunth, Enum. v. 2 (1837) p. 56; Trim. Fl. Ceyl. v. 5, p. 30. *Papyrus dehiscens*, Nees, in Wight, Contrib. (1834) p. 89.—Flowers: Sept.

KONKAN: *Cooke*! DECCAN: Lanoli, *Garade*! SIND: *Pinwill*!—DISTRIB. Throughout India; Ceylon, Tropical Africa; cultivated in Mauritius.

Much employed in Calcutta for the manufacture of mats, which are sometimes imported into Europe.

35. **Cyperus bulbosus,** *Vahl, Enum.* v. 2 (1806) p. 342. Glabrous, stoloniferous; stolons ½–2½ in. long, filiform, with bulbils formed close to the ends of the stolons; bulbils when ripe ovoid, ⅜ by ⅕ in., coated with a thick striate black integument which ultimately splits irregularly into lanceolate segments; stem 4–12 in. long, slender, trigonous, arising from a bulb, clothed at the base with black coriaceous scales. Leaves coming off at some distance from the base, below the middle of the stem and usually longer than it, reaching ⅛ in. broad, tapering to a fine point at the apex, spreading and recurved; sheaths very long, membranous. Inflorescence a head of umbels formed of slender alternate spikes each bearing 3–12 spikelets, the lower distant from the upper; bracts 3, very unequal, filiform, the longest 3–4 in. long. Spikelets ⅜–⅝ by $\frac{1}{12}$–$\frac{1}{10}$ in., compressed, red, 8–24-flowered; rhachilla with persistent elliptic wings. Glumes ⅛ in. long, oblong, slightly mucronulate, cymbiform, membranous, 7–11-nerved; the sides bright red with hyaline margins in the lower part. Stamens 3; anthers $\frac{1}{16}$ in. long, linear, subacute, yellow. Nut $\frac{1}{16}$ in. long, obovoid, obtuse, triquetrous, black. Fl. B. I. v. 6, p. 611; Dalz. & Gibs. p. 284; Trim. Fl. Ceyl. v. 5, p. 22; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431. *Cyperus jeminicus*, Retz. Obs. fasc. 4 (1786) p. 11; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 175 (*not* of Rottb.); Watt, Dict. Econ. Prod. v. 2, p. 685.—Flowers: Dec.

Sandy shores near the sea, *Dalzell & Gibson*. SIND: Hydrabad, *Woodrow*; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (W. Peninsula); Beluchistan, Ceylon, Tropical Africa, and Australia.

The bulbs are used as flour in times of scarcity and eaten roasted or boiled. When roasted they have the flavor of potatoes and would be valuable for food, but that they are so small. See Watt, Dict. Econ. Prod. l. c.

36. **Cyperus rotundus,** *Linn. Sp. Pl.* (1753) p. 45. Glabrous; stolons elongate, slender, 4–8 in. long, bearing hard ovoid tunicate black fragrant tubers ⅓–1 in. in diam.; root-fibres clothed with flexuous hairs; stems subsolitary, 4–30 in. long, triquetrous at the top, sometimes tuberous at the base. Leaves shorter or longer than the stem, narrowly linear, ⅛–⅓ in. broad, finely acuminate, flat, 1-nerved. Umbel simple or compound; rays 2–8, the longest reaching 3 in. long, bearing short spikes of 3–10 slender spreading red-brown spikelets [the inflorescence sometimes contracted into a head, occasionally (*fide* C. B. Clarke) of only one spikelet]; bracts 3, variable in length, the longest reaching 6 in. long, but sometimes abbreviated and much shorter than the head. Spikelets variable in length, ⅝–1½ by $\frac{1}{10}$ in., linear, subacute, red-brown, 10–50-flowered, compressed; rhachilla with hyaline wings. Glumes ⅛–⅙ in. long, oblong, obtuse or slightly apiculate; back reddish-brown, 3–7-nerved; sides, margins, and tip hyaline. Stamens 3; anthers $\frac{1}{10}$ in. long. Nut $\frac{1}{16}$ in. long, broadly obovoid, trigonous, greyish-black;

style $\frac{1}{16}$ in. long; stigmas 3, elongate, reaching $\frac{1}{6}$ in. long, much exserted. Fl. B. I. v. 6, p. 614; Grah. Cat. p. 231; Dalz. & Gibs. p. 283; Boeck. in Linnæa, v. 36 (1870) p. 283; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 167; Trim. Fl. Ceyl. v. 5, p. 35; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1141; Watt, Dict. Econ. Prod. v. 2, p. 686.—Flowers: Sept.–Nov. VERN. *Moth*; *Motha*; *Nagar-motha*.

DECCAN: Poona, *Jacquemont*, 382!, *Bhagvat*!; Lanoli, *Woodrow*. SIND: *Bhola Puran*, 25!; Bhubak, *Woodrow*.—DISTRIB. Throughout India; Ceylon, most hot countries.

A very troublesome weed of cultivation, eradicated with difficulty owing to the stolons becoming woody. The tubers are roasted and pounded, and are used in native medicine and also for giving an aroma to certain fabrics. The fragrant sticks burnt in Hindu houses contain a portion of the powder.

37. **Cyperus tuberosus,** *Rottb. Descrip. et Icon.* (1773) p. 28, t. 7, fig. 1. Perennial; rhizome creeping, woody; stolons elongate, not tuberiferous; root-fibres filiform, covered with branched hairs; stems 2–4 ft. long, slender, trigonous with tuberous base. Leaves mostly radical, usually shorter than the stem, up to $\frac{1}{6}$ in. broad, with smooth margins. Umbel compound; primary rays few or many, slender, spreading, reaching 6 in. long; secondary rays terminating in 4–8 approximate spreading spikelets; bracts 3–4, the longest 1–2 ft. long with smooth margins. Spikelets $\frac{1}{2}$–$\frac{3}{4}$ in. long, reddish-brown, somewhat turgid along the median line, 16–24-flowered; rhachilla slender, with hyaline wings. Glumes suberect, reaching $\frac{1}{4}$ in. long, oblong-lanceolate, apiculate, keeled; the back reddish-brown, 3–5-nerved, the sides hyaline. Stamens 3; anthers narrow, muticous, yellowish-brown. Nut $\frac{1}{16}$ in. long, broadly obovoid, tapering towards the base, umbonate, granulate, trigonous, grey; style reaching $\frac{1}{16}$ in. long; stigmas 3, capillary, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Not distinguishable from *Cyperus rotundus* by any good characters and it might well be united with it. Fl. B. I. v. 6, p. 616; Boeck. in Linnæa, v. 36 (1870) p. 285 (exclud. Cape plants and description of nut); Trim. Fl. Ceyl. v. 5, p. 33; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1141. *Cyperus tenuiflorus*, Roxb. Fl. Ind. v. 1 (1832) p. 199; Dalz. & Gibs. p. 284. *C. rotundus* var. *procerula*, C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 172.

KONKAN: *Law*!; Matheran, *Woodrow*; Thana, *Woodrow*. DECCAN: Poona, *Woodrow*.—DISTRIB. India (C. Bengal, W. Peninsula); Ceylon, Mauritius, Australia.

38. **Cyperus exaltatus,** *Retz. Obs.* fasc. 5 (1789) p. 11. A large glabrous herb; stolons 0; root-fibres stout; stems 3–6 ft. long, obtusely trigonous. Leaves few, longer or shorter than the stem, linear, $\frac{1}{4}$–$\frac{3}{8}$ in. broad, finely acuminate, 1-nerved, multistriate, with more or less scaberulous margins. Umbel compound; rays 5–10, sometimes reaching 6 in. long, spreading, bearing spikes $\frac{3}{4}$–2 in. long of 20–40 rather distant short spikelets; bracts 3–6, leaf-like, the longest up to 2 ft. long. Spikelets $\frac{1}{6}$–$\frac{1}{4}$ by $\frac{1}{16}$ in., ascending, narrowly elliptic-lanceolate, chestnut-brown, much compressed, 8–16-flowered; rhachilla with narrow peristent wings. Glumes $\frac{1}{12}$ in. long, closely imbricate, ovate-oblong, mucronate; back green, obscurely 3-nerved; sides chestnut-brown, not or scarcely nerved, the margins not or sometimes very narrowly scarious. Stamens 3; anthers $\frac{1}{25}$ in. long, yellow, muticous. Nut $\frac{1}{30}$ in. long, ellipsoid, tapering

to both ends, trigonous, brown or yellow; style $\frac{1}{20}$ in. long; stigmas 3, rather shorter than the style, capillary, exserted. Fl. B. I. v. 6, p. 617; Boeck. in Linnæa, v. 36 (1870) p. 319; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 186; Trim. Fl. Ceyl. v. 5, p. 32; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1141; Watt, Dict. Econ. Prod. v. 2, p. 684. *Cyperus umbellatus*, Roxb. Fl. Ind. v. 1 (1832) p. 205; Dalz. & Gibs. p. 284.—Flowers: Sept.

KONKAN: Karjat, *Woodrow*. DECCAN: *Dalzell & Gibson*; Lanoli, *Woodrow*. S. M. COUNTRY: Dambal (Dharwar districts), *Dalzell*!—DISTRIB. India (Panjáb, W. Peninsula); Ceylon, Tropical Africa, Indo-China, Australia.

VAR. *dives*, C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 187. Spikelets more turgid, yellow or golden-yellow, shining, horizontally spreading; glumes with scarious margins. Fl. B. I. v. 6, p. 617. *Cyperus dives* (sp.), Delile, Fl. Egypte (1812) p. 149, t. 4, fig. 3.

SIND: *Pinwill*!—DISTRIB. India (Bengal); Africa.

39. **Cyperus digitatus,** *Roxb. Hort. Beng.* (1814) p. 81. Perennial, glabrous; rhizome stout, woody, creeping; stolons 0; root-fibres stout. Stems 1–4 ft. long, trigonous or triquetrous above, with smooth angles. Leaves longer or shorter than the stem, $\frac{1}{2}$–$\frac{2}{3}$ in. broad, flat, coriaceous, multistriate, with scaberulous margins. Umbel very large, broad, up to 12 in. in diam., simple or compound; rays 4–10, trigonous, 2–6 in. long, terminated by stellately spreading sessile or cylindric spikes of unequal length, loosely set all round with innumerable horizontally spreading spikelets; bracts 3–6, leaf-like, the longest reaching sometimes 1 ft. long or more; bracteoles very slender; spikes 1–1½ by $\frac{3}{8}$–$\frac{1}{2}$ in., sessile or a few pedicellate. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ by $\frac{1}{20}$ in., subterete, acute, 12–20-flowered, spreading horizontally, yellowish-brown; rhachilla with lanceolate acute scarious deciduous wings. Glumes $\frac{1}{16}$ by $\frac{1}{40}$ in., with rounded shortly cuspidate tip; back chestnut-brown, somewhat obscurely 3-nerved; sides hyaline. Stamens 3; anthers linear-oblong, not crested. Nut $\frac{1}{20}$ in. long, ellipsoid, tapering at both ends, straight or slightly curved, trigonous, yellowish; style $\frac{1}{30}$ in. long; stigmas 3, slightly longer than the style, capillary. Fl. B. I. v. 6, p. 618; Trim. Fl. Ceyl. v. 5, p. 36; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1141. *Cyperus Neesii*, Boeck. in Linnæa, v. 36 (1870) p. 315. *Cyperus auricomus*, C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 188.—Flowers: Sept.

KONKAN: *Law*! DECCAN: Lanoli, *Woodrow*; Poona, *Woodrow*, 204! S. M. COUNTRY: Londa, *Cooke*!—DISTRIB. India (E. Bengal, Assam, Pegu, Moradabad, Sikkim, W. Peninsula); Ceylon, Ethiopia, China, Malaya, Oceania.

40. **Cyperus Clarkei,** *T. Cooke*. Rootstock tuberous; stolons elongate, $\frac{1}{25}$ in. in diam., clothed with oblong-lanceolate striate pale-brown scales; stems 3–8 in. long, thick, trigonous, from a bulbous base. Leaves longer or shorter than the stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad, linear, very acute; lower sheaths much inflated, striate, brown. Umbel simple, with very short rays, or subcapitate; spikes 5–8, cylindric, dense, pale, $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{4}$–$\frac{3}{8}$ in.; bracts 5–7, leaf-like, the longest reaching 6 in. long. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. long, densely packed, spreading nearly at right angles, bearing 1 nut. Nut-bearing glumes ovate, acute, multistriate, straw-colored.

Stamens 3, with long filaments. Nut $\frac{1}{12}$–$\frac{1}{10}$ in. long, ellipsoid, trigonous, brown; style $\frac{1}{25}$ in. long; stigmas rather shorter than the style. *Mariscus bulbosus*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 620; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431. *Kyllinga bulbosa*, Kœnig, in Vahl, Enum. v. 2 (1806) p. 376 (*in note*).—Flowers: Oct.

S. M. Country: *Woodrow*, 36!; Badami, *Woodrow*; Dharwar, *Woodrow*. Kanara: N. Kanara, *Young* ex *C. B. Clarke*.—Distrib. India (W. Peninsula).

As the name *Cyperus bulbosus* is preoccupied by Vahl's plant [Vahl, Enum. v. 2, (1806) p. 342], I have had to find a new name for this, and, as it was first described by Mr. C. B. Clarke, I have adopted the name *C. Clarkei*.

41. **Cyperus konkanensis,** (*nov. sp.*) *T. Cooke*. Rhizome short; stolons 0 on the only specimen seen; root-fibres stout; stems reaching 30 in. long from a thickened base, stout, trigonous, striate, smooth, about $\frac{1}{2}$ in. in diam. at the base. Leaves $1\frac{1}{2}$–2 ft. long; sheaths reaching 6–10 in. long, striate. Inflorescence reaching 9 in. long. Umbel compound, with 4–6 long rays up to 7 in. long, and some sessile spikes at its base; secondary umbels with 3–4 sessile spikes of many widely spreading spikelets; bracts of primary umbel $\frac{1}{2}$–2 ft. long, up to $\frac{1}{2}$ in. broad, leaf-like; bracts of secondary umbel $\frac{1}{2}$–1 in. long, filiform; bracteoles $\frac{1}{12}$–$\frac{1}{4}$ in. long, lanceolate or aristate from a lanceolate base. Spikelets exceeding $\frac{1}{4}$ in. long, lanceolate, subterete, $\frac{1}{30}$ in. in diam., somewhat distantly placed along the rhachis, shining, straw-colored. Lowest glume $\frac{1}{10}$ in. long, oblong, obtuse, scarious, with parallel nerves. Upper glumes $\frac{1}{4}$ in. long, twisted, wrapped round the nut, deeply striate to the margins which are not hyaline. Stamens 3; anthers $\frac{1}{16}$ in. long, narrow, pointed, reddish-brown. Nut $\frac{1}{6}$ by $\frac{1}{30}$ in., oblong, trigonous, pale-brown; style $\frac{1}{10}$ in. long; stigmas 3, reaching $\frac{1}{4}$ in. long, much exserted. *Mariscus Sieberianus*, Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 (*not* of Nees). ? *Mariscus umbellatus*, Dalz. & Gibs. p. 285.

Konkan: Western Ghâts, *Woodrow*, 34!

There is but one sheet from the Bombay Presidency in Herb. Kew. collected by Woodrow, containing 1 specimen only. Mr. Clarke has labelled the specimen *Mariscus Sieberianus* var. *subcomposita* (forma *gigantea*), and in a pencilled note on the sheet remarks ? *Sp. nova*. It is a much larger and coarser plant than the var. *subcomposita* alluded to, the spikelets are not closely packed but rather distant, the glumes are distinctly twisted and conspicuously striate up to the non-hyaline margins.

42. **Cyperus paniceus** (*Mariscus*), *Vahl, Enum.* v. 2 (1806) p. 373. Var. **Roxburghiana,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 6 (1893) p. 621 (under *Mariscus*). Perennial; rootstock small, horizontal, stoloniferous; stolons slender, rigid; stems up to 2 ft. long, trigonous, smooth. Leaves long, narrow, 1-nerved. Umbel simple; rays reaching sometimes 2 in. long; spikes reaching 1 by $\frac{1}{4}$–$\frac{1}{3}$ in., cylindric; the rhachis closely clothed with the persistent lower glumes of the spikelets; bracts 5–7, the longest reaching 10 or 11 in. long, leaf-like. Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long, consisting of 4 glumes, the 2 lowest empty, scarious, the third fertile, the fourth empty, lanceolate, with a long subulate tip; rhachilla winged above the articulation. Nut-bearing glume $\frac{1}{3}$–$\frac{1}{6}$ in. long, lanceolate-subulate, convolute, wrapped round the upper glume and nut; back strongly 3-nerved; sides scarcely striate, often dotted with brown spots, and with narrowly hyaline margins. Stamens 3; anthers long, slender. Nut nearly $\frac{1}{8}$ in. long, slightly curved, oblong-ellipsoid, attenuated at

each end, trigonous, pale-brown; style $\frac{1}{40}$ in. long; stigmas 3, longer than the style, capillary. *Mariscus cyperinus*, Nees, in Wight, Contrib. (1834) p. 90, var. *a* (*not* of Vahl). *Scirpus echinatus*, Linn. Sp. Pl. (1753) p. 50. *Kyllinga umbellata*, Roxb. Icon. ined. t. 191.

KONKAN: *Law*!—DISTRIB. More or less throughout India; Ceylon, Java.

There is but one sheet in Herb. Kew. from the Bombay Presidency ticketed "Konkan, *Law*," containing two specimens (without leaves) which consist each of a piece of the upper portion of a stem less than 3 in. long, carrying spikes and bracts.

43. **Cyperus pennatus,** *Lam. Illust.* v. 1 (1791) p. 144. Perennial; rootstock tuberous, woody, stoloniferous; root-fibres very stout; stem 2–3 ft. by $\frac{1}{3}$ in. or more in diam., stout, trigonous, smooth. Leaves longer than the stem, sometimes reaching 4 ft. long by $\frac{1}{3}$ in. broad, coriaceous, sometimes septato-punctate, the margins and keel scaberulous. Umbel compound, 4–8 in. in diam., with 4–8 stout rays 1–3 in. long and short secondary rays with spreading cylindric sessile spikes $\frac{1}{2}$–1 in. long, covered with stout horizontally spreading spikelets; bracts 4–6, leaf-like, up to 16 in. long. Spikelets $\frac{1}{4}$–$\frac{5}{16}$ in. long, reddish-brown or straw-colored, oblong-lanceolate, acute, subterete, 3–6-flowered; rhachilla with short winged internodes. Glumes closely imbricate, concave, ovate, subobtuse, the nut-bearing ones reaching $\frac{1}{6}$ in. long, dorsally rounded, spotted with brown; nerves many, slender, the margins narrowly hyaline. Stamens 3; anthers small, oblong. Nut $\frac{1}{16}$ in. long, ellipsoid, trigonous, black when ripe; style $\frac{1}{20}$ in. long; stigmas 3, longer than the style. C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 194. *Cyperus canescens*, Boeck. in Linnæa, v. 36 (1870) p. 340. *Mariscus albescens*, Gaud. in Freyc. Voy. Bot. (1826) p. 415; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 623; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1146.—Flowers: Oct.

KONKAN: *Cooke*!; Mâhad, *Woodrow*. DECCAN: Lanoli, *Woodrow*.—DISTRIB. India (Bengal, Birma, W. Peninsula); Ceylon, Ethiopia, China, Malaya, Oceania.

Cyperus stuppeus, Forst. Prodr. (1786) p. 89, should perhaps as the older name have precedence.

44. **Cyperus dilutus,** *Vahl, Enum.* v. 2 (1806) p. 357. Perennial, glabrous; rootstock short; stem 1–4 ft. long, obtusely trigonous, smooth. Leaves as long as or longer than the stems, up to $\frac{1}{2}$ in. broad, coriaceous or spongy, septato-punctate, the margins and keel scaberulous. Umbel large, decompound; rays many, trigonous, up to 6 in. long, simple or bearing secondary or tertiary umbellules, the ultimate rays terminated by globose heads (contracted spikes) $\frac{3}{4}$–1 in. in diam., of innumerable narrow stellately spreading spikelets; bracts many, long and broad in large specimens, few and narrow in small ones, leaf-like. Spikelets $\frac{1}{3}$–$\frac{1}{2}$ in. long, slender, terete, red-brown, shining, bearing 4–14 nuts; rhachilla very slender, with internodes about $1\frac{1}{2}$ in. long, and oblong persistent wings. Glumes reaching $\frac{1}{6}$ by $\frac{1}{30}$ in., loosely imbricate, faintly nerved, straight, oblong or oblong-lanceolate, obtuse, dorsally rounded, the margins not hyaline. Stamens 3; anthers $\frac{1}{20}$ in. long, reddish-brown, muticous. Nut (not including beak) reaching $\frac{1}{12}$ in. long, oblanceolate-oblong, narrow, acutely trigonous, stipitate, distinctly beaked; style shorter than the nut; stigmas 3, exserted. Boeck. in Linnæa, v. 36 (1870) p. 354; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 193. *Cyperus spinulosus*, Roxb. Fl. Ind. v. 1 (1832) p. 203.

Mariscus microcephalus, Presl, Rel. Haenk. (1830) p. 182; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 624.

SIND: *Pinwill!*—DISTRIB. More or less throughout India; Ceylon, Mauritius, China, Malaya.

EXCLUDED SPECIES.

CYPERUS GLABER, Linn. Mantiss. (1771) p. 179. Spikelets tinged with red; glumes muticous or nearly so; nut obovoid, obtuse, minutely conic-apiculate (otherwise as *C. compressus*). C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 606.

There is no specimen of *C. glaber* in the Indian bundles in Herb. Kew.

CYPERUS ESCULENTUS, Linn. Sp. Pl. (1753) p. 45. Stolons long, slender, bearing tubes; spikelets yellow or brownish; glumes plicate-striate over nearly their whole breadth. C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 616; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431.

There is in Herb. Kew. a solitary specimen from *Jacquemont* (No. 277) which, according to the ticket on it, was collected between Ellora and Poona. As Ellora is in the Nizam's dominions, and at least 120 miles from Poona, and as no precise locality has been given, the existence of the plant in the Bombay Presidency is extremely doubtful, especially as no Bombay botanists have apparently met with it.

2. **KYLLINGA,** Rottb.

Perennial herbs tufted or with a creeping rhizome; stem trigonous, leafy below only, terminated by 1–3 sessile capitate spikes. Leaves narrow. Spikelets minute, green, strongly laterally compressed, 1–2-flowered, densely packed on short sessile oblong or globose involucrate spikes; rhachis short, naked after the fall of the spikelets, or squarrosely covered with the more or less persistent lowest glumes; rhachilla very minute, disarticulating above the two lowest glumes. Glumes 4, distichous, the two lowest hyaline, empty, much shorter than the third and fourth, the third and fourth much the largest, often green and speckled with brown, subequal or the upper longest, unequal-sided, keeled; keel sometimes winged, apiculate or cuspidate. Stamens 1–3; anthers long or short. Ovary suborbicular; style long or short, not swollen at the base; stigmas 2, linear. Fruit a strongly laterally compressed smooth nut, sometimes apiculate by the persistent style-base.—DISTRIB. All hot and temperate regions except Europe; species 33.

Nut-bearing glume winged in upper half of keel; rhizome creeping, elongate	1. *K. monocephala.*
Nut-bearing glume not winged in upper half of keel; rhizome very short	2. *K. triceps.*

1. **Kyllinga monocephala,** *Rottb. Descrip. et Icon.* (1773) p. 13, t. 4, fig. 4. Glabrous or nearly so; rhizome creeping, elongate; stems 3–12 in. high, usually solitary, erect. Leaves shorter than the stem, $\frac{1}{10}$–$\frac{1}{6}$ in. broad, linear, acute with a strong midnerve. Spikes solitary (rarely 2–3), the lateral when present very small, the middle spike $\frac{1}{4}$–$\frac{1}{3}$ in. in diam.; rhachis naked or pitted after the fall of the spikelets, the lowest glumes mostly deciduous; floral bracts 3–4, very long and narrow, similar to the leaves. Spikelets $\frac{1}{10}$ in. long, 1-flowered. Two outer glumes hyaline, the lowest glume narrowly ovate-lanceolate, $\frac{1}{16}$ in. long, the second glume broadly ovate, obtuse; glumes 3 and 4 green, often sparsely speckled with brown, falcately incurved, acuminate, the upper

slightly the longer, but no. 3 the broader, the keel dorsally winged about the middle, the wings spinulose, sometimes obscurely developed. Anthers small. Nut obovoid or oblong, compressed, rather more than half as long as the glume, pale reddish-brown; style rather more than $\frac{1}{30}$ in. long; stigmas 2, filiform, as long as the style. Fl. B. I. v. 6, p. 588; Grah. Cat. p. 232; Dalz. & Gibs. p. 285; Trim. Fl. Ceyl. v. 5, p. 44; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1135.

S. M. COUNTRY: Londa, *Cooke*!—DISTRIB. Throughout India; Ceylon, hot and warm temperate regions of the Old World except the Mediterranean.

2. **Kyllinga triceps,** *Rottb. Descrip. et Icon.* (1773) p. 14, t. 4, fig. 6. Glabrous; rhizome very short or 0; stems 2–9 in. long, tufted. Leaves as long as (rarely longer) but usually shorter than the stem, $\frac{1}{12}$–$\frac{1}{6}$ in. broad, linear, acute. Spikes ovoid-oblong or subcylindric, usually 3 together (rarely solitary), the middle one the largest, $\frac{1}{6}$–$\frac{1}{4}$ in. in diam.; rhachis clothed, after the fall of the spikelets, with the persistent lower glumes; bracts beneath the head 3–4, leaf-like, up to 3 in. long. Two lower glumes hyaline, the lowest lanceolate, acuminate, $\frac{1}{20}$ in. long, the second lanceolate or suborbicular, the third and fourth herbaceous, membranous, green not speckled with brown, ovate-lanceolate, obtusely apiculate, strongly nerved, the uppermost (fourth) rather the longest, $\frac{1}{12}$–$\frac{1}{10}$ in. long. Stamens 2. Nut oblong or ellipsoid-oblong, yellowish-brown, much compressed, $\frac{1}{16}$ in. long; style with 2 filiform stigmas, together nearly as long as the nut. Fl. B. I. v. 6, p. 587; Grah. Cat. p. 232; Wight, Contrib. p. 91; Trim. Fl. Ceyl. v. 5, p. 45; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers: Sept.

DECCAN: Poona, *Jacquemont*, 345!, *Woodrow*. SIND: *Pinwill*!—DISTRIB. India (N.-West, Sind, Bengal, Birma); Ceylon, Africa, China, Australia.

3. COURTOISIA, Nees.

Herbs with erect simple stems, leafy only near the base. Leaves grass-like. Spikelets compressed, in globose spikes; rhachilla disarticulating above the two lowest glumes. Glumes persistent, I and II empty; 1–3 above them hermaphrodite, nut-bearing, winged on the keel; uppermost sterile or empty. Stamens 3; anthers oblong. Ovary ovoid; style short, persistent; stigmas 3, linear, longer than the style. Fruit a trigonous nut with acute apex, continuous with the style.—DISTRIB. India, Africa, Madagascar; species 2.

1. **Courtoisia cyperoides,** *Nees, in Linnæa*, v. 9 (1835) p. 286. Annual, glabrous, whole plant of a yellowish hue; root fibrous; stems 3–16 in. long, cæspitose, slender, trigonous, striate, leafy towards the base. Leaves usually longer than the stems, linear, acute, $\frac{1}{10}$–$\frac{1}{5}$ in. broad. Umbel simple or compound, with 3–10 rays 1–3 in. long; secondary rays 3–5 up to 1 in. long, bearing dense globose yellowish-brown spikes composed of many short spikelets; bracts 3–7, leaf-like, 4–15 in. long; secondary bracts often $\frac{3}{4}$ in. long. Spikelets $\frac{1}{8}$ in. long, many, in globose heads $\frac{1}{4}$–$\frac{1}{2}$ in. in diam. Glumes boat-shaped, flattened, the fertile ones slightly mucronate, the keel with a continuous glistening wing along its whole length; sides not striate. Stamens 3; anthers

oblong. Nut rather more than $\frac{1}{8}$ in. long, narrow, trigonous, fusiform, tapering at both ends, almost beaked, chestnut-brown, granulate; style short, continuous with the nut; stigmas 3, filiform. Fl. B. I. v. 6, p. 625; Dalz. & Gibs. p. 285; Boeck. in Linnæa, v. 35 (1868) p. 434; Benth. in Hook. Icon. Pl. (1880) t. 1341; Nees, in Wight, Contrib. (1834) p. 92; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1147. *Kyllinga cyperoides*, Roxb. Fl. Ind. v. 1 (1832) p. 182; Grah. Cat. p. 232.

KONKAN: *Law*!

There is but one specimen in Herb. Kew. marked as above, and while Woodrow retains the plant in his list he does not indicate any locality where it is to be found. —DISTRIB. India (Sikkim, Assam, Bengal, Pegu, W. Peninsula); Tropical Africa, Madagascar.

4. **FIMBRISTYLIS,** Vahl.

Annual or perennial herbs; roots fibrous or woody; stolons 0; stems tufted. Leaves near the base of the stem, rarely reduced to sheaths, narrowly linear or filiform. Spikelets terete, angular or compressed, many-flowered, in a terminal umbellate or capitate inflorescence. Glumes imbricate spirally round the rhachilla, or the lower glumes distichous, glabrous (very rarely pubescent), deciduous, the lower 1–3 and sometimes the upper empty, the others 2-sexual; hypogynous bristles 0. Stamens 1–3; filaments flat; anthers linear, obtuse or acute, or subulately tipped. Ovary obovoid, somewhat flattened or trigonous; style long, base more or less dilated, flattened or slender, glabrous, pubescent or villous, wholly deciduous; stigmas 2 in the flattened, 3 in the trigonous ovaries, usually filiform and elongate. Fruit an obovoid biconvex or trigonous (very rarely cylindric) nut.—DISTRIB. Nearly all hot and warm regions, especially plentiful in S.E. Asia and N.E. Australia; species 125.

Stigmas 2.
- Spikelets solitary, terminating the stem (rarely 2 or 3 in *polythrichioides*).
  - Leaves 0 or very short (see also *F. ferruginea*); nut subcylindric, curved ..... 1. *F. tetragona.*
  - Leaves like the stem; nut turbinate.
    - Nut sessile, yellow dotted with white spots ... 2. *F. polythrichioides.*
    - Nut stipitate, snow-white with a brown patch on each face ..... 3. *F. schœnoides.*
- Spikelets umbellate or capitate.
  - Annuals (*F. diphylla* sometimes perennial).
    - Spikelets umbellate.
      - Nut with 6–9 broad trabeculate ribs; stamens 1–3 ..... 4. *F. dichotoma.*
      - Nut smooth; stamen 1 ..... 5. *F. æstivalis.*
    - Spikelets capitate ..... 6. *F. argentea.*
  - Perennials (*F. diphylla* sometimes annual).
    - Leaves 0 or very short; stamens 2-3 ..... 7. *F. ferruginea.*
    - Leaves many.
      - Glumes mucronate; stamens 1-3 ..... 8. *F. diphylla.*
      - Glumes with obtuse hyaline tips; stamens usually 2 ..... 9. *F. spathacea.*

Stigmas 3.
- Spikelets terete or polygonal, none of the glumes distichous.
  - Stems 6–24 in. long.

Style hairy; glumes acute, mucronate; rhachilla winged ..... 10. *F. quinquangularis.*
Style glabrous; glumes obtuse, not mucronate; rhachilla not winged ..... 11. *F. miliacea.*
Stems less than 6 in. long.
Inflorescence in a terminal head; stamens 3; nut globosely obovoid; style $\frac{1}{10}$ in. long ..... 12. *F. digitata.*
Inflorescence umbellate; stamen 1; nut narrowly obovoid; style $\frac{1}{25}$ in. long ..... 13. *F. Woodrowii.*
Spikelets compressed or trigonous; all or the lower glumes only distichous; bracts short in all.
Spikelet 1 (rarely 2) ..... 14. *F. monostachya.*
Spikelets many, umbellate.
Leaves filiform ..... 15. *F. monticola.*
Leaves flat.
Style glabrous ..... 16. *F. complanata.*
Style pubescent ..... 17. *F. juncifformis.*

1. **Fimbristylis tetragona,** *R. Br. Prodr.* (1810) p. 226. Perennial, glabrous; root-fibres stout; stems 6–24 in. long, tufted, slender, quadrangular, ribbed. Leaves 0, or the upper sheaths with an erect lanceolate acuminate limb; sheaths usually brown. Spikelet solitary, $\frac{1}{4}$–$\frac{3}{8}$ in. long, erect, ovoid-conic, terete, obtuse; lowest glume sometimes hardly bractiform, at others $\frac{1}{2}$ as long as the spikelet, coriaceous, deciduous; rhachilla thickly studded with deep tetragonal pits with raised edges. Glumes closely imbricate, $\frac{1}{5}$–$\frac{1}{6}$ in. long, broadly oblong or obovate-oblong, rounded at the apex, concave, embracing the nut, scarious, with a broad coriaceous central band. Stamens 2; filaments flattened, dark-brown (nearly black); anthers narrowly linear, muticous. Nut $\frac{1}{12}$ in. long (not including the style-base or the stalk), linear-oblong or subcylindric, narrow, tapering towards the base, slightly curved, with a long slender stalk, trabeculate with slender parallel ribs and minute cross bars, pale straw-colored (nearly white), deciduous with the glume; style villous, flattened, as long as the nut, with a large subpersistent conical compressed base; stigmas 2, short. Fl. B. I. v. 6, p. 631; Trim. Fl. Ceyl. v. 5, p. 48; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1150. *Fimbristylis cylindrocarpa,* Boeck. in Linnæa, v. 37 (1871) p. 7.—Flowers: Oct.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*!; Salsette, *Jacquemont,* 747! KANARA: *Law*! DECCAN: Hirdosi, *Woodrow*; Máwal (Poona districts), *Woodrow.*—DISTRIB Throughout India (except the North-West); Ceylon, E. Asia, Australia.

2. **Fimbristylis polythricioides** (*Scirpus*), *Vahl, Enum.* v. 2 (1806) p. 248. Perennial, glabrous; root-fibres filiform; stems 2–10 in. long, filiform, leafy at the base, trigonous, striate. Leaves $\frac{1}{2}$ as long as the stem or longer, slender, wiry, acute, terete or trigonous, striate; sheaths glabrous or puberulous. Spikelet solitary, $\frac{1}{4}$ in. long, erect, oblong-ellipsoid, many-flowered; rhachilla stout, terete, deeply pitted. Glumes $\frac{1}{8}$ in. long, linear-oblong, cymbiform, subobtuse or acute, minutely apiculate, membranous, with a narrow central band, pale straw-colored or almost white. Stamens 1–3; filaments flattened, membranous, white. Nut $\frac{1}{16}$ in. long, turbinate, sessile, much compressed, subtruncate at the apex, biconvex, with acute margins, yellow, dotted with white spots; style $\frac{1}{20}$ in. long, slightly hairy, scarcely dilated at the base, deciduous; stigmas 2, as long as the style. Fl. B. I. v. 6, p. 632; Trim. Fl. Ceyl. v. 5, p. 49; Woodr.

in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1150. *Fimbristylis juncea*, Boeck. in Linnæa, v. 37 (1871) p. 4 (*not* of Rœm. & Schult.).—Flowers: Sept.–Oct.

KONKAN: Sion (Bombay), *Woodrow*!—DISTRIB. India (Bengal, Sundribans, W. Peninsula); Ceylon, Malacca.

3. **Fimbristylis schœnoides,** *Vahl, Enum.* v. 2 (1806) p. 286. A glaucous herb; rhizome 0, or rarely horizontal and very short; root-fibres slender; stems 4–18 in. long, tufted, slender (almost filiform), obtusely angled, striate. Leaves usually shorter but hardly broader than the stem, $\frac{1}{20}$ in. broad or less, narrowly linear, very acute, coriaceous, striate above, dotted beneath, with recurved spinulose margins; sheaths glabrous with membranous margins. Spikelets $\frac{1}{4}$–$\frac{1}{2}$ in. long, solitary or 2–5 in an irregular umbel, sessile or on slender pedicels; bracts 2, very variable, usually shorter than the spikelets [in one specimen from Khadkala (Deccan) collected by Woodrow there are 2 leaf-like bracts below the umbel which one of them exceeds]; rhachilla slender. Glumes deciduous, loosely imbricate, $\frac{1}{8}$–$\frac{1}{6}$ in. long and about as broad as long, orbicular, obtuse, shortly apiculate, very concave, membranous, with 5–7 slender central nerves, straw-colored or pale brown. Stamens 3; anthers acute. Nut $\frac{1}{16}$–$\frac{1}{12}$ in. long, turbinate, compressed, biconvex, rounded at the apex, smooth, shortly stipitate, snow-white with a brown patch in the centre of each face; style $\frac{1}{16}$ in. long, the upper half villous, the base enlarged, cylindric or subglobose; stigmas 2, short. Fl. B. I. v. 6, p. 634; Boeck. in Linnæa, v. 37 (1871) p. 5; Trim. Fl. Ceyl. v. 5, p. 49; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1150.—Flowers: Sept.

KONKAN: *Woodrow*. DECCAN: Khadkala near Lanoli, *Woodrow*! SIND: *Pinwill*!—DISTRIB. Throughout India; Ceylon, China, Malaya, Australia.

4. **Fimbristylis dichotoma,** *Vahl, Enum.* v. 2 (1806) p. 287. Annual; root-fibres slender; stems 2–10 in. long, tufted, filiform, striate, smooth. Leaves usually shorter than the stems, very narrow, $\frac{1}{30}$ in. broad, tapering to a fine point, smooth; sheaths softly villous. Umbel laxly compound or decompound, 1–2 in. in diam.; rays few or many, up to 1 in. long, suberect; bracts filiform, shorter or longer than the umbels. Spikelets $\frac{1}{6}$–$\frac{1}{4}$ by $\frac{1}{16}$–$\frac{1}{12}$ in., somewhat angular from the acute keels to the glumes, ellipsoid, many-flowered; rhachilla stout, angular, with large pits. Glumes loosely imbricate, all, or all but the lowest fertile, $\frac{1}{16}$ by $\frac{1}{30}$ in., ovate, reddish-brown, 1–3-nerved on the back, the midnerve forming a conspicuous acute green keel which is prolonged into a cuspidate point. Stamens 1-3; anthers small, obtuse. Nut $\frac{1}{40}$–$\frac{1}{30}$ in. long, broadly turbinate, minutely stipitate, umbonate, compressed, biconvex, with 6–9 broad trabeculate ribs, pale straw-colored or almost white; style $\frac{1}{20}$ in. long, densely villous in the upper part, or sometimes all over, with a small globose bulbous base; stigmas 2, recurved. Fl. B. I. v. 6, p. 635; Boeck. in Linnæa, v. 37 (1871) p. 12; Trim. Fl. Ceyl. v. 5, p. 50; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1151.—Flowers: Oct.–Apr.

KONKAN: *Dalzell, Lambert*!, *Stocks*! DECCAN: Khandala, *Woodrow*. GUJARAT: Bodeli, *Woodrow*. SIND: *Stocks*, 1204!—DISTRIB. Throughout India especially in rice-fields; Ceylon, warm regions of the Old World.

5. **Fimbristylis æstivalis,** *Vahl, Enum.* v. 2 (1806) p. 288. An annual glaucous herb, more or less slightly pubescent; roots fibrous; stems 2–8 in. long, erect, trigonous, filiform, striate. Leaves shorter than the stem, very narrow, acute. Umbel compound or subdecompound, lax, with many slender erect rays; bracts 3–5, the longest usually much exceeding the umbel, narrowly linear, acute, leaf-like, pubescent. Spikelets $\frac{1}{5}$–$\frac{1}{6}$ by $\frac{1}{12}$–$\frac{1}{10}$ in., elliptic-oblong, brown, the two lowest glumes empty, bract-like, $\frac{1}{10}$ in. long, longer than the others, with a hispid keel which is produced into a long recurved mucro, and usually with hyaline margins; rhachilla prominently scarred. Glumes (fertile) $\frac{1}{16}$ in. long, oblong, puberulous, suberect; back strongly keeled, the keel produced into a stout mucro about $\frac{1}{40}$ in. long, which is often pubescent; sides streaked with reddish-brown, the margins not hyaline. Stamen 1. Nut scarcely $\frac{1}{50}$ in. long, orbicularly obovoid, much compressed, biconvex, with an acute margin, narrowed to the base, straw-colored, smooth, slightly umbonate; style about $\frac{1}{40}$ in. long, slightly pubescent, with a bulbous base; stigmas 2, recurved, nearly as long as the style. Fl. B. I. v. 6, p. 637; Boeck. in Linnæa, v. 37 (1871) p. 11; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1151.—Flowers: Sept.–Dec.

KONKAN: Matheran, *H. M. Birdwood, Woodrow.* DECCAN: Máwal (Poona districts), *Woodrow*; Kanara, *Law!*—DISTRIB. More or less throughout India, S. and E. Asia, Australia. Sir Joseph Hooker (Trim. Fl. Ceyl. v. 5, p. 51) considers the Ceylon plant a distinct species and not conspecific with Vahl's plant, which latter he says has not hitherto been found in Ceylon.

6. **Fimbristylis argentea,** *Vahl, Enum.* v. 2 (1806) p. 294. A densely tufted glaucous glabrous annual; root-fibres filiform; stems many, 4–8 in. long, filiform, trigonous, striate. Leaves shorter and often more slender than the stem, flexuous, smooth, canaliculate, acute; sheaths short, glabrous. Spikelets $\frac{1}{6}$–$\frac{3}{8}$ in. long, 3–20, sessile, forming a terminal globose head, cylindric-oblong, terete, obtuse, many-flowered; bracts 3–4, much longer than the head, reaching 3 in. long. Glumes $\frac{1}{16}$ in. long, closely imbricate, ovate, obtuse, not cuspidate; back with a strong green keel, obscurely 3-nerved; sides brown, with hyaline margins. Stamen 1. Nut $\frac{1}{50}$ in. long, orbicularly obovoid, compressed, biconvex, shortly stipitate, with narrow acute margins, straw-colored, quite smooth, umbonate; style $\frac{1}{30}$ in. long, minutely hairy in the upper part, with a bulbous base; stigmas 2, shorter than the style. Fl. B. I. v. 6, p. 640; Dalz. & Gibs. p. 287; Boeck. in Linnæa, v. 37 (1871) p. 8; Prain, Beng. Pl. p. 1151. *Scirpus argenteus,* Rottb. Descrip. et Icon. (1773) p. 51, t. 17, fig. 6; Grah. Cat. p. 232.

This is given for the Bombay Presidency on the authority of Dalzell & Gibson (Bo. Fl. l. c.), who assign no locality to the plant. Woodrow does not include it in his list of plants and there are no specimens from the Bombay Presidency in Herb. Kew. The plant seems to be tolerably common in Madras.—DISTRIB. India (Bengal, W. Peninsula); Ceylon, Mauritius.

7. **Fimbristylis ferruginea,** *Vahl, Enum.* v. 2 (1806) p. 291. ? Perennial; rhizome 0 or scarcely any; root-fibres stout and slender; stem 1–2½ ft. long, subtrigonous. Leaves 0 or few, short, very narrow, glabrous or hairy; sheaths pubescent, thin. Umbels simple or subcompound, of few spikelets; bracts shorter than the umbel, striate,

slender. Spikelets $\frac{3}{8}$ by $\frac{1}{8}$ in., ellipsoid, pale reddish-brown, pubescent, the lowest spikelets usually bracteiform, variable, $\frac{1}{8}$–$\frac{1}{4}$ in. long, cuspidate, the mucro varying from $\frac{1}{20}$ to $\frac{1}{8}$ in. long, pubescent; rhachilla stout, angular, with large pits. Glumes $\frac{1}{8}$ by $\frac{1}{10}$ in., erect or slightly recurved, broadly ovate, subacute, concave, shortly mucronate, chartaceous; the back with a green keel but with no conspicuous nerves. Stamens 2–3. Nut $\frac{1}{16}$ in. long, obovoid or suborbicular, narrowly margined all round, compressed, umbonate, with a long stipe, pale straw-colored, not ribbed, obscurely reticulate, smooth; style $\frac{1}{10}$ in. long, flattened, slightly dilated at the base, the margins of the upper part villous; stigmas 2, short. Fl. B. I. v. 6, p. 638; Dalz. & Gibs. p. 287; Boeck. in Linnæa, v. 37 (1871) p. 16; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1151.—Flowers: Sept.–Dec.

DECCAN: Poona, *Cooke*!, *Woodrow*! SIND: *Pinwill*!—DISTRIB. Throughout India; Ceylon, China, Japan, Malaya, Australia, Polynesia.

8. **Fimbristylis diphylla,** *Vahl, Enum.* v. 2 (1806) p. 289. Rhizome 0 or rarely up to 1 in. long, stout; root-fibres rather stout; stolons 0; stems 6–24 in. long, tufted, slender, angled, striate, smooth. Leaves usually shorter than the stem, $\frac{1}{12}$–$\frac{1}{5}$ in. broad, linear, coriaceous, rather rigid, often serrulate towards the acute tip, striate above, obscurely 2-nerved beneath, and with scaberulous margins; sheaths glabrous or pubescent, rather short. Umbel simple or compound (or spikelets in a compact head); rays few, very unequal, up to 2 in. long; bracts filiform, long or short. Spikelets scattered or clustered, $\frac{1}{5}$–$\frac{3}{8}$ in. long, ovoid, acute, terete, the lowest 1–3 glumes empty, smaller than the others, deciduous (rarely elongate and bract-like); rhachilla stout, pitted. Glumes $\frac{1}{8}$ by $\frac{1}{10}$ in., broadly ovate, acute, apiculate, concave, chartaceous, loosely imbricate; keel obtuse, green, 3-nerved, the midrib reaching the tip; sides chestnut-brown. Stamens 1–3; anthers long with a conical tip. Nut $\frac{1}{20}$ in. long, broadly or orbicularly ovoid, compressed, biconvex, shortly stipitate, many-ribbed, trabeculate, umbonate, pale straw-colored or nearly white; style $\frac{1}{16}$ in. long, very broad, villous throughout, base dilated, truncate; stigmas 2, short. Fl. B. I. v. 6, p. 636; Trim. Fl. Ceyl. v. 5, p. 53; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1151. *Fimbristylis polymorpha*, Boeck. in Linnæa, v. 37 (1871) p. 14.—Flowers: Aug.

KONKAN: *Stocks*!, *Woodrow*. KANARA: *Talbot*, 601, ex *C. B. Clarke*, in Journ. Linn. Soc. v. 34, p. 58. SIND: *Pinwill*!—DISTRIB. Throughout India; Ceylon, most warm regions.

9. **Fimbristylis spathacea,** *Roth, Nov. Pl. Sp.* (1821) p. 24. Rhizome short or elongate, stout, woody; root-fibres both stout and slender; stems densely leafy below, $\frac{1}{2}$–$1\frac{1}{2}$ ft. long, stout, obtusely trigonous, striate. Leaves many, densely crowded on the rootstock, much shorter than the stem, spreading and recurved, narrowly linear, obtuse or acute, up to $\frac{1}{16}$ in. broad, rigidly coriaceous, with recurved scaberulous margins; sheaths short, open, coriaceous. Umbel simple or compound, open or with the spikelets more or less crowded, sometimes into a globose head, but almost always pedicellate; bracts short, rigid, erect, leaf-like, with broadly dilated base which often has membranous margins. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ by $\frac{1}{10}$ in., ellipsoid or ovoid, pale brown,

subterete; rhachilla stout, deeply pitted. Glumes rather laxly imbricate, $\frac{1}{16}$ in. long, broadly ovate, concave, obtuse, altogether hyaline except a narrow reddish-brown band at the back, obscurely 3–5-nerved, the keel conspicuous. Stamens usually 2. Nut about $\frac{1}{30}$ in. long, very shortly stipitate, turbinate, compressed, biconvex, rounded at the apex, tapering at the base, at first yellow, afterwards black, microscopically rugose; style about $\frac{1}{30}$ in. long, glabrous; stigmas 2, longer than the style. Fl. B. I. v. 6, p. 640; Trim. Fl. Ceyl. v. 5, p. 54; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1151. *Fimbristylis glomerata*, Nees, in Linnæa, v. 9 (1835) p. 290; Boeck. in Linnæa, v. 37 (1871) p. 47. *F. Wightiana*, Nees, in Wight, Contrib. (1834) p. 99.—Flowers: Dec.

Sind: *Pinwill*!; Karachi, *Woodrow*.—Distrib. India (Orissa, W. Peninsula); Ceylon, Æthiopia, Arabia, China, Malaya.

10. **Fimbristylis quinquangularis,** *Kunth, Enum.* v. 2 (1837) p. 229. Annual, glabrous, leafy; root-fibres slender; stems tufted, 6–24 in. long, slender, weak, obtusely angled, deeply striate. Leaves longer or shorter than the stem, very slender, $\frac{1}{10}$ in. broad, linear, finely acuminate, flaccid, with scaberulous margins and keel; sheaths long, subdistichous, green, coriaceous. Umbel decompound, with many suberect filiform much-branched rays bearing innumerable small pedicellate spikelets (the whole inflorescence appearing like one oblong panicle); bracts filiform, acute, usually shorter than the umbel. Spikelets $\frac{1}{8}$ by $\frac{1}{16}$ in., ellipsoid or ovoid, terete, pale brown, 6–14-flowered; rhachilla winged. Glumes rather laxly imbricate, $\frac{1}{16}$ in. long, broadly ovate, acute, mucronate by the excurrent keel; back 3-nerved; sides hyaline. Stamens 3; anthers obtuse. Nut shortly stipitate, $\frac{1}{40}$ in. long, obovoid, obtusely trigonous, yellow or pale-brown, tuberculate, transversely lineolate, slightly umbonate; style as long as the nut, more or less pubescent, the base not or scarcely dilated; stigmas 3, recurved, longer than the style. Fl. B. I. v. 6, p. 644; Dalz. & Gibs. p. 287; Boeck. in Linnæa, v. 37 (1871) p. 42; Trim. Fl. Ceyl. v. 5, p. 55; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1152.—Flowers: Sept.

Konkan: *Law*! Gujarat: Baroda, *Woodrow*.—Distrib. More or less throughout India; Ceylon, Malaya, China, Australia.

11. **Fimbristylis miliacea,** *Vahl, Enum.* v. 2 (1806) p. 287. A glabrous leafy annual; root-fibres slender; stems 6–24 in. long, slender, obtusely angled below, triquetrous above. Leaves shorter than the stem, slender, $\frac{1}{10}$ in. broad or less, tapering to a firm point and with nearly smooth margins; sheaths subdistichous, striate with scarious margins. Umbel decompound; rays unequal, suberect or spreading, filiform, bearing many scattered very small pedicellate spikelets; bracts filiform, shorter than the umbels. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long, subglobose or subcylindric, obtuse, brown; rhachilla stout, pitted, not winged. Glumes $\frac{1}{20}$ in. long, closely imbricate, ovate, obtuse, cymbiform, membranous, obscurely nerved; keel not excurrent into a mucro. Stamens 1–3; anthers obtuse. Nut $\frac{1}{40}$ in. long, obovoid, obtusely trigonous, minutely stipitate, tuberculate, transversely striolate, yellow; style as long as the nut, glabrous: stigmas 3, about as long as the style. Fl.

B. I. v. 6, p. 644; Dalz. & Gibs. p. 287; Boeck. in Linnæa, v. 37 (1871) p. 43; Trim. Fl. Ceyl. v. 5, p. 56; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1152. *Scirpus tetragonus*, Poir, Encyc. Méthod. v. 6 (1804) p. 767; Grah. Cat. p. 233. Closely allied to *F. quinquangularis*, but the spikelets are more obtuse, the glumes not mucronate, the rhachilla not winged, and the style glabrous.

KONKAN: *Lambert*!; Kalyan, *Woodrow*. SIND: *Pinwill* ex *C. B. Clarke*.—DISTRIB. More or less throughout India; Ceylon, most warm regions.

12. **Fimbristylis digitata,** *Boeck. in Flora*, v. 61 (1878) p. 35. A low glabrous plant; root-fibres slender; stems 2–5 in. long, cæspitose from a bulbous base, slender, subquadrangular, striate; sheaths short, striate, with obliquely truncate mouth. Leaves radical, few, about $\frac{1}{2}$ as long as the stem, bristle-like, linear, acute. Inflorescence in a terminal head, $\frac{1}{8}$–$\frac{1}{2}$ in. in diam., consisting of 3–5 umbellately arranged sessile spikelets; bracts usually 2, subequal, membranous, $\frac{1}{8}$–$\frac{1}{6}$ in. long, ovate, acute, striate. Spikelets $\frac{1}{8}$–$\frac{1}{2}$ by $\frac{1}{12}$–$\frac{1}{8}$ in., erect, closely approximate, ovoid-oblong, subacute, straw-colored, subterete. Glumes $\frac{1}{10}$–$\frac{1}{8}$ in. long, ovate, cymbiform, the keel produced into a short mucro, all scarious except the 3-5-nerved back; rhachilla winged. Stamens 3; filaments reaching $\frac{1}{6}$ in. long; anthers large, $\frac{1}{30}$ in. long, very shortly pyramidally pointed, yellow. Nut $\frac{1}{30}$ in. long, globosely obovoid, trigonous, with rather acute angles, scarcely stipitate, not umbonate, faintly ribbed and trabeculate between the ribs, yellow; style exceptionally long, reaching $\frac{1}{10}$ in., glabrous, with a small conical base; stigmas 3, shorter than the style, exserted. Fl. B. I. v. 6, p. 648; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432. *Trichelostylis digitata*, Dalz. ex Boeck. in Flora, v. 61 (1878) p. 35.—Flowers: Oct.

KONKAN: *Dalzell*!, *Stocks*, *Law*!; Marmagão, *Talbot*, 2506! DECCAN: Lanoli, *Woodrow*. S. M. COUNTRY: Badami, *Woodrow*, 56! KANARA: *Law*!; Belekerri (N. Kanara), *Talbot*, 491!—DISTRIB. India (W. Peninsula).

13. **Fimbristylis Woodrowii,** *C. B. Clarke, in Journ. Linn. Soc.* v. 34 (1898) p. 68. A low glabrous slender herb; roots fibrous; stems $1\frac{1}{2}$–$4\frac{1}{2}$ in. long, cæspitose, 5-angled below the umbel. Leaves usually shorter than but occasionally as long as the stem, $\frac{1}{20}$–$\frac{1}{16}$ in. broad, acute, flat. Umbel subcompound, $\frac{1}{4}$–$\frac{5}{8}$ in. in diam., with 8–18 short rays; bracts 2–3, the longest leaf-like, exceeding the umbel. Spikelets varying in length, often geminate, $\frac{1}{6}$–$\frac{1}{2}$ in. long; rhachilla deeply pitted. Glumes ovate, boat-shaped, spirally arranged, closely imbricate, $\frac{1}{16}$–$\frac{1}{12}$ in. long, rusty-brown, with a green keel which is produced into a mucro. Stamen 1. Nut $\frac{1}{30}$ in. long, narrowly obovoid, trigonous, straw-colored or white, stipitate, not umbonate, faintly longitudinally ribbed and trabeculate between the ribs; style $\frac{1}{25}$ in. long with a bulbous base, glabrous; stigmas 3, about as long as the style. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431.—Flowers: Oct.

KONKAN: Malwán, *Woodrow*! DECCAN: Khandala, *Woodrow*!—DISTRIB. India (W. Peninsula).

Mr. Clarke originally described the plant from undergrown specimens from Khandala, the spikelets of which did not exceed $\frac{1}{8}$ in. long. Specimens collected more recently at Malwán show that the spikelets reach $\frac{1}{3}$ in. long.

14. **Fimbristylis monostachya,** *Hassk. Pl. Jav. Rar.* (1848) p. 61. Densely tufted and leafy; root-fibres slender. Stems 6–12 in. long, very slender or filiform, striate. Leaves crowded on the swollen base of the stem, filiform or nearly so, about ½ as long as the stem, acute or acuminate; sheaths short, with scarious margins. Spikelets solitary (rarely 2) on the stem, variable in size, ⅛–½ by ⅛–¼ in., compressed, ovate, acute, shining, pale straw-colored, the 2 lower glumes empty and longer than the others, cuspidate; rhachilla slender with persistent wings. Glumes loosely imbricate, subdistichous, much-keeled, ovate, acute, cuspidate, coriaceous. Stamens 3; anthers $\frac{1}{16}$ in. long, subacute, yellow. Nut $\frac{1}{10}$ in. long with a long stalk, globosely pyriform, narrowed into the stout stipes, trigonous with rather acute angles, tuberculate on the 3 faces, with a short pyramidal apex, straw-colored, glabrous; style ⅛ in. long, stout, pubescent all over and on the conical base; stigmas 3, much shorter than the style. Fl. B. I. v. 6, p. 649; Trim. Fl. Ceyl. v. 5, p. 59; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1150. *Abildgaardia monostachya*, Vahl, Enum. v. 2 (1806) p. 296; Dalz. & Gibs. p. 286; Boeck. in Linnæa, v. 37 (1871) p. 53.—Flowers: July.

DECCAN: Poona, *Jacquemont*, 411! S. M. COUNTRY: Badami, *Woodrow*.—DISTRIB. Throughout the warmer parts of India; Ceylon, most warm countries.

15. **Fimbristylis monticola,** *Hochst. ex Steud. Syn. Pl. Cyp.* (1855) p. 111. A very slender plant; root-fibres filiform; stems 3–12 in. or more long, filiform, obtusely trigonous, striate, flexuous. Leaves many at the base of the stem, shorter than or sometimes nearly equalling the stem, filiform, acute, with distantly scabrid margins; sheaths short, membranous. Umbel subsimple or subcompound; rays 2–4 with 1 or 2 spikelets on each, ¼–½ in. long, filiform, spreading or recurved; bracts very short, setiform. Spikelets ¼–⅓ in. long, elliptic-oblong, obtuse or acute, compressed, dark-brown; lowest glumes very small, deciduous; rhachilla with deep pits with hyaline margins. Glumes laxly subdistichously imbricate, ⅛ in. long, triangularly ovate, apiculate, concave, coriaceous, with hyaline margins; back 3-nerved; keel conspicuous. Stamens 3; anthers with an acute tip. Nut stipitate, $\frac{1}{20}$ in. long, globosely obovoid, obtusely trigonous, minutely tuberculate, yellow or brown; style $\frac{1}{16}$ in. long, with bulbous base, more or less pubescent all over; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 642; Trim. Fl. Ceyl. v. 5, p. 60; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431.—Flowers: Aug.

KONKAN: Shelarvadi (Bhore Ghát), *Woodrow*, 10!—DISTRIB. India (W. Peninsula); Ceylon.

16. **Fimbristylis complanata,** *Link, Hort. Berol.* v. 1 (1827) p. 292. Glabrous; rhizome very short, hard, creeping; root-fibres wiry; stems 8–24 in. long, much flattened near the top, 2-edged, ⅛ in. broad, deeply grooved and ribbed, quite smooth. Leaves crowded at the base of the stem and shorter than it, 3–8 by ⅛–¼ in., coriaceous, flat, linear, suddenly narrowed at the tip, obtuse or subacute, with scaberulous margins; sheaths coriaceous with scarious margins. Umbels decompound, effuse, 1–3 in. broad, with few or many flattened rays, loosely corymbosely branched, the branches bearing small shortly pedicellate

brown spikelets; bracts ½ as long as the umbel, the largest leaf-like, erect, the others subulate. Spikelets ⅛–¼ by $\frac{1}{20}$–$\frac{1}{10}$ in., ovoid-oblong, few-flowered, brown, with more or less distichously arranged glumes, the lowest glume empty. Glumes $\frac{1}{10}$ in. long, ovate, the keel prolonged into a long mucro; sides brown, the margins not hyaline; keel deep, acute. Stamens 3; anthers long, obtuse. Nut $\frac{1}{30}$ in. long, obovoid, stipitate, obtusely trigonous, pale straw-colored or nearly white, slightly umbonate, minutely warted; style longer than the nut with a conical base, slender, glabrous; stigmas 3, long. Fl. B. I. v. 6, p. 646; Trim. Fl. Ceyl. v. 5, p. 63; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1152. *Scirpus complanatus*, Retz. Obs. fasc. 5 (1789) p. 14; Grah. Cat. p. 233.

DECCAN: near Chattersinghi (Poona districts), *Ranade*! SIND: *Pinwill*!—DISTRIB. India (Mussooree, Saharanpur, Assam, Birma, W. Peninsula); Ceylon, Indo-China, Africa, Oceania.

VAR. *microcarya*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 646 (by misprint *microcarpa*, an error which Mr. Clarke has corrected on the sheets in Herb. Kew.). Stems slender, hardly flattened under the umbel. Spikelets more slender. Nut very small, velate (*i. e.*, the outermost cells withering and peeling off). Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431. *Fimbristylis microcarya* (sp.), F. Muell. Fragm. Phyt. Austral. v. 1 (1858–59) p. 200; Benth. Fl. Austral. v. 7 (1878) p. 316.

DECCAN: water-holes at Hewra, *Dalzell*!; Poona, *Woodrow*.

17. **Fimbristylis junciformis,** *Kunth, Enum.* v. 2 (1837) p. 239. Glabrous; rhizome woody, short or creeping; root-fibres stout, wiry; stems 4–18 in. long, tufted, rigid, 4–5-angled or compressed above, deeply striate. Leaves crowded round the base of the stems and very much shorter than them, $\frac{1}{12}$–$\frac{1}{6}$ in. broad, spreading and recurved, flat, coriaceous, with a triangular acute tip and scaberulous margins; sheaths short, coriaceous. Umbel compound, with few slender rays 1–3 in. long, bearing distant or clustered small chestnut-brown spikelets; bracts 2–4, much shorter than the umbel, erect, rigid, acute. Spikelets ⅛–⅕ by $\frac{1}{10}$ in., the 2 lowest glumes distichous, the lowest empty; rhachilla stout, with caducous wings. Glumes $\frac{1}{10}$ in. long, ovate, shortly mucronate, with slender keel and pale hyaline margins. Stamens 3; anthers long, acuminate. Nut $\frac{1}{20}$ in. long, very shortly stipitate, obovoid, trigonous, obscurely ribbed and with faint vein-like markings, pale straw-colored or nearly white, minutely umbonate; style $\frac{1}{12}$ in. long with conical base, pubescent above; stigmas 3, about as long as the style. Fl. B. I. v. 6, p. 647; Boeck. in Linnæa, v. 37 (1871) p. 49; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1152.—Flowers: Nov.

DECCAN: Karli, *Woodrow*. SIND: *Pinwill*!—DISTRIB. Throughout India; Ceylon, Madagascar, Philippines.

5. **STENOPHYLLUS,** Rafin.

Annual herbs; stems slender, leafy at the base only. Leaves very narrow, filiform or capillary. Spikelets small, crowded in a terminal head or umbellate; bracts short. Glumes few or many, imbricate all

round the rhachilla, 1–2 lowest and often the uppermost empty; hypogynous bristles 0. Stamens 1–3; anthers linear, obtuse or apiculate. Ovary obovoid; style slender, glabrous; stigmas 3. Fruit an obovoid obtuse trigonous smooth nut, crowned by the persistent style-base.—DISTRIB. Species about 70, in most warm regions.

The name *Stenophyllus* [Raf. Neog. (1825) p. 4] is prior to the name *Bulbostylis*, Kunth (1837), as pointed out by Dr. N. L. Britton in "The Sedges of Jamaica," published in the 'Bulletin of the Jamaica Department of Agriculture,' v. 5, Suppl. 1, p. 1.

1. **Stenophyllus barbata** (*Scirpus*), *Rottb. Descrip. et Icon.* (1773) p. 52. A slender annual 3–12 in. high; stems tufted, filiform, glabrous, striate. Leaves about ½ as long as the stem, capillary, acuminate, the margins involute, scaberulous upwards; sheaths short, membranous, with bearded mouths. Spikelets ⅛–¼ in. long, few-flowered, oblong-lanceolate, reddish-brown, crowded in a terminal head ¼–½ in. in diam.; bracts shorter than or rarely exceeding the spikelets; rhachilla stout. Glumes $\frac{1}{10}$ in. long, ovate, laterally compressed, boat-shaped, loosely imbricate, acute or with the stout acute keel ending in a mucro. Stamen 1; anther linear, subacute. Nut $\frac{1}{30}$ in. long, globosely obovoid, trigonous with prominent angles, crowned with the minute base of the style, smooth, pale straw-colored; style slender; stigmas 3. *Bulbostylis barbata*, Kunth, Enum. v. 2 (1837) p. 208; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 651; Trim. Fl. Ceyl. v. 5, p. 66; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1156. *Scirpus barbatus*, Rottb. Descrip. et Icon. (1773) p. 52, t. 17, fig. 4; Boeck. in Linnæa, v. 36 (1870) p. 751.—Flowers: July.

S. M. COUNTRY: Badami, *Woodrow*. SIND: *Pinwill!*—DISTRIB. Throughout India; Ceylon, warm regions.

6. ELEOCHARIS, R. Br.

Glabrous herbs; stems tufted, simple, erect, embraced by one or more membranous truncate sheaths. Leaves obsolete, or, rarely, a herbaceous or membranous limb on the sheath. Inflorescence a single solitary ovoid or cylindric many-flowered spikelet. Glumes imbricate round the rhachilla, membranous or coriaceous, the lowest usually empty, bract-like, but not longer than the spikelet; the uppermost empty, the remainder 2-sexual; hypogynous bristles 8 or fewer, rarely absent, retrorsely scabrous or spinulose. Stamens 3–1; anthers linear or linear-oblong, crested, muticous, or with an acicular tip. Ovary orbicular-ovoid; style with a swollen base; stigmas 2–3, filiform or flattened. Fruit a plano-convex or trigonous nut, crowned by the persistent and swollen, pyriform conical or depressed style-base.—DISTRIB. Cosmopolitan; species 113.

Glumes subrigid, smooth or striate, but keeled, concolorous; stems usually stout; stigmas 2–3.
- Nut smooth; stems terete, transversely septate when dry. 1. *E. plantaginea*.
- Nut longitudinally striate; stems subtriquetrous below the spikelet, not septate.
  - Spikelets acute; glumes ovate, subacute ..... 2. *E. fistulosa*.
  - Spikelets obtuse; glumes quadrate, rounded or subtruncate ..... 3. *E. spiralis*.

Glumes membranous, usually 1–3-nerved, with a green keel
stems usually slender.
Stigmas 2; nut compressed.
Roots fibrous; rhizome short or 0.
Bristles glistening, white ..... 4. *E. atropurpurea.*
Bristles brown or rusty ..... 5. *E. capitata.*
Rhizome creeping; bristles rusty-brown..... 6. *E. palustris.*
Stigmas 3; nut obovoid, trigonous ..... 7. *E. Chætaria.*

1. **Eleocharis plantaginea,** *R. Br. Prod.* (1810) p. 224 (*in note*). Stolons long, $\frac{1}{8}$–$\frac{1}{6}$ in. in diam.; stems 1–3 ft. high, $\frac{1}{8}$–$\frac{1}{3}$ in. in diam., densely tufted, appearing transversely septate when dry; sheaths 2–8 in. long, very thin, soon torn, bright red-brown, shining. Spikelets $\frac{3}{4}$–$1\frac{3}{4}$ in. long, straw-colored, rather narrower than the stem; rhachilla stout, angled, with irregular broad concave facets between the insertion of the glumes. Glumes closely imbricate, $\frac{1}{5}$ in. long, subrigid, concolorous, not keeled, broadly ovate, obtuse, rarely truncate, 1-nerved, coriaceous, persistent, the lowest very stout, appearing as a continuation of the stem. Bristles 7, equalling or exceeding the nut, retrorsely scabrid, yellow. Stamens 3; anthers narrowly linear, with a long setaceous tip. Nut $\frac{1}{12}$ in. long, orbicular-obovoid, compressed, smooth, yellowish; style long, flattened, with a triangular base; stigmas 3. Fl. B. I. v. 6, p. 625; Trim. Fl. Ceyl. v. 5, p. 68; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Scirpus plantaginus,* Roxb. Fl. Ind. v. 1 (1832) p. 212; Grah. Cat. p. 233. *Scirpus plantaginoides,* Rottb. Descrip. et Icon. (1773) p. 45, t. 15, fig. 2. *Heleocharis plantaginea,* Boeck. in Linnæa, v. 36 (1870) p. 474.—Flowers: Sept.

Konkan: Bombay without locality or authority in Herb. Kew.! Gujarat: Baroda, *Woodrow.* Sind: *Pinwill!*—Distrib. India (N.-West, Assam, W. Peninsula); Ceylon, Malay Peninsula, Tropics of the Old World.

2. **Eleocharis fistulosa,** *Link, in Spreng. Jahrb. Gewäch.* (1820) Heft 3, p. 78. Stems robust or slender, 1–3 ft. by $\frac{1}{8}$–$\frac{1}{4}$ in., stoloniferous, triquetrous under the spikelet, concave on one face, not transversely septate; sheaths obliquely truncate, thinly membranous, loose, ending in an ovate, acute or lanceolate hyaline limb. Spikelets $\frac{3}{4}$–$1\frac{1}{2}$ in. long, as broad as the stem or broader, greenish; lowest glumes bracteiform, broadly ovate, coriaceous, with narrow membranous margins; rhachilla slender, angular, with broad concave facets between the glumes. Fertile glumes nearly $\frac{1}{5}$ in. long, ovate-oblong or subobovate, multistriate on the back outside, often with minute brown spots inside; bristles longer than the nut, brown, retrorsely scabrid. Nut $\frac{1}{10}$ in. long, obovoid, striate, pale, tipped with the annular somewhat saucer-shaped style-base, which is about three-fourths the width of the nut; stigmas usually 3. Fl. B. I. v. 6, p. 626; Trim. Fl. Ceyl. v. 5, p. 70; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Heleocharis fistulosa,* Boeck. in Linnæa, v. 36 (1870) p. 472.

Kanara: *Talbot,* 1040, ex *C. B. Clarke,* in Journ. Linn. Soc. v. 34 (1898–1900) p. 48.
I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew.—Distrib. India (Nipal, Assam, Birma, W. Peninsula); Tropics generally.

3. **Eleocharis spiralis,** *R. Br. Prodr.* (1810) p. 224 (*in note*). Stems densely tufted, stoloniferous, 1–2 ft. by $\frac{1}{8}$–$\frac{1}{6}$ in., trigonous or

biconvex below, triquetrous above; upper sheath with a broad ovate-oblong appressed limb sometimes reaching $\frac{1}{4}$ in. long. Spikelets $\frac{1}{2}$–1 in. long, thicker than the stem, cylindric, obtuse, pale; lowest glume like the others but more coriaceous; rhachilla stout, terete, deeply regularly pitted. Glumes very many, closely spirally imbricate, $\frac{1}{8}$ in. long and as broad as long, quadrate, rounded at the apex, with a hyaline border on the sides and on the top; back thick, pale (nearly white) outside, dotted with brown spots inside; bristles much shorter than the nut, scabrid. Stamens $\frac{1}{8}$ in. long; anthers narrow. Nut $\frac{1}{16}$ in. long (not including the conical whitish style-base, which reaches to about $\frac{1}{30}$ in. long and which is as broad as $\frac{2}{3}$ of the nut), ashy brown, globosely obovoid, biconvex, shining, with thickened margins, faintly striate and with minute transverse yellowish streaks; style with the style-base as long as the nut; stigmas 2 or 3. Fl. B. I. v. 6, p. 627; Trim. Fl. Ceyl. v. 5, p. 70; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Scirpus spiralis*, Rottb. Descrip. et Icon. (1773) p. 45, t. 15, fig. 1.—Flowers: Dec.

Konkan: Salsette, *Jacquemont*, 725!; Goa, *Lisboa*, 45!—Distrib. India (Bengal, Birma, W. Peninsula); Ceylon.

4. **Eleocharis atropurpurea,** *Kunth*, *Enum.* v. 2 (1837) p. 151. Annual; roots fibrous; stems slender, densely tufted, 2–7 in. long, straight or curved. Leaves 0; sheaths short. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ in. long, ovoid, obtuse or subacute, much broader than the stem, many-flowered; rhachilla pitted. Glumes $\frac{1}{16}$–$\frac{1}{12}$ in. long, broadly ovate-oblong, obtuse, concave, loosely imbricate, easily detached; back green; sides membranous with a chestnut-brown band along each; bristles 4–7, slender, scabrid, as long as the nut, white. Anthers small, apiculate. Nut $\frac{1}{25}$ in. long, obovoid, biconvex, smooth, black, apiculate with the short stout white style-base; stigmas 2. Fl. B. I. v. 6, p. 627; Trim. Fl. Ceyl. v. 5, p. 71; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Heleocharis atropurpurea*, Boeck. in Linn. v. 36 (1870) p. 458.—Flowers: Sept.

Gujarat: Godra, *Woodrow*! Sind: *Pinwill*!—Distrib. India (W. Himalaya, Assam, W. Peninsula); Ceylon, Tropics generally.

5. **Eleocharis capitata,** *R. Br. Prod.* (1810) p. 225. Annual; root fibrous; stems densely tufted, numerous, 2–10 in. long, slender, trigonous. Leaves 0; sheaths short, sometimes tinged with purple, the mouth oblique, acute. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. in diam., globosely ovoid, rounded at the apex, pale. Lowest glumes bractiform, $\frac{1}{20}$ in. long, ovate-oblong, obtuse; fertile glumes $\frac{1}{16}$ in. long, orbicular-ovate, obtuse, imbricate, easily detached, concave; rhachilla terete, pitted; bristles longer than the nut, 7 or fewer, pale rose-brown when ripe (*Clarke*), retrorsely scabrid. Anthers small, linear, obtuse. Nut $\frac{1}{30}$ in. long, globosely obovoid, brown, smooth, shining, apiculate with the broad style-base; style short; stigmas 2. Fl. B. I. v. 6, p. 627; Dalz. & Gibs. p. 285; Trim. Fl. Ceyl. v. 5, p. 72; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Heleocharis capitata*, Boeck. in Linnæa, v. 36 (1870) p. 461.—Flowers: Sept.

Deccan: Poona, *Woodrow*. Kanara: *Thomson*. Sind: *Dalzell*!; Jemadar ka Landa near Karachi, *Stocks*!—Distrib. India (Behar, Bengal, W. Peninsula); Ceylon, Singapore, most warm countries.

6. **Eleocharis palustris,** *R. Br. Prod.* (1810) p. 224 (*in note*). A variable plant; rhizome creeping, black or chestnut-brown, rooting from the nodes; stems 4–24 by $\frac{1}{25}$–$\frac{1}{8}$ in.; upper sheath truncate or sometimes produced at one side into a small triangular limb. Spikelets $\frac{1}{4}$–1 by $\frac{1}{8}$–$\frac{1}{5}$ in., ellipsoid or cylindric, chestnut-brown or straw-colored, subacute, the lowest glume bract-like, empty, suborbicular, smaller than the fertile ones, coriaceous, with hyaline margins, about $\frac{1}{2}$-surrounding the stem; bristles usually 4, longer than the nut, scabrid, brown. Fertile glumes $\frac{1}{8}$–$\frac{1}{5}$ in. long, thinly membranous, either hyaline except the back which is narrow and green, ovate-lanceolate, obtuse or subacute; or elliptic, acute, with the back and sides chestnut-brown and with hyaline margins. Stamens 3. Nut $\frac{1}{12}$ in. long (not including the large oblong-conic obtuse subcompressed pale or brown-dotted style-base which reaches sometimes $\frac{1}{16}$ in. long), globosely obovoid, smooth, biconvex, bright yellow or pale brown, the margins scarcely thickened; style above the conical base $\frac{1}{20}$ in. long; stigmas 2 (very rarely 3), about as long as the style. Fl. B. I. v. 6, p. 628; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. 1148. *Heleocharis palustris*, Lindl. Syn. Brit. Fl. (1829) p. 280; Boeck. in Linnæa, v. 36 (1870) p. 466.

SIND: Hyderabad, *Woodrow*.—DISTRIB. Cosmopolitan except Australia.

7. **Eleocharis Chætaria,** *Roem. & Schult. Syst.* v. 2 (1817) p. 154. Glabrous; roots fibrous, rarely with a white filiform rhizome 1 in. long; stems 1–8 in. long, densely tufted, filiform or capillary, straight or curved; sheaths short, membranous. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. long, ovoid, obtuse, usually tinged with red, terete or compressed, with 1–4 nuts, the lowest glume boat-shaped, empty, $\frac{1}{5}$ in. long, with green obscurely 3-nerved back and broad hyaline margins; rhachilla narrowly winged; bristles 6 or fewer, rather longer than the nut, pale-brown, scabrid, sometimes wanting. Glumes 6–8, subdistichous, loosely imbricate, reaching $\frac{1}{8}$ in. long, boat-shaped, with narrow green backs and chestnut-brown sides and with hyaline margins. Anthers linear, $\frac{1}{10}$ in. long. Nut obovoid, trigonous, $\frac{1}{20}$ in. long (not including the acutely pyramidal style-base, which is less than $\frac{1}{50}$ in. long and nearly as broad as the nut), cancellate, the angles smooth produced into short prominences or shoulders below the convex top, dull pale-straw-colored; style short; stigmas 3, very long. Fl. B. I. v. 6, p. 629; Trim. Fl. Ceyl. v. 5, p. 71; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Heleocharis Chætaria*, Boeck. in Linnæa, v. 36 (1870) p. 428.

S. M. COUNTRY: Londa, *Woodrow*; Dharwar, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Malacca, Tropics generally.

7. SCIRPUS, Linn.

Glabrous often tall herbs, leafless or leafy at the base only (very rarely leafy all along the stem); stems terete, trigonous or triquetrous. Inflorescence terminal or lateral, of clusters or umbels of oblong or ovoid many-flowered sessile or pedicellate spikelets. Glumes spirally imbricating round a stout or slender rhachilla, the lowest 2 and a few of the uppermost empty; hypogynous bristles 0 or 2–7, retrorsely

scabrid or rarely (*S. litoralis* and *S. Kysoor*) plumose. Stamens 1–3; anthers linear. Ovary obovoid; style slender, the base dilated; stigmas 2–3, slender. Nut obovoid, trigonous or biconvex, smooth or nearly so; the style leaving no button on the nut.—DISTRIB. Species about 136, spread throughout the world.

Large or middle-sized herbs; stems 1–6 ft. or more long, leafy only near the base, rush-like; hypogynous bristles present or not.
- Nut marked with transverse wavy lines; hypogynous bristles 0.
  - Stems flowering nearer to the base than the top, stout, terete, spongy; glumes ½ in. long, with a subcordate base, not inflated in front, hardly keeled ..... 1. *S. articulatus.*
  - Stems flowering nearer to the top than the base, slender, obtusely trigonous; glumes $\frac{1}{10}$ in. long, with tapering (not subcordate) base, not inflated in front, strongly keeled ..... 2. *S. supinus.*
  - Stems flowering nearer to the top than the base, slender, subcompressed; glumes often 5-ranked. ⅛ in. long, with tapering (not subcordate) base, inflated in front, keeled ..... 3. *S. quinquefarius.*
- Nut not marked with transverse wavy lines.
  - Hypogynous bristles 0 ..... 4. *S. corymbosus.*
  - Hypogynous bristles present.
    - Hypogynous bristles retrorsely scabrid (not plumose).
      - Glumes 2-fid at the apex ..... 5. *S. maritimus.*
      - Glumes not 2-fid at the apex ..... 6. *S. grossus.*
    - Hypogynous bristles plumose.
      - Inflorescence lateral; nut plano-convex ..... 7. *S. litoralis.*
      - Inflorescence terminal; nut obovoid ..... 8. *S. Kysoor.*

Small tufted herbs with slender stems never reaching 1 ft. long; hypogynous bristles 0.
- Perennial herb ..... 9. *S. Kyllingioides.*
- Annual herbs.
  - Glumes elliptic; mucro ¼ the length of the blade; bracts many, reaching 3½ in. long ..... 10. *S. Michelianus.*
  - Glumes trapeziform; cusp as long as the blade; bracts 1–3, reaching 1 in. long ..... 11. *S. squarrosus.*

1. **Scirpus articulatus,** *Linn. Sp. Pl.* (1753) p. 47. A glabrous perennial(?) herb; stems 1–3 ft. long, densely tufted, as thick as the little finger, spongy and transversely septate within (visible externally), terete, striate, flowering nearer the base than the top. Leaves 0, or the sheaths with a membranous acute tip sometimes 1 in. long. Spikelets variable in length, ¼–¾ in. long, ovoid-oblong, acute, terete or obscurely angular, rusty-brown, sessile in laterally stellately spreading clusters of 15–60; bracts 0. Glumes ⅕ in. long and nearly as broad, broadly ovate, acute, very shortly mucronate, closely imbricate, membranous, concave, persistent, scarcely keeled, with a subcordate base and hyaline margins. Stamens 3, reaching ⅕ in. long; anthers linear, obtuse, $\frac{1}{10}$ in. long, yellow. Nut $\frac{1}{12}$ in. long, obovoid, sharply triquetrous, black, opaque, shortly pointed, striate with transverse wavy lines; style $\frac{1}{12}$ in. long; stigmas 3, nearly as long as the style. Fl. B. I. v. 6, p. 656; Grah. Cat. p. 233; Boeck. in Linnæa, v. 36 (1870) p. 702; Trim. Fl. Ceyl. v. 5, p. 75; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain,

Beng. Pl. p. 1159. *Isolepis articulata*, Nees, in Wight, Contrib. (1834) p. 108; Dalz. & Gibs. p. 286.—Flowers: Oct.-Feb.

KONKAN: *Woodrow*. GUJARAT: Dakor, *Kanitkar*! SIND: *Pinwill*!—DISTRIB. Throughout India; Ceylon, Africa, Philippines, Australia.

2. **Scirpus supinus,** *Linn. Sp. Pl.* (1753) p. 49. A glabrous annual; roots fibrous; stems densely tufted, 6–15 in. long, slender, obtusely trigonous, striate, flowering above the middle. Leaves very short or 0; sheaths short or long, the mouth oblique, rarely produced into a very short erect acute limb. Spikelets 3–8 in a cluster, coming off from 2 to 6 in. below the top of the stem, $\frac{1}{8}$–$\frac{1}{4}$ in. long, ellipsoid or oblong, green, sessile or nearly so, obscurely angular by reason of the sharp keels of the glumes; rhachilla slender, not winged. Glumes $\frac{1}{10}$ in. long, ovate, acute, membranous, closely imbricate, strongly keeled, the keel produced into a short mucro; hypogynous bristles 0. Nut $\frac{1}{16}$ in. long, globosely obovoid, rugose with transverse wavy lines, trigonous, umbonate, black; style $\frac{1}{30}$ in. long; stigmas 3, nearly as long as the style. Fl. B. I. v. 6, p. 655; Boeck. in Linnæa, v. 36 (1870) p. 699; Trim. Fl. Ceyl. v. 5, p. 74; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1159.—Flowers: Oct.-Feb.

KONKAN: *Law*!; Kalyan, *Woodrow*; Bansda, *Woodrow*. GUJARAT: Dakor, *Kanitkar*! SIND: *Pinwill*!—DISTRIB. More or less throughout India; Ceylon, Old World generally and in America.

VAR. *uninodis*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 656. Inflorescence of 1–4 heads in a contracted umbel, the rays rarely reaching 1 in. long. Prain, Beng. Pl. p. 1159. *Isolepis uninodis* (sp.), Delile, Fl. Egypte, p. 8, t. 6, fig. 1. *Scirpus mucronatus*, Roxb. Fl. Ind. v. 1 (1832) p. 216 (*not* of Linn.).

SIND: *Pinwill*!

3. **Scirpus quinquefarius,** *Ham. in Wall. Cat.* (1828) 3465. Root fibrous; stems 3–25 in. long, slender, terete or slightly compressed, often when dry transversely septate; sheaths with an obliquely truncate mouth. Leaves almost 0. Spikelets 1–9 in a single lateral dense head, usually nearer to the top than the base of the stem, $\frac{3}{8}$–$\frac{1}{2}$ by $\frac{1}{4}$ in., ovoid-oblong, obtuse, slightly compressed, pale-brown, shining. Glumes inflated in fruit, $\frac{1}{6}$ in. long, usually 5-ranked, elliptic-lanceolate, membranous, multistriate, acutely mucronate, the apex slightly recurved, keeled, tapering (not cordate) at the base; hypogynous bristles 0. Stamens 3, reaching $\frac{1}{8}$ in. long; anthers linear, obtuse. Nut $\frac{1}{16}$ in. long, obovoid, acutely trigonous, apiculate, rugose with transverse wavy lines, black; style $\frac{1}{16}$ in. long; stigmas 3, shorter than the style. Fl. B. I. v. 6, p. 657; Boeck. in Linnæa, v. 36 (1870) p. 701; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1159.—Flowers: Nov.-Dec.

KONKAN: *Dalzell*!; Bombay, without authority in Herb. Kew.! GUJARAT: Umrat, *Woodrow*. SIND: *Pinwill*!; Bhubak, *Woodrow*.—DISTRIB. India (North-West, Central India, W. Bengal, W. Peninsula); Afghanistan, Beluchistan, Africa.

4. **Scirpus corymbosus,** *Heyne, ex Roth, Nov. Pl. Sp.* (1821) p. 28. Glabrous; rhizome 2–4 in. long, horizontal; stems approximate, reaching 3 ft. long, stout, terete, finely striate; sheaths few, near the base, with

an obliquely subacute mouth. Leaves 0. Inflorescence lateral, from near the top of the stem, which is produced bract-like above it into an acute stiff point. Spikelets in pedunculate clusters $\frac{1}{4}$–$\frac{3}{8}$ in. long, ellipsoid, reddish-brown. Glumes $\frac{1}{8}$ in. long, broadly ovate, acute, pale-brown with darker streaks, strongly keeled, the keel produced into a short erect mucro; hypogynous bristles 0. Stamens 3, reaching $\frac{1}{8}$ in. long; anthers $\frac{1}{30}$ in. long, linear, obtuse, yellow. Nut $\frac{1}{12}$ in. long, obovoid, trigonous, with a somewhat pyramidal apex, smooth, not rugose with transverse wavy lines, yellow: style reddish, $\frac{1}{10}$ in. long; stigmas as long as the style. Fl. B. I. v. 6, p. 657; Boeck. in Linnæa, v. 36 (1870) p. 706; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.—Flowers: Dec.

KONKAN: Goa, *Woodrow*. SIND: *Pinwill!*, *Woodrow*.—DISTRIB. India (Bandelkand, W. Peninsula); Africa, Madagascar.

5. **Scirpus maritimus,** *Linn. Sp. Pl.* (1753) p. 51. Glabrous; rhizome creeping, bearing tubers; stems 1–3 ft. long, stout, triquetrous. Leaves grass-like, harsh, numerous, often as long as the stem, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, keeled; sheaths long. Inflorescence terminal or subterminal, umbellate with rays of unequal length; bracts 3–5, leaf-like, the longest much exceeding the inflorescence, keeled, finely pointed. Spikelets 3–8 or solitary on each ray (or umbel rarely reduced to a head of 3–1 spikelets), $\frac{3}{8}$–1 in. long and often $\frac{1}{5}$ in. in diam., ovate-oblong or cylindric, reddish-brown. Glumes $\frac{1}{4}$ in. long, broadly ovate, strongly keeled, membranous, glabrous or puberulous, brown or golden-brown, bifid at the apex and with a long subrecurved mucro about $\frac{1}{20}$ in. long formed by the production of the keel between the apical lobes; hypogynous bristles 3–6, unequal, $\frac{1}{16}$–$\frac{1}{10}$ in. long, shorter than the nut, slender, retrorsely scabrid. Stamens 3, reaching $\frac{1}{4}$ in. long. Nut $\frac{1}{8}$ in. long, obovoid, obtusely trigonous, umbonate, quite smooth, pale yellow, nearly white; style $\frac{1}{10}$–$\frac{1}{8}$ in. long; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 658; Dalz. & Gibs. p. 288; Boeck. in Linnæa, v. 36 (1870) p. 722; Watt, Dict. Econ. Prod. v. 6, part 2, p. 491. *Scirpus tridentatus*, Roxb. Hort. Beng. (1814) p. 81; Fl. Ind. v. 1 (1832) p. 225; Grah. Cat. p. 233.—Flowers: Nov.

KONKAN: Bombay, *Woodrow*. DECCAN: Miraj, *Woodrow*. GUJARAT: Umrat, *Woodrow!* SIND: *Dalzell!*, *Stocks*, 1094!; Karachi, *Woodrow*.—DISTRIB. India (Kashmir, Kashgar, Moradabad, W. Peninsula); Old World with vars. in Australia and America.

VAR. *affinis*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 659. Spikelets capitate, usually 3–1, large, ovoid-lanceolate; glumes straw-colored, sparingly hairy; hypogynous bristles 4, as long as the nut; nut small; stigmas 2. Prain, Beng. Pl. p. 1159. *Scirpus affinis* (sp.), Roth, Nov. Pl. Sp. (1821) p. 30; Nees, in Wight, Contrib. (1834) p. 111.

KONKAN: Bombay, *Law!* DECCAN: Nasik, *Cooke!* SIND: *Dalzell!*

6. **Scirpus grossus,** *Linn. f. Suppl.* (1781) p. 104. Rootstock stout, stoloniferous or not; root-fibres thick; stem 6–10 ft. high, as thick as the little finger, triquetrous, spongy, with concave sides and smooth angles. Leaves few, radical, 2–3 ft. by $\frac{1}{2}$ in., much keeled,

finely acuminate, coriaceous, with smooth or scaberulous margins; sheaths long, open. Spikelets subglobosely ovoid, $\frac{1}{6}$–$\frac{3}{8}$ in. long, dark-brown, in large corymbiform decompound terminal open or contracted umbels 3–8 in. in diam., solitary on the top of rigid erect or spreading rays of various lengths; involucral bracts 3, leaf-like, the longest up to 3 ft. long by $\frac{1}{2}$–$\frac{3}{4}$ in. broad at the base, flat, linear, acuminate; bracts of the secondary and tertiary umbels lanceolate, acute, scarious, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Glumes rather loosely imbricate, $\frac{1}{8}$–$\frac{1}{6}$ in. long, elliptic, obtuse, mucronate, keeled, membranous; hypogynous bristles 6, unequal, longer than the nut, retrorsely scabrid (not plumose), brown. Stamens 3, reaching $\frac{1}{8}$ in. long; anthers linear, large. Nut $\frac{1}{12}$ in. long, obovoid, trigonous, with a minute conical tip (*style-base*), ashy-grey or yellowish, smooth; style $\frac{1}{16}$ in. long, with dilated base; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 659; Boeck. in Linnæa, v. 36 (1870) p. 723; Trim. Fl. Ceyl. v. 5, p. 77; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1159.—Flowers: Sept.

KONKAN: Kalyan, *Woodrow*. DECCAN: Poona, *Cooke*! SIND: *Pinwill*!—DISTRIB. More or less throughout India; Ceylon, Malaya, Tonkin, Philippines.

7. **Scirpus litoralis,** *Schrad. Fl. Germ.* v. 1 (1806) p. 142, t. 5, fig. 7. Rootstock stout, hard, with matted fibrillose root-fibres; stem 2–3½ ft. long, as thick as the thumb at the soft base, and as a crow-quill near the top, terete below, trigonous above, spongy, striate, smooth. Leaves 6–24 by $\frac{1}{10}$–$\frac{1}{4}$ in., membranous, grass-like, finely acuminate; sheaths long, soft, open. Inflorescence near the top of the stem, which is produced 1–6 in. beyond the umbel. Spikelets pale brown, $\frac{1}{4}$–$\frac{1}{2}$ in. long, oblong, obtuse, terete, pedicellate, in lax subcorymbose or paniculate umbels with drooping rays 1–2 in. long. Glumes $\frac{1}{6}$ in. long, membranous, ovate-oblong, obtuse, notched at the top, mucronate in the notch by the excurrent slender green keel; hypogynous bristles 2–7, longer than the nut, unequal, linear, plumose with moniliform hairs. Stamens 2 or 3, reaching $\frac{1}{6}$ in. long; filaments broad; anthers slender, tipped with a red appendage. Nut $\frac{1}{16}$ in. long and broad, orbicularly obovoid, plano-convex, smooth, with a long apiculation, dull-brown: style $\frac{1}{18}$ in. long; stigmas 2, as long as the style. Fl. B. I. v. 6, p. 659; Trim. Fl. Ceyl. v. 5, p. 77; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1159. *Scirpus subulatus*, Dalz. & Gibs. Bo. Fl. (1861) p. 288 (*not* of Vahl).

SIND: *Dalzell*! GUJARAT: Ahmedabad, *Burkhill* ex *Drummond*; Kathiawar, *Mehta* ex *Drummond*; Rajkote, *Cooke*!—DISTRIB. India (Panjáb, Central India, W. Peninsula); Ceylon, Persia, Central Asia, Africa, Mediterranean regions.

Mr. Drummond in a paper in the 'Journal of the Asiatic Society Bengal' (v. 73, part 2 (1904) p. 137) shows that *S. subulatus*, Vahl, which in the 'Flora of British India' (*l. c.*) has been made synonymous with *S. litoralis* should be considered distinct from that species in consequence of its having a trifid style.

8. **Scirpus Kysoor,** *Roxb. Hort. Beng.* (1814) p. 6; *Fl. Ind.* v. 1 (1832) p. 230. Rootstock stoloniferous, the stolons often producing hard globose tubers $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., densely clothed with matted fibres; stems straight, erect, 4–6 ft. high, triquetrous, with sharp often retrorsely hispid angles. Leaves several to each stem and about as long as the stem, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, linear, acuminate, the margins and keel somewhat hispid when young. Umbel terminal, supra-decompound, very

similar to that of *Scirpus grossus*; bracts 3, very unequal, the longest often 2 ft. or more long, the shortest 2–3 in., leaf-like. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ in. long, subglobosely ovoid, brown. Glumes $\frac{1}{8}$ in. long, broadly ovate or suborbicular, membranous, reddish-brown, with a strong keel in the upper part produced into a straight or slightly recurved mucro about $\frac{1}{10}$ in. long. Stamens 3, reaching $\frac{1}{8}$ in. long; hypogynous bristles 5, plumose with many minute multicellular hairs. Nut $\frac{1}{12}$ in. long, obovoid, trigonous, with pyramidal apex, smooth, yellow; style $\frac{1}{16}$ in. long with dilated red base; stigmas 3, as long as or longer than the style.

Mr. Clarke, in Hook. f. Fl. B. I. (*l. c.*), gives the number of hypogynous bristles as 6. Roxburgh (*l. c.*) says 5, and I have invariably found 5 in many specimens that I have examined. Graham, Cat. p. 233; Dalz. & Gibs. p. 288; Watt, Dict. Econ. Prod. v. 6, part 2, p. 490. *Scirpus grossus* var. *Kysoor*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 660; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1159.—Flowers: Sept. VERN. *Kachar.*

KONKAN: beds of rivers in both Konkans, *Graham*; Bombay, *Dalzell!*, cultivated, *Woodrow.*—DISTRIB. More or less throughout India, sometimes cultivated.

The tubers are dug up in the cold season, sliced and eaten by the natives in many parts of India. They are sweet and starchy and are considered cooling and highly nutritious (*Watt*).

9. **Scirpus Kyllingioides,** *Boeck. in Linnæa*, v. 36 (1870) p. 733. Perennial, glabrous; stem 3–6 in. long, slender, with thickened base and sometimes with long slender stolons. Leaves $\frac{1}{2}$–$\frac{3}{4}$ the length of the stem, $\frac{1}{20}$ in. broad, green, keeled, narrowed above and with very minutely dentate margins. Head terminal, $\frac{1}{8}$–$\frac{1}{4}$ in. in diam., of 5–15 spikelets; bracts 3, leaf-like, spreading or reflexed, 1–3 in. long. Spikelets very small, closely packed, ovoid-lanceolate, many-flowered. Glumes ovate-lanceolate or oblong-lanceolate, subacute, keeled, many-nerved, straw-colored; hypogynous bristles 0. Stamens 2 or 3; filaments scabrous; anthers small, not crested. Nut obovoid-oblong, minute, scarcely half as long as the glume, equally trigonous or subcompressed, obtuse, shortly apiculate, yellowish-black or reddish, minutely punctulate; style slender, shorter than the nut; stigmas 3. Fl. B. I. v. 6, p. 662; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1158.

KANARA: *Young* ex *C. B. Clarke* (Fl. B. I. l. c.).

I have not seen any Bombay specimens; there are none in Herb. Kew.—DISTRIB. India (N.-West, Bengal, Rajputana, W. Peninsula); Tropical Africa.

10. **Scirpus Michelianus,** *Linn. Sp. Pl.* (1753) p. 52. A small glabrous tufted annual; roots fibrous; stems 2–5 in. high, triquetrous, leafy towards the base and there brown. Leaves as long as or sometimes longer than the stem, grass-like, narrowly linear, acute. Spikelets numerous, in dense compound terminal heads $\frac{1}{4}$–$\frac{3}{4}$ in. in diam. (generally 1 head in the middle and 4 or 5 in the circumference); bracts many, the longest sometimes reaching $3\frac{1}{2}$ in. long, leaf-like, linear, dilated at the base, acute at the apex. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, oblong, subterete, straw-colored. Glumes $\frac{1}{12}$ in. long, elliptic, hyaline, with a long mucro about $\frac{1}{4}$ the length of the blade, 3-nerved on the back. Stamens usually 2. Nut $\frac{1}{25}$ in. long, fusiform, smooth, pale yellow, minutely

punctate and with (microscopically) narrow hyaline margins; style scarcely $\frac{1}{50}$ in. long, reddish-brown; stigmas 2, as long as or longer than the style, recurved. Fl. B. I. v. 6, p. 662; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1158. *Cyperus diffusus*, Roxb. Fl. Ind. v. 1 (1832) p. 189. *C. pygmæus* var. *β*, Boeck. in Linnæa, v. 35 (1868) p. 494.—Flowers: Oct.

KONKAN: *Woodrow*. GUJARAT: Pali, *Woodrow*. SIND: Bhubak, *Woodrow*.—DISTRIB. Throughout India; Europe, Asia, Algeria.

11. **Scirpus squarrosus,** *Linn. Mant.* (1771) p. 181. A slender glabrous tufted annual; root-fibres capillary; stems 3–6 in. long, filiform, terete, striate. Leaves shorter than the stem, filiform, acuminate, erect, smooth, with involute margins; sheaths short, open. Spikelets solitary or 2–4 in a cluster, sessile, $\frac{1}{8}$–$\frac{1}{4}$ in. long, globose or oblong, obtuse, green, many-flowered; rhachilla naked; bracts 1–3, capillary, finely acuminate, leaf-like, dilated at the base, one or two sometimes 1 in. long. Glumes $\frac{1}{20}$ in. long, closely imbricate, squarrosely spreading and recurved, trapeziform with acutely angled sides, narrowed above into a recurved cusp as long as or longer than the blade with a stout central nerve, very caducous in fruit; hypogynous bristles 0. Stamens 1 or 2; anthers minute, oblong, apiculate, yellow. Nut $\frac{1}{50}$ in. long, obovoid-ellipsoid, trigonous, yellow, brown or ultimately black; style very short or 0; stigmas 3, minute, recurved. Fl. B. I. v. 6, p. 663; Grah. Cat. p. 233; Boeck. in Linnæa, v. 36 (1870) p. 734; Trim. Fl. Ceyl. v. 5, p. 74; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1158. *Isolepis squarrosa*, Rœm. & Schult. Syst. v. 2 (1817) p. 111; Dalz. & Gibs. p. 286.—Flowers: Oct.–Dec.

Widely distributed throughout the Presidency.—DISTRIB. More or less throughout India; Ceylon, Tropical Africa, Java, China.

8. ERIOPHORUM, Linn.

Glabrous herbs; stem leafy only near the base. Leaves many, long, linear. Spikelets with many perfect flowers in compound umbels. Glumes imbricate on all sides; hypogynous bristles 6, divided nearly to the base into ligulate comose segments. Stamens 3–1 on the anterior side of the ovary. Ovary ovoid; style slender, glabrous, short or long; stigmas 3 (casually 2 or 4), long. Fruit a sessile trigonous smooth dusky nut with narrowed apex.—DISTRIB. Species 10, chiefly in Arctic or N. temperate regions.

1. **Eriophorum comosum,** *Wall. Cat.* (1828) 3446. A glabrous herb; rhizome scarcely any; stems 6–20 in. long, terete below, trigonous at the top, leafy at the very base. Leaves equalling or exceeding the stem, rigid, linear, narrow, with serrulate margins; sheaths brown, shining, striate. Umbel supra-decompound, 2–8 in. in diam., with many rays, the spikelets usually solitary on the top of the rays with 1 or 2 sessile ones in the forks; bracts very long, sometimes reaching 12 in., leaf-like. Spikelets numerous, reaching $\frac{1}{4}$ in. long, elliptic-oblong, obtuse, terete, reddish-brown. Glumes $\frac{1}{8}$ by $\frac{1}{30}$ in., oblong-lanceolate, membranous, 1-nerved, mucronate, reddish-brown. Anthers large, yellow with a long lanceolate pointed bright-red crest. Nuts nearly

$\frac{1}{8}$ in. long by about $\frac{1}{50}$ in. wide, linear-oblong or subfusiform, trigonous, acute, shining, greyish-black, with numerous erect white bristles reaching $\frac{1}{3}$ in. long at the base; style $\frac{1}{16}$–$\frac{1}{12}$ in. long, reddish-brown; stigmas 3, as long as the style, reddish-brown, much exserted. Fl. B. I. v. 6, p. 664; Dalz. & Gibs. p. 289; Boeck. in Linnæa, v. 37 (1871) p. 98; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1157; Watt, Dict. Econ. Prod. v. 3, p. 266.—Flowers: Oct.

Deccan: W. Deccan, near Junnar, *Dalzell & Gibson*; near Junnar, *Bhiva*! Gujarat: Champanir, *Woodrow*. Sind: *Pinwill*!—Distrib. Throughout India; Tonkin. China.

The plant is used to make ropes and mixed with *Ischæmum angustifolium* is often exported to the plains from the Himalayas (see Watt, Dict. Econ. Prod. l. c.).

9. **FUIRENA,** Rottb.

Annual or perennial, glabrous or pubescent leafy herbs. Leaves linear-lanceolate; sheaths entire, with an annular membrane at the mouth. Spikelets many-flowered, in dense axillary pedunculate and terminal clusters. Glumes imbricate all round the rhachilla, orbicular or ovate-oblong, membranous, with a stout 3-nerved keel ending in a cusp or stout scabrid awn; hypogynous bristles 3, minute, or 0; hypogynous scales (*petals*) 3, enclosing the nut, linear, quadrate or obovate, strongly 3-nerved, glabrous or ciliate. Stamens 2–3. Ovary trigonous; style slender, finally deciduous; stigmas 3. Fruit a trapezoidal trigonous nut, narrowed or stipitate below, with a long or short cusp or beak above, the angles acute, the sides smooth, pale.—Distrib. Species 25, scattered through all warm regions.

Hypogynous scales (*petals*) 0	1. *F. Wallichiana.*
Hypogynous scales (*petals*) present, quadrate or obovate.	
Annuals; leaves hairy.	
Spikelets $\frac{1}{6}$–$\frac{1}{3}$ in. long; rhachilla slender; claw of petals as long as the blade	2. *F. glomerata.*
Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long; rhachilla obsolete; claw of petals shorter than the blade	3. *F. uncinata.*
Perennial; rhachilla slender; petals sessile or nearly so	4. *F. umbellata.*

1. **Fuirena Wallichiana,** *Kunth, Enum.* v. 2 (1837) p. 182. Rhizome creeping, short or long; stems many, 1–1½ ft. high (rarely higher), triquetrous, more or less pubescent towards the apex. Leaves 2–8 by $\frac{1}{6}$–$\frac{1}{4}$ in., linear-lanceolate, acute, with a strong midnerve and recurved margins; sheaths long, trigonous, striate, with a short ligule. Spikelets in corymbose terminal clusters; bracts small. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, oblong, terete, many-flowered. Glumes $\frac{1}{8}$ in. long (not including the stout conical slightly hairy mucro, which reaches $\frac{1}{20}$ in. long), broadly oblong, rounded at the apex below the mucro, green with red streaks by transmitted light, pubescent and ciliate; hypogynous bristles shorter than the nut, reddish-brown; hypogynous scales (*petals*) 0. Anthers linear-oblong, not crested. Nut $\frac{1}{20}$ in. long, turbinate, with a conical pubescent apex, trigonous, longitudinally ribbed, trabeculate between the ribs, pale yellow; style $\frac{1}{16}$ in. long; stigmas 3, about as long as the style. Fl. B. I. v. 6, p. 665; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432. *Fuirena cuspidata,* Kunth, Enum. v. 2 (1837) p. 187;

Dalz. & Gibs. p. 286. *F. pubescens*, Boeck. in Linnæa, v. 37 (1871) p. 104 (*not* of Kunth).—Flowers: Sept.

DECCAN: watery places, *Dalzell*!; Poona, *Woodrow*, 882!, *Jacquemont*, 413!—DISTRIB. India (N.-West, Central India, W. Peninsula).

2. **Fuirena glomerata,** *Lam. Illust.* v. 1 (1791) p. 150. Annual; stems 4–16 in. long, slender, erect, leafy, sparsely hairy above, glabrous or nearly so below. Leaves 2–5 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear-lanceolate, acuminate, 3–5-nerved, hairy; sheaths long, closed, striate. Spikelets clustered, approximate; bracts 0 but the leaf under each cluster of spikelets. Spikelets $\frac{1}{8}$–$\frac{1}{3}$ in., ovoid or oblong, obtuse, brown; lowest glumes longest, empty. Glumes $\frac{1}{8}$ in. long (including the stout hairy awn which sometimes reaches $\frac{1}{20}$ in. long), squarrosely imbricate, at length deciduous, membranous, obovate-oblong, obtuse, the keel ending in a long awn, the tip ciliolate, the back sometimes with a few bristles; hypogynous scales (*petals*) nearly $\frac{1}{20}$ in long, with a slender stalk about equalling the blade, the blade quadrate, strongly 3-nerved, with 3 acute lobes or teeth at the apex, of which the middle one is the longest, hastate or cordate at the base, brown, membranous. Nut $\frac{1}{30}$ in. long, stipitate, trigonous with acute angles, subrotund or broadly obovoid, cuspidate, smooth, pale; style $\frac{1}{30}$ in. long; stigmas 3, nearly as long as the style. Fl. B. I. v. 6, p. 666; Boeck. in Linnæa, v. 37 (1871) p. 107; Trim. Fl. Ceyl. v. 5, p. 79; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1157. *Fuirena ciliaris*, Roxb. Hort. Beng. (1814) p. 81; Grah. Cat. p. 232.—Flowers: Nov.

KONKAN: *Stocks*!, *Law*!; Sávantvadi, *Woodrow*. GUJARAT: Godra, *Woodrow*.—DISTRIB. Throughout the warmer parts of India, common in rice-fields; Ceylon, Tropical Africa, S.E. Asia, and Australia.

3. **Fuirena uncinata,** *Kunth, Enum.* v. 2 (1837) p. 184. Annual; stems 4–12 in. long, rather stout, leafy, glabrous below, more or less pubescent above. Leaves 2–6 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear-lanceolate, acuminate, membranous, 3–5-nerved, laxly hairy on both sides; sheaths long, closed, hairy. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. long, densely crowded in capitate axillary, sessile or pedunculate, simple or lobed clusters $\frac{1}{4}$–$\frac{1}{2}$ in. in diam., pale-brown; lowest glumes longest, empty, with a broad membranous blade and rather longer awn than the others; rhachilla scarcely any; bracts at the base of the clusters like large glumes within which are a few very short broad hyaline ciliate scales unlike either the bracts or glumes. Glumes $\frac{1}{8}$ in. long (excluding the recurved stout laxly hairy mucro $\frac{1}{10}$ in. long), obovate, obtuse, cymbiform, pubescent on the back, hispid and hispidly ciliate at the apex, 5-nerved; hypogynous scales quadrate, shortly clawed, $\frac{1}{25}$ in. long, with a short scabrid awn at the apex and often a minute triangular tooth at each side of the awn. Nut $\frac{1}{30}$ in. long, shortly stalked, obovoid, trigonous, with a curved beak, pale, almost white; style longer than the nut; stigmas 3, nearly as long. I have not found the awns of the glumes *hooked* as stated by Mr. Clarke, but merely *recurved*. Fl. B. I. v. 6, p. 666; Boeck. in Linnæa, v. 37 (1871) p. 108; Trim. Fl. Ceyl. v. 5, p. 79; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.—Flowers: Dec.

KANARA: *Thomson*!—DISTRIB. India (W. Peninsula); Ceylon.

4. **Fuirena umbellata,** *Rottb. Descrip. et Icon.* (1773) p. 70, t. 19, fig. 3. Perennial; rhizome creeping, stout, horizontal, woody, with filiform root-fibres; stems 1–4 ft. long, stout or slender, striate and ribbed, glabrous or nearly so, with nodes throughout their length. Leaves variable, 6–10 in. long, up to $\frac{2}{3}$ in. broad, linear-lanceolate, acuminate, 3–5-nerved, often ciliate towards the base, the margins smooth or nearly so; sheaths long, closed at the mouth, with a small brown ligule. Spikelets $\frac{1}{4}$–$\frac{3}{8}$ by $\frac{1}{8}$ in., sessile, oblong, crowded in simple or compound axillary and terminal pedunculate sometimes subpaniculate dark-brown clusters $\frac{1}{2}$–1 in. in diam., with tomentose or villous peduncles; rhachilla slender; bracts beneath the clusters short, cuspidate. Glumes closely imbricate, at length deciduous, $\frac{1}{16}$ in. long (not including the mucro), obovate-oblong, rounded or sometimes slightly retuse at the apex, membranous, pubescent on the back and with the upper margins ciliate, strongly 3-nerved, the nerves uniting into a strong, more or less hairy mucro about $\frac{1}{25}$ in. long; hypogynous scales (*petals*) $\frac{1}{26}$ in. long, nearly sessile, quadrate-obovate, reddish-brown, 3-nerved, the upper margin thickened, apiculate. Stamens 3. Nut $\frac{1}{20}$–$\frac{1}{15}$ in. long, trapezoidally obovoid, stipitate, trigonous with sharp angles, chestnut-brown, smooth, with a long pale beak; style $\frac{1}{25}$ in. long; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 666; Boeck. in Linnæa, v. 37 (1871) p. 110; Trim. Fl. Ceyl. v. 5, p. 80; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1157.—Flowers: Nov.

Deccan: Alandi, *Woodrow*. S. M. Country: Londa, *Woodrow*.—Distrib. More or less throughout India; Ceylon, most warm (not too dry) countries.

10. HYPOLYTRUM, L. C. Rich.

Stout perennial herbs with a woody rootstock and very stout root-fibres; stem erect, trigonous, leafy. Leaves long, narrow, linear or ensiform, coriaceous, 3-nerved. Spikelets small, ovoid or subglobose, in broad subumbellate panicles with stout spreading branches, or the panicle contracted into a more or less compact lobed head; bracts leaf-like. Glumes containing 1 hermaphrodite flower having 2 opposite, lateral, keeled, free or connate hypogynous scales (or bracteoles) containing 2 (rarely 3) stamens and a pistil; hypogynous bristles 0. Stamens 2 (rarely 3); filaments elongate. Ovary terminal, flattened, beaked; style continuous with the ovary, early deciduous; stigmas 2–3, filiform, sometimes thickened at the apex. Fruit a rounded or obtusely angled nut with a thick hard endocarp, beaked, often with vein-like sculpturing.—Distrib. Tropical regions of both hemispheres; species 39.

Mr. Clarke regards the whole not as a single flower, but as an inflorescence with the glumes between the stamens and pistil undeveloped.

1. **Hypolytrum Wightianum,** *Boeck. in Linnæa*, v. 37 (1871) p. 130. Glaucescent; root-fibres stout; stem slender, 2–3 ft. long, trigonous, scarcely as thick as a goose-quill, quite smooth. Leaves rather rigid, often longer than the stems, linear, acuminate, flat or with the basal portion complicate, 3-nerved, $\frac{1}{2}$–$\frac{5}{8}$ in. broad, the margins and midrib spinulose towards the top. Spikelets in dense compound

corymbose depressed panicles; bracts leaf-like, 2–6 in. long. Spikelets $\frac{1}{6}$–$\frac{1}{3}$ in. long, sessile or shortly pedicellate, subglobose or oblong-cylindric. Glumes $\frac{1}{10}$–$\frac{1}{8}$ in. long, oblong, obtuse, sometimes apiculate, 1-nerved, with scarious margins, brown speckled with minute darker spots; hypogynous scales (or bracteoles) 2 at the base of the nut, $\frac{1}{10}$ by $\frac{1}{25}$ in., oblong, obtuse, cymbiform, scarious, with a scabrous or hairy keel. Stamens 2; filaments long, slender; anthers linear-oblong. Nut $\frac{1}{8}$–$\frac{1}{6}$ in. long, ovoid-lanceolate, terete or slightly compressed, beaked, veined below with stout obtuse veins, yellow, minutely dotted with darker spots; style short; stigmas 2. Fl. B. I. v. 6, p. 678; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.—Flowers: Dec.–Feb.

Stocks without locality in Herb. Kew.! S. M. COUNTRY: Castlerock, *Kanitkar*! KANARA: *Dalzell*!; Katgal (N. Kanara), *Woodrow*!—DISTRIB. India (W. Peninsula, Nicobars).

11. **RHYNCHOSPORA,** Vahl (*Rynchospora*).

Usually tall herbs; stems simple, leafy throughout (rarely at the base only), stout or slender. Leaves narrow, often filiform. Spikelets small, ovoid, capitate, corymbose, subumbellate or paniculate, with 1 or 2 bisexual flowers; bracts various. Glumes imbricate all round the rhachilla, membranous or coriaceous, 1-nerved, the 3 or 4 lower shorter, empty, the next 1 or 2 fertile, the uppermost empty; hypogynous bristles 0 or 6 (rarely fewer), scabrid with teeth pointing upwards. Stamens 1–3; anthers linear. Ovary rounded; style slender, glabrous, with conical base; stigmas 2. Nut ovoid or subglobose, turgidly biconvex, smooth or transversely waved, crowned by the conical much enlarged often very long and stout persistent style-base.—DISTRIB. Species 150, in the warmer regions of the world, numerous in America.

Stem leafy towards the base only; spikelets in a single terminal head.	
Nut biconvex, $\frac{1}{10}$ in. long	1. *R. Wallichiana.*
Nut flattened, $\frac{1}{8}$ in. long	2. *R. Wightiana.*
Stem leafy throughout its entire length; spikelets in paniculately arranged corymbs	3. *R. aurea.*

1. **Rhynchospora Wallichiana,** *Kunth, Enum.* v. 2 (1837) p. 289. Stems 6–24 in. high, leafy at the base only, tufted, slender, striate, trigonous. Leaves shorter than the stem, narrowly linear, up to $\frac{1}{6}$ in. broad, flat or complicate, narrowed from the sheath to the tip, acute. Head of spikelets globose, terminal, brown, shining, $\frac{3}{8}$–$\frac{5}{8}$ in. in diam.; bracts 3–8, spreading or deflexed, 1–3 in. long, linear-lanceolate, acute. Spikelets $\frac{3}{8}$ in. long, sessile, densely clustered in a terminal head, lanceolate, acute. Glumes glabrous, shining, chestnut-brown, the lowest 3–4 short, ovate-lanceolate, empty, the fertile glumes $\frac{3}{8}$ in. long, ovate-lanceolate, acuminate; hygogynous bristles if present as long as the nut or shorter, scabrid with teeth pointing upwards. Stamens 2–3; anthers with an acute tip. Nut nearly $\frac{1}{10}$ in. long, with a rather long stalk, turgidly biconvex, strongly margined, with a conical beak, nearly black; style very slender; stigmas 2, very long. Fl. B. I. v. 6, p. 668; Boeck. in Linnæa, v. 37 (1871) p. 542; Trim. Fl. Ceyl. v. 5, p. 83; Woodr. in

Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1134.—Flowers: Aug.

KONKAN: Kalyan, *Woodrow*.—DISTRIB. Throughout India (except the North-West); Ceylon, Malaya, Japan, Tropical Africa, and Tropical Australia.

2. **Rhynchospora Wightiana,** *Steud. Cyp.* (1855) p. 148. Stems tufted, 6–16 in. long, slender, trigonous, glabrous; stolons 0. Leaves many, at the base of the stem only and $\frac{1}{4}$–$\frac{3}{4}$ its length, linear, acuminate, grass-like, $\frac{1}{10}$ in. broad. Spikelets numerous, in reddish-brown heads $\frac{3}{8}$–$\frac{5}{8}$ in. in diam.; bracts 3–6, unequal, the longest reaching 3 in. long, linear-lanceolate, acuminate, dilated and ciliate at the base. Spikelets $\frac{1}{4}$–$\frac{3}{8}$ in. long, lanceolate, acute, reddish-brown, smooth and shining. Glumes 6–7, elliptic-lanceolate, very acute, $\frac{1}{4}$ in. long, the 3 or 4 lowest empty, the next 2-sexual and larger than the lower ones, the upper male or rudimentary; hypogynous bristles 6, unequal, $\frac{1}{6}$–$\frac{1}{4}$ in. long, slender, scabrous with numerous minute teeth pointing upwards, brown. Nut $\frac{1}{8}$ in. long, compressed, rounded at the apex below the beak, oblong, dark brown, with pale papillæ; beak $\frac{1}{20}$ in. long, compressed-conical, nearly white; style $\frac{1}{8}$ in. long, very slender, brown; stigmas 2, very minute. Fl. B. I. v. 6, p. 669; Boeck. in Linnæa, v. 37 (1872) p. 544; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.—Flowers: Aug.

KONKAN: *Law*!; Bombay without authority in Herb. Kew.! DECCAN: Khandala, *Jacquemont*, 649!, *Woodrow*; Poona, *Woodrow*.—DISTRIB. India (W. Peninsula); Cochinchina.

3. **Rhynchospora aurea,** *Vahl, Enum.* v. 2 (1806) p. 229. Root-fibres stout; stems 2–3 ft. long, leafy throughout, trigonous with smooth angles; stolons 0. Leaves 1–2 ft. by $\frac{1}{2}$–$\frac{3}{4}$ in., contracted at the sheath, then narrowed to the acute tip, flat, the margins and the slender keel scabrid; sheaths of the upper leaves closed, those of the lower open. Spikelets clustered or spicate at the ends of the branches of large corymbiform decompound terminal and axillary umbels; bracts up to 6 in. long. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, narrowly ovoid, acuminate, reddish-brown. Glumes 6–7, the 3 or 4 lower empty, ovate, mucronate or awned, the next 2-sexual reaching $\frac{1}{4}$ in. long, ovate, mucronate or awned, 1-nerved, keeled, cymbiform, the upper male or empty; hypogynous bristles 6 or fewer, very slender, scaberulous, shorter than the nut. Nut (including the beak) reaching $\frac{1}{3}$ in. long, brown, often exserted from the glume, the portion below the beak obovoid, compressed, with slightly undulate faces; beak reaching $\frac{1}{5}$ in. long, conical, hard, acute, as broad as the nut at the base and broadly channelled down the centre; style long, slender; stigmas 2, very minute. Fl. B. I. v. 6, p. 670; Boeck. in Linnæa, v. 37 (1873) p. 626; Trim. Fl. Ceyl. v. 5, p. 83; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1134. *Rhynchospora articulata*, Roem. & Schult. Syst. Mant. v. 2 (1824) p. 49; Dalz. & Gibs. p. 288. *Schœnus articulatus*, Roxb. Hort. Beng. (1814) p. 81; Grah. Cat. p. 233.

S. M. COUNTRY: *Young* ex *Woodrow*.

This plant is given both by Graham and Dalzell & Gibson, neither of whom has assigned any locality to it. There are no specimens from Bombay in Herb. Kew.—DISTRIB. More or less throughout India; Ceylon, warm regions of the globe.

12. **REMIREA,** Aublet.

A low creeping branched rigid glabrous perennial, growing on sandy shores of sea-coasts; rhizome or subterranean stem sometimes several feet long, rooting at the nodes, giving off short, erect, densely leafy flowering branches; internodes of the rhizome often long, reaching 1–2 in.; sheaths scarious, acuminate; flowering branches clothed below with imbricating scarious sheaths. Leaves numerous on the branches, rigid, spreading and recurved, pungent; sheaths very short, open. Spikelets small, short, 1-flowered, crowded in a terminal ovoid solitary or lobed head. Glumes 4, the 3 lower empty, the second and third larger than the lowest, suborbicular, concave, the upper fertile very thick, corky, 1-flowered; hypogynous bristles 0. Stamens 3; anthers linear, acute. Nut closely embraced by the 2 upper glumes, linear-oblong, obtusely trigonous, beaked; style very short, thickened at the base; stigmas 3, short.—DISTRIB. Sea-coasts in Tropical countries.

1. **Remirea maritima,** *Aubl. Hist. Pl. Guian.* v. 1 (1775) p. 45. Rhizome as thick as a crow-quill, curved, hard, terete, horizontally creeping; sheaths leafless, as long as or sometimes longer than the internodes, acuminate. Branches erect or ascending, 2–6 in. long, simple, sheathed in the lower part with stout ovate acute finely striate scarious sheaths, densely leafy above often to the apex. Leaves crowded, rigid, recurved, linear, narrowed above, keeled and channelled, with infolded sides, triquetrous and pungent at the apex. Heads of spikelets solitary or 3 or more close together; bracts 3–4, leaf-like, usually longer (rarely shorter) than the heads. Spikelets sessile or very shortly pedunculate, $\frac{1}{6}$–$\frac{1}{5}$ in. long and broad; lowest glume small, the next 2 larger, broadly ovate or suborbicular, concave, multistriate, coriaceous, with scarious margins; flowering glume oblong, cymbiform, nearly as long as the outer glumes, smooth, ultimately corky, pale brown, closely embracing the nut. Stamens 3; filaments long, flat. Nut $\frac{1}{8}$ in. long, oblong, tapering at both ends, compressed, minutely punctulate, dark brown or nearly black; style hardly $\frac{1}{30}$ in. long; stigmas 3, short, but longer than the style. Fl. B. I. v. 6, p. 677; Boeck. in Linnæa, v. 35 (1868) p. 435; Trim. Fl. Ceyl. v. 5, p. 87; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.

KANARA: *Thomson*!, *Talbot* ex *C. B. Clarke*.—DISTRIB. Sea-coasts in India; Ceylon, most tropical sea-coasts.

13. **SCLERIA,** Berg.

Perennial (rarely annual) erect leafy herbs; stems trigonous or triquetrous. Leaves narrow or broad. Flowers all unisexual. Spikelets dimorphic, androgynous or male, and female, solitary or clustered on the branches of a panicle, mixed with hyaline scales (rarely spicate or capitate); bracts often foliaceous; bracteoles usually filiform. Glumes 1-nerved. MALE or ANDROGYNOUS SPIKELETS narrow. Glumes many, the 5–6 lower distichous, the intermediate convolute, membranous, enclosing many narrowly linear hyaline scales. Stamens 1–3; anthers narrowly linear, cuspidate. Ovary sterile or 0. FEMALE SPIKELETS shorter, broader, 1-flowered. Glumes 3 or more, distichous, the lower

2–3 empty, the next above fertile, the upper empty. Disk at the base of the ovary annular (rarely obscure), often enlarged and lobed in fruit. Ovary minute; style slender; stigmas 3. Fruit a globose or oblong nut, usually white and polished, smooth or sculptured.—DISTRIB. Most tropical and subtropical regions; species about 160.

Disk of female flowers 0	1. *S. lithosperma.*
Disk of female flowers cupular or 3-lobed.	
Disk cupular	2. *S. annularis.*
Disk 3-lobed.	
Leaves $\frac{1}{10}$–$\frac{1}{8}$ in. broad.	
Nut tessellately cancellate	3. *S. tessellata.*
Nut smooth	4. *S. hebecarpa.*
Leaves $\frac{1}{4}$–$\frac{1}{3}$ in. broad.	
Disk 1-seriate; nut globose, $\frac{1}{12}$ in. in diam.	5. *S. biflora.*
Disk 2-seriate; nut ellipsoid, $\frac{1}{8}$–$\frac{1}{6}$ in. long	6. *S. Stocksiana.*

1. **Scleria lithosperma,** *Sw. Prodr.* (1788) p. 18. Rhizome hard, elongate, horizontal, nodose; root-fibres slender, wiry; stems not tufted, 1½–3 ft. long, very slender, trigonous, smooth. Leaves as long as or shorter than the stem, narrowly linear, $\frac{1}{20}$–$\frac{1}{12}$ in. broad, narrowed to the subobtuse tip; sheaths trigonous, closed, glabrous or hairy. Spikelets few, subsolitary, distant on the filiform rhachis and on the few distant branches of slender terminal and axillary subspiciform panicles, dark-brown; bisexual spikelets many; bracts and bracteoles long, slender, almost capillary. Fruiting spikelets $\frac{1}{10}$ in. long. Glumes broadly ovate, cuspidately acuminate. Disk-lobes obsolete. Nut $\frac{1}{10}$ in. long, broadly ellipsoid, obtusely trigonous, smooth, polished, white; style about $\frac{1}{30}$ in. long; stigmas 3, longer than the style. Fl. B. I. v. 6, p. 685; Grah. Cat. p. 233; Dalz. & Gibs. p. 288; Boeck. in Linnæa, v. 38 (1874) p. 451; Trim. Fl. Ceyl. v. 5, p. 96; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1132.—Flowers: Dec.

KONKAN: Matheran, *Woodrow.* KANARA: *Talbot*, 562, ex *C. B. Clarke.*—DISTRIB. Throughout India (except the West arid area); Ceylon, most warm regions except Continental Africa.

2. **Scleria annularis,** *Kunth, Enum.* v. 2 (1837) p. 359. Root fibrous; rhizome 0; stem erect, 1–2 ft. high, compressed, triquetrous, slender, scabrous at the apex with spinules pointing downwards. Leaves 6–12 by $\frac{1}{5}$ in., linear, subacute, keeled, 3-nerved, the margins and keel scabrous; sheaths 3-winged, hairy or glabrous. Panicles axillary, remote, subspicate, rather dense, oblong, 1–2 in. long; bracteoles conspicuous, linear-lanceolate, acuminate, leaf-like. Spikelets oblong, acute. Glumes $\frac{1}{8}$ in. long, reddish-brown, ovate-lanceolate, cuspidate, acutely keeled, the keel spinulose above. Nut $\frac{1}{10}$ in. long, ellipsoid, terete or obscurely trigonous, rounded at the apex, smooth, white. Disk shallowly cup-shaped, small, brown, not lobed, closely appressed to the base of the nut. Fl. B. I. v. 6, p. 687; Boeck. in Linnæa, v. 38 (1874) p. 456; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.

KONKAN: *Stocks!*, *Law!* KANARA: *Law!*—DISTRIB. India (N.-West, Central India, W. Peninsula); China.

3. **Scleria tessellata,** *Willd. Sp. Pl.* v. 4 (1805) p. 315. Root fibrous, the fibres very dark, nearly black; stems many, tufted, slender, 1–2½ ft. long, triquetrous. Leaves 6–12 by $\frac{1}{10}$ in. or less, linear, sub-

acute or obtusely acuminate, rigid, 3-nerved, with involute scaberulous margins; sheaths trigonous, closed, the mouth truncate. Spikelets solitary or in small clusters on the branches of narrow erect terminal and subterminal sparingly branched panicles 2–3 in. long; bracteoles filiform. Fruiting spikelets $\frac{1}{10}$ in. long. Glumes 3, broadly ovate, acuminate, dark brown. Disk-lobes small, thick, triangular, obtuse, creamy-white. Nut globose, $\frac{1}{10}$ in. in diam., tessellately cancellate in vertical lines, top rounded, not beaked, white, not or rarely puberulous with reddish hairs on the ridges. Fl. B. I. v. 6, p. 686; Boeck. in Linnæa, v. 38 (1874) p. 470; Trim. Fl. Ceyl. v. 5, p. 98; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1132.

KONKAN: near Pánvel, *Jacquemont*!—DISTRIB. Throughout India (except the West arid area); Ceylon, Malaya, China, Japan, Australia.

4. **Scleria hebecarpa,** *Nees, in Linnæa*, v. 9 (1835) p. 303. Rhizome woody, nodose; root-fibres stout; stem 2–3 ft. long or more, triquetrous. Leaves 10–12 by $\frac{1}{5}$–$\frac{1}{3}$ in., narrowed to the obtuse tip, multistriate, flat, 3-nerved, rigid, usually with scabrous margins; sheaths trigonous, closed, the mouth truncate, with an ovate coriaceous pubescent ligule, the sheaths of the middle stem-leaves winged. Spikelets all unisexual, solitary or in small clusters on the suberect branches of narrow terminal and subterminal sparingly branched panicles 2–3 in. long; bracts 2–4 in. long, leaf-like; bracteoles filiform, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Fruiting spikelets $\frac{1}{8}$ in. long. Glumes 3, the upper broadly ovate, cuspidate. Disk-lobes triangular-ovate, acute, with a broad sinus, $\frac{1}{4}$–$\frac{1}{3}$ the height of the nut. Nut $\frac{1}{8}$ in. long, globose or broadly ovoid, obscurely trigonous, apiculate, white, smooth, polished. Fl. B. I. v. 6, p. 689; Boeck. in Linnæa, v. 38 (1874) p. 478; Trim. Fl. Ceyl. v. 5, p. 99; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.

KONKAN: *Stocks*!, *Law*! KANARA: N. Kanara, *Talbot* ex *Woodrow*.—DISTRIB. Throughout India (except the N.W. arid region); Ceylon, Malaya, China, Japan, Australia, Polynesia.

5. **Scleria biflora,** *Roxb. Fl. Ind.* v. 3 (1832) p. 573. Root fibrous; stems tufted, 1–2 ft. long, trigonous, slender, leafy. Leaves 6–10 by $\frac{1}{4}$–$\frac{1}{3}$ in., ensiform, obtuse or subacute, thin, flat, 3-nerved, the margins smooth or scaberulous; sheaths loose, closed, trigonous, the mouth truncate. Spikelets solitary or in small clusters on the branches of slender, erect, terminal and subterminal, sparingly branched panicles 2–3 in. long; bracteoles filiform, $\frac{1}{4}$–$\frac{5}{8}$ in. long. Fruiting spikelets $\frac{1}{10}$ in. long. Glumes 3, broadly ovate, acuminate. Disk 3-lobed, the lobes ovate, acuminate, large, often half the length of the nut, reddish-brown. Nut globose, $\frac{1}{12}$ in. in diam., tessellately cancellate in vertical lines, pubescent on the ridges with reddish-brown hairs, shortly beaked, white. Fl. B. I. v. 6, p. 687; Trim. Fl. Ceyl. v. 5, p. 99; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1132. *Scleria Steudeliana*, Miq. Fl. Ned. Ind. v. 3 (1859) p. 344; Boeck. in Linnæa, v. 38 (1874) p. 475.—Flowers: Dec.

Closely allied to *S. tessellata*, from which it differs in the leaves which are broader, in the disk-lobes which are much larger, and in the nut which is beaked.

KONKAN: Matheran, *Woodrow*, 77!—DISTRIB. India (N. & E. Bengal, Cachar, W. Peninsula); Ceylon, Malaya, S. China.

6. **Scleria Stocksiana,** *Boeck. in Linnæa*, v. 38 (1874) p. 474. Root fibrous, small; stem 6–15 in. long, erect, slender, striate, triquetrous above, scabrous on the margins, the minute spinules on the upper part pointing upwards, those below pointing downwards. Leaves 6–12 in. long, linear, acuminate, $\frac{1}{4}$ in. broad, multistriate, with scabrous margins. Panicle elongate, slender, the lower branches remote; sheaths long, striate, truncate, usually hairy at the mouth; bracts of variable length, leaf-like, $\frac{1}{12}$–$\frac{1}{6}$ in. broad; bracteoles narrowly linear, acute, much longer than the spikelets. Spikelets with female and androgynous flowers more or less mixed with males, oblong, obtuse. Glumes ovate-lanceolate. Nut $\frac{1}{8}$–$\frac{1}{6}$ in. long, exceeding the glumes, globosely ellipsoid, truncate at the base, slightly umbonate at the apex, terete or obsoletely trigonous, densely cancellate-reticulate. Disk 2-seriate, the outer with 3 broad rounded spreading lobes, dark-brown with a whitish margin, the 3 inner lobes ovate, acute, closely appressed to the nut, whitish. Fl. B. I. v. 6, p. 687; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.

KONKAN: *Stocks!*, *Law!* S. M. COUNTRY: Londa, *Woodrow!* KANARA: *Woodrow*, 76!—DISTRIB. India (W. Peninsula).

14. **CAREX,** Linn.

Perennial, glabrous (rarely pubescent) grassy sedges; stems leafy, chiefly at the base; spikelets solitary or few, one terminal, the others lower down (rarely all clustered in terminal or axillary panicles or compound spikes), unisexual or androgynous, the lower spikelets female with a few males at the base or top, very rarely dicœcious, uppermost often wholly male. Glumes many, imbricate all round the rhachilla, persistent or deciduous; flowers solitary in the glumes. MALE FLOWERS of 2–3 stamens; anthers linear, obtuse. FEMALE FLOWERS a compressed or triquetrous ovary enclosed in an urceolate usually 2-toothed utricle; style usually slender; stigmas 2 or 3, protruding from the utricle.—DISTRIB. Species about 500.

Spikelets short ($\frac{5}{8}$ in. long or less), numerous, arranged in compound panicles.	
Nuts 3 4; beak of utricle $\frac{1}{3}$ the length of the body; style much shorter than the nut; female glumes ovate-lanceolate, shortly apiculate	1. *C. condensata.*
Nuts 6–10; beak of utricle nearly as long as the body; style nearly as long as the nut; female glumes elliptic, conspicuously aristate	2. *C. mercarensis* [var. *major.*
Spikes 1–1¼ in. long, few (3 or fewer), very remote, slender, racemosely arranged	3. *C. speciosa.*

1. **Carex condensata,** *Nees, in Wight, Contrib.* (1834) p. 123. Stem 2–3 ft. high, erect, rigid, slender, obtusely triquetrous above, smooth, leafy. Leaves long, linear, acuminate, flat, with minutely scabrous margins, $\frac{1}{4}$–$\frac{3}{8}$ in. broad, the upper exceeding the inflorescence. Panicle axillary, decompound, pale brown, concolorous, 6–8 in. long; partial panicles 1½–2½ in. long, much-branched, the upper approximate, the lower rather remote, pedunculate; bracts foliaceous with long sheaths; bracteoles beneath the spikelets filiform. Spikelets sessile, $\frac{1}{4}$–$\frac{3}{8}$ in. long, with 3–4 nuts, reddish-brown, oblong, terete, with many male flowers. Glumes reaching $\frac{1}{6}$ in. long, ovate-lanceolate, acute, apiculate, membranous, pale brown. Utricle rather more than $\frac{1}{6}$ in.

long, yellowish-brown, dotted with ferruginous spots, straight or slightly curved, ovoid-lanceolate, trigonous, irregularly ribbed, scabrous-pilose; beak $\frac{1}{3}$ the length of the utricle, 2-fid. Nut $\frac{1}{16}$ in. long, ellipsoid, trigonous, very shortly stipitate; style about $\frac{1}{50}$ in. long; stigmas very short. Fl. B. I. v. 6, p. 716; Boott, Carex, part 2 (1860) p. 86, tt. 247, 248. *Carex indica*, Nees, in Wight, Contrib. (1834) p. 123 (*not* of Linn.); Dalz. & Gibs. p. 288; Grah. Cat. p. 233. *C. bengalensis*, Roxb. Hort. Beng. (1814) p. 103; Boeck. in Linnæa, v. 40 (1876) p. 346.

Deccan: Mahableshwar, *Dalzell & Gibson.* Sind: *Pinwill.*—Distrib. India (Himalaya and Khasia Hills).

2. **Carex mercarensis,** *Hochst. ex Steud. Syn. Pl. Cyp.* (1855) p. 194. Var. **major,** *Steud. l. c.* Rhizome short, hard, subtuberous; root-fibres long, stout; stem erect, slender, 1–2 ft. high, firm, triquetrous, smooth. Leaves shorter than the stem, $\frac{1}{8}$–$\frac{3}{8}$ in. broad, linear, acuminate, multistriate and with a strong midrib. Inflorescence elongate; partial panicles oblong or scarcely pyramidal; branches erect, spreading; bracts foliaceous, much longer than the panicles. Spikelets $\frac{3}{8}$–$\frac{5}{8}$ in. long with distant glumes, the female flowers 6–10 in the lower part of the spikelet, the males very few at the apex. Female glumes $\frac{1}{8}$ in. long, elliptic, aristate. Utricle (including beak) $\frac{1}{6}$ in. long, trigonous, straight or slightly curved, scabrous-hairy, with numerous slender nerves; beak nearly as long as the body, shortly 2-toothed or sometimes entire. Nut $\frac{1}{12}$–$\frac{1}{10}$ in. long, ellipsoid, acutely trigonous, shortly stipitate, pale-yellow; style as long as the nut; stigmas rather shorter than the style. Fl. B. I. v. 6, p. 719. *C. mercarensis*, Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers: Oct.

Deccan: Mahableshwar, *Woodrow*, 79! S. M. Country: Londa, *Woodrow.* Kanara: Hulgi (N. Kanara), *Talbot* ex *Woodrow.*—Distrib. India (W. Peninsula).

3. **Carex speciosa,** *Kunth, Enum.* v. 2 (1837) p. 504. Glabrous; rhizome short or long; stems cæspitose, 1–1½ ft. long, slender, winged and scaberulous at the apex below the inflorescence. Leaves subbasal, often exceeding the stem, $\frac{1}{8}$–$\frac{5}{8}$ in. wide, linear, acuminate, multistriate, flat. Peduncles radical, 6–12 in. long, surmounted by narrow oblong spikes 1–1¼ by $\frac{1}{6}$ in.; male flowers in the upper third of the spike which is attenuated in the male portion; female flowers at the base of the spike; bracts foliaceous, shorter or longer than the inflorescence, shortly sheathed. Glumes broadly ovate or suborbicular, obtuse or abruptly apiculate, reaching $\frac{1}{8}$ in. long, multistriate, all green, concolorous. Utricle reaching $\frac{1}{4}$ in. long, acutely trigonous, multistriate, concave on the inner face, rounded on the back, the two interior margins slightly winged and ciliate; beak $\frac{1}{16}$ in. long, conical, truncate, 2-fid, with ciliate margins. Nut $\frac{1}{5}$ in. long, ellipsoid, trigonous, with prominent angles, stipitate, pale brown with darker markings, finely reticulate; style persistent, very stout, conical, thickened at the base; stigmas very short. Fl. B. I. v. 6, p. 729; Boott, Carex, part 1 (1858) p. 53; Boeck. in Linnæa, v. 40 (1876) p. 388; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1130. —Flowers: Oct.

Kanara: Hulgi (N. Kanara), *Talbot*, 2282!—Distrib. Throughout India; Borneo.

Order CXLVII. GRAMINEÆ.

Erect decumbent or creeping herbs (rarely suffruticose), or in Tribe *Bambuseæ* shrubs or trees; stems usually branched at the base, terete or compressed, with hollow or solid internodes. Leaves distichous, simple, usually long and narrow, generally parallel-nerved, with a sheathing base (*sheath*) distinct from the blade and rarely an interposed petiole; sheath split to the base (very rarely entire), with usually a transverse erect appendage (*ligule*) consisting of a membrane or a fringe of hairs at the union with the blade. Inflorescence terminal (rarely terminal and lateral), composed of variously arranged spikelets, paniculate, racemose, capitate, simply or compoundly spicate (rarely of a single spikelet). Spikelets consisting of an axis (*rhachilla*) and typically of 3 or more alternate distichous more or less heteromorphous bracts (*glumes*), of which the two lowest (*involucral glumes*) form an involucre to the spikelet and are empty, while the following (*floral glumes*) bear in their axils subsessile flowers subtended by a hyaline 2-keeled or 2-nerved dorsal scale (*palea*); floral glumes differing usually in structure and size from the involucral glumes, and forming with the palea and the flower proper false flowers (*florets*), which are alike or different in structure and sex. Flowers hermaphrodite or 1-sexual (often with the rudiments of the other sex), consisting of 2 (rarely 3) minute hyaline fleshy scales (*lodicules*) which represent a perianth (sometimes absent), and of stamens or a pistil or both. Stamens usually 3 (rarely 6, 4, 2, or 1, very rarely more), hypogynous; filaments slender, usually free; anthers versatile, fugacious, with 2 parallel cells, usually dehiscing by a longitudinal slit. Ovary entire, 1-celled; ovule erect, anatropous; styles 2 (rarely 3 or 1), free or connate at the base, usually elongate and exserted from the apex or sides of the spikelet, clothed with simple or branched stigmatic hairs. Fruit a seed-like grain, free within the flowering glume and palea or adnate to either or both; pericarp very thin (rarely thick and separable from the seed). Seed erect; albumen copious, floury; embryo minute, at the base of and outside the albumen; cotyledon shield-shaped with an erect conical plumule and a descending conical radicle.—Distrib. Genera about 325; species more than 3000, in all parts of the world.

I have, at Dr. Stapf's suggestion, adopted for the two classes of glumes the terms *involucral* and *floral*. In the clavis I have closely adhered to the Tribes adopted by Dr. Stapf in his 'Flora Capensis' (1898).

In citing Trimen's 'Flora of Ceylon,' the Gramineæ of which have been entirely written by Sir J. D. Hooker, I have, for the sake of brevity, adopted the citation "*Trim. Fl. Ceyl.*" except in cases of descriptions of new species.

SERIES I. Mature spikelets articulate on their pedicels (sometimes inarticulate in *Isachne*) or deciduous with them; spikelets similar or differing in sex and structure, the perfect spikelets with 2 heteromorphous florets, the upper hermaphrodite, the lower male or neuter. Rhachilla not produced beyond the upper floret.

Tribe 1. **PANICEÆ.** Spikelets in usually continuous spikes, racemes, or panicles; lower invol.-glume smaller, often minute or suppressed;

lower floral glume generally resembling the invol.-glumes in structure and nervation; upper floral glume firmer, at length rigid, often chartaceous to crustaceous.

- Shrubs; flowers diœcious ..... 1. SPINIFEX.
- Herbs; flowers not diœcious.
  - Spikelets 2-flowered, the upper 2-sexual; lower male or neuter, rarely (*Isachne*) both fertile.
    - Mature spikelets persistent on their pedicels, surrounded singly or in clusters by an involucel of naked or plumose bristles or spines which fall along with the spikelets.
      - Involucel of bristles ..... 2. PENNISETUM.
      - Involucel of spines connate at the base ..... 3. CENCHRUS.
    - Mature spikelets falling entire and singly from the tips of their pedicels.
      - Spikelets subtended by an involucel of bristles ..... 4. SETARIA.
      - Spikelets not subtended by bristles.
        - Branches of the panicle produced beyond the uppermost spikelets; lower invol.-glume minute, orbicular, white, hyaline ..... 5. CHAMÆRAPHIS.
        - Branches of the panicle not produced beyond the uppermost spikelets.
          - Glumes 4, all distinct or 3 distinct and 1 obsolete (in *Panicum subeglume* sometimes 2 obsolete).
            - Invol.-glumes separately deciduous ..... 6. ISACHNE.
            - Invol.-glumes not separately deciduous.
              - Spikelets awned (except in *Tricholæna Teneriffæ*).
                - Spikelets densely silky..... 7. TRICHOLÆNA.
                - Spikelets not silky.
                  - Palea of lower floral glume very short, 2-fid ..... 8. AXONOPUS.
                  - Palea of lower floral glume entire or 0 ..... 9. OPLISMENUS.
              - Spikelets not awned except in *Panicum stagninum* (mucronate or apiculate in a few species of *Panicum* and in *Eriochloa*).
                - Lower invol.-glume distinct (except in *Panicum subeglume*); inflorescence paniculate ..... 10. PANICUM.
                - Lower invol.-glume minute (rarely absent); nerves of lower floral glume 5-7, straight, prominent; inflorescence usually digitate ... 11. DIGITARIA.
                - Lower invol.-glume absent; nerves of lower floral glume 5 or fewer, the side-nerves curved.
                  - Spikelets not thickened at the base ..... 12. PASPALUM.
                  - Spikelets thickened at base ... 13. ERIOCHLOA.

TRIBE 2. **ANDROPOGONEÆ.** Spikelets usually in pairs, one sessile, the other pedicellate, rarely 3-nate or solitary on the axis of a usually spike-like raceme. Invol.-glumes more or less rigid and firmer than the floral glumes, the lower always longer than the florets; floral glumes membranous, often hyaline, that of the upper floret usually awned or reduced to an awn.

Spikelets all similar.
- Spikelets solitary, secund on a filiform or flattened inarticulate rhachis ..... 14. DIMERIA.
- Spikelets in open or contracted panicles.
  - Racemes of spikelets in compound panicles.
    - Rhachis not fragile.
      - Panicle spiciform silky; spikelets 1-flowered ... 15. IMPERATA.
    - Rhachis fragile.
      - Leaves petiolate; spikelets 2-flowered ..... 16. SPODIOPOGON.
      - Leaves not petiolate; spikelets 1-flowered.
        - Panicle much branched, open, silky.
          - Spikelets awnless ..... 17. SACCHARUM.
          - Spikelets awned ..... 18. ERIANTHUS.
  - Racemes of spikelets 2-nate, digitate or approximate on a short main axis ..... 19. POLLINIA.

Spikelets dissimilar.
- Spikelets of each pair differing in sex and structure or (*Ophiurus*) spikelets solitary not secund.
  - Spikelets sunk in pits of an articulate or fragile rhachis.
    - Sessile spikelets unaccompanied by an upper spikelet or the pedicel of one ..... 20. OPHIURUS.
    - Sessile spikelets accompanied by a dissimilar pedicellate spikelet.
      - Lower invol.-glume ovate or oblong, flat, smooth ..... 21. ROTTBOELLIA.
      - Lower invol.-glume globose, inflated, pitted ... 22. MANISURIS.
  - Spikelets not sunk in nodes of the rhachis.
    - Spikelets 3 on a very short uninodal inarticulate rhachis, a sessile 2-flowered and 2 pedicellate enclosed in a pedunculate spathe ..... 23. APLUDA.
    - Spikelets many or few on a plurinodal marticulate rhachis.
      - Spikelets many, 2-nate (rarely solitary), in spike-like racemes which are solitary, 2-nate, digitate or approximate on a short main axis; lower floret of the sessile spikelet male.
        - Margin of lower invol.-glume of sessile spikelet inflexed ..... 24. ISCHÆMUM.
        - Margin of lower invol.-glume of sessile spikelet not inflexed.
          - Spikelets 2-awned ..... 25. POGONATHERUM.
          - Spikelets 1-awned.
            - Pedicellate spikelets floriferous ..... 26. LOPHOPOGON.
            - Pedicellate spikelets reduced to pedicels often glume-like.
              - Spikelets 1-2-flowered; lower invol.-glume cuneate-obovate or obcordate, villous; lodicules 0. 27. APOCOPIS.
              - Spikelets 1-flowered; lower invol.-glume lanceolate, often muriculate; lodicules 2 ..... 28. ARTHRAXON.
              - Spikelets 2-flowered; lower invol.-glume ovate, beaked, transversely rugose, lodicules 2 ..... 29. THELEPOGON.
      - Spikelets in compound panicles or spike-like racemes, variously disposed, 2-nate (rarely 3-nate); lower floret of all the spikelets empty; upper usually awned or reduced to an awn.
        - Lower invol.-glume furnished with oil-glands or penicillate tubercles close to the keels; spikelets not awned but often beaked ..... 30. ELIONURUS.

Lower invol.-glume not furnished with oil-glands; spikelets awned.
Spikelets in alternate pairs or lower solitary.
Inflorescence usually elongate; sessile spikelets many ..... 31. ANDROPOGON.
Inflorescence very short; sessile spikelets 2 ..... 32. PSEUDANTHISTIRIA.
Spikelets dimorphic, the 4 lower sessile forming an involucre round the upper.
Rhachis articulate above the involucral spikelets ..... 33. THEMEDA.
Rhachis articulate below the involucral spikelets ..... 34. ISEILEMA.

TRIBE 3. **MAYDEÆ.** Inflorescence monœcious, spicate, the male and female spikelets on the same spike (in which case the females are at the base of the spike) or on different spikes; spikelets never awned, the male and female very dissimilar.

Fruiting spikelet enclosed in a stony polished nut-like bract ..... 35. COIX.
Fruiting spikelet with the lower invol.-glume forming a crustaceous nut-like envelope to the other glumes and grain ..... 36. POLYTOCA.

SERIES II. Mature spikelets breaking up, leaving the persistent or subpersistent glumes on the pedicel, or if falling entire, then not consisting of 2 heteromorphous florets as in Series I.

A. *Leaf-blades rarely* (Centotheca) *transversely veined, not articulate on the sheath.*

TRIBE 4. **ARUNDINELLEÆ.** Florets 2, heteromorphous, the lower awnless, male or neuter. Rhachilla not produced beyond the upper floret. Lower floral glume awnless, rather resembling the invol.-glumes; upper generally awned; awn from the sinus often between 2 bristle-like lateral awns (rarely from the entire obtuse tip), usually geniculate and twisted below the knee.

Spikelets solitary on distinct pedicels, small; flaps of the palea auricled ..... 37. ARUNDINELLA.
Spikelets in clusters of 3, large; flaps of the palea not auricled ..... 38. TRISTACHYA.

TRIBE 5. **ARUNDINEÆ.** Florets 2–many, enveloped in very long hairs springing either from the callus or from the back or margin of the floral glumes. Glumes membranous, often hyaline.

Hairs springing from the margins of the upper floral glume ..... 39. THYSANOLÆNA.
Hairs springing from the callus ..... 40. PHRAGMITES.

TRIBE 6. **STIPEÆ.** Floret 1. Rhachilla not produced beyond the upper floral glume which is 2-sexual, hardened when mature, tightly enveloping the fruit; nerves joining or closely approaching at the tip. Awn terminal (rarely 0).

Awns 3 from the entire tip or 1 simple below, 3-branched above, rarely quite simple ..... 41. ARISTIDA.

TRIBE 7. **AGROSTEÆ.** Floret 1. Rhachilla rarely produced beyond the floret. Upper floral glume membranous, not changed

when mature, usually 5-nerved, all the nerves or the outer side-nerves often slightly excurrent, parallel, or at least not anastomosing. Spikelets awned or not.

Spikelets in cylindric spike-like panicles; spikelets not awned ..... 42. HELEOCHLOA.
Spikelets in open or contracted many-flowered panicles; spikelets awned.
Spikelets subdigitately panicled at the top of a slender peduncle, laterally compressed; stamens 2 ..... 43. WOODROWIA.
Spikelets terete, in branched panicles; stamens 3 ..... 44. GARNOTIA.

TRIBE 8. **ZOYSIEÆ.** Mature spikelets falling entire and singly or in clusters. Floret 1. Rhachilla not produced beyond the floret. Glumes equal or the lower much smaller or suppressed. Floral glume small, thinly membranous, 1–3-nerved. Spikelets in slender spiciform panicles or racemes.

Spikelets falling in clusters of 2–4.
Spikelets fascicled.
Fascicles secund on a broad articulate rhachis; glumes 4; upper invol.-glume not echinate..... 45. TRACHYS.
Fascicles all round a slender rhachis; glumes 3; upper invol.-glume echinate ..... 46. TRAGUS.
Spikelets falling singly.
Lower invol.-glume with pectinate margins; upper invol.-glume spinulosely tuberculate; glumes 3 ..... 47. LATIPES.
Invol.-glumes neither pectinate nor tuberculate.
Glumes 2; spikelets not awned ..... 48 ZOYSIA.
Glumes 3; spikelets with a long awn ..... 49. PEROTIS.

TRIBE 9. **SPOROBOLEÆ.** Involucral and floral glumes very similar. Floret 1. Rhachilla not (or rarely) produced beyond the floret. Upper floral glume membranous, acute or obtuse, not changed when ripe, 1- or more or less distinctly 3-nerved, awnless, usually olive-green or grey; side-nerves, if present, delicate, evanescent above. Seed often free in the delicate pericarp.

Spikelets small ..... 50. SPOROBOLUS.

TRIBE 10. **ERAGROSTEÆ.** Spikelets variously panicled, sometimes spicate or subspicate. Florets usually numerous and far-exserted from the glumes. Involucral and floral glumes somewhat similar in general appearance. Floral glumes membranous or chartaceous, entire or 2–3-cleft, 3-nerved, the nerve evanescent above or excurrent into bristles; side-nerves usually submarginal, glabrous or pubescent or finely ciliate below. Paleæ often persistent or subpersistent.

Floral glumes entire.
Upper invol.-glume 3-nerved ..... 51. ERAGROSTIS.
Upper invol.-glume 5-nerved ..... 52. HALOTYRUM.
Floral glumes toothed..... 53. DIPLACHNE.

TRIBE 11. **CHLORIDEÆ.** Spikelets usually in 2-ranked secund spikes or spike-like racemes, rarely distinctly pedicellate and paniculate. Florets 1 to many. Floral glumes usually membranous, truncate, emarginate or toothed, 3-nerved; nerves distant, subparallel, distinct, percurrent or excurrent, and often ciliate all along, the lateral submarginal (in *Eleusine* there are sometimes additional side-nerves close to the middle nerve of the glume). Awn, if present, straight, usually from a truncate or toothed tip.

Spikelets in deciduous articulate clusters ..... 54. GRACILEA.
Spikelets not clustered.
Spikelets 1-flowered or with one hermaphrodite and 1 or more male or barren florets.
Spikelets 1-flowered, awnless.
Spike solitary, terminal; invol.-glumes longer than the ciliate membranous floral glume ..... 55. MICROCHLOA.
Spikes digitate; invol.-glumes shorter than the glabrous subchartaceous floral glume ..... 56. CYNODON.
Spikelets with 1 hermaphrodite flower, the others male or barren, usually awned, in digitate or fascicled spikes ..... 57. CHLORIS.
Hermaphrodite florets 2–many in each spikelet (sometimes reduced to 1 in *Tripogon pauperculus*).
Spikelets crowded on a solitary spike ..... 58. TRIPOGON.
Spikes digitate or whorled ..... 59. ELEUSINE.
Spikes in narrow pyramidal racemes ..... 60. DINEBRA.

TRIBE 12. **PAPPOPHOREÆ.** Floral glumes broad, 5-many-nerved, cleft into 3–many subulate lobes with or without alternating fine straight awns from the sinuses.

Floral glumes 9-cleft ..... 61. ENNEAPOGON.

TRIBE 13. **ORYZEÆ.** Spikelets all alike or more or less heteromorphous and unisexual. Fertile floret 1, awned or not, terminal with 2 minute empty florets (floral glumes) below it or solitary. Invol.-glumes very minute or confluent into an annular rim or suppressed. Palea 3–9-nerved. Stamens usually 6 (rarely more), or 1–3.

A floating glabrous grass; spikelets awned ..... 62. HYGRORHIZA.
Leafy tall grasses, not floating; spikelets usually awnless.
Keels of floral glume and palea pectinately ciliate; spikelets awnless ..... 63. LEERSIA.
Keels of floral glume and palea not pectinately ciliate; spikelets rarely awned ..... 64. ORYZA.

TRIBE 14. **FESTUCEÆ.** Involucral glumes more or less resembling the floral ones in general appearance. Fruiting florets 2 to many (very rarely 1), often much exserted from the glumes. Floral glumes 5- or more-nerved (rarely 1–3-nerved). Awns, if present, terminal or subterminal, never geniculate.

Leaves broad, tessellately nerved; fruiting glumes with reflexed submarginal tubercle-based bristles ..... 65. CENTOTHECA.
Leaves narrow, not tessellately nerved; fruiting glumes without submarginal bristles.
Leaves reaching 12 in. long or more, flaccid; inflorescence in long, often interrupted cylindric spikes ..... 66. ELYTROPHORUS.
Leaves less than 2 in. long, rigid, pungent; inflorescence in short subcapitate spikes ..... 67. ÆLUROPUS.

TRIBE 15. **HORDEÆ.** Spikelets sessile, singly or in clusters, more or less sunk in the hollows of the rhachis of a simple spike. Florets 1 or more.

Spikelets solitary at the nodes of the spike with their plane radial to the rhachis. Florets 1–3 ..... 68. OROPETIUM.

B. *Blades of leaves transversely veined and articulate on the sheath.*

TRIBE 16. **BAMBUSEÆ.** Shrubs or trees. Spikelets all of one kind. Florets few to many (rarely 1). Lower 2 or more glumes empty, gradually increasing in size up to the flowering, with sometimes

small terminal imperfect ones. Floral glumes subherbaceous to subcoriaceous, 5–many-nerved, usually awnless. Lodicules usually 3. Stamens 3–6 or more. Styles 2 or 3.

Pericarp thin, adnate to the seed.
- Paleæ all 2-keeled; stamens 6; filaments free ..... 69. BAMBUSA.
- Paleæ of upper flowers 0 or glume-like, not keeled; filaments connate ..... 70. OXYTENANTHERA.

Pericarp fleshy or crustaceous, not adnate to the seed.
- Spikelets 2–many-flowered; palea 2-keeled; stamens 6; pericarp crustaceous ..... 71. DENDROCALAMUS.
- Spikelets 1-flowered; palea 0 or glume-like; pericarp fleshy ..... 72. OCHLANDRA.

1. **SPINIFEX,** Linn.

Dioecious gregarious much-branched rigid littoral bushes; stem and branches woody. Leaves narrow, rigid, involute, spreading and recurved, thickly coriaceous. Inflorescence of large terminal globose bracteate heads, with radiating spike-like racemes, the male with many spikelets on each spike, the female with one only. MALE SPIKELETS 1–2-flowered, distichous, articulate on short pedicels. Glumes 4, chartaceous, acute, strongly nerved; invol.-glumes empty; lower floral glume paleate, empty or 3-androus; upper floral glume paleate, 3-androus, the paleæ of both floral glumes acuminate, as long as the glumes. Anthers linear. FEMALE SPIKELETS narrower than the male, erect, lanceolate, 1-flowered. Glumes acute or acuminate, strongly nerved, the lower invol.-glume the longest; lower floral glume empty; upper floral glume thin, dorsally compressed; palea linear-oblong, acuminate. Lodicules 2, large, connate below, strongly nerved. Styles long, connate below; stigmas long, penicillate, exserted at the top of the glume. Grain clavate, tipped by the long rigid style, free within the hardened glume and palea.—DISTRIB. Species 4, one in India, three in Australia.

1. **Spinifex squarrosus,** *Linn. Mant.* (1771) p. 300. A pale grey or glaucous squarrose shrub, several feet high and broad, forming an impenetrable thicket; stem as thick as the little finger below, smooth, solid. Leaves 4–6 in. long, spreading and recurved, smooth, tapering from the base to the tip, concavo-convex, base not dilated, margins scaberulous; sheath ½–1 in. long, smooth, with naked margins; ligule a ridge of stiff hairs. MALE INFLORESCENCE reaching 6–8 in. in diam.; bracts shorter than the spikes, lanceolate, aristately pungent, flat, chartaceous, the midrib very prominent beneath; racemes (male) 1–3 in. long, longer than the stout angular peduncles; rhachis angular. Spikelets ½ in. long, smooth, straw-colored. Glumes 4; lower invol.-glume usually shorter than the upper, ovate, acute, pungent, conspicuously 7–9-nerved; upper invol.-glume similar but usually longer; floral glumes longer than the invol.-glumes, subequal, 5–7-nerved. FEMALE INFLORESCENCE reaching 10 in. in diam.; bracts as in the male but smaller; peduncle thickened towards the base. Spikelets ½–⅔ in. long, narrowly lanceolate. Glumes 4; lower invol.-glume oblong-lanceolate, many-nerved, scaberulous; upper invol.-glume rather shorter, 7-nerved; lower floral glume empty, the palea 0 or imperfect; upper floral glume ovate-lanceolate, 5-nerved; palea shorter than the glume,

acute. Fl. B. I. v. 7, p. 63; Grah. Cat. p. 240; Trim. Fl. Ceyl. v. 5, p. 174; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1168; Watt, Dict. Econ. Prod. v. 6, part 3, p. 331.—Flowers: Nov. A valuable sand-binding plant.

KONKAN: *Law*!; Shrivardhan, *Woodrow*; sandy shores near Bandra, close to Bombay, *Graham*. KANARA: *Thomson*!; Kumpta, *Woodrow*. GUJARAT: near Domas, *Cooke*!—DISTRIB. Sandy shores of India; Ceylon, Java, China.

2. **PENNISETUM,** Pers.

Annual or perennial grasses. Leaves narrow. Inflorescence of spike-like racemes of involucellate clusters of shortly pedicellate spikelets articulate on a simple rhachis; involucels consisting of unequal scabrid or plumose simple or branched bristles. Spikelets 1–6 in each involucel, persistent on their pedicels, 1–2-flowered, obovoid or lanceolate. Glumes 3 or 4; lower invol.-glume small or 0; upper invol.-glume subequal to the lower floral glume, 5–7-nerved, awned or not, rarely absent; lower floral glume paleate or not, male or empty; upper floral glume sessile, coriaceous, 2-sexual or female. Lodicules 2. Stamens 3; anthers linear. Styles long, free or connate below. Grain oblong, free within the hardened glume and palea.—DISTRIB. Species about 40, in most warm countries.

Bristles of involucel free to the base, slender, not dilated at the base.	
Inner bristles of involucel scaberulous, not ciliate.	
Leaves 12–18 in. long	1. *P. Alopecuros.*
Leaves 3–6 in. long	2. *P. dichotomum.*
Inner bristles of involucel ciliate below the middle with long hairs, but naked at the base; involucel stipitate	3. *P. orientale.*
Inner bristles of involucel densely villous or ciliate below the middle, not naked at the base; involucel sessile.	
Inner bristles of involucel densely villous	4. *P. pedicellatum.*
Inner bristles of involucel laxly ciliate with long silky hairs (not villous)	5. *P. setosum.*
Inner bristles of involucel dilated below, their bases confluent in a coriaceous disk	6. *P. cenchroides.*

1. **Pennisetum Alopecuros,** *Nees, ex Steud. Syn. Gram.* (1855) p. 102. Perennial; stems 2–3 ft. high, stout, erect, densely tufted below, subdistichously branched above; branches strict, erect. Leaves 12–18 by $\frac{1}{10}$–$\frac{1}{6}$ in., coriaceous, convolute, glabrous, with usually a tuft of soft hairs at the base; sheaths glabrous or nearly so; ligule a small hairy ring. Racemes spike-like, 5–7 in. long; rhachis flexuous, scaberulous, angular; involucel very shortly pedicellate; bristles very unequal, the longest 2–3 times as long as the spikelet, scaberulous. Spikelets reaching nearly $\frac{3}{8}$ in. long, lanceolate, acute, solitary. Glumes 4; lower invol.-glume $\frac{1}{20}$ in. long, suborbicular, hyaline; upper invol.-glume $\frac{1}{6}$ in. long, lanceolate, acuminate, 3-nerved, hyaline; lower floral glume $\frac{1}{3}$ in. long, lanceolate, acuminate, 7–11-nerved with involute margins; upper floral glume slightly longer than the lower one, lanceolate, acuminate, 5-nerved, with involute margins, 2-sexual; palea lanceolate, as long as the glume. Fl. B. I. v. 7, p. 84; Woodr. in Journ. Bomb. Nat. v 13 (1901) p. 435; Watt, Dict. Econ. Prod. v. 6, part 1, p. 127. *Pennisetum aureum*, Dalz. & Gibs. Bo. Fl. (1861) p. 294.—Flowers: Oct. VERN. *Mohl.*

Deccan: common, *Dalzell & Gibson*; Poona, *Jacquemont*, 407 !, *Woodrow*, *Lisboa*; Lanoli, *Lisboa*; Nasik, *Lisboa*. S. M. Country: Belgaum, *Woodrow*. Sind: *Dalzell* ! —Distrib. India (W. Peninsula, Rajputana, Central India). The leaves are used on Mount Abu for making ropes.

2. **Pennisetum dichotomum,** *Delile, Fl. d'Egypte*, p. 159, t. 8, fig. 1. Perennial, quite glabrous, bushy; stem distantly dichotomously branched, the branches often fascicled; internodes long, rigid, smooth and polished. Leaves 3–6 by $\frac{1}{10}$–$\frac{1}{8}$ in., narrowly linear, tapering to a subulate point, rigid. Racemes $2\frac{1}{2}$–5 in. long, cylindric, pale (nearly white); rhachis more or less scaberulous, angular; involucel sessile or nearly so; bristles very numerous, slender, pale, unequal, the longer twice as long as the spikelet, free to the base. Spikelets usually solitary, $\frac{1}{3}$ in. long, lanceolate, acuminate, nearly white. Glumes 4; lower invol.-glume nearly $\frac{1}{4}$ in. long by $\frac{1}{16}$ in. broad at the base, lanceolate, acuminate, 1-nerved, hyaline; upper invol.-glume $\frac{1}{3}$ in. long, lanceolate, acuminate, 5–7-nerved, hyaline; lower floral glume as long as the upper invol.-glume, ovate-lanceolate, cuspidately acuminate, paleate, 5-nerved, the palea nearly as long as the glume, lanceolate, acute; upper floral glume as long as the lower one, ovate-lanceolate, acuminate, cuspidate, 5-nerved; palea $\frac{1}{4}$ in. long, lanceolate, acuminate. Styles much exserted beyond the spikelets, free nearly to the base, densely plumose in the upper part. Fl. B. I. v. 7, p. 85; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435. *Cenchrus ramosissimus*, Poir. Encyc. Méthod. v. 6 (1804) p. 51; Dalz. & Gibs. p. 294.—Flowers: Nov.–Dec.

Gujarat: in hedges, *Dalzell & Gibson*. Sind: on sand hills, *Stocks* !, *Woodrow*; Hyderabad, *Cooke* ! —Distrib. India (Panjáb, N.W. Provinces, W. Peninsula); Afghanistan and westwards to N. Africa.

3. **Pennisetum orientale,** *Rich. in Pers. Syn.* v. 1 (1805) p. 72. Perennial, 2–4 ft. high; stem suberect from a stout rootstock, leafy, clothed below with withered sheaths. Leaves 6–12 by $\frac{1}{8}$–$\frac{3}{8}$ in., narrowly linear, finely acuminate, flat, smooth, the margins scaberulous ciliate close to the obtuse or truncate base; sheaths glabrous with ciliate margins; ligule a shortly ciliate line. Racemes reaching as much as 10 in. long; rhachis subterete, pubescent; involucel shortly stipitate, the stipe pubescent; bristles very unequal, the longest about $\frac{3}{4}$ in. long (rarely one may be found 1 in. long), often purplish, scaberulous, the inner ciliate with long hairs below the middle, but naked at the base. Spikelets usually 2–6 (rarely solitary) within the involucel, reaching $\frac{1}{4}$ in. long, on pubescent pedicels. Glumes 4; lower invol.-glume $\frac{1}{16}$–$\frac{1}{12}$ in. long, ovate-oblong, obtuse, nerveless, hyaline; upper invol.-glume $\frac{1}{6}$ in. long, ovate-lanceolate, acuminate; lower floral glume $\frac{1}{4}$ in. long, ovate-lanceolate, 5-nerved, awned, triandrous, the palea $\frac{1}{5}$ in. long, oblong, obtuse, often 2-fid, hyaline; upper floral glume $\frac{1}{5}$ in. long, membranous, ovate-lanceolate, 5-nerved, awned; palea $\frac{1}{6}$ in. long, lanceolate, acuminate, with involute margins, sometimes biaristulate at the tip. Fl. B. I. v. 7, p. 86; Trim. Fl. Ceyl. v. 5, p. 171; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1169.—Flowers: July.

Konkan: *Stocks* ! —Distrib. India (W. Himalaya, Panjáb, W. Peninsula); N. Africa.

4. **Pennisetum pedicellatum,** *Trin. in Mém. Acad. Pétersb.* sér. 6, v. 3, part 2 (1835) p. 184. Annual; stems 1–3 ft. long, branched from the base and above, leafy. Leaves 6–10 by $\frac{1}{6}$–$\frac{3}{8}$ in., flat, flaccid, glabrous or sparsely hairy; sheaths glabrous; ligule a shortly ciliate membrane. Racemes cylindric, 2–5 in. long, dense-flowered; rhachis glabrous or nearly so, notched; involucel sessile; outer bristles few, slender, short, about $\frac{1}{3}$ in. long; inner bristles numerous, the longest reaching $\frac{3}{8}$ in. long (or more), densely villous below the middle, unequal, usually pale, free to the base. Spikelets $\frac{1}{6}$ in. long, usually solitary within the involucel, shortly pedicellate. Glumes 4; lower invol.-glume very small, woolly; upper invol.-glume oblong-lanceolate, apiculate, $\frac{1}{8}$ in. long, 7-nerved, hyaline; lower floral glume $\frac{1}{8}$ in. long, oblong, truncate, 3-toothed, 5-nerved, hyaline; upper floral glume ovate-oblong, obtuse, with a fimbriately ciliate tip, rather shorter than the lower floral glume, coriaceous, smooth, shining; palea as long as the glume, lanceolate, toothed. Fl. B. I. v. 7, p. 86; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1169. *Pennisetum lanuginosum*, Hochst. in Flora, v. 25, part 1 (1842), Beibl. i. p. 133; Lisboa, in Journ. Bomb. Nat. v. 5 (1891) p. 339.—Flowers: Oct.

Deccan: *Lisboa.* Gujarat: *Lisboa*; Rajkot (Kathiawar), *Woodrow.*—Distrib. India (Behar, Rajputana, W. Peninsula); Tropical Africa.

5. **Pennisetum setosum,** *Rich. in Pers. Syn.* v. 1 (1805) p. 72 (*exclud. syn.*). Annual; stem erect, often fastigiately branched at the nodes, green or purplish. Leaves 6–10 by $\frac{1}{4}$–$\frac{3}{8}$ in., linear, finely acuminate, glabrous or hairy; sheaths glabrous; ligule a line fringed with rather long soft hairs. Racemes 2–4 in. long, usually purplish-brown; rhachis glabrous, notched; involucel sessile; bristles unequal, the outer not ciliate, short, about $\frac{1}{8}$ in. long, the inner longer, ciliate below the middle with long silky hairs (1 of the inner bristles is often much longer than the others, reaching $\frac{1}{2}$ in., the others $\frac{1}{4}$–$\frac{1}{3}$ in. long). Spikelets $\frac{1}{6}$ in. long, solitary within the involucel. Glumes 3 or 4; lower invol.-glume minute or wanting; upper invol.-glume $\frac{1}{6}$ in. long, ovate-oblong, gradually or suddenly cuspidate, 5-nerved, hyaline; lower floral glume $\frac{1}{3}$ in. long, oblong, obtuse, with 2 subobtuse lateral and an acute median tooth at the apex, 5-nerved, paleate, male, the palea $\frac{1}{10}$ in. long, narrowly oblong, hyaline; upper floral glume $\frac{1}{10}$ in. long, ovate-oblong, truncate, fimbriately ciliate at the tip, coriaceous, smooth and shining; palea as long as the glume, oblong, truncate, toothed or ciliate at the tip. Anthers nearly $\frac{1}{12}$ in. long. Styles long, reaching $\frac{1}{3}$ in., much exserted beyond the spikelet. Fl. B. I. v. 6, p. 87; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1169.—Flowers: Dec.

Sind: Hyderabad, *Woodrow.*—Distrib. India (Behar, W. Bengal, Upper Gangetic plain, W. Peninsula); Tropical Africa and America.

6. **Pennisetum cenchroides,** *Rich. in Pers. Syn.* v. 1 (1805) p. 72. Perennial; stems tufted, 6–18 in. long, erect, or decumbent and much-branched from the base, stout or slender, leafy, or ascending from a branched often nodose rootstock. Leaves 4–10 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear, tapering to a fine point, glabrous or hairy. Racemes cylindric, dense, 1–4 by $\frac{1}{3}$–$\frac{1}{2}$ in., pale or purplish; rhachis finely scaberulous; involucels

subsessile; outer bristles slender, short, not ciliate; inner bristles about $\frac{3}{5}$ in. long (1 bristle conspicuously longer and stouter than the others, reaching $\frac{1}{2}$ in. long or more), dilated and connate into a ring at the base. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. long, oblong-lanceolate, 3–1 in each involucel. Glumes 4; lower invol.-glume $\frac{1}{10}$ in. long, ovate-lanceolate, acute, faintly 1-nerved, hyaline; upper invol.-glume $\frac{1}{8}$ in. long, ovate, acuminate, 1-nerved, hyaline; lower floral glume $\frac{1}{8}$–$\frac{1}{5}$ in. long, ovate-lanceolate, cuspidately acuminate, 3–5-nerved, paleate, usually male, the palea narrowly lanceolate, as long as the glume; upper floral glume as long as the lower one, lanceolate, 3–5-nerved; palea lanceolate, as long as the glume. Fl. B. I. v. 7, p. 88; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Watt, Dict. Econ. Prod. v. 6, part 1, p. 127.—Flowers: Dec.

Deccan: *Lisboa*. Gujarat: *Lisboa*; Rajkot (Kathiawar), *Woodrow*. Sind: Jemadar ka Landa, near Karachi, *Stocks*!—Distrib. India (Kashmir, Upper Gangetic plain, W. Peninsula); Sicily, Tropical Africa, and the Canaries.

Pennisetum Typhoideum, Rich. in Pers. Syn. v. 1 (1805) p. 72. An annual plant widely cultivated in India, probably a native of Africa, growing to a height of 5 or 6 ft. with racemes sometimes reaching a foot long.

In the Bombay Presidency more than four millions of acres are annually grown, and in many parts it forms the staple food of the people. It is so well known by its native name *Bajri* that description is unnecessary. Fl. B. I. v. 7, p. 82; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1169; Watt, Dict. Econ. Prod. v. 6, part 1, p. 127. *Holcus spicatus*, Linn. Syst. ed. 10, p. 1305; Grah. Cat. p. 238; Dalz. & Gibs. Suppl. p. 99.

3. **CENCHRUS,** Linn.

Characters of *Pennisetum*, but involucels composed of subulate hard spines without filiform tips, connate below into a short coriaceous cup which is surrounded by erect or squarrose bristles.—Distrib. Species few, tropical and subtropical.

Base of involucel rounded; inner bristles up to $\frac{1}{2}$ in. long, erect, not ciliate ..... 1. *C. biflorus*
Base of involucel turbinate; inner bristles up to $\frac{3}{5}$ in. long, usually squarrosely spreading, ciliate at the base ..... 2. *C. catharticus*.

1. **Cenchrus biflorus,** *Roxb. Fl. Ind.* v. 1 (1832) p. 233. Annual?; stem 6–24 in. long, simple. Leaves 3–10 by $\frac{1}{8}$–$\frac{3}{5}$ in., linear-lanceolate, finely acuminate, glabrous or hairy; sheaths glabrous or nearly so, ciliate near the mouth; ligule a pubescent ring. Racemes 2–4 in. long, solitary, cylindric; rhachis angular, smooth; involucel usually 2-flowered, rounded at the base; bristles thick, lanceolate-subulate, erect, dorsally flattened, the outer very short, about $\frac{1}{18}$–$\frac{1}{10}$ in. long, glabrous, the inner $\frac{1}{4}$ in. long, glabrous or puberulous. Spikelets $\frac{1}{6}$ in. long, subglobose. Glumes 4; lower invol.-glume $\frac{1}{10}$ in. long, ovate, acuminate, very thin, hyaline, 1 (rarely 3)-nerved; upper invol.-glume $\frac{1}{6}$ in. long, ovate, apiculate, 5-nerved, hyaline; lower floral glume scarcely shorter than the upper invol.-glume, ovate, acute, 5–7-nerved, paleate, the

palea $\frac{1}{8}$ in. long, oblong, obtuse; upper floral glume as long as the lower, ovate, obtuse. Anthers $\frac{1}{10}$–$\frac{1}{8}$ in. long. Styles free almost to the base. Grain $\frac{1}{12}$ by $\frac{1}{16}$ in., orbicular-oblong, compressed, smooth, shining, pale brown. Fl. B. I. v. 7, p. 89; Grah. Cat. p. 234; Dalz. & Gibs. p. 294; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435.

GUJARAT: Ahmedabad, *Cooke*!; Morvi (Kathiawar), *Beck* ex *Woodrow*. SIND Karachi, *Woodrow*; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Panjáb, Rajputana, W. Peninsula); Beluchistan, Arabia, Africa.

2. **Cenchrus catharticus,** *Delile*, *Cat. Hort. Monsp.* (1838); *Linnæa*, v. 13 (1839), *Litt.* p. 103. Quite glabrous; stems tufted, geniculately ascending, branched from the base, leafy. Leaves 1–5 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear-lanceolate, finely acuminate; sheaths glabrous; ligule a hairy ring. Racemes 1–6 in. long, usually more or less enclosed in the uppermost leaf-sheaths; rhachis angular, glabrous, flexuous; involucels with a turbinate base; bristles hard, subulate, sharply pungent, the outermost short, glabrous or nearly so, spreading or reflexed, the inner ciliate at the base, subulate, suberect or squarrosely spreading, dorsally grooved, reaching $\frac{3}{8}$ in. long. Spikelets shorter than the inner bristles. Glumes 4; lower involucel-glume ovate-lanceolate, acute, hyaline, $\frac{1}{12}$ in. long; upper involucel-glume rather more than $\frac{1}{6}$ in. long, 5-nerved, hyaline; lower floral glume ovate, acuminate, as long as the upper involucel-glume, 5-nerved, paleate, hyaline, the palea $\frac{1}{8}$ in. long, narrowly lanceolate, acute, hyaline; upper floral glume as long as the lower one, cuspidately acuminate, 5-nerved, membranous; palea ovate, acuminate, membranous, as long as the glume. Grain $\frac{1}{10}$ in. long, ovoid-oblong, compressed, pale, rugulose. Fl. B. I. v. 7, p. 90; Watt, Dict. Econ. Prod. v. 2, p. 246.

GUJARAT: Perim Island, at the mouth of the Narbada river, *Raoji*!—DISTRIB. India (Panjáb, W. Peninsula); Arabia, Tropical Africa.

4. SETARIA, Beauv.

Annual (rarely perennial) grasses of various habit; nodes of stem glabrous or hairy; ligules a ridge of hairs. Spikelets subsessile in contracted, cylindric or pyramidal terminal panicles, articulate on a very short pedicel, subtended by 1 to many persistent scabrid or barbed bristles (modified branchlets) which often form a one-sided involucel, but are sometimes present and absent in the same inflorescence. Glumes 4; lower involucel-glume usually much the smallest, 3–5-nerved, membranous; upper involucel-glume 5–7-nerved; lower floral glume more or less exceeding and resembling the upper involucel-glume, usually paleate; upper floral glume coriaceous or crustaceous, 5-nerved, paleate, the palea about equalling the glume. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted. Grain tightly enclosed by the hardened glume and palea, oblong or ellipsoid.—DISTRIB. Tropical and temperate; species about 40.

Leaves plicate.
- Perennial; stems reaching 8 ft. long; leaves up to 24 in. long; panicle 1–2 ft. long, with a scabrid rhachis ..... 1. *S. plicata.*
- Annual; stem reaching 2 ft. high; leaves up to 8 in. long; panicle 2–6 in. long, with a hairy rhachis ..... 2. *S. rhachitricha.*

Leaves flat not plicate.
- Bristles of involucel with spreading or erect teeth.
  - Inflorescence a cylindric spike-like raceme; bristles of involucel 6–12; spikelets $\frac{1}{4}$ in. long ..... 3. *S. glauca.*

Inflorescence a narrowly pyramidal panicle; bristles of involucel 3–6; spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. long ..... 4. *S. intermedia.*
Bristles of involucel with deflexed teeth ..... 5. *S. verticillata.*

1. **Setaria plicata,** *T. Cooke.* Perennial; stem 1–8 ft. long, erect or ascending from a woody branching rootstock, stout, leafy; nodes strigillose; internodes 2–6 in. long. Leaves 6–24 by $\frac{1}{2}$–3 in., linear-lanceolate, finely acuminate, chartaceous, glabrous or sparsely hairy, plicate between the numerous veins, base narrow; sheaths smooth or hispid, the margins naked, or ciliate near the top only; ligule of long hairs. Panicle 1–2 ft. long, contracted, nodding; rhachis stout, angular, scabrid; branches usually alternate, distant (the lower 3–4 in. long), filiform, suberect, bearing short capillary few-flowered branchlets and bristle-like flowerless ones. Spikelets $\frac{1}{8}$ in. long, sessile or shortly pedicellate, ovoid, acute or apiculate, glabrous. Glumes 4; lower invol.-glume broadly ovate, obtuse, 5-nerved, membranous, $\frac{1}{2}$ as long as the spikelet; upper invol.-glume rather more than $\frac{1}{2}$ as long as the upper floral glume, ovate, obtuse, 7-nerved, membranous; lower floral glume slightly longer than the upper, ovate, shortly apiculate, membranous, empty, paleate or not, 5-nerved, the palea when present small, hyaline, narrowly ovate, acute; upper floral glume crustaceous, ovate-oblong, acute or shortly apiculate, slightly transversely striate, pale-yellow, with strongly involute margins; palea ovate, acute, nearly as long as the glume, faintly transversely striate and with incurved membranous margins. *Panicum plicatum,* Lam. Illustr. v. 1 (1791) p. 171; Hook. f. Fl. B. I. v. 7, p. 55; Trim. Fl. Ceyl. v. 5, p. 157; Jacq. Eclog. Gram. v. 1, t. 1; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1176. *P. nepalense,* Spreng. Syst. v. 1 (1825) p. 321; Dalz. & Gibs. p. 291.—Flowers: Nov.

Konkan: western side of the Ghâts, *Dalzell & Gibson*; Parel (Bombay), *Lisboa.* Sometimes cultivated as an ornamental grass in gardens.—Distrib. Throughout the moister hilly parts of India; Ceylon, Malay Peninsula, China, Malay Islands.

2. **Setaria rhachitricha,** *T. Cooke.* Annual; stems tufted, erect, 8–24 in. long, glabrous; nodes softly pubescent. Leaves 3–8 by $\frac{1}{2}$–1 in., oblong-lanceolate, tapering to both ends, finely acuminate, flaccid, glabrous or sparsely hairy, many-veined, plicate between the veins; sheaths with ciliate margins; ligule a tuft of hairs. Panicle 2–6 in. long, pyramidal; rhachis of panicle angular, hairy; branches 1–1$\frac{1}{2}$ in. long, alternate, spreading, with bristle-like flowerless scabrid branchlets at the base of the spikelets, much longer than the spikelets, 1 (rarely 2) to each pedicel; rhachis of branches angular, sparsely hairy. Spikelets numerous, glabrous, $\frac{1}{10}$ in. long, densely or loosely imbricate, ovate, subacute, dorsally compressed, pale with green nerves, articulated on short scaberulous pedicels. Glumes 4; lower invol.-glume orbicular-oblong, $\frac{1}{25}$ in. long, hyaline, obscurely nerved or nerveless; upper invol.-glume $\frac{1}{10}$ in. long, broadly ovate, subobtuse, 5-nerved, thinly membranous; lower floral glume about equal to the upper invol.-glume, similar, 5-nerved, epaleate; upper floral glume elliptic-oblong, subacute, coriaceous, white, transversely striate, $\frac{1}{10}$ in. long, with strongly involute margins; palea as long as the glume, elliptic, with involute membranous margins. *Panicum rhachitrichum,* Hochst. in Flora, v. 27 (1844) p. 254;

Hook. f. Fl. B. I. v. 7, p. 56; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1176.—Flowers: Oct.

S. M. Country: Londa, *Gammie* ex *Woodrow*.—Distrib. India (Subtropical Himalaya, W. Peninsula); Tropical Africa.

I have not seen any specimens from the Bombay Presidency; there are none in Herb. Kew.

3. **Setaria glauca,** *Beauv. Agrost.* (1812) p. 51. Stem 1–2 ft. high, erect or ascending, simple or branched; nodes glabrous, the lower rooting. Leaves 4–12 by $\frac{3}{8}$ in., linear, finely acuminate, flat, glabrous or sparsely hairy, with scabrid margins, base usually rounded; sheaths smooth; ligule a ridge of hairs. Inflorescence a cylindric densely flowered spike-like raceme 1–5 in. long; bristles of involucel 6–12, pale or reddish-brown, $\frac{1}{6}$–$\frac{1}{3}$ in. long, with very short erect or spreading teeth. Spikelets numerous, closely set along the rhachis of the spike, $\frac{1}{8}$ in. long, ellipsoid, glabrous. Glumes 4; lower invol.-glume less than $\frac{1}{2}$ as long as the spikelet, broadly ovate, often shortly apiculate, 3-nerved, hyaline; upper invol.-glume slightly longer than the lower, broadly ovate or suborbicular, hyaline, 5-nerved; lower floral glume thinly membranous, as long as the upper one, 5-nerved, paleate, empty or male, the palea hyaline; upper floral glume coriaceous, broadly elliptic, obtuse, dorsally convex, transversely rugose, pale. Fl. B. I. v. 7, p. 78; Dalz. & Gibs. p. 293; Trim. Fl. Ceyl. v. 5, p. 162; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1170; Watt, Dict. Econ. Prod. v. 6, part 2, p. 546.—Flowers: Oct. Vern. *Kolára.*

Konkan: *Stocks*!; Thána, *Lisboa.* Deccan: Mahableshwar common, *Dalzell & Gibson, Woodrow, Cooke*!; Nasik, *Lisboa.* Gujarat: Baroda, *Cooke*!—Distrib. More or less throughout India; Ceylon, most warm temperate and tropical regions.

4. **Setaria intermedia,** *Roem. & Schult. Syst.* v. 2 (1817) p. 489. Stem 2–3 ft. long, slender, erect or ascending; nodes glabrous, the lower often rooting. Leaves 2–9 by $\frac{1}{8}$–$\frac{3}{4}$ in., linear-lanceolate, finely acuminate, thin, flat, sparsely hairy on both surfaces, with scaberulous margins, base narrow; sheaths long, smooth, the mouth villous, the margins ciliate especially in the upper part. Panicle 4–6 in. long, narrowly pyramidal; rhachis glabrous, grooved; branches short, distant below, rather crowded above, dense-flowered; bristles of involucel 3–6, about $\frac{1}{4}$ in. long, very slender, flexuous, studded with minute erect teeth, pale. Spikelets $\frac{1}{12}$–$\frac{1}{16}$ in. long, ovoid, subacute. Glumes 4; lower invol.-glume orbicular-oblong or ovate, about $\frac{1}{3}$ as long as the spikelet, hyaline, faintly 3-nerved; upper invol.-glume about $\frac{1}{2}$ as long as the spikelet, broadly ovate, subacute, hyaline, 5-nerved; lower floral glume about equalling the upper, broadly ovate, thinly membranous, 5-nerved, paleate, empty, the palea hyaline; upper floral glume broadly ovate or suborbicular, acute, coriaceous, very concave, transversely rugulose all over, yellowish-brown; palea elliptic, subacute. Fl. B. I. v. 7, p. 79; Trim. Fl. Ceyl. v. 5, p. 163; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1170; Watt, Dict. Econ. Prod. v. 6, part 2, p. 546.—Flowers: Aug.–Oct. Vern. *Pandar.*

Tolerably common throughout the Presidency. Konkan: *Law* ex *Woodrow.* Deccan: in cultivated fields about Poona, *Jacquemont*, 355! S. M. Country: Belgaum, *Ritchie*, 839!—Distrib. Throughout India; Ceylon, temperate and tropical regions.

5. **Setaria verticillata,** *Beauv. Agrost.* (1812) p. 51. Annual; stems erect or ascending, 1–3 ft. long, stout or slender, leafy, more or less branched, glabrous. Leaves 3–10 by $\frac{1}{8}$–$\frac{3}{4}$ in., thin, flat, glabrous or sparsely hairy and scaberulous, linear or linear-lanceolate, tapering to a fine point, base usually narrow; sheaths smooth, striate; ligule a fringe of hairs. Panicle 1–5 in. long, erect or curved, spike-like, cylindric or oblong, coarsely bristly; bristles of the involucel 1 or few, $\frac{1}{8}$–$\frac{1}{3}$ in. long, closely studded with conspicuous downward-pointing teeth. Spikelets $\frac{1}{12}$ in. long, ellipsoid, obtuse, glabrous. Glumes 4; lower invol.-glume $\frac{1}{30}$ in. long, ovate, acute, hyaline, faintly 3-nerved; upper invol.-glume about as long as the spikelet, ovate, subacute, thinly membranous, 5-nerved; lower floral glume similar to the upper invol.-glume, 5-nerved, empty, paleate or not, the palea when present hyaline, very small; upper floral glume elliptic-oblong, plano-convex, subobtuse, coriaceous, straw-colored, faintly striatulate and with incurved margins; palea as long as the glume, coriaceous, elliptic, faintly striatulate. Fl. B. I. v. 7, p. 80; Dalz. & Gibs. p. 294; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Trim. Fl. Ceyl. v. 5, p. 163; Prain, Beng. Pl. p. 1170; Watt, Dict. Econ. Prod. v. 6, part 2, p. 549.—Flowers: Dec. VERN. *Dangani.*

KONKAN: *Stocks!* GUJARAT: Baroda, *Woodrow*; Morvi (Kathiawar), *Woodrow.* SIND: *Stocks*, 649!—DISTRIB. Throughout India; Ceylon, temperate and tropical regions.

Setaria italica, Beauv. Agrost. (1812) p. 51. Annual; stems 2–5 ft. long, usually branched, tufted, rooting towards the base. Panicle dense, spike-like; bristles few, smooth or barbed. *The Italian Millet,* extensively cultivated as a food-grain throughout India. According to Watt (Dict. Econ. Prod. v. 6, part 2, p. 548), about 330,000 acres were under cultivation in the Bombay Presidency during the year 1886–87. Fl. B. I. v. 7, p. 78; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1170. *Panicum italicum,* Linn. Sp. Pl. (1753) p. 56; Grah. Cat. p. 237; Dalz. & Gibs. Suppl. p. 98.—VERN. *Rála.*

5. CHAMÆRAPHIS, Br.

Glabrous marsh or aquatic grasses. Leaves narrowly linear-lanceolate. Spikelets 1–2-flowered, subsessile and subsecund on the branches of a simple panicle which are produced as awn-like bristles beyond the ultimate spikelet, obscurely articulate but persistent on their short obconic pedicels, narrowly lanceolate, terete, green. Glumes 4; lower invol.-glume very small, suborbicular, hyaline, white, nerveless; upper invol.-glume longer than the lower floral glume, membranous, green, narrowly lanceolate, acuminate or narrowed into a rigid awn, 9–11-nerved; lower floral glume lanceolate, acute or aristately acuminate, paleate, 7-nerved, male, the palea smaller than the glume, hyaline; upper floral glume much smaller than the lower, stipitate, female, oblong or ovate-oblong, acute, flat, thinly coriaceous, nerveless, the palea hyaline, as broad as the glume, acute, nerveless. Lodicules cuneate. Stamens 3; anthers short. Styles free; stigmas laterally exserted. Grain minute, oblong, compressed, free within the subcoriaceous glume and hyaline palea.—DISTRIB. Tropical Asia and Australia; species 5 or 6.

1. **Chamæraphis spinescens,** *Poir. Encyc. Méthod. Suppl.* v. 2 (1811) p. 189. Forming floating much-branched masses with leafy ascending stems 1–3 ft. long. Leaves 1–3 by $\frac{1}{16}$–$\frac{1}{8}$ in., flat, acuminate, narrowly linear-lanceolate, smooth or scabrid, base narrowed; sheaths long, loose, with naked margins; ligule a ridge of minute hairs. Panicle 2–4 in. long, shortly pedunculate, more or less contracted; rhachis angular, sulcate; branches filiform, angular, grooved, flexuous, few- or many-flowered, the lower 1–2 in. long, the awn-like tips $\frac{1}{6}$–$\frac{1}{2}$ in. long. Spikelets (including their awn) $\frac{1}{4}$–$\frac{1}{3}$ in. long, subsessile. Glumes 4; lower involucel-glume scarcely $\frac{1}{30}$ in. long, orbicular or subquadrate, usually rounded at the apex, hyaline; upper involucel-glume $\frac{1}{4}$–$\frac{1}{3}$ in. long (including the awn), lanceolate, setosely scabrid on the sides, membranous, 9–11-nerved, with a long scabrid awn which is sometimes as long as the body of the glume; lower floral glume shorter than the upper involucel-glume, finely acuminate or awned, 7-nerved, male, paleate, membranous, the palea hyaline, smaller than the glume, linear-oblong, subacute; upper floral glume about $\frac{1}{12}$ in. long, ovate-lanceolate, acute, female, nerveless, the palea hyaline. Fl. B. I. v. 7, p. 62; Trim. Fl. Ceyl. v. 5, p. 165; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1171.—Flowers: Sept.

Konkan: Wangni, *Woodrow.*—Distrib. India (Rajputana, Bengal, W. Peninsula); Ceylon, China, Malaya, Australia.

I have seen no specimens from the Bombay Presidency; there are none from that Presidency in Herb. Kew.

6. ISACHNE, Br.

Perennial grasses. Leaves ovate or linear-lanceolate. Spikelets small or minute, loosely paniculate, not or obscurely articulate with the pedicel, subglobose or obovoid, 1–2-flowered. Glumes 4, the 2 lower often separately deciduous, thinly coriaceous or membranous, strongly nerved; involucel-glumes subequal, convex, empty; the 2 floral glumes both paleate, equal and convex, or the lower larger and flatter; lower floral glume male or neuter; upper floral glume jointed and often stipitate on the very short rachilla, hemispheric, female or hermaphrodite. Lodicules most minute. Stamens usually 3 (rarely 4 or 6). Styles 2, free; stigmas short, plumose, exserted at the top of the spikelet. Grain free within the hardened glume and palea.—Distrib. Species about 25, tropical and subtropical.

Involucel-glumes longer than the floral glumes ..... 1. *I. Lisboæ.*
Involucel-glumes about equalling the floral glumes.
  Floral glumes equal and similar, both hemispheric and coriaceous ..... 2. *I. elegans.*
  Floral glumes usually unequal, the lower floral glume thin, flat, often longer than the upper.
    Stem reaching 18 in. long; panicle rather large, ovoid or pyramidal; spikelets $\frac{1}{12}$ in. long; leaves 1–2½ in. long ... 3. *I. australis.*
    Stem rarely reaching 10 in. long; panicle small, lax-flowered; spikelets $\frac{1}{20}$–$\frac{1}{18}$ in. long; leaves 1–1½ in. long ..... 4. *I. miliacea.*

1. **Isachne Lisboæ,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 22. A low plant 6 in. high; stems creeping, with long wiry roots, then ascending, rather stout, leafy. Leaves 1–2 by $\frac{2}{3}$ in., recurved, thin, oblong-lanceolate, acute, ciliate on the margins with long slender hairs, closely and

conspicuously nerved; sheaths glabrous or sparsely hairy; ligule 0. Panicles 1–2 in. long; branches of the panicle (*spikes*) ½–¾ in. long, horizontally spreading. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. in diam., secund on the lower side of the branches, hairy with bulbous-based hairs; pedicels short, triquetrous, hairy. Glumes 4; lower and upper invol.-glumes equal, broadly ovate or suborbicular, acuminate, conspicuously 5-nerved, longer than the floral glumes, hairy; floral glumes orbicular, equal, smaller than the invol.-glumes, concave, glabrous. Palea with incurved flaps. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers: Sept.-Oct.

DECCAN: Panchgani, *Raoji*!; Mahableshwar, *Cooke*!, *Lisboa*.—DISTRIB. Bombay Presidency, apparently endemic.

2. **Isachne elegans,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 291. A small elegant grass 8–12 in. high; stems densely tufted, soft, geniculate below, and with slender fibrous roots. Leaves 2–6 by $\frac{1}{6}$–$\frac{1}{4}$ in., linear-lanceolate, acute, striate, with thickened and glabrous or minutely serrulate margins; sheaths bristly at the mouth. Panicle 3–5 in. long, glabrous; branches slender, alternate, undulating, ½–1 in. long, smooth; pedicels short, glabrous. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. in diam., hispid, with 2 perfect flowers. Glumes 4; invol.-glumes equal, similar, inconspicuously many-nerved, broadly ovate or suborbicular, with red margins, hairy; floral glumes as long as the invol.-glumes, hemispheric, puberulous. Anthers $\frac{1}{16}$ in. long, brownish-yellow. Fl. B. I. v. 7, p. 23; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers: Sept. VERN. *Dunda*.

KONKAN: Pen, in inundated land, *Dalzell*! DECCAN: margins of rivulets in the Deccan, *Dalzell & Gibson*; Poona, *Woodrow*; Lanoli, *Woodrow*, 175!; between Poona and Karli, *Jacquemont*, 556!—DISTRIB. Bombay Presidency apparently endemic.

3. **Isachne australis,** *R. Br. Prodr.* (1810) p. 196. Stem slender, erect or ascending from a creeping rootstock, 8–18 in. high, leafy, smooth, branched below; nodes glabrous. Leaves 1–2½ by $\frac{1}{6}$–$\frac{1}{3}$ in., linear-lanceolate, acuminate, flat, multistriate, scaberulous on both surfaces, base rounded; sheaths ¾–1½ in. long, striate, the margins above the middle densely ciliate: ligule a tuft of long slender erect white hairs. Panicle 1–4 in. long; branches alternate, flexuous, erect or spreading, up to 1½ in. long, sometimes divided; rhachis angular, smooth. Spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. in diam., globose, sessile or pedicellate, green or violet; pedicels sometimes ¼ in. long, capillary. Glumes 4; invol.-glumes similar, broadly ovate or suborbicular, obtuse, concave, membranous, 7-nerved, glabrous or with a few bristles; floral glumes usually unequal, the lower longer and thinner than the upper, ovate, obtuse, nerveless; upper floral glume hemispheric, coriaceous, ciliolate. Palea glabrous. Anthers $\frac{1}{16}$ in. long, red. Fl. B. I. v. 7, p. 24; Trim. Fl. Ceyl. v. 5, p. 128; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1172.—Flowers: Oct. VERN. *Daura*.

DECCAN: Poona, *Lisboa*; Mahableshwar, *Woodrow*; Nasik, *Lisboa*.—GUJARAT. *Lisboa*.—DISTRIB. Throughout India; Ceylon, Australia, New Zealand.

4. **Isachne miliacea,** *Roth, Nov. Pl. Sp.* (1821) p. 58. A slender plant, variable in size, 6–10 in. high; stems very slender, prostrate,

widely creeping and branched below, then ascending. Leaves small, rather distant, $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{3}$ in., ovate, acute, glabrous or sparsely hairy, base rounded. Panicle small, lax-flowered. Spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. in diam., globose, few and distant; pedicels short or long, capillary. Invol.-glumes orbicular-oblong, almost hemispheric, often hispid with long hairs, obscurely 7-nerved; lower floral glume rather longer than the upper, ovate-oblong, membranous, male; upper floral glume smaller, hemispheric, coriaceous, female. Palea glabrous. Fl. B. I. v. 7, p. 25; Trim. Fl. Ceyl. v. 5, p. 128; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1172.

Seems to be but a small state of *I. australis* with shorter leaves, laxer panicles, and smaller spikelets.

Konkan: *Woodrow*. Deccan: Lanoli, *Woodrow*!—Distrib. More or less throughout India; Ceylon, China, Malay and Pacific Islands, S. America.

7. TRICHOLÆNA, Schrad.

Erect tufted perennial (rarely annual) grasses. Leaves narrow; ligule a fringe of hairs. Spikelets 1–2-flowered, articulate on their pedicels, paniculate, laterally compressed, clothed with long silky hairs. Glumes 3 or 4; lower invol.-glume somewhat remote from the upper, often reduced to a minute scale or obsolete; upper invol.-glume membranous, emarginate or muticous, or finely mucronate or aristate from the sinus, 5-nerved, usually hairy; lower floral glume like the upper invol.-glume, male or barren, with a hyaline 2-nerved subequal palea; upper floral glume much smaller than the lower, thinly chartaceous, glabrous, shining, obtuse or emarginate, obscurely 5-nerved, 2-sexual. Lodicules 2, small. Stamens 3. Styles free.—Distrib. Species many, chiefly African.

Spikelets up to $\frac{1}{8}$ in. long; lower invol.-glume minute or obsolete; lower floral glume apiculate (not awned) ..... 1. *T. Teneriffæ*.
Spikelets reaching $\frac{3}{8}$ in. long; lower invol.-glume $\frac{1}{10}$ in. long; lower floral glume awned ..... 2. *T. Wightii*.

1. Tricolæna Teneriffæ, *Parlat. in Webb & Berth. Phyt. Canar.* v. 3, part 2 (1848) p. 425. Perennial; stems many from a woody rootstock, geniculate below, slender, rigid. Leaves $1\frac{1}{4}$–3 by $\frac{1}{16}$–$\frac{1}{8}$ in., narrowly linear-lanceolate, finely acuminate, convolute, rigid, glabrous; sheaths glabrous; ligule a narrow softly hairy ridge. Inflorescence of slender erect panicles $2\frac{1}{2}$–$4\frac{1}{2}$ in. long; branchlets and pedicels capillary. Spikelets up to $\frac{1}{6}$ in. long, clothed with silky hairs. Glumes 3 (rarely 4); lower invol.-glume minute or obsolete; upper invol.-glume $\frac{1}{8}$ in. long, ovate, acute, densely silky; lower floral glume $\frac{1}{6}$ in. long, ovate, acute, apiculate, paleate, the palea narrowly oblong, subobtuse, hyaline; upper floral glume $\frac{1}{10}$ in. long, ovate-oblong, obtuse, coriaceous, shining; palea as long as the glume, oblong-lanceolate, subacute. Anthers $\frac{1}{10}$ in. long, narrowly linear. Stigmas $\frac{1}{10}$ in. long, exserted, sessile or nearly so, plumose. Fl. B. I. v. 7, p. 65; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Aug.

Sind: *Stocks*, 639!; Thano-Bullo-Khan, *Woodrow*.—Distrib. India (Panjáb, W. Peninsula); westward to Sicily and N. Africa.

There is but one specimen (a very poor one) from Sind in Herb. Kew. collected by Stocks!

2. **Tricholæna Wightii,** *Nees, ex Steud. Syn. Gram.* (1855) p. 93. Stems 6–18 in. high, tufted, stout or slender. Leaves 1–6 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear, finely acuminate, flat, glabrous or hairy; sheaths glabrous or hairy with bulbous-based hairs; ligule a hairy line. Inflorescence a narrow panicle 2–5 in. long; branchlets and pedicels capillary, flexuous. Spikelets variable in size, sometimes exceeding $\frac{3}{8}$ in. long (including the awns), silky-hairy. Glumes 4; lower invol.-glume $\frac{1}{10}$ in. long, linear, obtuse, distant from the others, strongly bearded at the base; upper invol.-glume ovate-lanceolate, tumid at the base, obtuse or subacute, silky-hairy, the midnerve produced from the back into a capillary awn nearly $\frac{1}{5}$ in. long; lower floral glume similar to the upper invol.-glume, with a similar awn, silky-hairy, paleate, male, the palea narrow, hyaline; upper floral glume $\frac{1}{10}$ in. long, elliptic-oblong, obtuse, concave, smooth, thin, 2-sexual; palea as long as the glume. Anthers $\frac{1}{10}$ in. long. Stigmas $\frac{1}{6}$ in. long, with distinct styles free to the base or nearly so. Fl. B. I. v. 7, p. 65; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Sept. VERN. *Chota-Kayli.*

DECCAN: Malhargad, *Woodrow*; Poona, *Woodrow*; Mahableshwar, *Lisboa*; Panchgani, *Lisboa*. S. M. COUNTRY: Badami, *Woodrow*, 23!—DISTRIB. India (Rajputana, W. Peninsula); Arabia, Cape Verd Islands.

8. AXONOPUS, Beauv.

Annual or perennial grasses of various habit. Leaves subradical; ligules membranous, ciliate or reduced to a ciliate rim. Panicles consisting of digitate or more or less whorled slender or stout often spike-like racemes. Spikelets ovoid or oblong, mucronate or awned, solitary, 2-nate or fasciculate, 2-flowered, articulate on thin pedicels, erect. Glumes 4; lower invol.-glume shorter than the spikelet, hyaline, acuminate or aristate, 3-nerved; upper invol.-glume as long as the upper floral glume, ovate, 5-nerved, the lateral nerves marginal and hairy or villous; floral glumes subequal; lower oblong-ovate, 5-nerved, paleate, male, the palea small, 2-partite; upper floral glume 2-sexual, ovate or oblong, narrowed into a terminal awn, thinly coriaceous; palea oblong-elliptic. Lodicules flabelliform. Stamens 3; anthers linear. Styles free; stigmas linear, laterally exserted, shortly penicillate. Grain oblong, free within the hardened glume and palea.—DISTRIB. Species 3, one from South Africa and the Mascarene Islands to India and Australia, one in the Indo-Malayan region, the third in Tropical Africa.

1. **Axonopus cimicinus,** *Beauv. Agrost.* (1812) p. 12. A tufted grass; stems 1–2 ft. long, erect, or decumbent at the base; nodes hairy. Leaves 1–3 by $\frac{3}{8}$–$\frac{5}{8}$ in., ovate-lanceolate from a broad cordate base, acute, flat, glabrous or hairy, ciliate on the margins with stiff bulbous-based hairs; sheaths glabrous or hairy; ligule of short hairs. Inflorescence in spike-like racemes, 3–10 on the top of a slender smooth glabrous peduncle 2–6 in. long, with sometimes a fascicle of 2 or more lower down on the peduncle; peduncle naked in the lower part; rhachis of raceme angular, scaberulous, slender. Spikelets (including a slender scaberulous awn about $\frac{1}{4}$ in. long) $\frac{1}{4}$–$\frac{5}{16}$ in. long, subsecund, solitary or 2- (rarely 3-)nate, erect, readily disarticulating from the pedicel; pedicels unequal, scaberulous, cupular at the tip. Glumes 4; lower invol.-glume

rather more than $\frac{1}{10}$ in. long, narrowly ovate-lanceolate, aristately acuminate, hyaline, with 3 slender green nerves, of which the 2 lateral arch to join the midrib below the tip; upper invol.-glume $\frac{1}{5}$ in. long, broadly ovate, cuspidately acuminate, thinly membranous, 5-nerved, the 3 central nerves slender, green, the 2 lateral nerves marginal, bristly with long coarse purplish hairs which reach $\frac{1}{10}$ in. long; lower floral glume $\frac{1}{8}$ in. long, ovate-oblong, obtuse, male, paleate, the palea small, 2-partite; upper floral glume $\frac{1}{4}$ in. long (or more), including the awn, which is nearly as long as the glume, ovate, acute, coriaceous, often faintly ciliolate and with slightly incurved margins; palea as long as the glume, coriaceous, elliptic-oblong, subobtuse. Fl. B. I. v. 7, p. 64; Trim. Fl. Ceyl. v. 5, p. 166; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1173. *Urochloa cimicina*, Kunth, Revis. Gram. (1829) v. 1, p. 31; Dalz. & Gibs. p. 289.—Flowers: Oct.

KONKAN: *Stocks*! S. M. COUNTRY: Dharwar, *Woodrow*; Badami, *Woodrow*!

9. **OPLISMENUS**, Beauv.

Slender leafy weak grasses; stems creeping below; branches ascending. Leaves ovate-lanceolate, acuminate, thin, flat; margins scaberulous, base narrow, auricled on one side; ligule a ridge of long hairs. Spikelets solitary or 2-nate, disarticulating at the base, in small clusters or in spike-like more or less secund racemes along a common axis, subterete, awned. Glumes 4; invol.-glumes similar, more or less subequal, herbaceous to membranous, 3–7-nerved, both usually with straight awns; lower floral glume resembling the upper invol.-glume, 5–9-nerved, empty, muticous or very shortly awned, with or without a hyaline 2-nerved or more or less reduced palea; upper floral glume 2-sexual, as long as or shorter than the lower, chartaceous to coriaceous, 5–7-nerved, muticous; palea of similar texture, about equal to the glume, 2-nerved. Lodicules 2, minute, cuneate. Stamens 3. Styles distinct, long; stigmas exserted at the top of the glume. Grain oblong-ellipsoid, free within the hardened glume and palea.—DISTRIB. Species about 8, in the warmer parts of the world.

A tall branching grass; awns stout, smooth, obtuse ..... 1. *O. compositus*.
A small diffuse grass; awns capillary, minutely scaberulous ..... 2. *O. Burmanni*.

1. **Oplismenus compositus,** *Beauv. Agrost.* (1812) p. 54. A tall branching grass; stems 1–3 ft. long, slender, branched, and creeping below; branches ascending, leafy, rooting from the lower nodes. Leaves variable, 2–6 by $\frac{1}{2}$–$\frac{3}{4}$ in., ovate to ovate-lanceolate, acuminate, thin, flat, glabrous or hairy, base narrow, auricled on one side; sheaths glabrous or pubescent, with ciliate margins. Panicle 3–10 in. long; peduncle long or short; branches of panicle usually distant, 1–3 in. long; rhachis glabrous or pubescent, angular, grooved. Spikelets distant, $\frac{1}{8}$ in. long (excluding the awn), lanceolate-ellipsoid, green; pedicels very short, often with a tuft of hairs at the base. Glumes 4; lower invol.-glume ovate-lanceolate, acuminate, $\frac{1}{10}$ in. long (without the awn, which is about $\frac{1}{5}$ in. (or more) long and truncate at the apex, glabrous, often purple), 5-nerved, membranous; upper invol.-glume $\frac{1}{8}$ in. long (including a short mucro or awn), rather broader than the lower invol.-glume, 5–7-nerved, membranous; lower floral glume, $\frac{1}{6}$ in. long, membranous, broadly ovate, subacute, the midrib prolonged behind

into a very short apiculation, 7–9-nerved with a very narrow palea; upper floral glume shorter than the lower, ovate-oblong, acute, coriaceous, smooth, shining, with incurved margins; palea oblong, acute, with strongly involute margins. Fl. B. I. v. 7, p. 66; Trim. Fl. Ceyl. v. 5, p. 168; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1173. *Oplismenus lanceolatus*, Kunth, Revis. Gram. (1829) p. 45; Dalz. & Gibs. p. 292.—Flowers: Nov.-Dec.

Konkan: at the foot of the Ghâts under the shade of trees, *Dalzell & Gibson*; Matheran, *Woodrow*; Thana, *Lisboa*. Deccan: Lanoli, *Lisboa*. Kanara: Kadgal (N. Kanara), *Woodrow*!—Distrib. Throughout India; Ceylon, most tropical regions (except Australia).

2. **Oplismenus Burmanni**, *Beauv. Agrost.* (1812) p. 54. A very slender diffusely branched leafy grass; stems 6–18 in. long; nodes glabrous or hairy. Leaves $\frac{3}{4}$-2 by $\frac{1}{4}$-$\frac{1}{2}$ in., ovate or ovate-lanceolate, acuminate, sparsely pilose with long slender white hairs; sheaths glabrous or hairy. Panicle 1–$2\frac{1}{2}$ in. long; peduncle slender (almost filiform), usually very long; branches of panicle spike-like, few, distant, subsessile, $\frac{1}{8}$-$\frac{3}{4}$ in. long; rhachis slender, angular, clothed with long slender white hairs nearly as long as the spikelets. Spikelets $\frac{1}{10}$ in. long (excluding the awns), secund, solitary or 2-nate; pedicels short, hairy. Glumes 4; lower invol.-glume $\frac{1}{18}$ in. long (excluding the acute scaberulous capillary awn which reaches $\frac{1}{3}$ in. long), ovate, obtuse, 3–5-nerved, hyaline, silky-hairy and ciliate; upper invol.-glume similar and subequal to the lower, 5-nerved, with an awn reaching $\frac{1}{5}$ in. long; lower floral glume reaching $\frac{1}{10}$ in. long (excluding an awn of about $\frac{1}{20}$ in. long), broadly ovate, subobtuse, concave, hyaline, silky-hairy, and ciliate, 7–9-nerved, empty, epaleate; upper floral glume as long as the lower, ovate, acute, membranous, with incurved margins; palea as long as the glume, membranous, ovate-oblong, acute, with strongly involute margins. Fl. B. I. v. 7, p. 68; Dalz. & Gibs. p. 291; Trim. Fl. Ceyl. v. 5, p. 169; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1173.—Flowers: Sept.-Oct.

Found usually under the shade of trees throughout the Presidency, *Dalzell & Gibson*. Konkan: Parel (Bombay), *Woodrow*. Deccan: Panchgani, *Woodrow*. Gujarat: Domas (near Surat), *Cooke*!—Distrib. Throughout India; Ceylon, Malay Islands, China, Japan, Tropical Africa.

10. **PANICUM,** Linn.

Annual or perennial grasses of various habit. Leaves broad or narrow; ligules usually reduced to a ciliate rim or a fringe of hairs (rarely a distinct membrane) or 0. Inflorescence various. Spikelets small, 1–2-flowered, terete or dorsally or laterally compressed, solitary or 2-nate, often secund, ovoid or oblong, articulate at the base and deciduous, rarely awned. Glumes 4; invol.-glumes empty; the lower the smallest (sometimes minute) and fewest-nerved; upper invol.-glume usually equal or almost equal to the lower floral glume, sometimes cuspidate, 5–13-nerved; lower floral glume equalling the upper or longer, more or less resembling the upper invol.-glume, usually neuter, paleate or not; upper floral glume coriaceous to crustaceous, sometimes shortly stipitate, convex, 2-sexual, paleate, the palea usually as long as and of the same texture as the glume. Lodicules 2, cuneate. Stamens 3. Styles distinct; stigmas laterally exserted near the top of the spikelet.

Grain free but tightly enclosed by the hardened glume and palea, oblong, ellipsoid or lanceolate.—DISTRIB. Species 200–250, chiefly in the warm regions of the world.

Spikelets dorsally compressed or subterete.
Inflorescence racemose, of simple (rarely branched) spikes or racemes bearing secund spikelets.
Rhachis of spikes broad, flattened.
Spikelets 2-seriate.
Spikes shorter than the internodes ..... 1. *P. flavidum.*
Spikes longer than the internodes.
Upper floral glume granulate ..... 2. *P. punctatum.*
Upper floral glume smooth ..... 3. *P. fluitans.*
Spikelets 3–5-seriate; lower floral glume cuspidate or awned.
Stems stout, reaching 5 ft. long; lower floral glume awned ..... 4. *P. stagninum.*
Stems slender, decumbent, 1–2 ft. long; lower floral glume cuspidate, not awned ..... 5. *P. colonum.*
Rhachis of spikes narrow and filiform, terete or angular.
Lower invol.-glume minute, not ¼ as long as the upper floral glume, nerveless.
Leaf-base rounded; lower invol.-glume triangular ..... 6. *P. Isachne.*
Leaf-base cordate-amplexicaul; lower invol.-glume semilunate ..... 7. *P. prostratum.*
Lower invol.-glume from ⅓–½ as long as the upper floral glume, 3–5-nerved.
Upper floral glume apiculate or awned.
Upper floral glume only apiculate.
Lower invol.-glume ovate, acute, ½ as long as the upper floral glume ..... 8. *P. ramosum.*
Lower invol.-glume orbicular, about ¼ as long as the upper floral glume . 9. *P. setigerum.*
Upper floral glume abruptly awned; lower invol.-glume rather less than ½ the lower floral glume ..... 10. *P. javanicum.*
Inflorescence of spiciform or effuse panicles.
Panicles narrow, spiciform.
Lower invol.-glume very minute; spikelets lanceolate ..... 11. *P. interruptum.*
Lower invol.-glume ¼ as long as the upper; spikelets globosely ovoid ..... 12. *P. myosuroides.*
Panicles broad, effuse.
Lower invol.-glume as long as the lower floral glume or nearly so ..... 13. *P. turgidum.*
Lower invol.-glume shorter than the lower floral glume.
Annuals.
Leaves ⅜ in. broad; panicle 15 in. long ..... 14. *P. obscurans.*
Leaves ⅛–¼ in. broad; panicle 4–10 in. long . 15. *P. trypheron.*
Perennials.
Lower invol.-glumes very minute, 1 or rarely both often obsolete ..... 16. *P. subeglume.*
Lower invol.-glumes distinctly evident.
Spikelets laxly clustered on the branches... 17. *P. antidotale.*
Spikelets solitary (rarely 2-nate).
Lower invol.-glume not ¼ the length of the upper, orbicular or reniform ..... 18. *P. proliferum* var. *paludosum.*
Lower invol.-glume ½ the length of the upper, ovate, subacute ..... 19. *P. montanum.*
Spikelets strongly laterally compressed, gibbously ovoid ... 20. *P. patens.*

1. **Panicum flavidum,** *Retz. Obs.* fasc. 4 (1786) p. 15. Stems 1–4 ft. long, slender, ascending from a short decumbent base; nodes glabrous. Leaves sub-bifarious, 3–5 by $\frac{1}{8}$–$\frac{1}{4}$ in., narrowly linear, acuminate, thinly coriaceous, glabrous or the margins slightly scaberulous; sheaths compressed, glabrous, the margins not ciliate; ligule a ridge of long hairs. Spikes few or many, distant, erect, $\frac{1}{2}$–1 in. long, shorter than the internodes, secund, sessile; rhachis flattened, glabrous. Spikelets $\frac{1}{10}$ in. long, gibbously globose, sessile or nearly so, 2-seriate, closely imbricate, glabrous. Glumes 4, pale-green or nearly white, the 3 lower with green nerves; lower invol.-glume about $\frac{1}{2}$ as long as the spikelet, orbicular, concave, 3-nerved; upper invol.-glume broadly ovate, concave, shorter than the upper floral glume, 7-nerved; lower floral glume shorter than the upper, orbicular, 5-nerved, paleate, empty; upper floral glume broadly ovate or almost orbicular, often mucronate, very convex, striolate-punctate, white. Palea with the sides infolded nearly to the middle, striolate. Fl. B. I. v. 7, p. 28; Trim. Fl. Ceyl. v. 5, p. 133; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1174; Watt, Dict. Econ. Prod. v. 6, part 1, p. 8. *Panicum brizoides,* Jacq. Eclog. Gram. (1813) p. 2; Dalz. & Gibs. p. 290.—Flowers: Oct.

Konkan: N. & S. Konkan, *Law!* Deccan: Khandala, *Woodrow.* Gujarat: near Surat, *Dalzell & Gibson*; Morvi (Kathiawar), *Woodrow*; Porbander (Kathiawar), *Woodrow.*—Distrib. Plains of India; Ceylon, Trop. Asia and Africa.

2. **Panicum punctatum,** *Burm. Fl. Ind.* (1768) p. 26. Perennial, quite glabrous; stem prostrate at the often floating base, 2–4 ft. long, rooting at the lower stout spongy nodes. Leaves 4–8 by $\frac{1}{4}$–$\frac{3}{8}$ in., linear, acute or acuminate, base narrow; lower sheaths inflated; ligule a ridge of hairs. Spikes many, $\frac{1}{2}$–1 in. long, distant, sessile, longer than the internodes, appressed to the glabrous rhachis, very pale. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long, imbricate, sessile, 2-seriate, ovoid-oblong on a flattened undulate rhachis which is produced beyond the spike into an acicular tip which is as long as or longer than the terminal spikelet. Glumes 4; lower invol.-glume small, about $\frac{1}{20}$ in. long, orbicular, rounded or slightly retuse at the apex, thinly membranous; upper invol.-glume about $\frac{1}{2}$ as long as the floral glumes, membranous, 3–5-nerved, orbicular, with truncate or rounded tip; lower floral glume ovate, acute, 3–5-nerved, membranous, neuter; upper floral glume about as long as the lower, cuspidately acuminate, thinly coriaceous, granulate, white. Palea coriaceous, with inflexed membranous sides. Anthers $\frac{1}{20}$ in. long. Fl. B. I. v. 7, p. 29; Trim. Fl. Ceyl. v. 5, p. 134; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1174. *Panicum fluitans,* Retz. Obs. fasc. 3 (1783) p. 8 (not fasc. 5, p. 18); Grah. Cat. p. 237; Dalz. & Gibs. p. 290.—Flowers: Nov. Vern. *Petnar.*

Deccan: Poona, *Woodrow, Lisbon*; Ahmednagar, *Woodrow.*—Distrib. Throughout India in marshes; Ceylon, Malaya, Mauritius, Trop. and N. Africa.

3. **Panicum fluitans,** *Retz. Obs.* fasc. 5 (1789) p. 18.—Perennial; stem 1–4 ft. long from a stout creeping base, often as thick as a swan's quill, smooth, soft, striate; lower nodes 2–5 in. long, quite glabrous. Leaves 4–8 by $\frac{1}{4}$–$\frac{3}{8}$ in., linear, finely acuminate, glabrous, the margins smooth or nearly so, often incurved, base narrow; sheaths large, loose, glabrous, the margins not ciliate; ligule a ridge of hairs. Panicle 8–12 in. long; rhachis erect, angular, glabrous or nearly so. Spikes

many, ½–1½ in. long, sessile, longer than the internodes, often appressed to the rhachis; rhachis of spikes flattened. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long, ovoid, acute, glabrous, 2-seriate, imbricate. Glumes 4; lower invol.-glume $\frac{1}{20}$ in. long, broader than long, thinly membranous, without nerves, white; upper invol.-glume ovate, acute, concave, thinly membranous, with 5–7 green nerves, slightly shorter than the upper floral glume; lower floral glume subcoriaceous, 5–7-nerved, paleate, empty or male; upper floral glume broadly ovate, mucronate, thinly coriaceous, smooth or nearly so; palea with inflexed membranous margins. Trim. Fl. Ceyl. v. 5, p. 135; Prain, Beng. Pl. p. 1174. *Panicum paspaloides* (*paspalodes*), Pers. Syn. v. 1 (1805) p. 81; Hook. f. Fl. B. I. v. 7, p. 30; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.

Dalzell without locality in Herb. Kew.! SIND: *Stocks*!; Manchar Lake, *Stocks*!, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Afghanistan, Arabia, Tropical Africa and America.

4. **Panicum stagninum,** *Retz. Obs.* fasc. 5 (1789) p. 17. Annual or perennial; root-fibres many, long, wiry, with numerous filiform rootlets; stem erect from a geniculate or prostrate base, reaching 5 ft. (or more) long, sometimes rooting from the lower nodes. Leaves 6–18 by ⅛–½ in., linear, tapering to a fine point; sheaths striate, smooth, glabrous; ligule a fringe of stiff hairs. Panicle 4–8 in. long; rhachi slender, more or less flexuous, angular, grooved, scabrid on the ridges and with scattered bristles; branches few or many, distant or close, alternate, usually suberect, 1–2 in. long, sessile or nearly so with a tuft of hairs at the base; rhachis of the branches angular, grooved, clothed sparingly with bulbous-based hairs. Spikelets crowded, ovoid-lanceolate, ⅛–⅕ in. long (excluding the awn), hairy with bulbous-based hairs, pale; pedicels very short with enlarged tips. Glumes 4; lower invol.-glume $\frac{1}{10}$ in. long (half as long as the spikelet), broadly ovate or suborbicular, cuspidate, 3-nerved, hairy and ciliate, thinly membranous; upper invol.-glume ⅕ in. long (including the mucro), broadly ovate, concave, hairy and ciliate with bulbous-based hairs, thinly membranous, 7-nerved in the upper part with green nerves, acuminate or produced into a short compressed scabrid awn; lower floral glume like the upper invol.-glume with an awn varying from ⅛–1 in. long, paleate, male, the palea hyaline, as long as the glume; upper floral glume ⅛ in long, ovate-lanceolate, mucronate, straw-colored, shining, faintly striolate, with involute margins, coriaceous; palea as long as the glume, elliptic-oblong, acute, striolate, with inflexed margins. Roxb. Fl. Ind. v. 1 (1832) p. 295; Grah. Cat. p. 237 (misspelt *staginum*); Stapf, in Dyer, Fl. Capen. v. 7 (1899) p. 394. *Panicum Crus-galli* var. *stagninum*, Trim. ex Hook. f. in Trim. Fl. Ceyl. v. 5, p. 136; Prain, Beng. Pl. p. 1174. *P. Crus-galli*, Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 (*not* of Linn.). *Oplismenus stagninus*, Kunth, Rev. Gram. v. 1 (1827) p. 44; Dalz. & Gibs. p. 292.—Flowers: Oct.

Throughout the Presidency in wet places, especially in cultivated ground and in ditches.—DISTRIB. More or less throughout India; Ceylon, most warm countries.

I do not believe that the true *P. Crus-galli* of Linnæus occurs anywhere in the Bombay Presidency, *P. stagninum*, which has been restored to specific rank by Stapf (Fl. Capen. l. c.), having been mistaken for it. Dalzell's *Oplismenus Crus-galli*, which has been cited in the 'Flora of British India' (v. 7, p. 31) as a synonym for *P. Crus-galli*, is undoubtedly *Panicum Isachne*. *P. stagninum* is a tall plant which

grows in water-holes and places where water has lodged; it has a conspicuous ligule of a fringe of hairs, as noticed by Dr. Stapf in his clavis on p. 384 in the 'Flora Capensis,' while *P. Crus-galli* has no ligule.

VAR. *frumentacea*, Trim. Cat. Ceyl. Pl. (1885) p. 104. Tall, robust; panicle often nodding; spikes thickened, often incurved, sometimes branched and corymbosely panicled, lower floral glume cuspidate but not awned. Fl. B. I. v. 7, p. 31; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1174. *Panicum frumentaceum*, Roxb. Fl. Ind. v. 1 (1832) p. 304; Grah. Cat. p. 237; Watt, Dict. Econ. Prod. v. 6, part 1, p. 9. *Oplismenus frumentaceus*, Dalz. & Gibs. Suppl. p. 98. —VERN. *Shamula.*

Cultivated in and near the Ghát districts. The quickest growing of all the millets and in some localities can be harvested within six weeks after being sown (*Watt*).

5. **Panicum colonum,** *Linn. Syst.* ed. 10 (1759) p. 870. Annual; stem 1–2 ft. long, slender, decumbent or shortly creeping below; nodes glabrous or puberulous. Leaves 4–8 by $\frac{1}{6}$–$\frac{1}{3}$ in., narrowly lanceolate or linear, acuminate, flat, glabrous, with scaberulous margins; sheaths up to 6 in. long; ligule 0. Spikes 8–20, suberect, usually distant, $\frac{1}{2}$–1 in. long; rhachis stout, angular, scaberulous on the angles. Spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. long, globosely ovoid, acute or subcuspidate, more or less hispidly pubescent, secund, sessile, 3–5-seriate. Glumes 4; lower invol.-glume about $\frac{1}{3}$ as long as the lower floral glume, broadly ovate or suborbicular, membranous, 3-nerved, ciliolate; upper invol.-glume about equal to the lower floral glume, broadly ovate, cuspidate, concave, 5–7-nerved, hairy; lower floral glume similar, empty, with a hyaline palea; upper floral glume coriaceous, broadly ovate, turgid, acute, finely striolate, polished, yellowish white, with a coriaceous palea. Very similar to *P. frumentaceum*, Roxb., but a more slender plant with smaller spikelets. Fl. B. I. v. 7, p. 32; Grah. Cat. p. 237; Trim. Fl. Ceyl. v. 5, p. 136; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1174; Watt, Dict. Econ. Prod. v. 6, part 1, p. 7. *Oplismenus colonus*, H. B. & K. Nov. Gen. & Sp. v. 1 (1815) p. 108; Dalz. & Gibs. p. 291.—Flowers: Oct. VERN. *Bovur*; *Sáma.*

KONKAN: *Stocks!* S. M. COUNTRY: Londa, *Woodrow.* GUJARAT: Morvi (Kathiawar), *Woodrow.*—SIND: *Stocks*, 650!, *Woodrow*; Shikarpur, *Woodrow.*—DISTRIB. Throughout the plains of India; Ceylon, most warm countries.

6. **Panicum Isachne,** *Roth, Nov. Pl. Sp.* (1821) p. 54. Annual; stems many, 1–2 ft. long, ascending from a decumbent or creeping and rooting base, geniculate, very slender, with villous nodes, otherwise glabrous, much branched below, simple above. Leaves 1–2 by $\frac{1}{12}$–$\frac{1}{5}$ in., linear-lanceolate from a rounded base, acute, subpungent, glabrous or sparsely hairy with scaberulous margins; sheaths glabrous or hairy, ciliate on the upper part; ligule a fringe of hairs. Inflorescence 2–3 in. long, erect, consisting of 6–12 secund or subsecund racemosely arranged spikes $\frac{1}{2}$–1 in. long, longer than the internodes, sessile or shortly pedunculate, usually appressed to the triquetrous slender hairy rhachis. Spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. long, secund, closely imbricate in 2 series, oblong, subacute or obtuse, softly hairy; rhachis of spikes triquetrous, hairy, about $\frac{1}{50}$ in. in diam.; pedicels very short. Glumes 4; lower invol.-glume minute, triangular, membranous, glabrous; upper invol.-

glume membranous, oblong, obtuse, 5-nerved, hispidly pubescent; lower floral glume narrower, 3-nerved, paleate, neuter or sometimes male, with hyaline palea; upper floral glume shorter, oblong, obtuse dorsally flattened, coriaceous, glabrous, shining, 2-sexual, with coriaceous palea. Anthers $\frac{1}{25}$ in. long. Fl. B. I. v. 7, p. 28; Trim. Fl. Ceyl. v. 5, p. 133; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1174. *Panicum eruciforme*, Sibth. & Sm. Fl. Græc. Prodr. v. 1 (1806) p. 40 & Fl. Græc. t. 59. *Oplismenus Crus-galli*, Dalz. & Gibs. Bo. Fl. (1861) p. 292 (*not* of Dum.).—Flowers: Sept.–Jan.

Dalzell without locality in Herb. Kew.! DECCAN: Poona, *Jacquemont*, 452!, *Woodrow*. GUJARAT: Surat, *Dalzell*!—DISTRIB. Throughout the plains of India in watery places; Ceylon, westward to Italy, Africa.

7. **Panicum prostratum,** *Lamk. Illustr.* v. 1 (1791) p. 171. A slender annual grass; stem 4–18 in. long, ascending from a long creeping base, often branched below; nodes pubescent; internodes 1–3 in. long. Leaves 1–2 by $\frac{1}{4}$–$\frac{5}{8}$ in., ovate-lanceolate from a cordate amplexicaul base, acuminate, thin, flat, nearly glabrous or quite glabrous above, often clothed with long hairs beneath, sometimes nearly glabrous; sheaths slender, with ciliate margins; ligule a tuft of white hairs or 0. Racemes 5–8, alternate, secund, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, sessile or shortly pedunculate, distichously spreading; rhachis of racemes slender, angular. Spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. long, solitary or binate, secund, ellipsoid, somewhat turgid, subacute, glabrous or hairy; pedicels very short, with long slender hairs at the tip below the spikelet. Glumes 4; lower invol.-glume minute, semilunate, hyaline, nerveless; upper invol.-glume about equalling the lower floral glume, membranous, broadly ovate, acute, pubescent, 7-nerved; lower floral glume 5-nerved, empty, with hyaline palea; upper floral glume elliptic, dorsally rounded, thinly coriaceous, finely striolate, nearly white, with subcoriaceous palea. Anthers $\frac{1}{30}$ in. long. Fl. B. I. v. 7, p. 33; Dalz. & Gibs. p. 290; Trim. Fl. Ceyl. v. 5, p. 138; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1175; Watt, Dict. Econ. Prod. v. 6, part 1, p. 15.—Flowers: Sept. VERN. *Chimanchara.*

DECCAN: Poona, *Woodrow*. GUJARAT: Surat, *Dalzell & Gibson*, *Lisboa*; Kathiawar, *Woodrow*. SIND: *Woodrow*.—DISTRIB. Plains of India; Ceylon, Tropics generally.

8. **Panicum ramosum,** *Linn. Mantiss.* (1767) p. 29. Annual; stem 1–3 ft. long, erect or ascending from a shortly creeping base, slender or rather stout, much branched from the base upwards, usually glabrous, leafy; nodes pubescent. Leaves 2–5 by $\frac{1}{6}$–$\frac{1}{2}$ in., linear-lanceolate, finely acuminate, thin, flat, smooth, glabrous or pubescent beneath, with scaberulous margins, base rounded; sheaths glabrous or pubescent, ciliate or not towards the mouth; ligule a fringe of short hairs. Panicle 2–6 in. long, subpyramidal, with a long peduncle; rhachis angular; branches of panicle 5–10, distant, 1–2 in. long, alternate or the lower opposite, erect or spreading, shorter upwards; rhachis of racemes slender, angular, puberulous. Spikelets alternate, $\frac{1}{16}$–$\frac{1}{8}$ in. long, close or distant, often in pairs (a sessile and a pedicellate one), ovoid, acute, pubescent, turgid, pale green or yellowish; pedicels with a few long hairs near the tip. Glumes 4; lower invol.-glume $\frac{1}{2}$ as long as the lower floral glume, ovate, acute, hyaline; upper invol.-glume about equalling the lower floral glume, ovate, acute, cuspidate, 5-nerved; lower floral glume similar but slightly broader, with membranous palea,

empty; upper floral glume coriaceous, ovoid-oblong, acute, rugulose, with coriaceous palea. Fl. B. I. v. 7, p. 36; Trim. Fl. Ceyl. v. 5, p. 140; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1175. *Panicum Helopus*, Watt, Dict. Econ. Prod. v. 6, part 1, p. 10 (partly). *P. umbrosum*, Retz. Obs. fasc. 4 (1786) p. 16; Roxb. Fl. Ind. v. 1 (1832) p. 297.—Flowers: Aug.-Nov.

DECCAN: Poona, *Woodrow*, *Lisboa*. S. M. COUNTRY: Badami, *Woodrow*.—DISTRIB. Throughout India; Ceylon, Afghanistan.

9. **Panicum setigerum,** *Retz. Obs.* fasc. 4 (1786) p. 15. Stems 2–3 ft. long, prostrate and widely straggling below, branched, slender, firm; nodes bearded, the lower rooting; internodes 1–2 in. long. Leaves 3–5 by $\frac{3}{8}$–$\frac{7}{8}$ in., ovate-lanceolate from a cordate, amplexicaul, more or less ciliate base, finely acuminate, flat, thin, with slender midrib, 5–6 pairs of nerves and scabrid margins; sheaths glabrous except at the back beneath the leaf-blade, with ciliate margins; ligule a tuft of long woolly hairs. Inflorescence of 3–10 racemes 1–2 in. long, the lower very distant, alternate; rhachis of racemes angular, glabrous or pubescent, villous at the base. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long, loosely imbricate, 2-seriate (one often pedicellate, the other sessile), secund, ovoid, acute or acuminate, glabrous or pubescent; pedicels pubescent and with long spreading slender hairs on or below the pedicel. Glumes 4; lower invol.-glume about $\frac{1}{3}$ as long as the upper, orbicular, thinly membranous; upper invol.-glume broadly ovate, acute or acuminate, 7-nerved, membranous; lower floral glume about equal to the upper invol.-glume, 5-nerved, paleate, neuter, the palea membranous, as long as the glume, subacute; upper floral glume elliptic, obtuse, shortly apiculate, coriaceous, granulate, with narrowly incurved margins, the palea coriaceous, elliptic-oblong, obtuse. Fl. B. I. v. 7, p. 36; Trim. Fl. Ceyl. v. 5, p. 141; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1175.—Flowers: Sept.-Dec.

DECCAN: Poona, *Woodrow*.—DISTRIB. India (Bengal, W. Peninsula); Ceylon.

VAR. *tomentosa*, Hook. f. Fl. B. I. v. 7 (1896) p. 37. Margins of leaves and sheaths with long white hairs; spikelets larger, $\frac{1}{6}$ in. long, tomentose; awn longer.

GUJARAT: Rajkot (Kathiawar), *Woodrow*, 45!

10. **Panicum javanicum,** *Poir. Encyl. Suppl.* v. 4 (1816) p. 274. Annual; stem 1–2 ft. long, decumbent and rooting below, geniculately ascending, branching upwards; nodes pubescent. Leaves 1–5 by $\frac{1}{4}$–$\frac{1}{2}$ in., ovate-lanceolate, from a rounded, cordate, or amplexicaul base, acuminate, softly hairy on both sides, with scaberulous margins; sheaths loose, softly hairy, the mouth villous; ligule a beard. Panicle erect; branches 6–12, rather distant; rhachis of racemes compressed, glabrous or pubescent. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, secund, 2-seriate, loosely imbricate, subsessile or very shortly pedicellate, ovoid, acute, pubescent, tomentose, or villous; pedicels pubescent and with a few long hairs near the tip. Glumes 4; lower invol.-glume ovate, acute or obtuse, not $\frac{1}{2}$ as long as the upper invol.-glume, 3-nerved or nerveless; upper invol.-glume as long as and similar to the lower floral glume, ovate, acute, 7-nerved; lower floral glume similar, 5-nerved, empty or male, with membranous palea; upper floral glume crustaceous,

broadly ovate-oblong, rugulose, the tip rounded, abruptly cuspidate with a long mucro, concealed by the lower glumes, and with a crustaceous palea. Fl. B. I. v. 7, p. 35; Trim. Fl. Ceyl. v. 5, p. 142; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1175. *Panicum Helopus*, Watt, Dict. Econ. Prod. v. 6, part 1, p. 10 (partly). *Urochloa panicoides*, Beauv. Agrost. p. 53; Dalz. & Gibs. p. 290.—Flowers: Aug.–Nov. VERN. *Phadya*; *Kuri*. Distinguished from *P. ramosum* by the awned upper floral glume.

Dalzell without locality in Herb. Kew.!; common in cultivated plains, *Lisboa*. DECCAN: N. Khandesh, *Woodrow*; Poona, *Woodrow*, *Jacquemont*, 390!; Dapuri near Poona, *Jacquemont*, 482! S. M. COUNTRY: Badami, *Woodrow*. GUJARAT: Baroda, *Cooke*!—DISTRIB. Plains of India; Ceylon, Tropics generally. A good fodder grass for horses and cattle.

11. **Panicum interruptum,** *Willd. Sp. Pl.* v. 1 (1797) p. 341. A large perennial grass, quite glabrous; stem reaching 5–6 ft. long, ascending from a stout creeping and rooting or floating rootstock; lower nodes emitting fascicles of long stout roots clothed with root-hairs; upper internodes very long, slender. Leaves 6–12 by $\frac{1}{4}$–$\frac{1}{2}$ in., linear, finely acuminate, soft, flat, glabrous, with smooth or scaberulous margins, base rounded or subcordate; sheaths 2–4 in. long, with smooth margins; ligule short, broad, membranous. Inflorescence a spike-like panicle 6–12 by $\frac{1}{4}$–$\frac{1}{3}$ in., cylindric, interrupted below; rhachis stout, strict, channelled. Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long, densely crowded in small fascicles, subsessile or shortly pedicellate, spreading, ovoid-lanceolate, acute, green. Glumes 4; lower invol.-glume scarcely $\frac{1}{16}$ in. long, broadly ovate, obtuse, hyaline, 3–5-nerved; upper invol.-glume ovate, acute, herbaceous, membranous, prominently 9-nerved; lower floral glume about equalling the upper invol.-glume, ovate, acute, 7-nerved, paleate, male or barren, the palea hyaline; upper floral glume shorter than the lower, ovate-oblong, subacute, thinly coriaceous, white, polished, dorsally convex, the palea thinly coriaceous, as large as the glume. Anthers purple, much exserted. Grain obovoid, apiculate. Fl. B. I. v. 7, p. 40; Dalz. & Gibs. p. 316; Trim. Fl. Ceyl. v. 5, p. 147; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1175.—Flowers: Oct.–Feb.

KONKAN: *Stocks*!, *Law*!; Panvel, *Woodrow*; Vingorla, *Woodrow*; margins of tanks throughout the Konkan, *Dalzell & Gibson*. S. M. COUNTRY: Londa, *Woodrow*! SIND: *Woodrow*.—DISTRIB. Throughout India in swamps; Ceylon, Malaya, Trop. and S. Africa.

12. **Panicum myosuroides,** *R. Br. Prodr.* (1810) p. 189. Stem 2–3 ft. long, erect, or shortly creeping below, rather stout, leafy; internodes 3–5 in. long. Leaves 6–8 by $\frac{1}{10}$–$\frac{1}{6}$ in., narrowly linear, finely acuminate, margins smooth, base narrow; sheaths 2–4 in. long, with naked margins; ligule 0. Inflorescence a spike-like panicle $1\frac{1}{2}$–8 by $\frac{1}{6}$ in., cylindric, erect or curved; rhachis grooved, glabrous. Spikelets innumerable, $\frac{1}{12}$ in. long or less, densely crowded in small fascicles, very shortly pedicellate, globosely ovoid, obtuse, glabrous or pubescent, green or purplish. Glumes 4; lower invol.-glume about $\frac{1}{2}$ as long as the upper, ovate, subacute, 3-nerved; upper invol.-glume ovate, obtuse, conspicuously 5–9-nerved, glabrous or pubescent; lower floral glume about equalling the upper invol.-glume, but broader, ovate, obtuse, very concave, 5–9-nerved, glabrous or pubescent, paleate, empty; upper floral

glume much smaller than the lower, ovate-oblong, acute, quite smooth, white, dorsally convex with involute margins, thinly coriaceous; palea as long as the glume. Fl. B. I. v. 7, p. 42; Trim. Fl. Ceyl. v. 5, p. 148; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1175.

KONKAN: Sávantvádi, *Woodrow*; Alibag, *Lisboa*.—DISTRIB. Throughout the hotter parts of India; Ceylon, Malay Peninsula, China, Australia, Trop. Africa.

13. **Panicum turgidum,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 18. Perennial, glabrous, glaucous; rootstock sometimes as thick as the little finger; root-fibres thick, velvety; stem hard (bamboo-like), solid, smooth and polished, $\frac{1}{10}$–$\frac{1}{8}$ in. in diam. about the middle, emitting from the nodes fascicles of branches in tufts from a swollen base. Leaves few, those at the base of the stem and branches 1–3 in. long, flat, coriaceous, linear-lanceolate, acuminate, smooth, those of the upper nodes often reduced to open chartaceous sheaths with a setiform blade. Panicle terminal, subpyramidal, 1½–4 in. long; branches at first erect, then more or less spreading, ½–1½ in. long; rhachis angular, grooved, glabrous. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, solitary, or rarely 2-nate, subsecund, ovoid, turgid, glabrous, white; pedicels short or long, with a cupular tip, scaberulous. Glumes 4, subcoriaceous; lower invol.-glume scarcely shorter than the upper, and about equalling the lower floral glume, broadly ovate, acute, concave, 5–7-nerved; upper invol.-glume broadly ovate, acute, 7-nerved; lower floral glume ovate, acuminate, 9-nerved, paleate, male; upper floral glume much smaller than the lower, ovate-oblong, acute, smooth, polished. Anthers purple. Styles short; stigmas short, pale purple. Fl. B. I. v. 7, p. 44; Delile, Fl. d'Egypte, p. 19, t. 9, fig. 2; Duthie, Fodd. Grass. N. Ind. p. 13; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Nov. The plant grows on arid or desert plains.

• GUJARAT: Rajkot (Kathiawar), *Woodrow*. SIND: *Duthie*.—DISTRIB. Beluchistan, Egypt, Arabia, Trop. Africa.

14. **Panicum obscurans,** *Woodr. in Journ. Bomb. Nat.* v. 13 (1901) p. 434. Annual; stems tufted, erect or ascending, 1–2 ft. (or more) high (in specimens raised from seed by Woodrow at Poona, in the College of Science Botanical Garden, the stem is simple and about 3 ft. high); nodes glabrous. Leaves 3½–5 by ⅜ in. at the widest part, lanceolate, acute, with a few scattered hairs above, hispid with bulbous-based hairs below; sheaths closely striate, hispid with short bulbous-based hairs, the margins naked; ligule a tuft of hairs. Panicle large, 15 by 12 in., pyramidal, lax; branches of the panicle widely spreading, laxly racemosely or subpaniculately branched, each branchlet 1–3-flowered at the apex, naked below; rhachis angular, grooved, scaberulous on the angles. Spikelets distant, solitary, $\frac{1}{8}$–$\frac{1}{5}$ in. long, pedicellate, narrowly ovoid, acuminate. Glumes 4, the 3 lower strongly nerved with green nerves; lower invol.-glume ⅛ in. long, ovate, acuminate, shorter than the upper, membranous, 5-nerved, the nerves scaberulous; upper invol.-glume $\frac{1}{8}$ in. long, ovate, acuminate, 7-nerved; lower floral glume rather less than $\frac{1}{8}$ in. long, ovate, acuminate, empty, paleate, the palea ½ as long as the glume, elliptic-oblong, hyaline, shortly 2-dentate; upper floral glume $\frac{1}{16}$ in. long, crustaceous, hard, smooth, concave, elliptic,

obtuse, with incurved margins, yellowish-white, very faintly 5–7-nerved; the palea crustaceous, elliptic, obtuse, with incurved margins, as long as the glume. *Isachne obscurans*, Woodr. in Gard. Chron. v. 23, ser. 3 (1898) p. 161.—Flowers: Nov.–Dec. VERN. *Tán-sawa.* The whole inflorescence breaks off and is driven about by the wind (*Woodrow*).

DECCAN: Jeur near Sholapur, *Woodrow*! Specimens in Herb. Kew. also grown from seed in the Botanic Garden of the College of Science at Poona.

The grain is used as a fast-day food and cooked like rice (*Woodrow*).

15. **Panicum trypheron,** *Schult. Mantiss.* v. 2 (1824) p. 244. Annual; stems 1–3 ft. high, tufted, erect, or geniculate below, stout or slender, leafy at the base; nodes glabrous; internodes 2–5 in. long. Leaves 3–10 by $\frac{1}{8}$–$\frac{1}{4}$ in., usually flat, thin, linear, acuminate, more or less hairy on both surfaces, margins often ciliate, base narrow; sheaths long, glabrous or hairy, the margins often ciliate towards the top; ligule short, fimbriate. Panicle 4–10 in. long, often as broad as long, effuse; rhachis filiform, slightly scaberulous; branches up to 4 in. long, capillary. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long, very distant, ovoid, acuminate, sometimes with a purple tinge, glabrous; pedicels long or short, filiform. Glumes 4; lower invol.-glume about $\frac{2}{3}$ as long as the lower floral glume, broadly ovate, acuminate, membranous, 5-nerved; upper invol.-glume slightly longer than the lower floral glume, ovate, acuminate, 7–9-nerved; lower floral glume similar but shorter, 7-nerved, empty, paleate, the palea oblong, obtuse, 2-toothed at the apex, smaller than the glume, hyaline; upper floral glume elliptic, obtuse, dorsally convex, smooth, shining, yellowish-white, coriaceous, faintly 5-nerved, the margin very slightly incurved, the palea elliptic, as long as the glume, coriaceous. Fl. B. I. v. 7, p. 47; Trim. Fl. Ceyl. v. 5, p. 152; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1176.—Flowers: Sept. VERN. *Bhatur.*

KONKAN: Malabar Hill (Bombay), *Lisboa.* DECCAN: Poona, *Woodrow*; Jeur (Sholapur districts), *Woodrow*; Malhargad, *Woodrow.*—DISTRIB. India (Bengal, Panjáb, W. Peninsula); Ceylon, China, Borneo, Trop. Africa.

16. **Panicum subeglume,** *Trin. in Mém. Acad. Pétersb.* sér. 6, v. 3, part 2 (1835) p. 292. Perennial; stem slender, 1–2 ft. long, glabrous or nearly so; nodes glabrous or tomentose. Leaves 3–6 by $\frac{1}{4}$–$\frac{3}{8}$ in., linear, finely acuminate, glabrous or softly hairy; sheaths glabrous or softly hairy; ligule short, membranous. Panicle large, effuse, 3–7 in. long, spreading; rhachis capillary; branches capillary, reaching 4 in. long, the lower suberect, alternate, often branched from the base; branchlets filiform. Spikelets pedicellate, $\frac{1}{10}$ in. long, oblong-ellipsoid, tapering to both ends, dorsally compressed, glabrous or silky. Invol.-glumes very minute, hyaline, sometimes one (rarely both) obsolete; lower floral glume 5–7-nerved, elliptic-oblong, subacute, glabrous or silky; upper floral glume as long as the lower, elliptic-oblong, acute, with membranous inflexed margins; palea oblong, subacute, slightly shorter than its glume, with membranous inflexed margins. I have found the two invol.-glumes present (though exceedingly minute) in many specimens that I have examined. Fl. B. I. v. 7, p. 51; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434. *Panicum Torreyanum*, W. & A. ex Steud. Nom. ed. 2, v. 2 (1841) p. 264.—Flowers: Sept.

S. M. COUNTRY: Badami, *Woodrow.*—DISTRIB. India (W. Peninsula).

17. **Panicum antidotale,** *Retz. Obs.* fasc. 4 (1786) p. 17. A tall glabrous perennial grass reaching 5 ft. high; rootstock creeping, stoloniferous; stem solid, woody, terete, smooth; nodes thickened, the lower sometimes rooting. Leaves 6–24 by $\frac{1}{4}$–$\frac{3}{4}$ in., linear, very finely acuminate with capillary tips; sheaths long, glabrous, striate, with naked margins; ligule short, membranous, jagged or fimbriate. Panicle 6–9 in. long, effuse, pyramidal; rhachis very slender, angular, glabrous or slightly scaberulous; branches usually fascicled (the upper sometimes solitary), 3–4 in. long, filiform, spreading and drooping; branchlets capillary. Spikelets laxly crowded on the branchlets, reaching $\frac{1}{5}$ in. long or slightly longer, ovoid, acute, glabrous. Glumes 4; lower invol.-glume $\frac{1}{2}$ as long as the upper, broadly ovate, subobtuse, 3-nerved, hyaline; upper invol.-glume broadly ovate, acuminate, 7–9-nerved, membranous; lower floral glume equal and similar to the upper invol.-glume, paleate, empty or male, the palea oblong, subacute, hyaline, as long as the glume; upper floral glume coriaceous, elliptic, obtuse, with incurved margins, dorsally smooth, yellowish-white; palea thinly coriaceous, ovate, acute, as long as the glume. Anthers linear-oblong. Styles 2, distinct, conspicuous, very plumose. Fl. B. I. v. 7, p. 52; Trim. Fl. Ceyl. v. 5, p. 156; Duthie, Indig. Fodd. Grass. t. 3; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Mar.

S. M. Country: Londa, *Woodrow.* Gujarat: Kathiawar, *Woodrow*, 44! Sind: *Stocks*, 659!; Sukkur, *Woodrow.*—Distrib. India (Panjáb and upper Gangetic plain, W. Peninsula); Ceylon, Afghanistan, Trop. Africa and Australia.

18. **Panicum proliferum,** *Lam. Encyc. Méthod.* v. 4 (1797) p. 747. Var. **paludosum,** *Stapf, in Dyer, Fl. Capen.* v. 7 (1899) p. 407. Perennial; stem simple or branched, 2–3 ft. high, leafy, ascending from a creeping or floating spongy rootstock which is sometimes as thick as the little finger. Leaves 6–12 by $\frac{1}{4}$–$\frac{2}{3}$ in., linear or ensiform, acute or acuminate, flat, subcoriaceous, glabrous, base broad, subcordate; sheaths loose, glabrous, the margins naked; ligule a ridge of fine hairs. Panicle 4–10 in. long, often as broad as long when spreading, sessile at the mouth of the leaf-sheath or very shortly pedunculate; lower branches whorled and fascicled; rhachis stout, angular, scaberulous; branches of panicle strict, naked below, bearing short erect flowering branchlets about the middle. Spikelets $\frac{1}{5}$–$\frac{1}{3}$ in. long, narrowly ovoid-lanceolate, acuminate, greenish, solitary or 2-nate; pedicels angular, scaberulous. Glumes 4; lower invol.-glume not $\frac{1}{4}$ the length of the upper, orbicular or reniform, not nerved, hyaline; upper invol.-glume ovate, acuminate, 7-nerved, as long as the lower floral glume; lower floral glume similar, 9-nerved, paleate or not, empty (rarely male); upper floral glume shorter than the lower, oblong, acute, yellowish-white, smooth, shining, with incurved margins; palea as long as the glume, oblong, acute. Dr. Stapf (*l. c.*) states that the typical *P. proliferum* is only to be found in the Atlantic States of North America. *Panicum proliferum*, Hook. f. Fl. B. I. v. 7, p. 50; Trim. Fl. Ceyl. v. 5, p. 155; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1176. *Panicum paludosum*, Roxb. Fl. Ind. v. 1 (1832) p. 307. *P. decompositum* var. *paludosum*, Trim. Cat. p. 105.—Vern. *Borati.*

Konkan: Salsette, *Lisboa.* Deccan: Poona, *Lisboa*; Ianoli, *Lisboa.*—Distrib. Throughout the low countries of India in marshes and still waters; Ceylon, S. Africa, Tropics generally.

19. **Panicum montanum,** *Roxb. Fl. Ind.* v. 1 (1832) p. 313. Perennial; stem 3–4 ft. high (or more), erect from a woody rootstock, stiff, hard, solid, smooth, sparingly branched; nodes glabrous, the lower emitting long filiform roots. Leaves 5–7 by $\frac{1}{2}$–1 in., spreading or deflexed from the sheath, linear-oblong, acuminate, flat, smooth, many-veined, glabrous or ciliate near the base only, with slender midrib and scaberulous margins, base broad, deeply cordate; sheaths shorter than the internodes, glabrous or pubescent, the margins naked or ciliate near the top; ligule of soft long hairs. Panicle 8–15 in. long, effuse, copiously branched; branches suberect or spreading, the lower branches very long; rhachis of panicle and the branches more or less scaberulous. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long, ellipsoid, obtuse, solitary, distant; pedicels long, capillary, erect. Glumes 4; lower invol.-glume about $\frac{1}{2}$ as long as the spikelet (or more), ovate, subacute, 3–5-nerved, with ciliate margins; upper invol.-glume broadly ovate, obtuse, 5-nerved, sometimes with ciliolate margins, subcoriaceous; lower floral glume slightly longer than the upper invol.-glume, broadly ovate, obtuse, 5-nerved, epaleate, subcoriaceous; upper floral glume elliptic, subacute, faintly striolate, coriaceous or almost crustaceous; palea nearly as long as the glume, elliptic, subacute, coriaceous, with inflexed membranous margins. Fl. B. I. v. 7, p. 53; Trim. Fl. Ceyl. v. 5, p. 155; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1176.—Flowers: Jan. VERN. *Tokarbaud.*

KONKAN: *Stocks!, Law!*; Khardi (Thána districts), *Lisboa.*—DISTRIB. Hotter parts of India; Ceylon, Penang, Malaya, China, Philippines.

20. **Panicum patens,** *Linn. Sp. Pl.* (1753) p. 58. Stem 1–2 feet long, very slender, branched, creeping and rooting below; nodes glabrous, the lower emitting long, solitary wiry roots. Leaves $\frac{3}{4}$–$3\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{2}$ in., ovate-lanceolate or linear-lanceolate, finely acuminate, thin, glabrous or hairy; sheaths with ciliate margins and mouth; ligule membranous, rounded. Panicle 2–5 in. long, usually inclined, effuse or contracted; branches very slender, long, distant, naked below; branchlets capillary. Spikelets $\frac{1}{15}$ in. long, gibbously obovoid, obtuse, glabrous, laterally compressed, brown; pedicels long, capillary. Glumes 4; lower invol.-glume $\frac{1}{2}$ as long as the spikelet, elliptic-oblong, obtuse, concave, membranous, brown; upper invol.-glume longer than the lower, but shorter than the floral glumes, gibbous, concave, keeled, membranous, brown; lower floral glume as long as the upper, elliptic, obtuse, concave, often ciliate at the tip, paleate, membranous, brown, empty, the palea small, hyaline, ovate-lanceolate, acuminate; upper floral glume glabrous, very gibbous, with a protuberant rounded back, boat-shaped, coriaceous, shortly stipitate, laterally compressed, white, shining; palea as long as the glume, elliptic with incurved margins. Fl. B. I. v. 7, p. 57; Trim. Fl. Ceyl. v. 5, p. 159; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434. *Panicum radicans,* Retz. Obs. fasc. 4 (1786) p. 18.—Flowers: Dec.

KANARA: Kadgal (N. Kanara), *Woodrow,* 32!—DISTRIB. India (Sikkim, Khasia Hills, W. Peninsula); Ceylon, Malay and Pacific Islands.

Panicum maximum, Jacq. Icon. Pl. Rar. v. 1 (1781) p. 2, t. 13. A tall perennial reaching 8–10 ft. high the first year, but after being cut two or three times it does not grow so high but grows thicker. The *Guinea Grass*, a native of Africa, cultivated as a fodder crop chiefly in Gujarat and Sind. Fl. B. I. v. 7, p. 49; Trim. Fl. Ceyl. v. 5, p. 153; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1176. *Panicum altissimum*, Brouss. Elench. Hort. Monsp. (1805) p. 42; Dalz. & Gibs. Suppl. p. 98. *P. jumentorum*, Pers. Syn. v. 1 (1805) p. 83; Duthie, Fodd. Grass. N. Ind. (1888) p. 9; Watt, Dict. Econ. Prod. v. 6, part 1, p. 10.

Panicum miliaceum, Linn. Sp. Pl. (1753) p. 58. An annual hairy grass 2–4 ft. high with leafy erect stem and a much-branched panicle, a native of Egypt and Arabia, is cultivated in many places in Gujarat and on the Ghâts for its grain which is eaten and a preparation of which constitutes a favorite food at marriage ceremonies. Fl. B. I. v. 7, p. 45; Grah. Cat. p. 237; Dalz. & Gibs. Suppl. p. 98; Duthie, Fodd. Grass. N. Ind. (1888) p. 9; Trim. Fl. Ceyl. v. 5, p. 150; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1176; Watt, Dict. Econ. Prod. v. 6, part 1, p. 12.—VERN. *Varai*; *Ghoti-sáva*.

Panicum miliare, Lamk. Illust. v. 1 (1791) p. 173. Annual; stems many, 1–3 ft. high, erect, leafy; leaves smooth, linear, finely acuminate, glabrous or nearly so. Cultivated occasionally but not largely, in Gujarat and other parts of the Bombay Presidency. The grain, which becomes dark brown when ripe, is eaten by the poorer classes. Fl. B. I. v. 7, p. 46; Grah. Cat. p. 237; Duthie, Fodd. Grass. N. Ind. (1888) p. 10; Trim. Fl. Ceyl. v. 5, p. 150; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1176; Watt, Dict. Econ. Prod. v. 6, part 1, p. 13. *Panicum psilopodium*, Trin. Gram. Pan. Diss. 2 (1826) p. 217; Hook. f. Fl. B. I. v. 7, p. 46; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—VERN. *Sáva*.

Panicum muticum, Forsk. Fl. Ægypt.-Arab. (1775) p. 20. A tall grass; stem 6–8 ft. high with bearded nodes; leaves 6–10 by $\frac{1}{2}$–$\frac{2}{3}$ in. with subcordate base; panicle 3–8 in. long. The *Water-Grass* and *Mauritius Grass* of Ceylon, a native of S. America, has been occasionally cultivated according to Woodrow at Kirkee and Surat. It is a valuable fodder grass and has been largely grown in Ceylon. Fl. B. I. v. 7, p. 34; Trim. Fl. Ceyl. v. 5, p. 140; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1175.

EXCLUDED SPECIES.

PANICUM AURITUM, *P. INDICUM*, *P. NODOSUM*, and *P. TRIGONUM* are given in Woodrow's list (Journ. Bomb. Nat. v. 13) as occurring in the Bombay Presidency, but no localities have been assigned as their habitat. There are no specimens of these from the Bombay Presidency in Herb. Kew. and there is not at present any evidence to show that they exist in that Presidency.

11. **DIGITARIA,** Rich.

Annual or perennial grasses. Leaves linear or lanceolate. Spikelets usually 2–3-nate, in digitate or racemose spikes, jointed on the pedicel but not thickened at the base; lower floret barren, reduced to the floral glume and a very minute palea; upper floret hermaphrodite. Glumes very dissimilar, normally 4; the lower invol.-glume usually hyaline, sometimes absent or present in the same species; the upper invol.-glume membranous, 1–5-nerved or nerveless; floral glumes equal or subequal, the lower like the upper invol.-glume, usually 7–9-nerved, the nerves close, parallel, straight, prominent; upper floral glume chartaceous or subchartaceous, usually 3-nerved. Palea of upper floret subequal to the glume, and of same texture, 2-nerved. Lodicules 2, minute, broadly cuneate. Stamens 3. Styles distinct; stigmas plumose, laterally exserted near the apex of the floret. Grain oblong, slightly dorsally compressed, free, but tightly enclosed between the hardened glume and the palea.—Distrib. Species about 50, mostly in warm parts of the Old World; 1 species widely spread as a weed all over the globe except the arctic regions.

Spikelets $\frac{1}{10}$ in. long or longer.	
Spikelets with clavate hairs	1. *D. ternata.*
Hairs on the spikelets not clavate.	
Spikelets bearded; spikes few	2. *D. sanguinalis* var. *ciliaris.*
Spikelets subsilky; spikes many	3. *D. pennata.*
Spikelets less than $\frac{1}{10}$ in. long.	
Rhachis capillary, trigonous	4. *D. pedicellaris.*
Rhachis narrowly winged.	
Spikelets subsilky with slender (not clavellate) hairs	5. *D. longiflora.*
Spikelets with clavellate hairs	6. *D. Royleana.*

1. **Digitaria ternata,** *Stapf, in Dyer, Fl. Capen.* v. 7 (1898) p. 376. Annual; stems tufted, erect from a geniculate base, slender, 6–18 in. long, glabrous or nearly so. Leaves 2–6 by $\frac{1}{4}$ in., linear-lanceolate, acute, glabrous; sheaths glabrous, striate, the mouth ciliate; ligules short, truncate, membranous. Spikes 2–3 (or more), subdigitate, erect or spreading, silvery-white; rhachis narrowly winged. Spikelets 2–3-nate, $\frac{1}{8}$ in. long, elliptic, subacute, closely appressed to the rhachis, pale; pedicels unequal, up to $\frac{1}{10}$ in. long, shortly hairy towards the tips. Lower invol.-glume usually obsolete; upper invol.-glume tender, 3-nerved, the sides villous with clavate hairs; floral glumes subequal, the lower prominently 5-nerved, densely and appressedly silky-villous with clavate hairs, the upper chartaceous, ovate-oblong, subacute, dark brown (nearly black). *Paspalum ternatum,* Hook. f. Fl. B. I. v. 7 (1896) p. 17; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.

S. M. Country: Belgaum, *Ritchie*!—Distrib. India (Khasia Hills); Abyssinia.

2. **Digitaria sanguinalis,** *Scop. Fl. Carn.* ed. 2, v. 1 (1772) p. 52. Var. **ciliaris,** *Prain, Beng. Pl.* p. 1181. Annual; stems tall, reaching 3 ft. long or more, slender, ascending from a geniculate or prostrate branched base, glabrous. Leaves 2–6 by $\frac{1}{6}$–$\frac{1}{3}$ in., linear or linear-lanceolate, acute, flat, with scabrous margins, glabrous or more or less sparsely hairy; sheaths long, loose, glabrous, or rarely hairy except near the mouth. Spikes few (3–8), 3–6 in. long; rhachis slender,

triquetrous, narrowly winged. Spikelets oblong, acute, $\frac{1}{10}$–$\frac{1}{8}$ in. long, bearded; pedicels twin, one short, the other much longer, triquetrous with scabrid margins. Glumes 4; the lower invol.-glume a minute scale; the upper invol.-glume about $\frac{1}{2}$ as long as the lower floral glume, membranous; the lower floral glume ovate-oblong, acute, membranous, 3–5-nerved; the upper floral glume as long, subchartaceous. *Paspalum sanguinale* var. *ciliaris*, Hook. f. Fl. B. I. v. 7, p. 15. *Paspalum ciliare*, DC. Fl. Fr. ed. 3, v. 6 (1815) p. 250. *Panicum ciliare*, Retz. Obs. fasc. 4 (1786) p. 16; Grah. Cat. p. 237. *Panicum sanguinale* var. *ciliaris*, Watt, Dict. Econ. Prod. v. 6, part 1, p. 15.—Flowers: Oct. VERN. *Roeya*; *Dinohi*.

Throughout the Presidency, common.—DISTRIB. Most warm countries.

3. **Digitaria pennata,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 16 (*Paspalum*). Stems 2 ft. long, tufted, leafy. Leaves 1–6 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear or linear-lanceolate, finely acuminate, glabrous or sparsely hairy, distantly ciliate with long, fine, bulbous-based hairs; sheaths long, striate, glabrous or with a few scattered hairs; ligule long, oblong, membranous. Spikes several, radiating, 3–6 in. long; rhachis very slender, trigonous, with numerous long cilia. Spikelets erect, solitary or 2-nate, $\frac{1}{8}$ in. long, narrowly lanceolate, acute, subsilky. Glumes normally 4; lower invol.-glume minute, ovate, acute (rarely absent); upper invol.-glume lanceolate, acute, membranous; lower floral glume similar to the upper invol.-glume, 3–5-nerved; upper floral glume chartaceous, lanceolate, acuminate, nearly equal to the lower. *Paspalum pennatum*, Hook. f. *l. c.*; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers: Oct.

GUJARAT: Morvi (Kathiawar), *Beck* ex *Woodrow*. SIND: Jemadar ka Landa near Karachi, *Stocks*, 1183!—DISTRIB. Beluchistan, Abyssinia.

4. **Digitaria pedicellaris,** *Prain, Beng. Pl.* (1903) p. 1181. Stems tufted, 6–18 in. long, leafy. Leaves 2–6 by $\frac{1}{10}$–$\frac{1}{6}$ in., linear-lanceolate, finely acuminate. Spikes 3–10, alternate, racemosely arranged on a very slender peduncle, suberect or spreading, 1–4 in. long; rhachis capillary, trigonous; pedicels $\frac{1}{24}$–$\frac{1}{8}$ in. long, those of the upper spikelet longer than the spikelet. Spikelets 2–5-nate, $\frac{1}{20}$–$\frac{1}{16}$ in. long, elliptic, acute. Lower invol.-glume obsolete; upper invol.-glume elliptic, acute, very slightly hairy, 5-nerved, thinly membranous (almost hyaline); lower floral glume similar; upper floral glume elliptic, acuminate, thickly membranous, pale. *Paspalum pedicellare*, Trin. ex Steud. Nom. ed. 2 (1841) p. 272; Hook. f. Fl. B. I. v. 7 (1896) p. 19; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.

KONKAN: *Stocks*!—DISTRIB. Throughout India.

5. **Digitaria longiflora,** *Pers. Syn.* v. 1 (1805) p. 85 (*not* of Trin.). Annual or perennial; stems many, tufted, slender, creeping and rooting, or ascending or suberect, 6–18 in. long, glabrous, with many nodes, often branched, leafy. Leaves $\frac{1}{2}$–4 in. long, linear-lanceolate, acute, spreading, flat, or, in short-leaved states, stiff and pungent, glabrous (rarely hairy); sheaths smooth or hairy; ligule very short, membranous. Spikes 2–5, terminal, very slender, 1–4 in. long, erect or spreading; rhachis narrowly winged, glabrous; pedicels 2 (rarely 3)-nate, unequal,

short. Spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. long, appressed to the rhachis, elliptic, obtuse, acute or subacute, pale or purplish, glabrous, or subsilky with wrinkled hairs. Lower invol.-glume 0 or rudimentary; upper invol.-glume 3–7-nerved; lower floral glume similar and subequal to the upper invol.-glume, 3–5-nerved; upper floral glume subchartaceous, ovate-oblong, slightly shorter than the lower, pale brown, smooth; palea with inflexed (not auricled) flaps. Prain, Beng. Pl. p. 1181. *Digitaria tenuiflora*, Beauv. Agrost. (1812) p. 51. *Paspalum longiflorum*, Retz. Obs. fasc. 4 (1786) p. 15; Hook. f. Fl. B. I. v. 7, p. 17; Trim. Fl. Ceyl. v. 5, p. 124; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.

Throughout the Presidency, but not common.—DISTRIB. Throughout India; Ceylon, tropical and subtropical regions of the Old World.

6. **Digitaria Royleana,** *Prain, Beng. Pl.* (1903) p. 1181. Perennial; stems 1–2 ft. long, tufted, slender, erect, leafy. Leaves 4–9 by $\frac{1}{8}$–$\frac{1}{4}$ in., erect, linear, acuminate, flat, glabrous or sparsely ciliate towards the base; sheaths glabrous or with a few scattered hairs; ligule short, rounded, membranous. Spikes 3–15, erect, subdigitate or alternate, 3–6 in. long, on the top of a slender peduncle, very slender; rhachis filiform, very narrowly winged, glabrous; pedicels often much longer than the spikelets, usually setulose with long hairs. Spikelets secund, $\frac{1}{20}$–$\frac{1}{16}$ in. long, broadly elliptic, tomentose with minute clavellate hairs. Lower invol.-glume 0 or reduced to a tuft of hairs; upper invol.-glume usually much smaller than the floral glumes or reduced to hairs; lower floral glume thinly membranous, broadly elliptic, strongly 5-nerved, as long as and broader than the upper floral glume; upper floral glume thinly coriaceous, ovate, acute, striolate, polished and shining, dark brown or nearly black; palea with inflexed flaps. *Paspalum Royleanum*, Nees, ex Thw. Enum. (1864) p. 358; Hook. f. Fl. B. I. v. 7, p. 18; Trim. Fl. Ceyl. v. 5, p. 125; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers: Dec.

Western Ghâts (Suvasni Ghât), *Woodrow*!—DISTRIB. Hilly districts throughout India; Ceylon, Trop. Africa.

12. PASPALUM, Linn.

Annual or perennial grasses. Leaves lanceolate or ovate-lanceolate. Spikelets orbicular to oblong, obtuse, 1-flowered, awnless, falling off entire from the very short or obscure pedicels, secund and generally 2-ranked on the flattened or triquetrous rhachis of spikes, plano-convex; lower floret barren, reduced to the floral glume; upper floret hermaphrodite. Glumes 3; lower invol.-glume 0; upper invol.-glume membranous, as long as the floral glume (rarely shorter or obsolete). Floral glumes equal or subequal; the lower resembling the upper invol.-glume; the upper chartaceous to subcoriaceous. Palea subequal to and of the same texture as the upper floral glume. Lodicules 2, connate. Stamens 3. Styles distinct, slender; stigmas plumose, exserted from near the top of the spikelet. Grain tightly enclosed in the hardened floral glume and palea, dorsally subcompressed.—DISTRIB. Species about 150, chiefly natives of the New World.

Annual.

Leaves 6–18 by $\frac{1}{2}$–$\frac{3}{4}$ in.; a tall plant 2–3 ft. high	1. *P. scrobiculatum.*
Leaves 1–3 by $\frac{1}{3}$–$\frac{1}{2}$ in.; plant 6–12 in. high	2. *P. compactum.*
Perennial; leaves 2–4 by $\frac{1}{20}$–$\frac{1}{8}$ in.	3. *P. distichum.*

1. **Paspalum scrobiculatum,** *Linn. Mantiss.* (1767) p. 29. Annual; stems 2–3 ft. long, tufted on a very short rhizome, erect (rarely ascending), leafy from the base upwards, glabrous. Leaves bifarious, erect or suberect, 6–18 by $\frac{1}{12}$–$\frac{1}{8}$ in., finely acuminate, glabrous or sometimes softly hairy; sheaths 4–8 in. long, compressed, loose, the mouth hairy, with very short membranous ligules. Spikes 2–6, sessile, usually distant and spreading, 1–6 in. long; rhachis herbaceous, $\frac{1}{12}$–$\frac{1}{8}$ in. broad with ciliate margins. Spikelets usually 2-ranked, $\frac{1}{12}$–$\frac{1}{8}$ in. in diam., sessile or shortly pedicellate, broadly elliptic or suborbicular, imbricate. Glumes 3; lower invol.-glume 0; the upper convex, 3–7-nerved, membranous; lower floral glume flat, membranous, like the upper invol.-glume; upper floral glume thickly coriaceous, brownish, shining, striolate; palea orbicular, tumid, thickly coriaceous like the upper floral glume, dorsally convex, ventrally strongly inflexed below the middle and forming 2 broad membranous auricles that embrace the grain. Fl. B. I. v. 7, p. 10; Grah. Cat. p. 234; Dalz. & Gibs. Suppl. p. 97; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1182; Watt, Dict. Econ. Prod. v. 6, part 1, p. 111. *Paspalum Kora*, Willd. Sp. Pl. v. 1 (1797) p. 332; Grah. Cat. p. 234.—Flowers: Oct. VERN. *Harik.*

Throughout the Presidency, cultivated.—DISTRIB. Tropics of the Old World.

The grain is eaten by the poorer natives, but its use requires care and considerable preparation, as in some cases the grain is poisonous and produces unconsciousness or delirium with violent tremors of the voluntary muscles. See Watt, Dict. Econ. Prod. l. c.

2. **Paspalum compactum,** *Roth, Nov. Pl. Sp.* (1821) p. 36. Plant 6–12 in. high; roots stiff, wiry; stems terete, decumbent and branched below, leafy, hairy. Leaves 1–3 by $\frac{1}{3}$–$\frac{1}{2}$ in., elliptic-lanceolate, acute, sparsely hairy on both sides, ciliate; sheaths densely hairy with fine bulbous-based hairs; ligule very short. Spikes numerous, shorter upwards, spreading (often nearly horizontally), glabrous or nearly so, forming a pyramidal raceme 2–4 in. long; rhachis slender, triquetrous. Spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. in diam., hemispheric, rather turgid, close-set but not imbricate, pendulous by short filiform pedicels. Lower invol.-glume 0; upper invol.-glume broadly elliptic or suborbicular; lower floral glume narrower; upper floral glume subcoriaceous, concave, orbicular, rounded at the tip, white; palea not or obscurely auricled. Fl. B. I. v. 7, p. 12; Steud. Syn. Gram. (1855) p. 31; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers: Sept. VERN. *Kuri.*

KONKAN: *Stocks!* DECCAN: Lanoli, *Lisboa, Woodrow*; Mahableshwar, *Cooke!, Woodrow.* KANARA: *Woodrow.*—DISTRIB. India (W. Peninsula).

3. **Paspalum distichum,** *Linn. Amœn. Acad.* v. 5 (1760) p. 391. Perennial; stem many-noded, sheathed throughout, ascending from a creeping, rooting, often very long and branched base. Leaves numerous, distichous, 2–4 by $\frac{1}{20}$–$\frac{1}{6}$ in., linear-lanceolate, acuminate, involute or flat, spreading, membranous, or, in short-leaved states, stiff and pungent, glabrous or nearly so; sheaths thin, glabrous except the usually bearded mouth; ligules very short, truncate. Spikes 2-nate, shortly pedunculate and articulate on the top of the stem; rhachis herbaceous, $\frac{1}{20}$ in. broad. Spikelets subsessile, solitary or 2-nate, elliptic-oblong, $\frac{1}{12}$–$\frac{1}{6}$ in. long, acute, dorsally flattened, imbricate and appressed to the rhachis,

glabrous, pale. Lower invol.-glume 0; upper invol.-glume membranous, with a scarcely evident midnerve; lower floral glume like the upper invol.-glume with a distinct midnerve; upper floral glume shorter, elliptic, concave, acuminate, subcoriaceous, smooth, nearly white; palea not or obscurely auricled. Anthers $\frac{1}{20}$–$\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 12; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1182. *Paspalum longiflorum*, Beauv. Fl. d'Owar. v. 2 (1809) p. 46, t. 85 (*not* of Retz.); Grah. Cat. p. 234.—Flowers: Oct.

KONKAN: Sea-shore, Bombay, *Woodrow*; Malwán, *Woodrow*.—DISTRIB. India (Sundribans, W. Peninsula, Andamans); Malacca.

13. **ERIOCHLOA,** H. B. & K.

Annual or perennial grasses. Leaves flat, lanceolate or ovate-lanceolate. Spikelets 1-flowered, aristulate, secund on the spiciform branches of a raceme or panicle, the base thickened and articulate on the thickened apex of the short pedicel. Glumes 3; lower invol.-glume (of *Panicum* &c.) absent; upper invol.-glume subequal to the lower floral glume; upper floral glume paleate, rather shorter than the lower, apiculate, hardening in fruit. Lodicules truncate. Stamens 3; anthers linear. Styles 2, free; stigmas plumose, subapically exserted. Grain oblong, free between the hardened glume and the palea.—DISTRIB. Species few, tropical.

1. **Eriochloa polystachya,** *H. B. & K. Nov. Gen. & Sp.* v. 1 (1815) p. 95, t. 31. Perennial, densely tufted, 2–5 ft. high; rootstock short, creeping; stems leafy, ascending from a creeping base, stout or slender, simple or branched, glabrous except the nodes. Leaves 3–8 by $\frac{1}{6}$–$\frac{1}{4}$ in., linear or linear-lanceolate, acuminate, glabrous; sheaths glabrous, ligule a villous ridge. Panicles 2–5 in. long; peduncles long or short; rhachis slender, angular, smooth; branches of panicle (spikes) alternate, 1–2 in. long, suberect, angular. Spikelets silvery, $\frac{1}{8}$–$\frac{1}{6}$ in. long, loosely imbricate, shortly pedicellate, distichous, solitary or 2-nate, elliptic-lanceolate, acuminate. Lower invol.-glume 0; upper invol.-glume oblong-lanceolate, acuminate, obscurely 3-nerved, silky-hairy, membranous; lower floral glume similar to the upper invol.-glume; upper floral glume much shorter than the lower, elliptic-oblong, obtuse, apiculate, thinly coriaceous, pale, shining; palea oblong with incurved margins. Anthers linear. Grain oblong, free within the hardened glume and palea. Fl. B. I. v. 7, p. 20; Trim. Fl. Ceyl. v. 5, p. 126; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1183. *Eriochloa annulata*, Kunth, Revis. Gram. v. 1 (1829) p. 30; Watt, Dict. Econ. Prod. v. 3, p. 257.—Flowers: Oct.

KONKAN: Bombay near Mahim, *Woodrow, Lisboa*. KANARA: N. Kanara, *Lisboa*.—DISTRIB. Throughout India; Ceylon, most hot countries.

14. **DIMERIA,** R. Br.

Erect slender, annual or perennial grasses. Leaves narrow. Inflorescence of solitary or 2-nate or digitate slender racemes bearing many spikelets; rhachis of racemes inarticulate, terete, angular or flattened. Spikelets 1-flowered, articulate, subsessile or on very short pedicels, laterally much compressed, solitary, secund, bifarious, 2-sexual.

Glumes 4; invol.-glumes usually divaricate in flower, empty; lower invol.-glume coriaceous, linear, with complicate sides, dorsally rounded; upper invol.-glume as long as or longer than the lower one, chartaceous, oblong, with hyaline margins and complicate sides, dorsally keeled, the keel sometimes winged; lower floral glume shorter than the upper invol.-glume, linear or oblanceolate, empty, epaleate; upper floral glume hyaline, complicate, oblong, 2-fid, awned in the sinus, the awn capillary with a short column; palea minute or 0. Lodicules 0 or very minute. Stamens 2; anthers long or short. Styles short; stigmas short, laterally exserted. Grain linear, compressed.—DISTRIB. Tropical Asia and Australia; species 18.

Racemes 2–3-nate; annuals.	
Rhachis nearly straight; awn long	1. *D. ornithopoda.*
Rhachis circinately curved; awn short	2. *D. Woodrowii.*
Racemes many-nate; a perennial grass	3. *D. gracilis.*

1. **Dimeria ornithopoda,** *Trin. Fund. Agrost.* (1820) p. 167, t. 14. A slender annual tufted leafy grass 6–20 in. high. Leaves 1–3 by $\frac{1}{10}$–$\frac{1}{8}$ in., erect, linear, finely acuminate; sheaths usually glabrous. Racemes 2 (rarely 3), very slender, 1–2 in. long; rhachis flexuous, stout, angular. Spikelets about $\frac{1}{10}$ in. long, sessile or subsessile, linear, acuminate; callus villous with short white hairs. Glumes 4; lower invol.-glume slender, linear, acute, $\frac{1}{10}$ in. long, slightly pubescent or nearly glabrous; upper invol.-glume slightly longer than the lower one, linear, acuminate, with hyaline margins, pubescent on the back; lower floral glume $\frac{1}{12}$ in. long, linear, acute; upper floral glume $\frac{1}{16}$ in. long, hyaline; awn nearly $\frac{1}{3}$ in. long, the column $\frac{1}{8}$ in. long, brown, the upper part white, capillary. Fl. B. I. v. 7, p. 104; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1187. *Psilostachys filiformis*, Dalz. in Dalz. & Gibs. Bo. Fl. (1861) p. 305.—Flowers: Oct. VERN. *Khúp-kurdi.*

KONKAN: Mahableshwar, *Dalzell & Gibson*, *Lisboa*; Panchgani, *Woodrow*; Khandala, *Woodrow*; Lanoli, *Lisboa*. KANARA. Jagalbet (N. Kanara), *Talbot*, 1565!—DISTRIB. Throughout India; Malay Islands, Japan, Tropical Australia.

2. **Dimeria Woodrowii,** *Stapf, in Hook. Icon. Pl.* v. 24 (1895) t. 2312. Annual, 3–6 in. high; stem slender, leafy, more or less branched; nodes pubescent; upper internode (or peduncle) with its leaf abruptly deflexed after flowering. Leaves 1½–3 by $\frac{1}{16}$–$\frac{1}{10}$ in., linear, finely acuminate, 3-nerved, with a strong midnerve, glabrous or nearly so; sheaths glabrous; ligule very short, hyaline. Racemes ¾–1 in. long, geminate, at first erect, then circinately incurved, glabrous; rhachis trigonous, subundulate; internodes shorter than the spikelets; pedicels distinct, about $\frac{1}{40}$ in. long. Spikelets $\frac{1}{6}$ in. long, sublinear, few, rather distant, suberect, diverging as the rhachis incurves; callus bearded. Glumes 4; lower invol.-glume rather more than $\frac{1}{8}$ in. long, linear, acute, folded, 1-nerved, glabrous or sparsely hairy; upper invol.-glume slightly longer than the lower one, broader, acute, narrowly keeled and thickened at the back, the margins hyaline; lower floral glume narrowly linear, hyaline, sometimes mucronulate; upper floral glume rather more than $\frac{1}{10}$ in. long, 2-fid, awned at the sinus, hyaline, the awn about $\frac{1}{8}$ in. long. Grain linear-lanceolate, compressed.

Fl. B. I. v. 7, p. 104; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers: Oct.

KONKAN: Ratnagiri, *Woodrow*!; Marmagão, *Talbot*, 2557!—DISTRIB. India (W. Peninsula).

3. **Dimeria gracilis,** *Nees, ex Steud. Syn. Gram.* (1855) p. 413. Perennial; stems densely tufted, 1–3 ft. high, leafy, stout or slender, rarely branched. Leaves 6–10 by $\frac{1}{8}$–$\frac{1}{6}$ in., erect, rigid, narrowly linear, finely acuminate, glabrous or pilose, base narrowed into the sheath; sheaths terete, not auricled at the mouth; ligule short, broad, membranous, ciliolate. Racemes 3–10, very slender, 3–5 in. long, pale brown, lax-flowered, flexuous; rhachis filiform, obtusely trigonous or subterete, glabrous. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ in. long; pedicels long or short; callus very short; densely bearded. Glumes 4; lower invol.-glume $\frac{1}{6}$ in. long, linear, acute, plicate, more or less scaberulous; upper invol.-glume $\frac{1}{5}$ in. long, linear, acute, aristate, with hyaline ciliolate margins; lower floral glume obovate-oblong, ciliolate above the middle; upper floral glume $\frac{1}{10}$ in. long, linear-oblong, acutely 2-fid; awn $\frac{3}{8}$ in. long (or more), the lower third brown, the upper two-thirds white; palea minute, narrow, ciliate. Lodicules large, broadly cuneate. Fl. B. I. v. 7, p. 105; Trim. Fl. Ceyl. v. 5, p. 199; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers: Dec.

KONKAN: *Law*!, *Stocks*! DECCAN: *Woodrow*, 172!; Lanoli, *Woodrow*.—DISTRIB. India (W. Peninsula); Ceylon.

15. IMPERATA, Cyrill.

Erect perennial grasses; stem leafy; internodes solid. Leaves narrow. Spikelets 1-flowered, in spike-like subcylindric silvery-silky panicles, with very short filiform inarticulate branches and rhachises, all alike and 2-sexual, narrow, terete, hidden among very long hairs arising from a small callus and from outer glumes, 2-nate, a sessile and a pedicellate one, articulate at the base, fugacious. Glumes 4; invol.-glumes subequal, membranous, dorsally rounded or the upper obscurely keeled, 3–5-nerved at the base; lower invol.-glume ovate-lanceolate with a hyaline obtuse tip; upper invol.-glume acuminate; floral glumes short, often erose; palea minute, hyaline. Lodicules 0. Stamens 1 or 2. Styles connate below; stigmas very long, narrow, exserted at the top of the spikelets. Grain small, oblong.—DISTRIB. Species 5, tropical, chiefly American; 2 Asiatic, one also European.

1. **Imperata arundinacea,** *Cyrill, Pl. Rar. Neap.* fasc. 2 (1792) p. 26, t. 11. Rootstock stoloniferous, often creeping; stem 1–3 ft. high, stout or slender; nodes naked or bearded. Leaves 6–18 by $\frac{1}{10}$–$\frac{1}{4}$ in., linear, flat, tapering from the middle to a finely acuminate point, smooth above, scaberulous beneath and on the margins; sheaths loose, glabrous; ligule of long soft hairs. Panicle 3–8 in. long, narrow, spike-like, subcylindric, silvery-white; branches short, crowded, appressed. Spikelets $\frac{1}{8}$ in. long, lanceolate; pedicels $\frac{1}{25}$–$\frac{1}{8}$ in. long; hairs of callus twice as long as the spikelet. Glumes 4; invol.-glumes ovate-lanceolate, subequal in length, obtuse or subobtuse, with ciliate tips, 3–7-nerved; lower floral glume less than $\frac{1}{2}$ as long as the invol.-glumes, oblong, obtuse, denticulate, ciliate, nerveless; upper floral glume ovate, glabrous, nerveless or with 1 faint nerve. Anthers $\frac{1}{10}$ in. long, orange. Stigmas

$\frac{1}{8}$–$\frac{1}{6}$ in. long, purple. Fl. B. I. v. 7, p. 106; Trim. Fl. Ceyl. v. 5, p. 200; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1188; Watt, Dict. Econ. Prod. v. 4, p. 336. *Saccharum cylindricum*, Lam. Encyc. Méthod. v. 1 (1783) p. 594; Grah. Cat. p. 239.

KANARA: *Law*! GUJARAT: *Law* ex *Graham*. SIND: *Stocks*!—DISTRIB. Throughout the hotter parts of India; Ceylon, most warm countries.

16. **SPODIOPOGON,** Trin.

Tall grasses. Leaves often with long petioles. Spikelets 1-2-flowered, paniculate, laterally compressed or subterete, 2–3-nate; lower sessile, male; upper 2-sexual; rhachis jointed. Glumes 4; invol.-glumes subequal; lower invol.-glume lanceolate, 5–9-nerved, with an acuminate or toothed tip; upper invol.-glume membranous, lanceolate, 3–7-nerved; lower floral glume hyaline, paleate or not, triandrous or empty; upper floral glume 2-fid or 2-partite, with a very slender exserted awn in the sinus; palea shorter than the glume. Lodicules cuneate. Anthers linear. Stigmas linear. Grain free, narrowly fusiform.—DISTRIB. Species about 5, Asiatic.

1. **Spodiopogon albidus,** *Benth. in Journ. Linn. Soc.* v. 19 (1881) p. 66. A weak straggling tufted annual grass 2–4 ft. high; stem slender, much-branched, leafy. Leaves 6–10 by $\frac{1}{4}$–$\frac{3}{4}$ in., oblong-lanceolate, acuminate, 1-nerved, usually suddenly narrowed into a slender petiole 1–3 in. long; sheaths $\frac{3}{5}$ in. long; ligule oblong, glabrous. Panicle at first enclosed in a long narrow spathaceous leaf-sheath; rhachis compressed, ciliate. Spikelets reaching $\frac{1}{4}$ in. long, lanceolate, silky-villous, one pedicellate, the other sessile; pedicels $\frac{1}{10}$ in. long, spathulate, flattened, ciliate. Glumes 4; invol.-glumes equal, ovate-lanceolate, finely mucronate, silky-hairy, 7-nerved; lower floral glume truncate, with erose tip, hyaline; upper floral glume $\frac{1}{8}$ in. long, deeply divided at the apex into 2 very acute lobes: awn reaching $\frac{1}{2}$ in. long, slender. Fl. B. I. v. 7, p. 108; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436. *Andropogon petiolatus*, Dalz. Bo. Fl. (1861) p. 303.—Flowers: Oct.

Dalzell without locality in Herb. Kew.! KONKAN: W. Ghâts, *Woodrow*, 157!; Matheran, *Cooke*!; Salsette, *Jacquemont*, 708! DECCAN: Lanoli, *Woodrow*; Mahableshwar, *Cooke*! KANARA: N. Kanara, *Talbot*, 279!—DISTRIB. India (Central Provinces, Rajputana, W. Peninsula).

17. **SACCHARUM,** Linn.

Perennial often very tall grasses. Leaves narrow, flat. Spikelets minute, awnless, 1-flowered, all similar, usually 2-nate (1 sessile, the other pedicellate), 2-sexual, articulate at the base, disposed in large silky much and densely branched panicles with spreading, at length erect, articulate capillary, usually fragile branches; sessile spikelets deciduous with the contiguous joint of the rhachis and pedicel; callus bearded with very long hairs. Glumes 4; lower invol.-glume about equal to the upper, oblong or lanceolate, dorsally flat or convex, with incurved or inflexed margins, 1–2-nerved at each flexure, keels not winged nor scaberulous; upper invol.-glume concave, dorsally rounded or obscurely keeled, 1–5-nerved; lower floral glumes hyaline, oblong; upper floral

glume smaller or 0, awnless; palea small, hyaline, nerveless or 0. Lodicules 2, cuneate or irregular. Stamens 3. Stigmas laterally exserted. Grain oblong or subglobose.—DISTRIB. Species about 12, tropical, chiefly Asiatic.

1. **Saccharum spontaneum,** *Linn. Mant.* (1771) p. 183. A tall erect grass reaching sometimes 20 ft. high; stem erect from a stout rootstock, solid, smooth, polished, silky beneath the panicle. Leaves 1–2½ ft. by ⅛–¼ in., narrowly linear, finely acuminate, rigid, coriaceous, usually glabrous, often with convolute margins; sheaths smooth, with fimbriate mouth; ligule ovate, membranous. Panicle 8–24 in. long, lanceolate, silky-hairy; rhachis slender; branches 3–5-nate, 2–4 in. long; rhachis of racemes almost capillary, fragile. Spikelets ⅛ in. long, lanceolate; callus minute, bearded with spreading silky hairs ½ in. long. Glumes 4; lower invol.-glume lanceolate-subulate, acuminate; upper invol.-glume equal to the lower, lanceolate, obscurely keeled, 1-nerved; lower floral glume ovate-lanceolate, subacute, ciliate, hyaline, nerveless; upper floral glume very slender, ciliate; palea minute, ciliate. Fl. B. I. v. 7, p. 118; Dalz. & Gibs. p. 304; Trim. Fl. Ceyl. v. 5, p. 201; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1188; Watt, Dict. Econ. Prod. v. 6, part 2, p. 11.—Flowers: Nov. VERN. *Bagheri*; *Kamis*; *Khair.*

KONKAN: *Stocks*!; Karjat, *Woodrow.* DECCAN: Poona (river-bank), *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie.* GUJARAT: Baroda, *Cooke*!; Domas (near Surat), *Dalzell & Gibson.* SIND: *Stocks*, 545!; Shikarpur, *Woodrow.*—DISTRIB. Throughout India; Ceylon, S. Europe and warm regions of the Old World, East Australia.

Saccharum arundinaceum, Retz. Obs. fasc. 4 (1786) p. 14. A tall strikingly handsome grass reaching, under favorable conditions, nearly 20 ft. high, with leaves 3–5 ft. by 1–3 in. with a conspicuous midrib. Panicle 1–2 ft. long, cream-colored, brown or purplish. Spikelets about ⅛ in. long, clothed with soft creamy or purplish woolly hairs. Fl. B. I. v. 7, p. 119; Trim. Fl. Ceyl. v. 5, p. 202; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1188; Watt, Dict. Econ. Prod. v. 6, part 2, p. 1. *Saccharum exaltatum*, Roxb. Fl. Ind. v. 1 (1832) p. 245; Grah. Cat. p. 239.

I cannot find any evidence that this plant is indigenous in the Bombay Presidency. The only specimens from Bombay in Herb. Kew. were collected by Woodrow from a Bombay garden, and Lisboa (Journ. Bomb. Nat. v. 6 (1891) p. 190) remarks that it has been seen only in cultivation in Bombay gardens, while Woodrow (*l. c.*) gives no habitat, merely noting it as "planted."

Saccharum officinarum, Linn. Sp. Pl. (1753) p. 54. *The Sugar Cane*, extensively cultivated in the Bombay Presidency and throughout the hotter parts of India. For a full account of the cultivation of the plant and the mode of extraction and refining of its sugar, see Watt, Dict. Econ. Prod. v. 6, part 2, pp. 3–380.—VERN. *Us.*

18. **ERIANTHUS**, Michx.

Tall perennial grasses. Leaves flat, narrow. Spikelets all similar, 2-nate (one sessile, the other pedicellate, very rarely both unequally pedicellate), 1-flowered, 2-sexual, on the articulate and usually fragile

rhachis of paniculate racemes (the sessile spikelets deciduous with the internode and pedicel); callus bearded with long hairs. Glumes 4; invol.-glumes subequal; lower invol.-glume oblong-lanceolate, dorsally flattened, more or less distinctly 2-keeled; upper invol.-glume 1-3-nerved, keeled; lower floral glume hyaline, oblong, muticous or mucronate; upper floral glume shortest, generally awned; palea small, hyaline, nerveless. Lodicules 2, cuneate. Stamens 2-3. Stigmas usually laterally exserted. Grain oblong or subglobose.—DISTRIB. Species about 20, mainly tropical.

Racemes panicled; leaves 2-3 ft. by 1-1½ in., scaberulous; sheaths hairy; callus with long silky hairs.	1. *E. Ravennæ.*
Racemes subdigitate; leaves 1-2 ft. by ⅛-¼ in., smooth; sheaths glabrous; hairs of callus short	2. *E. fastigiatus.*

1. **Erianthus Ravennæ,** *Beauv. Agrost.* (1812) p. 14. Stem 6-10 ft. high; nodes glabrous. Leaves 2-3 ft. by 1-1½ in., linear, scaberulous on both surfaces, flat, margins scabrid, midrib broad; sheaths hairy; ligule a narrow silky-hairy band. Panicles oblong, 1-3 ft. long, erect or inclined, clothed with silky hairs; branches many from the rhachis. Spikelets pale, ⅕ in. long (excluding awn), linear-lanceolate; pedicels with 2 opposite rows of very long silky hairs; callus short, with long silky hairs which are as long as or longer than the spikelet. Glumes 4; lower invol.-glume ⅕ in. long, membranous, lanceolate, aristately acuminate, with slightly scaberulous margins; upper invol.-glume slightly longer than the lower, lanceolate, aristately acuminate, obscurely 3-nerved; lower floral glume rather more than ⅛ in. long, narrowly lanceolate, very acute, with incurved margins, hyaline; upper floral glume ⅒ in. long, ovate-lanceolate, tapering into a whitish awn of variable length. Fl. B. I. v. 7, p. 121; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers: Dec.

SIND: Larkhana, *Cooke!*; Karachi, *Cooke!*, *Woodrow.*—DISTRIB. India (W. Himalaya, Panjáb, Upper Gangetic plain, W. Peninsula); westward to the Mediterranean.

2. **Erianthus fastigiatus,** *Nees, ex Steud. Syn. Gram.* (1855) p. 409. Stem 2-8 ft. high, stout or slender, silky-hairy below the panicle. Leaves 1-2 by ⅛-¼ in., linear from a narrow base, rigid, flat, smooth, with scabrid margins; sheaths glabrous, with fimbriate mouth; ligule a narrow membrane. Panicle oblong or fan-shaped; racemes crowded, subdigitately fascicled; rhachis angular, silky-hairy. Spikelets ⅕ in. long, lanceolate, dark brown below, paler above; callus with white hairs which are much shorter than the spikelet; pedicels as long as the spikelets, with 2 opposite rows of silky hairs. Glumes 4; lower invol.-glume ⅕ in. long, chartaceous, brown, shining, ovate-lanceolate, acute, the margins near the base clothed with long silky hairs; upper invol.-glume chartaceous, lanceolate, acuminate, brown below, paler above, equalling the lower invol.-glume; lower floral glume ⅛ in. long, narrowly lanceolate, acute, base membranous, colored, the upper part hyaline; upper floral glume ⅒ in. long, lanceolate, 2-toothed, hyaline, with a slender awn ¼ in. long or longer. Fl. B. I. v. 7, p. 125; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1189.

S. M. COUNTRY: Belgaum, *Ritchie*, 792!—DISTRIB. India (Sikkim, Khasia, Assam, Bengal, W. Peninsula).

19. **POLLINIA,** Trin.

Annual or perennial grasses of various habit. Leaves usually narrow. Spikelets all alike or nearly so, 3-nate (one sessile, the other pedicellate, rarely both pedicellate) on the articulate and usually fragile rhachis of 2-nate, digitate or fascicled spike-like racemes; callus short, bearded. Glumes 4; lower invol.-glume membranous, dorsally flattened or concave, more or less 2-keeled, with inflexed margins; upper invol.-glume membranous, keeled, 1–3-nerved, with inflexed margins; lower floral glume hyaline, paleate or not, sometimes suppressed; upper floral glume short, hyaline, 2-lobed or entire, generally awned; palea small or 0. Lodicules 2, small, cuneate. Stamens 3 (rarely 2). Styles short; stigmas linear, laterally exserted. Grain oblong.—DISTRIB. Species about 32, in tropical and subtropical regions of the Old World.

Racemes many, 6–12; perennial ..... 1. *P. argentea.*
Racemes few, 2–4; annual ..... 2. *P. fimbriata.*

1. **Pollinia argentea,** *Trin. in Bull. Sc. Acad. Pétersb.* v. 1 (1836) p. 71. Perennial; stems tufted, 1½–4 ft. high, stout or slender, erect, simple or branched, smooth, shining, leafy at the base and upwards; nodes glabrous. Leaves 6–18 by $\frac{1}{20}$–$\frac{1}{5}$ in., erect, narrowly linear, rigid, often filiform, glabrous, striate, tips capillary; sheaths long, slender, coriaceous, not auricled at the mouth, the sides bearded with long hairs; ligule a short membrane fringed with long hairs. Racemes 6–12, narrow, 1–6 in. long, lax-flowered; rhachis firm, flexuous, compressed; pedicels of spikelets flattened, slightly dilated at the apex, densely silky-villous on the edges. Spikelets $\frac{1}{6}$ in. long (excluding the long awn). Glumes 4; lower invol.-glume linear-oblong, crustaceous below, membranous above with a hyaline tip, silky villous on the back, the margins narrowly incurved, villous with long silky hairs; upper invol.-glume oblong, 1-nerved, tip erose, margins incurved, ciliate; lower floral glume $\frac{1}{8}$ in. long, narrowly oblong, hyaline, flat, nerveless; upper floral glume shorter than the upper invol.-glume, linear-oblong, cleft into 2 subulate lobes; palea 0; awn reaching $\frac{3}{4}$ in. long, not or scarcely ciliate, the lower half brown, twisted, the upper half white, straight. Fl. B. I. v. 7, p. 111; Trim. Fl. Ceyl. v. 5, p. 204; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1190.—Flowers: Oct.–Dec.

KONKAN: Ratnagiri, *Woodrow.* DECCAN: Máwal, *Woodrow,* 1!; Lanoli, *Woodrow, Lisboa.*—DISTRIB. Throughout India; Ceylon, Malaya, Australia.

2. **Pollinia fimbriata,** *Hack. Monogr. Androp. in DC. Monog. Phan.* v. 6 (1889) p. 164. Annual; stem 1–2 ft. long; internodes much longer than the sheaths; nodes glabrous. Leaves 6–10 by $\frac{1}{8}$ in., flaccid, sparsely hairy above; sheaths glabrous; ligule a ciliolate ridge. Racemes 2–4, villous with white hairs, 1–3 in. long, flexuous, pale, with long peduncles; rhachis slender, silky-hairy; pedicels of spikelets with 2 opposite rows of dense silky hairs. Spikelets $\frac{1}{8}$ in. long; callus very short, silky-villous with long white hairs. Glumes 4; lower invol.-glume elliptic-lanceolate, with villous keels above, 2-toothed; upper invol.-glume as long as the lower, elliptic, obtuse, with incurved ciliate margins; lower floral glume $\frac{1}{8}$ in. long, narrowly oblong, obtuse, hyaline, ciliolate; upper floral glume $\frac{1}{10}$ in. long, hyaline, deeply 2-fid into 2

acute lobes; awn $\frac{1}{2}$–$\frac{3}{4}$ in. long, ciliate, the lower half brown, twisted, the upper half white; palea minute or 0. Fl. B. I. v. 7, p. 112; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers: Oct.

KONKAN: *Law*!, *Stocks*! DECCAN: Lanoli, *Woodrow*, 173!—DISTRIB. India (W. Himalaya, W. Peninsula, Pegu).

20. **OPHIURUS,** Gærtn.

Annual or perennial tall grasses; stems solid, branching upwards, leafy. Leaves linear-lanceolate. Spikes solitary or fasciculate, terete, fragile; joints excavate, with concave tops. Spikelets 2-flowered, solitary and sessile in the joints, with no trace of an upper spikelet and no awn. Glumes 4; lower invol.-glume thickly coriaceous, convex, obtuse; upper invol.-glume membranous, concave, keeled; lower floral glume elliptic, obtuse, hyaline, faintly 2-nerved, the margins infolded, paleate, male; upper floral glume as long as the lower, oblong, obtuse, 2-sexual; palea narrow. Lodicules 2, cuneate. Stamens 3; anthers linear. Styles and stigmas small, not exserted. Grain oblong, free.—DISTRIB. Tropical Asia and Africa; species 1 or 2.

1. **Ophiurus corymbosus,** *Gærtn. f. Fruct.* v. 3 (1805) p. 4, t. 181, fig. 3 *a* (*Ophiuros*). Perennial; stems erect from a tuberous base, 3–6 ft. high, reed-like, as thick as a goose-quill below, solid, branching upwards, leafy throughout; nodes glabrous. Leaves 6–24 by $\frac{3}{8}$–1 in., flat (convolute in vernation), linear-lanceolate from a rounded base, finely acuminate, hairy above with bulbous-based hairs, glabrous beneath, the margins spinulose; sheaths short, terete, the upper leafless; ligule very short. Spikes 2–5 by $1\frac{1}{2}$ in., corymbosely fasciculate, erect, often in very dense fascicles, frequently tinged with purple; peduncles short; joints as long and as broad as the spikelets, the tip obliquely truncate. Spikelets $\frac{1}{8}$ in. long. Glumes 4; lower invol.-glume thickly coriaceous or cartilaginous, oblong, obtuse, convex, more or less seriately foveolate on the back, glabrous, at length recurved; upper invol.-glume membranous, as long as the lower, faintly 3-nerved; lower floral glume equalling the lower invol.-glume, elliptic, obtuse, hyaline, paleate, male; upper floral glume as long as the lower, elliptic-oblong, obtuse. Anthers $1\frac{1}{2}$ in. long. Fl. B. I. v. 7, p. 160; Dalz. & Gibs. p. 300; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1191. *Rottboellia corymbosa*, Linn. f. Suppl. (1781) p. 114; Grah. Cat. p. 233.—Flowers: Dec. VERN. *Hutia.*

DECCAN: pastures, *Dalzell & Gibson*; Poona, *Cooke*!, *Woodrow*; Jeur (Ahmednagar districts), *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*, 807! GUJARAT: *Dalzell & Gibson*, *Woodrow*.—DISTRIB. India (Himalaya and Khasia Hills, N. Bengal, W. Peninsula); Tonkin, Australia.

21. **ROTTBOELLIA,** Linn. f.

Annual or perennial grasses of various habit; stems leafy. Leaves narrow, flat. Racemes solitary or subpaniculate; rhachis articulate; internodes terete or compressed, each bearing a pair of usually dissimilar awnless spikelets, the lower 1–2-flowered, usually 2-sexual, the upper pedicellate, male or neuter, sometimes rudimentary, the pedicel free or adnate to the side of the internode. Glumes 4; lower invol.-glume

coriaceous, dorsally flattened or subconvex, ovate or oblong, usually obtuse; upper invol.-glume chartaceous to membranous, muticous; lower floral glume hyaline, paleate or not; upper floral glume paleate, 2-sexual. Lodicules 2, quadrate or cuneate. Stamens 3. Stigmas generally laterally exserted. Grain broadly oblong.—DISTRIB. Species about 30, temperate and tropical.

Rhachis of raceme not fragile; lower invol.-glume not winged; a perennial grass ..... 1. *R. compressa.*
Rhachis of raceme fragile; lower invol.-glume winged (scarcely winged in *R. exaltata*).
Annual; stems less than 30 in. long; lower invol.-glume broadly winged.
Lower invol.-glume 2-aristate ..... 2. *R. divergens.*
Lower invol.-glume with a simple awn or acuminate.
Pedicel of upper spikelet adnate to the joint of the rhachis.
Lower invol.-glume broadly ovate, acuminate (not awned)..... 3. *R. acuminata.*
Lower invol.-glume lanceolate with a slender scabrid awn ..... 4. *R. Talboti.*
Pedicel of upper spikelet wholly free from the joint of the rhachis; lower invol.-glume awnless ..... 5. *R. Clarkei.*
Perennial; stems 6–10 ft. long; lower invol.-glume scarcely winged ..... 6. *R. exaltata.*

1. **Rottboellia compressa,** *Linn. f. Suppl.* (1781) p. 114. Perennial; stems erect from a decumbent rooting base, 2–5 ft. long (according to Roxburgh scandent and reaching 20 ft. long), branched, compressed, glabrous, striate, leafy. Leaves 1–5 by $\frac{1}{8}$–$\frac{1}{5}$ in., linear, acuminate, flat, glabrous, base rounded, margins scabrid; sheaths shorter than the internodes, compressed, loose, glabrous; ligule short, membranous, ciliate. Racemes few or many, often fascicled, 2–5 in. long, erect, straight or curved, herbaceous, dark green; rhachis almost inarticulate; internodes broad, striate, glabrous, nearly as long as the glabrous spikelets. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in. long; callus small, naked. Glumes 4; lower invol.-glume coriaceous, bluntly acuminate, the tip often shortly membranous, 7–9-nerved; upper invol.-glume as long as the lower, linear-oblong, acutely acuminate, membranous, 3-nerved, adhering to the cavity of the internode; floral glumes subequal, $\frac{1}{8}$ in. long, lanceolate, acute, nerveless, hyaline; palea linear, $\frac{1}{10}$ in. long. *Pedicellate spikelets* rather longer and narrower than the sessile; lower invol.-glume acutely acuminate; upper invol.-glume chartaceous, 5–7-nerved; floral glumes as in the sessile spikelets. Fl. B. I. v. 7, p. 153; Grah. Cat. p. 233; Roxb. Fl. Ind. v. 1, p. 354; Trim. Fl. Ceyl. v. 5, p. 206; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1192.—Flowers: Nov. VERN. *Baikʻa.*

GUJARAT: Godra, *Cooke!* SIND: *Woodrow*; Shikarpur, *Woodrow.*—DISTRIB. Throughout the hotter parts of India, generally in wet places; Ceylon, most warm climates.

2. **Rottboellia divergens,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 292. Annual; stems 4–9 in. high, erect or ascending, slender; nodes 2–3, all with usually 2-nate flowering branches. Leaves 2–4 by $\frac{1}{10}$–$\frac{1}{8}$ in., linear, acuminate, complicate, rising

without constriction from the sheath, hairy; sheaths 1–1½ in. long, shorter than the internodes, loose, hairy; ligule $\frac{1}{12}$ in. long, membranous, rounded. Raceme 1–1½ in. long, pale yellow, simple, solitary; peduncle filiform, sheathed; joints of the rhachis shorter than the spikelets, subclavate, excised. *Sessile spikelets* ¼ in. long (excluding the awns), nearly ½ in. long when the awns are included, 2-aristate; callus short. Glumes 4; lower invol.-glume coriaceous, with 5–7 transverse echinulate ridges below the middle, the tips of the echinæ curved upwards, the central portion of the glume above the echinate base ovate-lanceolate, acute, cleft at the apex, with 2 nearly semicircular equal membranous wings with thickened flattened green margins on the inner edge, which margins are prolonged into slender slightly divergent awns; upper invol.-glume much shorter, about ⅛ in. long, thinly membranous, oblong, acute, 1-nerved; lower floral glume about $\frac{1}{10}$ in. long, broadly ovate, nerveless, empty; upper floral glume slightly shorter than the lower. *Pedicellate spikelets* as long as the sessile; pedicels about $\frac{1}{10}$ in. long; lower invol.-glume chartaceous without a muricate base, winged on one side only and with 1 awn from the thickened margin of the wing, about 7-nerved; upper invol.-glume with a large membranous wing on the back at the apex and an awn about $\frac{1}{12}$ in. long. Fl. B. I. v. 7, p. 155; Lisboa, in Journ. Bomb. Nat. v. 6 (1891) p. 195; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Sept. VERN. *Marel.*

DECCAN: Khandala, *Woodrow*; Sattara, *Lisboa*!; Mahableshwar, *Lisboa*! S. M. COUNTRY: Belgaum, *Ritchie*, 808! and 827!—DISTRIB. India (W. Peninsula).

The specimens from the Bombay Presidency in Herb. Kew. are much larger in all their parts than the specimens collected by Huegel from which Hackel described the species originally, and to which no precise locality has been assigned.

3. **Rottboellia acuminata,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 291. Annual, quite glabrous except the sheaths; stems 3–12 in. high, erect or ascending, compressed, densely leafy. Leaves flaccid, the lower 2–3 by $\frac{1}{10}$–$\frac{1}{6}$ in., linear-lanceolate, acuminate from a narrow base, the upper shorter, spreading and recurved; sheaths turgid, compressed, keeled, the mouth hairy; ligule short, truncate, membranous, glabrous. Racemes 1–2 in. long, sheathed at the base, straight or slightly curved, usually pale brown; joints subclavate, much shorter than the sessile spikelets, the base not excised. *Sessile spikelets* up to ⅓ in. long; callus scarcely distinct. Glumes 4; lower invol.-glume ⅓ in. long, ovate, coriaceous, winged above the middle, with 3–6 dorsal transverse echinulate or warted ridges below the wings, longitudinally striate between the ridges, 5-nerved in the narrow coriaceous part between the wings, with a long ciliate acumen, the cilia pointing upwards; upper invol.-glume ⅙ in. long (equalling the lower minus the acumen), elliptic-lanceolate, membranous, subacute, scarcely keeled, 3-nerved; lower floral glume equalling the upper invol.-glume, elliptic, paleate, male; upper floral glume less than ⅛ in. long, oblong, obtuse, nerveless; palea small, 2-lobed, nerveless. *Pedicellate spikelets* ⅙ in. long, oblong; lower invol.-glume lanceolate, 5-nerved, with a membranous ciliolate wing on one side; upper invol.-glume shortly winged on the back below the apex, elliptic, concave, 3-nerved; lower floral glume empty; upper floral glume male; pedicel $\frac{1}{10}$ in. long, dumbell-shaped, flattened.

Fl. B. I. v. 7, p. 155; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Oct.

KONKAN: *Stocks*!; Malwán, *Woodrow*; Marmagão, *Talbot*, 1291!, KANARA: Karwar, *Lisboa*!, *Talbot*, 2539!—DISTRIB. India (W. Peninsula).

4. **Rottboellia Talboti,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 155. Annual; stems 6–8 in. high. slender, erect, or geniculate at the base. Leaves 2–3 by $\frac{1}{10}$–$\frac{1}{8}$ in., linear, smooth; sheaths glabrous; ligule short, membranous. Raceme $\frac{3}{4}$–$1\frac{1}{4}$ by $\frac{1}{6}$ in., solitary, green; joints very short, tumid, excavate opposite the spikelet, the top broad, with a very large cavity and thick hispidulous margins. *Sessile spikelets* $\frac{1}{2}$ in. long (or more) including the awn, closely imbricating; callus annular, ciliolate Glumes 4; lower invol.-glume $\frac{1}{6}$ in. long (not including the awn), coriaceous, lanceolate, narrowed into a slender scabrid awn, with 2–3 transverse ridges at the base, the uppermost ridge extending right across the glume, the others only in its centre, broadly winged at each side above the base; upper invol.-glume $\frac{1}{8}$ in. long, thinly membranous, ovate-oblong acute, 1-nerved; lower floral glume broadly oblong, faintly 3-nerved, male; upper floral glume small, oblong, obtuse, nerveless; palea as long, nerveless. *Pedicellate spikelets* as long as the sessile; lower invol.-glume very irregularly winged, dorsally smooth, awnless, as in the sessile; pedicel wholly adnate to the joint of the rhachis. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Oct.

Goa, *Talbot*, 2572!

There is but one sheet in Herb. Kew., the specimens on which were collected at Goa by Mr. Talbot.

The species is allied to *R. divergens*, from which it differs in the lower invol.-glume of the sessile spikelets, which in that species is 2- in this 1-awned, and in the tumid joints of the rhachis.

5. **Rottboellia Clarkei,** *Hack. in Œstr. Bot. Zeitschr.* v. 41 (1891) p. 8. Annual; stem 8–24 in. high, erect, striate, compressed; nodes with a small ring of hairs. Leaves 4–6 by $\frac{1}{3}$–$\frac{1}{2}$ in., linear-lanceolate, acuminate, narrowed to the subcordate base, scabrous and more or less hairy, the hairs with minutely tubercular bases; midrib prominent; sheaths compressed, ciliate; ligule a hairy membrane. Raceme solitary, $\frac{1}{2}$–1 in. long, pale yellow, supported by a spathe; rhachis very fragile; joints pyriform, shorter than the spikelets, ciliolate and with a broad cavity at the tip, the sides not hollowed. *Sessile spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in. long, obtuse, closely imbricating; callus short and broad, cylindric. Glumes 4; lower invol.-glume with an ovate coriaceous 3–5-nerved disk and hyaline wings which are ciliate at the tip, dorsally gibbous, scabrid and hairy below the middle; upper invol.-glume $\frac{1}{10}$ in. long, ovate-oblong, subacute, membranous, 1-nerved, glabrous; lower floral glume shorter than the upper invol.-glume, ovate-oblong, subobtuse, hyaline, nerveless; upper floral glume rather smaller than the lower, oblong, obtuse, hyaline, nerveless, the margins incurved; palea like the glume, nerveless. *Pedicellate spikelets* imperfect, consisting usually of a solitary empty glume about $\frac{1}{20}$ in. long; pedicel quite free from the rhachis, pyriform, flattened, about $\frac{1}{16}$ in. long, Fl. B. I. v. 7, p. 156; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain,

Beng. Pl. p. 1192. *Rottboellia gibbosa*, Hack. ex Lisboa, in Journ. Bomb. Nat. v. 6 (1891) p. 195.—Flowers: Nov.

KANARA: Birchi (N. Kanara), *Talbot*, 2072!, *Lisboa*.—DISTRIB. India (Behar, Chota Nagpur, W. Peninsula).

6. **Rottboellia exaltata,** *Linn. f. Suppl.* (1781) p. 114. Perennial; stem 6–10 ft. high, erect, leafy, solid, smooth, branching from the base. Leaves 6–24 by $\frac{1}{4}$–1 in., linear-lanceolate, setaceously acuminate, scabrid or hispid and green above, smooth and glaucous beneath, the margins spinulosely scabrid; midrib stout, prominent beneath; sheaths loose, glabrous or hispid, the mouth contracted; ligule short, ciliate. Racemes 3–6 in. long, terete, glabrous, fragile, the upper part of the raceme slender, with imperfect spikelets; internodes $\frac{1}{3}$–$\frac{1}{5}$ in. long, dorsally rounded, smooth. *Sessile spikelets* about as long as the internodes, $\frac{1}{5}$ in. long. Glumes 4; lower invol.-glume $\frac{1}{5}$ in. long, ovate-oblong, obtuse, coriaceous, smooth, with truncate base, many obscure nerves and scaberulous margins; upper invol.-glume equalling the lower, chartaceous, broadly ovate, acute, 9–11-nerved, the keel very shortly winged towards the tip; lower floral glume as long as the lower invol.-glume, broadly ovate, acute, 3-nerved, rigidly membranous, paleate, male, the palea like the glume, with incurved margins; upper floral glume a little shorter than the lower, ovate from a broad base, acute, 1-nerved; palea as long as the glume, hyaline, nerveless. *Pedicellate spikelets* more or less imperfect; lower invol.-glume narrowly winged. Fl. B. I. v. 7, p. 156; Grah. Cat. p. 233; Trim. Fl. Ceyl. v. 5, p. 207; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1192.—Flowers: Nov. VERN. *Bursali.*

KONKAN: *Stocks*! DECCAN: Poona, *Cooke*!, *Woodrow*, 2!—DISTRIB Plains and lower hills of India; Ceylon, China, Malaya, Australia, Africa.

22. MANISURIS, Sw.

Annual erect slender leafy grasses. Leaves flat, cordate. Racemes small, terete, axillary and terminal, shortly pedunculate; rhachis green, ultimately fragile, glabrous, with short broad internodes excavate opposite the sessile spikelets. Spikelets minute, in dissimilar pairs, one globose, sessile, 2-sexual, the other ovate, pedicellate, male or neuter, the pedicel adnate or closely appressed to the joint of the rhachis. *Sessile spikelets*: glumes 4; lower invol.-glume hard, globose, foveolate, coriaceous at length crustaceous, with an oblong opening opposite the rhachis; upper invol.-glume minute, oblong, coriaceous, 1-nerved, closing the orifice of the lower invol.-glume; lower floral glume very minute, hyaline, orbicular, empty; upper floral glume and its palea hyaline, broadly oblong. Lodicules 2, subquadrate. Anthers minute. Styles and stigmas short.—DISTRIB. Species 2, tropical.

1. **Manisuris granularis,** *Linn. f. Nov. Gram. Gen.* (1779) p. 40. Stems 4–30 in. high, slender, compressed, softly hairy, leafy; nodes hairy. Leaves $1\frac{1}{2}$–8 by $\frac{1}{4}$–$\frac{1}{2}$ in., linear-lanceolate, acute or acuminate, flat, hairy on both surfaces or on the lower only with bulbous-based hairs, margins ciliate, base cordate; sheaths much shorter than the internodes, hispid with bulbous-based hairs; ligule very short,

membranous, densely ciliate. Racemes $\frac{1}{4}$–1 in. long, resembling a string of minute beads, solitary or seemingly fascicled in the axils of the leaves, but individually from shortened axillary branches. *Sessile spikelets* $\frac{1}{16}$–$\frac{1}{12}$ in. long, subglobose; callus tumid, glabrous. Glumes 4; lower invol.-glume irregularly foveolate on the back; upper invol.-glume closing the cavity of the lower floral glume, elliptic-oblong, obtuse, 1-nerved; lower floral glume hyaline, shorter than the upper invol.-glume; upper floral glume about equalling the lower, broadly ovate, obtuse; palea similar but a little shorter. *Pedicellate spikelets* equal in length to the sessile or longer, of 2 equal green glumes about $\frac{1}{10}$ in. long; lower invol.-glume broadly ovate or suborbicular, obtuse or subacute, 5–7-nerved, one margin narrowly folded, the other with a hyaline wing; upper invol.-glume boat-shaped, laterally compressed, the keel with a dorsal hyaline ciliolate wing. Fl. B. I. v. 7, p. 159; Grah. Cat. p. 234; Dalz. & Gibs. p. 300; Trim. Fl. Ceyl. v. 5, p. 209; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1191; Watt, Dict. Econ. Prod. v. 5, p. 164.—Flowers: Oct.

Common throughout the Presidency on barren land. DECCAN: Poona, *Cooke*!; Khandala, *Woodrow*. S. M. COUNTRY: Dharwar, *Woodrow*.—DISTRIB. Throughout the hotter parts of India; Ceylon, most tropical countries.

23. **APLUDA,** Linn.

A tall slender perennial leafy grass; stems erect or subscandent, branching. Leaves narrow, flat, more or less petiolate. Inflorescence paniculate, leafy, of small spikes each in a spathiform bract. Spikes deformed, base rounded, often utricular, bearing in front a sessile 2-sexual spikelet, prolonged above the base into 2 flat linear truncate parallel arms, one terminated by a solitary minute glume, the other by the upper spikelet. Glumes of both spikelets 4, the invol.-glumes empty, the floral glumes delicately membranous. *Lower spikelets*: lower invol.-glume longest, anticous, linear-oblong, coriaceous, rigid; upper invol.-glume thinner, tumid, beaked, dorsally gibbous, 7-nerved; lower floral glume oblong, acute, 3-nerved, triandrous or neuter, with a linear 2-nerved palea; upper floral glume short, quadrate, deeply 2-fid, awned in the sinus, female or 2-sexual, with a minute ovate palea. Styles short, free; stigmas short, penicillate. *Upper spikelets* dorsally compressed; lower invol.-glume oblong, acute, many-nerved, herbaceous, the margins narrowly incurved; upper invol.-glume chartaceous, ovate-lanceolate, acuminate, 3-nerved; lower floral glume oblong, 1-nerved, triandrous; upper floral glume oblong, 1-nerved, female or imperfectly 2-sexual; paleas of both floral glumes as in the lower spikelets. Lodicules of all flowers 2, cuneate. Anthers linear. Grain oblong, subcompressed.—DISTRIB. India, China, Pacific Islands; species 1.

1. **Apluda varia,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 196. Stems densely tufted, geniculately ascending, 1–6 ft. high, erect or the branches rambling among bushes, stout or slender, sometimes as thick as a goose-quill below, smooth and polished; internodes very long, solid. Leaves 4–18 by $\frac{1}{10}$–$\frac{3}{4}$ in., narrowed from the middle to a filiform tip and usually below it into a long or short

slender petiole, flat, scaberulous on both surfaces with scabrid margins; sheaths long, smooth, the mouth not auricled; ligule chartaceous, oblong, lacerate. Inflorescence very variable, of spikelets clustered on short peduncles, the clusters solitary or few or very numerous and arranged in elongate bracteate very contracted interrupted leafy panicles; rhachis of inflorescence slender, glabrous or slightly scabrid; bracts of spikelets $\frac{1}{8}$–$\frac{1}{3}$ in. long, sessile or pedicellate, cymbiform, green, striate, with aristulate tip. Spikes longer or shorter than the bracts, with rounded base. *Sessile spikelets* $\frac{1}{8}$–$\frac{1}{5}$ in. long; lower invol.-glume spreading, strict or recurved, bicuspidate, with hyaline margins; upper floral glume 3-5-nerved below the sinus, the lateral nerves arching and meeting the midnerve at the insertion of the awn. Fl. B. I. v. 7, p. 150; Trim. Fl. Ceyl. v. 5, p. 226; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1194.—Flowers: Oct.–Dec. VERN. *Ghagara.*

KONKAN: *Law!*, *Woodrow.* DECCAN: *Woodrow*, 115! S. M. COUNTRY: Belgaum, *Ritchie*, 824! GUJARAT: Surat, *Cooke!*; Ahmedabad, *Cooke!*—DISTRIB. Throughout India; Ceylon, E. Trop. Asia, Malaya, Australia, Pacific Islands.

Hackel divides the forms of this variable plant into 2 subspecies—one *mutica*, which is rarely awned; the other *aristata*, the spikelets of which are always awned. Of *aristata* Hackel has 4 varieties, to the first of which, *aristata proper*, most of the Bombay specimens are referable.

24. **ISCHÆMUM,** Linn.

Annual or perennial grasses. Leaves narrow. Racemes solitary, digitate or fascicled, articulate, fragile; internodes of rhachis and the pedicels of the upper spikelets trigonous, hollowed ventrally. Spikelets 2-nate, one sessile and one pedicellate, the pedicellate spikelet often dissimilar from the sessile. *Sessile spikelets*: glumes 4; invol.-glumes subequal, coriaceous or chartaceous, awnless or the upper sometimes awned; lower invol.-glume ovate-oblong or oblong-lanceolate, convex, more or less marginally winged above the middle; upper invol.-glume lanceolate, acuminate, concave; lower floral glume hyaline, paleate, triandrous, with a narrow lanceolate acuminate 2-nerved palea; upper floral glume hyaline, usually deeply 2-cleft, awned, the awn geniculate with a brown twisted column. Lodicules cuneate or quadrate. Stamens 3; anthers linear. Styles long; stigmas short. *Pedicellate spikelets* with pedicel half as long as the sessile spikelet or shorter; upper floral glume rarely awned.—DISTRIB. Species about 40, chiefly tropical.

Racemes 2–3 (rarely more); lower invol.-glume dorsally flat, not channelled or depressed along the median line.
  Margins of lower invol.-glume of sessile spikelets narrowly inflexed or incurved from base to apex.
    Leaves rounded at the base (slightly cordate in *I. molle*), sessile on the sheath.
      Pedicel of upper spikelet less than $\frac{1}{2}$ the length of the lower spikelet.
        Lower invol.-glume of sessile spikelets with nodulose margins ..... 1. *I. aristatum.*
        Lower invol.-glume of sessile spikelets closely transversely ribbed ..... 2. *I. rugosum.*
        Lower invol.-glume of sessile spikelets dorsally villous all over, not transversely ridged nor with nodulose margins ..... 3. *I. molle.*

Pedicel of upper spikelet ½ the length of the lower spikelet or more.
Stems woolly at the base ..... 4. *I. angustifolium.*
Stems not woolly at the base.
Upper invol.-glume of sessile spikelets 2-fid, 3-nerved; lateral nerves pectinately ciliate at the apex ..... 5. *I. diplopogon.*
Upper invol.-glume of sessile spikelets acuminate, 5-nerved; lateral nerves anastomosing, not pectinately ciliate . 6. *I. pilosum.*
Leaves hastate or deeply cordate at the base, petiolate ..... 7. *I. semisagittatum.*
Margins of lower invol.-glume of sessile spikelets broadly incurved below the middle.
Sessile spikelets ⅛ in. long; callus large, glabrous; awn ½ in. long ..... 8. *I. Lisboæ.*
Sessile spikelets ⅛ in. long; callus short, bearded; awn ½ in. long ..... 9. *I. ciliare.*
Raceme solitary; lower invol.-glume of sessile spikelets deeply channelled or depressed along the median line.
Racemes enclosed in long narrow spathes ..... 10. *I. spathiflorum.*
Racemes not enclosed in spathes.
Lower invol.-glume of sessile spikelets 6-nerved; upper invol.-glume of pedicellate spikelets shortly awned . 11. *I. laxum.*
Lower invol.-glume of sessile spikelets 2-nerved; upper invol.-glume of pedicellate spikelets not awned..... 12. *I. sulcatum.*

1. **Ischæmum aristatum,** *Linn. Sp. Pl.* (1753) p. 1049. Perennial; stems 1–4 ft. high, stout, erect or decumbent at the base, simple or branched above, leafy, glabrous, thickened at the top below the spikes. Leaves 4–10 by ¼–1 in., linear-lanceolate, finely acuminate, glabrous or sparsely hairy, glaucous beneath, narrowed to the acute or subcordate base, with scabrid margins; sheaths loose, glabrous, the mouth naked, auricled; ligule membranous. Racemes 1 or 2, stout or slender, 1–4 in. long. Spikelets reaching ⅛ in. long, a sessile and a pedicellate closely pressed together; callus of sessile spikelets broad, thick, $\frac{1}{25}$ in. long. *Sessile spikelets*: lower invol.-glume ⅛ in. long, broadly oblong, cartilaginous and often purplish below the middle, with 2–4 marginal nodules on each edge transversely connected by shallow ridges, thinner above the middle, with green anastomosing veins, tip obtuse or 2-dentate, margins narrowly incurved, ciliolate; upper invol.-glume lanceolate, acuminate, 1-nerved, with smooth rounded keel; lower floral glume ovate-lanceolate, acuminate, 1-nerved, membranous, male or 2-sexual, with an oblong palea; upper floral glume female, cleft to or below the middle into lanceolate acuminate lobes, with a brownish-red awn ½ in. or more long at the sinus, twisted below, straight above; palea linear-oblong. *Pedicellate spikelets* as long as the sessile, inarticulate on the very thick amorphous pedicel, which is densely silky-hairy at the base; lower invol.-glume gibbous or scimitar-shaped, acute, coriaceous, tinged with purple, with a ciliolate semicircular wing; upper invol.-glume and lower floral glume as in the sessile spikelets; upper floral glume hyaline, with a mucro or very short awn. Fl. B. I. v. 7, p. 126; Grah. Cat. p. 239; Dalz. & Gibs. p. 306; Trim. Fl. Ceyl. v. 5, p. 211; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195.—Flowers: Oct.–Dec. VERN. *Bherda*; *Guj.*

KONKAN: Matunga near Bombay, *Woodrow*, 4! S. M. COUNTRY: Belgaum, *Ritchie*, 812/2!—DISTRIB. Plains and lower hills of India; Ceylon, China, Malaya.

2. **Ischæmum rugosum,** *Salisb. Ic. Stirp. Rar.* (1791) p. 1, t. 1. Annual; stems 1–2 ft. long, erect or ascending, slightly thickened beneath the inflorescence, leafy, compressed; nodes glabrous or bearded. Leaves 4–6 by $\frac{1}{6}$–$\frac{1}{2}$ in., linear-lanceolate, acuminate, flat, glabrous or sparsely hairy, the margins scabrid, the uppermost leaves often reduced to spathiform lanceolate sheaths which partially enclose the racemes; sheaths compressed, loose, glabrous, the mouth auricled, the auricles membranous, confluent with the truncate ligules. Racemes usually 2, erect, pale yellow, glabrous, 1–3 in. long, fragile; rhachis trigonous, ciliate on the dorsal angle. Spikelets reaching $\frac{1}{4}$ in. long or more, linear-oblong, the sessile and pedicellate closely pressed together; pedicel of the latter very short and thick, clavate, angular, confluent with the bristly thick callus of the sessile spikelet. *Sessile spikelets*: lower invol.-glume cartilaginous for $\frac{2}{3}$ of its length from the base, the cartilaginous portion pale yellow, shining, concave, crossed by 3–6 deep smooth ridges, the upper third flattened, thinner, membranous, obtuse, with green veins, the margins narrowly incurved, the outer margin winged; upper invol.-glume oblong-lanceolate, acuminate, keeled, the keel with a narrow ciliolate wing below the tip; lower floral glume ovate-lanceolate, acuminate, hyaline, male or empty, paleate, the palea hyaline, narrow; upper floral glume $\frac{1}{6}$ in. long, deeply cleft into 2 acute lanceolate lobes; palea linear-lanceolate; awn reaching $\frac{5}{8}$ in. long or more. *Pedicellate spikelets* variable, rather shorter than the sessile; lower invol.-glume like that of the sessile or with fewer or sometimes more or less obscure transverse ridges, the upper half of the glume broader and more oblique; upper invol.-glume not keeled, otherwise as in the sessile spikelet; lower floral glume as in the sessile; upper floral glume oblong, obtuse, not awned. Fl. B. I. v. 7, p. 127; Grah. Cat. p. 239; Dalz. & Gibs. p. 305; Trim. Fl. Ceyl. v. 5, p. 212; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195; Watt, Dict. Econ. Prod. v. 4, p. 531.—Flowers: Oct.

Deccan; Poona, *Woodrow.*—Distrib. Throughout India; Ceylon, China, Malaya.

3. **Ischæmum molle,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 128. Stem 3–4 ft. long, solid, smooth, stout, leafy. Leaves 6–10 by $\frac{1}{4}$–$\frac{1}{3}$ in., linear, finely acuminate, sparsely hairy, base rounded, cordate; sheaths 4–6 in. long, smooth, glabrous or sparsely hairy above, the mouth villous. Racemes 1–2, axillary and terminal, 3–5 in. long, densely villous with soft white hairs. Spikelets reaching $\frac{1}{5}$ in. long; callus of sessile spikelets very short and broad. *Sessile spikelets*: lower invol.-glume thinly coriaceous, broadly ovate, obtuse, dorsally villous all over, many-nerved; upper invol.-glume chartaceous, obtuse, silky, keeled, the keel with a narrow ciliolate wing from the middle upwards; lower floral glume ovate, obtuse, hyaline, 3-nerved, ciliolate, paleate, the palea as long as the glume, narrow, obtuse; upper floral glume shorter than the lower one, cleft to the middle into 2 lanceolate acuminate ciliolate lobes; palea small, narrow; awn nearly $\frac{3}{4}$ in. long, the lower half dark brown, the upper half yellowish-white. *Pedicellate spikelets* rather smaller than the sessile, with similar glumes but awnless. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers: Oct.–Dec.

Deccan: Lanoli, *Woodrow.*

There is but one sheet from the Bombay Presidency in Herb. Kew. from Dalzell's Herbarium, but no locality is given for the plant. There is one other small specimen of the plant in the Kew Herbarium, collected in the Chanda district, Central Provinces, by Mr. Duthie.

4. **Ischæmum angustifolium,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 241. Perennial; stems tufted, woolly at the base, 2–3 ft. high, erect, slender, sparingly branched, grooved on one side, glabrous. Leaves 1–2 ft. by $\frac{1}{10}$–$\frac{1}{6}$ in., tapering into a subpungent acumen, concave or convolute, base obtuse, fimbriate, margins scaberulous; sheaths glabrous; ligule a tuft of short hairs. Racemes 2–4, on axillary and terminal filiform peduncles, 1–2 in. long, close or distant, erect, golden or rusty-villous; joints and pedicels $\frac{1}{2}$ as long as the lower spikelet, slender, shortly ciliate, the pedicels bearded at the base. *Sessile spikelets* $\frac{1}{6}$ in. long, lanceolate; callus short, hairy. Glumes 4; lower invol.-glume $\frac{1}{8}$ in. long, elliptic-oblong, chartaceous, 2–3-toothed, 5-nerved, the lower part of the glume ciliate with long rufous hairs and also with a tuft of hairs at the middle of the lower part of the back; upper invol.-glume $\frac{1}{8}$ in. long, membranous, ovate-lanceolate, 2-dentate, often mucronate between the teeth, 3–5-nerved; lower floral glume equalling the lower invol.-glume, oblong, obtuse, irregularly 2-dentate, hyaline, nerveless, paleate, the palea a little shorter than the glume, linear, 2-dentate; upper floral glume $\frac{1}{8}$ in. long, linear, hyaline, usually 2-dentate, but sometimes only acute at the apex; palea shorter than the glume; awn reaching $\frac{3}{8}$ in. long. *Pedicellate spikelets* like the sessile. Fl. B. I. v. 7, p. 129; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195; Watt, Dict. Econ. Prod. v. 4, p. 526.—Flowers: Dec.–Feb. VERN. *Sabai.*

DECCAN: cultivated at Poona, *Woodrow.* GUJARAT: Rajkot (Kathiawar), *Woodrow.* —DISTRIB. India (Lower Himalaya, Panjáb, Rajputana, Behar, Central India); Afghanistan, China, Philippines.

The grass was cultivated at Poona for paper-making by the Deccan Paper Mills. It was found suitable for the lower grades of paper, but for the higher grades was not satisfactory. The nodes are hard, and if boiled long enough to soften them the remaining parts are overboiled and useless.

5. **Ischæmum diplopogon,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 129. Annual; stem 12–20 in. long, branched from the base and upwards; nodes glabrous; internodes long. Leaves 3–6 by $\frac{1}{4}$–$\frac{5}{8}$ in., linear-lanceolate from a narrow base, acuminate, with many slender nerves, dark green and shining above; sheaths glabrous, those of the upper leaves open, spathiform; ligule an oblong glabrous membrane. Peduncles many from the upper spathe-like sheaths, solitary, filiform, the spathes 1–3 in. long, lanceolate. Racemes usually 2, compressed, 1–$1\frac{3}{4}$ in. long; joints and pedicels $\frac{1}{2}$ the length of the lower spikelets or longer, subclavate, dorsally rounded, ventrally concave. *Sessile spikelets*: callus nearly $\frac{1}{20}$ in. long, thick. Spikelets reaching $\frac{1}{4}$ in. long. Glumes 4; lower invol.-glume $\frac{1}{5}$ in. long, oblong, shortly 2-cuspidate, obscurely nerved and with shortly incurved margins; upper invol.-glume $\frac{1}{5}$ in. long, ovate, subacute, shortly 2-fid, 3-nerved, the lateral nerves pectinately ciliate near the apex with long erect hairs and furnished with a slender whitish awn $\frac{1}{5}$ in. long; lower floral glume linear-oblong, hyaline, 1-nerved; upper floral glume $\frac{1}{6}$ in. long, 2-fid at the apex into acute lobes, hyaline;

palea small, oblong; awn reaching $\frac{5}{8}$ in. long, the lower half brown, the upper yellowish white. *Pedicellate spikelets* often imperfect, not awned. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.

KONKAN: Matheran, *Woodrow*. DECCAN: *Woodrow*, 187!; Mahableshwar, *Woodrow*, 4!; Bhorkas near Poona, *Woodrow*, 3!—DISTRIB. India (W. Peninsula).

6. **Ischæmum pilosum,** *Hack. Monog. Andropog. in DC. Mon Phan.* v. 6 (1889) p. 240. Rhizome giving out densely scaly long stolons stems erect, 2–3 ft. long, slender, terete, glabrous; nodes glabrous. Leaves 6–12 by $\frac{1}{5}$–$\frac{1}{3}$ in., linear, finely acuminate, glabrous; sheaths glabrous; ligule rounded, $\frac{1}{12}$–$\frac{1}{8}$ in. long, membranous, glabrous. Racemes 2–6, fascicled, 1–4 in. long, yellow or brownish, pilose; rhachis hairy; joints and pedicels slender, compressed, subclavate, shorter than the sessile spikelets, sparsely ciliate; pedicel about $\frac{1}{2}$ as long as its spikelet. *Sessile spikelets* narrowly lanceolate, reaching $\frac{1}{4}$ in. long: callus minute, bearded with long hairs. Glumes 4; lower invol.-glume chartaceous, narrowed from the middle upwards, dorsally hairy, the margins incurved throughout their whole length, the nerves anastomosing; upper invol.-glume rather longer than the lower, chartaceous, ovate-lanceolate, acuminate, laterally compressed, 5-nerved, the lateral nerves anastomosing; lower floral glume a little shorter than the upper invol.-glume, linear-oblong, obtuse, ciliate above, paleate, male, the palea acute, membranous, nerveless, glabrous; upper floral glume equalling the lower one, cleft almost to the middle into acute ciliolate lobes; palea a little shorter, lanceolate-subulate, nerveless; awn $\frac{1}{4}$–$\frac{3}{8}$ in. long. *Pedicellate spikelets* $\frac{1}{8}$–$\frac{1}{5}$ in. long, like the sessile but usually with a shorter awn, sometimes imperfect or reduced to a single glume. Fl. B. I. v. 7, p. 130; Grah. Cat. p. 239; Dalz. & Gibs. p. 305; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Watt, Dict. Econ. Prod. v. 4, p. 531.—Flowers: Oct.–Mar. VERN. *Kunda*; *Nath.*

Very common in black soil, *Dalzell* without locality in Herb. Kew.! DECCAN: *Graham, Dalzell & Gibson, Lisboa*; Khandesh, *Lisboa*; Sholapur, *Lisboa*, Sattara, *Lisboa*.—DISTRIB. India (Rajputana, Central Provinces, W. Peninsula).

7. **Ischæmum semisagittatum,** *Roxb. Hort. Beng.* (1814) p. 8. Annual; stems 1–2 ft. long, decumbent at the base, then ascending, slender, terete; nodes glabrous; internodes long. Leaves 2–3 by $\frac{3}{8}$–$\frac{5}{8}$ in., oblong-lanceolate, acuminate, with capillary tips, base auricled, broadly cordate or sagittate, the lower leaves with a filiform petiole reaching nearly 1 in. long, the upper sessile, glabrous or sparsely hairy, the margins scabrid; sheaths loose, glabrous, those of the uppermost leaves spathiform; ligule oblong, $\frac{1}{8}$ in. long, obtuse, pilose. Racemes 2, more or less softly villous with long white or grey hairs, 1–2½ in. long, fragile; internodes and pedicels much shorter than the spikelets, trigonous. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{4}$ in. long; callus short, bearded with long hairs. Glumes 4; lower invol.-glume ovate, convex, the lower half cartilaginous, with 3–5 obscure or more or less conspicuous ridges ending in marginal nodules, the upper half chartaceous or membranous, with green veins and ciliolate margins; upper invol.-glume equalling the lower, ovate-oblong, obtuse, coriaceous; lower floral glume a little shorter than the lower invol.-glume, ovate, acuminate, 1–3-nerved, paleate, male, the palea linear-oblong, hyaline, 2-nerved; upper floral glume female, cleft to

below the middle into acute glabrous lobes; palea linear-oblong; awn $\frac{1}{2}$–$\frac{2}{3}$ in. long. *Pedicellate spikelets* rather shorter and narrower than the sessile, closely appressed to the sessile, with very broad pedicels $\frac{1}{25}$ in. long; lower invol.-glume narrowly oblong, not ridged; upper invol.- and lower floral glumes as in the sessile spikelets; upper floral glume narrowly oblong, tip 2-toothed with a minute awn. Fl. B. I. v. 7, p. 130; Trim. Fl. Ceyl. v. 5, p. 213; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195.—Flowers: Sept.–Nov.

Konkan: *Law*!; Parel (Bombay), *Woodrow*; Thána, *Lisboa*. Deccan: *Woodrow*!; Lanoli, *Woodrow*!; Sattara, *Lisboa*. Kanara: Yellapur, *Talbot*, 738!—Distrib. India (Bengal, W. Peninsula); Ceylon.

Var. *dasyantha*, Hack. Monog. Andropog. in DC. Monog. Phan. v. 6 (1889) p. 209. Lower invol.-glume appressedly villous at least in the upper spikelets; joints scabrous with hairy margins and keel. *Ischæmum conjugatum*, Roxb. Hort. Beng. (1814) p. 8; Hook. f. Fl. B. I. v. 7, p. 131; Grah. Cat. p. 239; Dalz. & Gibs. p. 305; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195.—Flowers: Dec.

Konkan: *Stocks*!, *Woodrow*. Kanara: Divimana, *Woodrow*.

8. **Ischæmum Lisboæ,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 133. Stem creeping below, very stout, rooting at the thickened nodes; branches ascending, 8–14 in. long, glabrous. Leaves on the creeping stem 1–2 by $\frac{1}{4}$–$\frac{3}{8}$ in., oblong, acute, closely imbricating in 2 series, the blades reflexed at right angles to the erect short open sheaths, softly tomentose on both surfaces; lower sheaths $\frac{1}{2}$–1 in. long, villous; ligule short, bearded with very long hairs. Racemes 2, softly tomentose, 2 in. long; joints and pedicels about $\frac{1}{2}$ as long as the spikelets, stout, shortly villous, concavo-convex, truncate. *Sessile spikelets* $\frac{1}{6}$ in. long; callus large, glabrous. Glumes 4; lower invol.-glume thickly coriaceous, dorsally convex, 2-fid, ciliate above the middle, margins broadly incurved below the middle, keels with broad auricular ciliate wings; upper invol.-glume $\frac{1}{8}$ in. long, rather longer than the lower, rigid, the keel winged above the middle, the back of the glume rounded below the wing, shortly awned; lower floral glume ovate-oblong, obtuse, with ciliate margins, paleate, male, the palea chartaceous, obovate, with broad hyaline wings above the middle; upper floral glume about $\frac{1}{12}$ in. long, 3-nerved below the middle, obtusely 2-lobed; palea lanceolate; awn about $\frac{1}{6}$ in. long. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.

Kanara: North Kanara, *Lisboa*. There is but one sheet in Herb. Kew., the specimens on which were collected in Kanara by Dr. Lisboa. I have seen no others.

9. **Ischæmum ciliare,** *Retz. Obs.* fasc. 6 (1791) p. 36. Stems tufted, up to 2 ft. long, erect or ascending, sometimes decumbent below and rooting at the nodes, slender; nodes glabrous or bearded. Leaves 2–6 by $\frac{1}{6}$–$\frac{1}{2}$ in., linear or linear-lanceolate, acuminate, flat, sessile, glabrous, pubescent or villous, narrowed towards the acute or rounded base, margins scabrid; sheaths glabrous or hirsute, compressed, loose, with ciliate rounded auricles; ligule short, obtuse, membranous, ciliate. Racemes 2, rather short, 1$\frac{1}{2}$–2 in. long; rhachis fragile; internodes and pedicels of upper spikelets subequal, erect, compressed, trigonous, bearded dorsally and on the angles. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in. long, oblong

or ovoid; callus very short, oblong, bearded. Glumes 4; lower invol.-glume 2-cuspidate, coriaceous, convex, smooth or pitted, hirsute below, flatter and veined above the middle, with lateral ciliolate broad or narrow equal wings, the margins narrowly incurved above, broadly so below; upper invol.-glume as long as or longer than the lower, chartaceous, lanceolate, acuminate or shortly awned, 3-5-nerved, keel narrowly winged towards the tip; lower floral glume ovate-lanceolate, acuminate, ciliate near the tip, triandrous, paleate, the palea lanceolate, acuminate, opaque, with broad hyaline ciliolate wings; upper floral glume cleft to the middle into oblong obtuse glabrous or ciliate lobes, female; palea lanceolate, acuminate, 2-nerved, not ciliolate; awn $\frac{3}{4}$–$\frac{1}{2}$ in. long. Anthers $\frac{1}{8}$ in. long. Styles and stigmas short. *Pedicellate spikelets* like the sessile, the upper floral glume usually awned. Fl. B. I. v. 7, p. 133; Trim. Fl. Ceyl. v. 5, p. 216; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1195; Watt, Dict. Econ. Prod. v. 4, p. 530. —Flowers: Oct. VERN. *Putena.*

KONKAN: Salsette, *Jacquemont*, 710!; Parel (Bombay), *Woodrow*. KANARA: *Dalzell*!; Kakti (N. Kanara), *Young* ex *Woodrow*.— DISTRIB. More or less throughout India; Ceylon, China, Malaya, Australia.

10. **Ischæmum spathiflorum,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 138. A tall grass reaching 3–4 ft. high, much branched above; branches erect. Stem as thick as a goose-quill below, leafy above; nodes glabrous. Leaves 1–1½ ft. by $\frac{3}{4}$ in., linear-lanceolate, finely acuminate, narrowed from the middle, often tinged with purple, almost petiolate, thin, sparsely hairy, margins smooth; midrib stout, nerves obscure; sheaths of lower leaves 6 in. long and upwards, terete, quite glabrous, the sheaths of the upper leaves passing into compressed lanceolate flowering spathes 3–4 in. long; ligule short, scarious. Racemes about 2 in. long, more or less exserted from the spathes, very slender, pale straw-colored; joints and pedicels more than $\frac{1}{2}$ as long as the sessile spikelets, compressed, one angle ciliate. *Sessile spikelets* $\frac{3}{8}$ in. long, narrowly linear-lanceolate; callus very short, hairy; lower invol.-glume $\frac{3}{8}$ in. long, thinly coriaceous, nerveless, white with dense silky hairs to above the middle, dorsal furrow very deep, causing a thick ridge on the inside of the glume, margins equally incurved, the tip 2-dentate; upper invol.-glume chartaceous, dorsally convex, nerveless, but with a nerve-like fold towards the ciliate margin, keel with long cilia above the middle, scabrid towards the emarginate tip; lower floral glume shorter, hyaline, oblong-lanceolate, obtuse, 3-nerved, paleate, the palea lanceolate, the anthers imperfect; upper floral glume as long as the lower, linear, 3-nerved; palea 0; awn 1½ in. long, the column twisted, brown, the upper portion slender, usually purple. *Pedicellate spikelets* longer than the sessile; lower invol.-glume $\frac{1}{2}$ in. long, dorsally convex, not furrowed lanceolate, narrowed into a bisetose often purplish awn, sparsely silky, 7–9-nerved; upper invol.-glume lanceolate, acute, glabrous; lower floral glume as in the sessile spikelet; upper floral glume awnless. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Sept.

KONKAN: Island of Salsette in hilly stony places, *Jacquemont*, 797! DECCAN: Khandala, *Woodrow*!; Palasdari on the Bhore Ghát (G. I. P. Railway), *Woodrow*.— DISTRIB. India (W. Peninsula), apparently endemic.

11. **Ischæmum laxum,** *Br. Prodr.* (1810) p. 205. Perennial; stems 2–3 ft. high, tufted on a short rootstock, simple, slender, erect, glabrous, leafy; nodes glabrous. Leaves 6–12 by $\frac{1}{10}$–$\frac{1}{6}$ in., erect, linear, narrowed to long capillary tips, flat, smooth, striate, glaucous, with minutely scaberulous margins, base not contracted; sheaths shorter than the internodes, glabrous or sparsely hairy, not auricled at the mouth; ligule a tuft of silky hairs. Raceme solitary, 2–4 in. long, suberect, pale, fragile; internodes and pedicels of upper spikelets about $\frac{1}{2}$ as long as the spikelets, concavo-convex, the sides ciliate with long silky hairs. *Sessile spikelets* $\frac{3}{8}$ in. long, linear-oblong, acuminate, pale green; callus short, obtuse, shortly bearded. Glumes 4; lower invol.-glume oblong-lanceolate, acuminate, with a broad depression in the middle instead of a midnerve, the tip 2-dentate, the teeth ending in short capillary awns, margins inflexed, nerves 6, very conspicuous on the back, the 2 lateral nerves very strong, running into the apical teeth, the 4 intermediate nerves diverging from the base in pairs, afterwards more or less converging; upper invol.-glume rather shorter than the lower, membranous, ovate-oblong, acuminate, concave, terminating in a slender awn reaching $\frac{1}{2}$ in. long, the margins ciliate near the apex, nerves 3, very slender; lower floral glume lanceolate, acuminate, hyaline, nerveless, triandrous, paleate, the palea linear-oblong, obtuse; upper floral glume $\frac{1}{3}$ in. long, linear, hyaline, deeply cleft into 2 lanceolate-subulate lobes, female; palea linear-oblong, equalling the glume; awn up to $1\frac{3}{4}$ in. long, the lower 1 in. brown, the upper $\frac{3}{4}$ in. white. *Pedicellate spikelets* as long as the sessile; lower invol.-glume $\frac{3}{8}$ in. long, ovate-oblong, bicuspidate, 7-nerved, the nerves very conspicuous on the back; upper invol.-glume 1-nerved, shortly awned; lower floral glume as in the sessile spikelet; upper floral glume triandrous, not awned. Fl. B. I. v. 7, p. 136; Trim. Fl. Ceyl. v. 5, p. 219; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1196; Watt, Dict. Econ. Prod. v. 4, p. 531.—Flowers: Sept. VERN. *Sheda*; *Paunat.*

Common throughout the Presidency. DECCAN: Khandesh (used for thatching), *Lisboa*; Poona, *Woodrow*; Poona to Karli, *Jacquemont*, 530!—DISTRIB. India (Bengal, Behar, Central Provinces, W. Peninsula); Ceylon, Australia, Cape de Verd Islands.

12. **Ischæmum sulcatum,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 248. Stems geniculate, ascending, reaching 20 in. long or more, weak, terete, glabrous, not ribbed, much branched from the base; nodes glabrous. Leaves 4–8 by $\frac{1}{8}$–$\frac{1}{6}$ in., linear or lanceolate, setaceously acuminate, many-nerved, glaucous, glabrous; sheaths lax, glabrous, constricted at the mouth; ligule a narrow ciliate membrane. Raceme solitary, 2–3 in. long; joints and pedicels shorter than the sessile spikelet, slender, ciliate. *Sessile spikelets* $\frac{3}{8}$ in. long; callus about $\frac{1}{16}$ in. long, shortly hairy at the base, cuneate; lower invol.-glume $\frac{3}{8}$ in. long, subchartaceous, bicuspidate, lanceolate, scabro-punctate, the margins incurved in the upper, open in the lower part, with a furrow in the middle in the place of the midnerve and 2 nerves one at each side of and close to the furrow; upper invol.-glume rather shorter than the lower, chartaceous, 3–5-nerved, shortly 2-dentate, ciliate in the upper part and with a capillary awn $\frac{3}{8}$ in. long from the sinus; lower floral glume $\frac{1}{4}$ in. long, linear, subacute, with incurved margins, hyaline, paleate, the palea as long, oblong, slightly emarginate; upper floral

glume $\frac{1}{4}$ in. long, divided into 2 acute lobes; palea as long as the glume; awn $\frac{3}{4}$–$1\frac{1}{2}$ in. long, the column brown, twisted, geniculate above the column, the upper part pale, scaberulous. *Pedicellate spikelets* smaller than the sessile, awnless; lower invol.-glume lanceolate, bicuspidate, not furrowed, the margins recurved throughout, 7-nerved, the midrib slender, the lateral nerves green, approximate, close to the margin; upper invol.-glume not awned; lower floral glume as in the sessile spikelets; upper floral glume acute, not awned. Fl. B. I. v. 7, p. 137; Woodrow, in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Oct.

Deccan: Sattara, *Lisboa*; Malsiras (Sholapur taluka), *Lisboa*.—Distrib. India (Central Provinces, W. Peninsula).

25. **POGONATHERUM,** Beauv.

Delicate perennial grasses; stems leafy upwards, branching. Leaves narrow, suberect. Racemes solitary on long flexuous peduncles, plumose from the slender awns; rhachis at length fragile; internodes short. Spikelets very small, subterete, 2-nate, 1–2-flowered, a sessile 2-sexual, and a pedicellate male or neuter (rarely 2-sexual); callus bearded with fine hairs. Glumes 3 or 4, all membranous and hyaline, obscurely nerved or nerveless; lower invol.-glume oblong, truncate, dorsally rounded; upper invol.-glume longer, ovate, keeled, 2-fid and awned in the sinus, the awn much longer than the spikelet, slightly twisted; lower floral glume nearly as long as the upper invol.-glume, not awned, usually absent from the pedicellate spikelet; upper floral glume about $\frac{1}{2}$ as long as the upper invol.-glume, 2-fid and awned in the sinus like the upper invol.-glume; palea broadly oblong, not keeled. Lodicules obsolete. Stamens 1 or 2; anthers long. Ovary narrow; styles short, free; stigmas very long, exserted at the top of the spikelet. Grain narrow, oblong, free.—Distrib. India, Afghanistan, China, Malaya, New Hebrides.

1. **Pogonatherum crinitum,** *Kunth, Enum. Pl.* v. 1 (1833) p. 478. Stems 6–12 in. long, densely tufted. Leaves 1–3 by $\frac{1}{10}$–$\frac{1}{5}$ in., linear-lanceolate, acuminate, more or less hairy; sheaths lax, glabrous with a hairy mouth; ligule of long hairs. Racemes terminating the branches of the stem, $\frac{3}{4}$–1 in. long; rhachis slender; internodes short, ciliate; tips thickened, truncate. Spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. long, usually monandrous; hairs of callus longer than the spikelets. Glumes nerveless, hyaline; lower invol.-glume oblong, dorsally rounded, ciliate at the rounded or retuse tip; upper invol.-glume longer than the lower, ovate, keeled, 2-fid, the lobes ciliolate, awned in the sinus with a long capillary awn $\frac{1}{2}$ in. long or more; lower floral glume linear, nearly as long as the upper invol.-glume, not awned, sometimes absent; upper floral glume cleft to the middle into 2 ciliolate lobes; awn straight or recurved, $\frac{3}{4}$ in. long. Fl. B. I. v. 7, p. 141; Trim. Fl. Ceyl. v. 5, p. 222; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1197. *Pogonatherum saccharoideum* var. α. *genuinum*, Hack. Monog. Andropog. in DC. Monog. Phan. v. 6 (1889) p. 193.—Flowers: July.

Kanara: Sampkand (N. Kanara), *Woodrow*.—Distrib. More or less throughout India; Afghanistan, China, Malaya, New Hebrides.

Pogonatherum saccharoideum, Beauv. Agrost. (1812), Expl. des Pl. p. 9, t. 11, fig. 7. *The Bamboo Grass* sometimes grown in gardens, scarcely distinct from *P. crinitum*, which Hackel makes a variety of *P. saccharoideum*. Fl. B. I. v. 7, p. 141; Trim. Fl. Ceyl. v. 5, p. 222; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1197.

26. **LOPHOPOGON,** Hack.

Small perennial densely tufted grasses. Leaves very narrow. Spikes short, solitary, 2-nate or fasciculate at the ends of capillary branches, fragile. Spikelets usually 2-nate at each node of the rhachis; the upper shortly or very shortly pedicellate, 1–2-flowered, aristate from the upper floral glume; the lower spikelet sessile, 2-flowered, not awned from the upper floral glume; lower invol.-glume of both spikelets 3–4-dentate, 5–7-nerved; upper invol.-glume of same 2-dentate, aristate between the teeth; lower floral glume narrow, hyaline, empty or male; upper floral glume hyaline or membranous, that of the upper spikelet with a long awn, that of the lower spikelet awnless. Lodicules 0. Stamens 2. Styles very short; stigmas exserted from the apex of the spikelet.—Distrib. India and Australia; species 3.

1. **Lophopogon tridentatus,** *Hack. in Engl. & Prantl, Pflanzenfam.* v. 2, part 2 (1887) p. 26. Perennial; stems tufted, 4–8 in. high, erect, slender, terete, glabrous. Leaves 2–4 by $\frac{1}{25}$–$\frac{1}{16}$ in., linear, acuminate, rigid, erect, green; sheaths close, quite glabrous, striate, shorter than the internodes, the upper ventricose; ligule very small, truncate, hyaline, ciliate. Heads of racemes erect; sheaths ovoid, flattened, membranous, caudate-acuminate. Racemes usually 2, closely appressed together, appearing like one, $\frac{1}{2}$–$\frac{3}{4}$ in. long, erect, pilose with golden or ferruginous hairs, the peduncle shortly exserted or more or less enclosed in the upper sheath; joints of rhachis very short, slender, glabrous. Spikelets densely imbricate. *Lower spikelets* reaching $\frac{1}{5}$ in. long, brown when dry, obovate-oblong; callus $\frac{1}{30}$ in. long, obtuse, with a small tuft of ferruginous hairs at the very tip. Glumes 4; lower invol.-glume chartaceous, cuneate-oblong, truncate, with 2 long lateral teeth and 1 or 2 shorter ones between, glabrous on the back, 5-nerved; upper invol.-glume $\frac{1}{5}$ in. long, membranous, lanceolate, acute, 3-nerved, hirsute near the apex with ferruginous hairs, and sending out an awn as long as the glume; lower floral glume $\frac{1}{6}$ in. long, narrowly linear, subacute, hyaline, nerveless, glabrous, epaleate; upper floral glume $\frac{1}{6}$ in. long, lanceolate, entire or 2-fid, hyaline, not awned. *Upper spikelets* very shortly pedicellate; lower invol.-glume membranous, 3-toothed, clothed with tufts of long bristles below the middle; upper floral glume with a long awn $\frac{3}{4}$ in. long, geniculate about the middle, the column brown, twisted. Fl. B. I. v. 7, p. 149; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Oct.–Dec.

Dalzell without locality in Herb. Kew.! Konkan: *Law!*, *Stocks!* Deccan: *Woodrow*, 56!; Poona, *Jacquemont*, 541!, *Woodrow*, *Lisboa*; Sholapur, *Stead* ex *Hackel*, *Lisboa*. S. M. Country: Belgaum, *Ritchie*, 882!, *Woodrow*.—Distrib. India (Central Provinces, W. Peninsula).

27. **APOCOPIS,** Nees.

Annual or perennial grasses; stems slender. Leaves narrow, flat. Racemes solitary or 2–3-nate, compressed; rhachis firm, not readily disarticulating; internodes very short, slender, villous. Spikelets secund, closely imbricating in 2 series, solitary, sessile, 1–2-flowered, the lowest 2–4 in each raceme imperfect, neuter; callus very short, acute, bearing the long capillary ciliate pedicel of an obsolete upper spikelet. Glumes 4; lower invol.-glume very large, cuneately obovate or obcordate, chartaceous below, membranous above, more or less villous with pale brown or yellow hairs, 7–9-nerved below the apex, margins incurved at the base only; upper invol.-glume as long as the lower, much narrower, membranous, oblong-ovate, truncate, 3-nerved, the sides broadly incurved; lower floral glume and its hyaline palea oblong, the tips broadly truncate and ciliolate, male or empty; upper floral glume 2-sexual, linear, 2-dentate, 1-nerved, hyaline, paleate, awned; palea half as long as the glume, quadrately oblong, nerveless, truncate with ciliolate tip; awn short, very slender, twisted. Lodicules 0. Stamens 2 or 3; anthers linear. Ovary narrow; stigmas slender, exserted at the top of the spikelet. Grain small, narrowly oblong.—Distrib. Eastern Asia; species 3 or 4.

1. **Apocopis vaginatus,** *Hack. in Œstr. Bot. Zeitschr.* v. 41 (1891) p. 8. A low decumbent annual; stems much branched from the base, 3–8 in. long. Leaves $\frac{3}{4}$–$1\frac{3}{4}$ by $\frac{1}{12}$–$\frac{1}{8}$ in., linear, acute, shorter upwards, hairy from tubercular bases; sheaths lax, longer than the internodes, hairy at the mouth; ligule a small membrane. Racemes 2-nate, $\frac{3}{4}$–$\frac{7}{8}$ in. long, closely appressed together, partly or almost entirely enclosed during flowering in the sheaths of the upper leaves, supported by a short common peduncle, more or less hairy with yellowish-brown hairs; joints much shorter than the spikelets, ciliate. Spikelets oblong, $\frac{1}{5}$ in. long, brown, nearly uniform in color; callus very short, hairy with long brown hairs. Glumes 4; lower invol.-glume $\frac{1}{6}$ in. long, membranous, obovate, truncate or emarginate at the ciliate hyaline apex, densely brown hairy in the lower half, 7–9-nerved, the nerves abruptly ceasing below the apex; upper invol.-glume as long as the lower, quadrate-oblong, truncate at the hyaline margin, hairy in the lower half, 3-nerved, finely ciliolate at the apex; lower floral glume $\frac{1}{6}$ in. long, hyaline, linear-oblong, obtuse, ciliolate at the apex, nerveless; upper floral glume $\frac{1}{5}$ in. long, conspicuously exceeding the other glumes, linear, membranous, truncate and shortly 2-dentate at the apex, awned; awn perfect, $\frac{7}{8}$–$1\frac{1}{4}$ in. long. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437. *A. Wightii* var. *vaginata*, Hook. f. Fl. B. I. v. 7 (1896) p. 143.

Konkan: Kalyan, *Woodrow*. Kanara: N. Kanara, *Talbot* ex *Woodrow*.—Distrib. India (Hazaribagh (Bengal), *C. B. Clarke*).

I have not seen any specimens from the Bombay Presidency.

28. **ARTHRAXON,** Beauv.

Annual or perennial slender grasses; stems decumbent, creeping and branching below. Leaves short, broad, cordate at the base; sheaths shorter than the internodes. Racemes 2-nate, digitate or fasciculate; rhachis very slender, articulate, fragile. Spikelets 1-flowered, secund, sessile, solitary or with an imperfect pedicellate spikelet, laterally com-

pressed, deciduous at the internodes; callus bearded. Glumes 4; lower invol.-glume lanceolate or linear-lanceolate, acute, thin or subcoriaceous, more or less muriculate or aculeate, margins hardly incurved; upper invol.-glume narrower, lanceolate, acuminate, chartaceous, keeled; lower floral glume hyaline, paleate, empty; upper floral glume hyaline, awned or mucronate, bisexual; palea minute or 0. Lodicules 2, cuneate or quadrate. Stamens 1–3. Styles short; stigmas laterally exserted. Grain linear or narrowly fusiform. — DISTRIB. Tropics of the Old World; species 8.

Awn of spikelets less than 1 in. long; joints of rhachis of racemes rectangularly truncate.
- Stamens 3; anthers nearly as long as the upper floral glume.
  - Spikelets all sessile (not pedicellate) ..... 1. *A. inermis.*
  - Spikelets sessile and pedicellate.
    - Tall, reaching 3 ft. high; joints of rhachis sparsely hairy; lower invol.-glume acuminate ..... 2. *A. lanceolatus.*
    - A weak grass reaching 1 ft. high; joints of rhachis densely clothed with silvery hairs; lower invol.-glume 2-fid ..... 3. *A. Meeboldii.*
- Stamens 2 or 3; anthers not ½ the length of the upper floral glume.
  - Lower invol.-glume 2-fid ..... 4. *A. microphyllus.*
  - Lower invol.-glume entire ..... 5. *A. ciliaris.*

Awn of spikelets 6 in. or more long; joints of rhachis of racemes obliquely truncate ..... 6. *A. jubatus.*

1. **Arthraxon inermis,** *Hook. f. Fl. Bl. I.* v. 7 (1896) p. 145. Stems very slender, much geniculately branched, glabrous; nodes pubescent. Leaves 1–1½ by ⅜–⅝ in., ovate, broadly amplexicaul, caudate-acuminate with setaceous tips, glabrous or sparsely hairy on both sides, ciliate near the base. Spikes often 3, short, green; peduncle slender, naked. Spikelets oblong-lanceolate, all sessile (none pedicellate), rather distant. Glumes 3 or 4; lower invol.-glume dorsally convex, obtuse, oblong-lanceolate, strongly 7–9-nerved, the margins not incurved and as well as the nerves scabrid; upper invol.-glume as long as the lower, obovate-oblong (when spread out), obtuse, emarginate, apiculate, 3-nerved, hardly keeled, nearly smooth; lower floral glume 0 (or palea of upper floral glume) shorter than the upper invol.-glume, lanceolate; awn basal, twice as long as the spikelets. Anthers very large. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Oct. VERN. *Vanguarin.*

KONKAN: Matheran, *Woodrow.* DECCAN: *Woodrow,* 189!; Mahableshwar, *Woodrow.* —DISTRIB. India (W. Peninsula).

There is a single and not very good specimen in Herb. Kew. collected by Woodrow and ticketed "Deccan." I have seen no other. The grass seems to be procurable at Matheran and Mahableshwar, both places of easy access, and a few specimens would be highly acceptable at Kew.

2. **Arthraxon lanceolatus,** *Hochst. in Flora,* v. 29 (1856) p. 188. A tall much-branched suberect or subscandent grass 1–3 ft. high; stems slender, quite glabrous or scaberulous below the nodes; floriferous branches usually elongate, solitary or twin. Leaves glaucous, very variable, from broadly ovate and ½–3 by ¼–1¼ to narrowly lanceolate and 1–4 by ⅛–½ in., caudate-acuminate, flaccid or rigid, glabrous or hairy, the margins ciliate with stiff hairs, the nerves slender, obscure; sheaths close; ligule ½₀–1½ in. long, rounded, membranous. Racemes 2–5-nate,

1–2 in. long, pale green or suffused with violet; rhachis sparsely hairy; joints about $\frac{1}{2}$ as long as the spikelets. *Sessile spikelets* $\frac{1}{4}$ in. long (not including the awn), linear-lanceolate; callus very short, not bearded. Glumes 4; lower invol.-glume $\frac{1}{4}$ in. long, lanceolate, acuminate, coriaceous, often purplish with a hyaline tip, the keels serrately bristly with strong curved teeth, the back convex, glabrous or muriculate, 5–7-nerved, with incurved margins; upper invol.-glume similar, lanceolate, acuminate or mucronulate, 3-nerved, with incurved margins; lower floral glume $\frac{1}{6}$ in. long, acute, glabrous, membranous; upper floral glume hyaline; awn $\frac{1}{2}$–$\frac{5}{8}$ in. long, basal, the column equalling the subulate portion. Anthers more than $\frac{1}{8}$ in. long. *Pedicellate spikelets* $\frac{1}{5}$ in. long, linear-lanceolate. Stamens perfect. Fl. B. I. v. 7, p. 143; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1198.—Flowers: Oct. VERN. *Harjala*; *Govinder*.

DECCAN: Lanoli, *Woodrow*. GUJARAT; Morvi (Kathiawar), *Woodrow*. SIND: *Stocks*, 642!—DISTRIB. More or less throughout India; Abyssinia, Tonkin, China.

3. **Arthraxon Meeboldii,** *Stapf, MS.* Annual; stems 2–3 from the base, shortly prostrate, ascending, 6–12 in. long, slender, terete, quite glabrous, often tinged with purple; nodes pubescent. Leaves $\frac{3}{4}$–2 by $\frac{1}{4}$–$\frac{3}{4}$ in., ovate lanceolate, finely acuminate, very sparsely hairy with slender bulbous-based hairs, green above, glaucous beneath, ciliate on the margins with bulbous-based hairs, base cordate, amplexicaul; sheaths of the lower leaves loose, the others close or the upper more or less tumid, at first enclosing the panicles, glabrous or with a few scattered hairs and more or less ciliate margins; ligule about $\frac{1}{20}$ in. long, quadrate, hyaline, shortly ciliate at the apex. Inflorescence of paniculate racemes at the apex of the stems; branches 2–4, reaching 2 in. long; joints of the rhachis about $\frac{1}{6}$ in. long, densely clothed with long silvery hairs; pedicels $\frac{1}{5}$ in. long, broad. *Sessile spikelets* $\frac{1}{4}$ $\frac{3}{8}$ in. long, narrowly linear-lanceolate; callus minute, bearded. Glumes 4: lower invol.-glume when young sometimes silky all over with a deciduous tomentum, linear-lanceolate, chartaceous, with a purplish 2-fid acumen with very narrow teeth and with incurved margins, keels serrately muricate from the base up to $\frac{3}{4}$ of their length, the murications passing into tubercles which, in the upper third of the glume, are ciliate with fine erect silky hairs; upper invol.-glume oblong-lanceolate, setosely acuminate, membranous, equalling the lower one, 3-nerved, with hyaline margins; lower floral glume empty, elliptic-oblong, subobtuse, $\frac{1}{6}$ in. long, nerveless; upper floral glume linear-lanceolate, acute, rather more than $\frac{1}{8}$ in. long, hyaline, aristate from near the base, the awn $\frac{1}{2}$ in. long or more. *Pedicellate spikelets* closely appressed to the sessile ones, lanceolate, acute, chartaceous, shorter than the sessile spikelets; lower invol.-glume with rigidly ciliate keels, otherwise glabrous, 9-nerved; upper invol.-glume lanceolate, acute, 3-nerved; lower floral glume empty, ovate-oblong, hyaline, $\frac{1}{6}$ in. long; upper floral glume ovate, 2-dentate, equalling the lower, mucronulate between the teeth, hyaline, male. Anthers $\frac{1}{8}$ in. long, bright yellow.—Flowers: Sept.

The long silky silvery hairs on the racemes are a good distinctive mark of the species.

DECCAN: Khandala, *Meebold*, 9132; Mahableshwar, *Cooke*!—DISTRIB. India (W. Peninsula).

4. **Arthraxon microphyllus,** *Hochst. in Flora*, v. 29 (1856) p. 188. Annual; stem and branches filiform, 6–12 in. long, straggling, glabrous or more or less obscurely pubescent below the spikes. Leaves ¾–1¼ by ⅛–⅓ in., ovate or elliptic, acuminate, membranous, very sparingly hairy or nearly glabrous, base slightly auricled, margins naked or sparsely ciliate especially towards the base; sheaths short, glabrous; ligule small, hyaline. Panicle of 3–5 slender branches; rhachis capillary; internodes shorter than the slender spikelets, usually ciliate with long erect hairs (rarely glabrous). Spikelets solitary (rarely with a pedicellate one), ⅛ in. long, narrowly lanceolate; callus nearly glabrous. Glumes 4; lower invol.-glume thinly membranous, lanceolate, 2-cuspidate, 5–7-nerved above the middle, the nerves usually scabrid; upper invol.-glume as long as the lower, narrowly lanceolate, narrowing out into a very fine awn-like point $\frac{1}{50}$–$\frac{1}{30}$ in. long; lower floral glume much shorter than the upper invol.-glume, lanceolate, acuminate, epaleate; upper floral glume $\frac{1}{20}$ in. long, ovate-lanceolate, subacute, hyaline, with an awn about ⅜ in. long from near the base, the column of the awn brown, much shorter than the usually purplish capillary subulate portion. Fl. B. I. v. 7, p. 147; Trim. Fl. Ceyl. v. 5, p. 224; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1199.—Flowers: Sept.

KONKAN: Salsette, *Jacquemont*, 713!; Parel (Bombay), *Woodrow*. GUJARAT: Surat, *Cooke*!—DISTRIB. More or less throughout India; Ceylon, Tonkin, Tropical Africa.

5. **Arthraxon ciliaris,** *Beauv. Agros.* (1812) p. 111, t. 11, fig. 6. Stems tall or short, tufted or branched from the base, or with long creeping stems and ascending leafy branches, glabrous. Leaves 1–2½ by ⅜–⅞ in., ovate to lanceolate, glabrous or laxly hairy, the margins ciliate towards the base; sheaths with ciliate margins. Racemes few or many, on long naked or spathaceously sheathed glabrous peduncles, pale green or purplish. Spikelets ⅛–⅕ in. long, lanceolate or linear-lanceolate; callus naked or shortly bearded. Glumes 4; lower invol.-glume chartaceous, ovate-lanceolate (when spread out), acute, 7–10-nerved, the nerves minutely aculeolate, often punctulate; upper invol.-glume as long as the lower, linear, acute, 3-nerved; lower floral glume much shorter than the upper invol.-glume, ovate-oblong, acuminate, nerveless; upper floral glume about ½ as long as the upper invol.-glume, awned; awn subbasal, about twice as long as the spikelet. Fl. B. I. v. 7, p. 145; Trim. Fl. Ceyl. v. 5, p. 225; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1199.—Flowers: Oct.

S. M. COUNTRY: Belgaum, *Ritchie*, 796 *a*! GUJARAT: Chamargaon, *Woodrow*.—DISTRIB. Throughout India in hilly districts; Ceylon.

A very variable species of which Hackel (Monog. Andropog. p. 354) recognizes no less than 12 forms. These, however, for the Indian species Sir Joseph Hooker has reduced to four. There is only one specimen from Bombay in Herb. Kew., obtained by *Ritchie* from Belgaum, and this has been included by Sir J. Hooker in his group *Violaceus*.

6. **Arthraxon jubatus,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 358. Annual; stems decumbent, then ascending, 4–12 in. long, very slender, terete, quite glabrous, leafy almost to the apex. Leaves ⅞–1¾ by ⅛–⅓ in., lanceolate, acute, flat, thinly membranous, green, undulate, densely pubescent or almost villous on both surfaces,

base subcordate, amplexicaul; sheaths lax, pubescent, the upper spathiform, leafless; ligule very short, truncate, hyaline, glabrous. Floral spathes 1½–2 in. long, linear-lanceolate, acuminate, green, with membranous margins, pubescent or villous, enclosing the spikes. Racemes 2-nate, on a common peduncle, a subsessile and a pedicellate one; the pedicel slender, pubescent, fragile; joints ½ as long as the spikelets and pedicels of upper spikelet clavate, compressed, pectinately ciliate. Spikelets 2-nate, a sessile and a pedicellate one at each joint, and a terminal male. *Sessile spikelets* ⅜ in. long, linear-lanceolate; callus $\frac{1}{20}$ in. long, bearded with hairs equalling itself. Glumes 4; lower invol.-glume membranous, linear, acute, bimucronulate, 2-nerved, the margins hyaline, inflexed; upper invol.-glume rather shorter than the lower, linear-lanceolate, mucronulate, much compressed, 1-nerved, with hyaline margins; lower floral glume ⅛ in. long, narrow, linear, subacute, hyaline, nerveless, glabrous; upper floral glume ½ as long as the upper invol.-glume, lanceolate, acute, glabrous, with a very long capillary awn reaching 6 in. (or more) long, attached at the base; palea 0. Anthers $\frac{1}{20}$ in. long. *Pedicellate spikelets* ¼ in. long, not awned. Fl. B. I. v. 7, p. 147; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Oct.

KONKAN: *Law!*, *Stocks!* DECCAN: *Woodrow*, from seed sown in the Botanical Garden of the College of Science, Poona, collected at Kori Fort, 12 miles S. of Lanoli. —DISTRIB. India (W. Peninsula).

29. **THELEPOGON,** Roth.

A coarse perennial grass. Leaves lanceolate, cordate, amplexicaul. Racemes few or many, corymbosely fascicled, pedunculate; rhachis flexuous, fragile, the joints more or less deeply excavated. Spikelets ovoid, acute, solitary at the joints, the upper spikelet reduced to a mere almost glume-like rigid pedicel, the lower sessile, 2-flowered, the lower flower male, the upper 2-sexual. Glumes 4; lower invol.-glume coriaceous, transversely rugose, ridged or tuberculate; upper invol.-glume chartaceous, not keeled, sunk in the cavity of the joint, rigid, sparingly tuberculate; lower floral glume shorter, paleate, usually male, triandrous, with a similar palea; upper floral glume hyaline, 2-cleft, with a long twisted awn in the sinus, 3-nerved; palea narrow, equalling the glume. Lodicules cuneate, truncate. Stamens 3; anthers long. Styles free; stigmas short.—DISTRIB. Species 1, African and East Indian.

1. **Thelepogon elegans,** *Roth*, *Nov. Pl. Sp.* (1821) p. 62. An annual robust grass; roots stout, rigid; stems 1–3½ ft. high, tufted and branching from the base, terete, erect or geniculately ascending, glabrous. Leaves 4–10 by ⅜–¾ in., linear, acuminate, thin, cordate, amplexicaul, usually hispid with bulbous-based hairs or sometimes only tuberculately scabrid, the margins cartilaginously ciliate; sheaths loose, hispid above with bulbous-based hairs and with ciliate margins; ligule narrow, membranous. Racemes 1–2 in. long, corymbose; peduncles slender, stiff; joints of the rhachis as long as the spikelets, subclavate, scaberulous, the top orbicular, cupular. Spikelets ¼ in. long, yellowish-white, ovate, beaked; callus small, annular, minutely bearded. Glumes 4; lower invol.-glume thickly coriaceous, ovate, acuminate, with a membranous 2-dentate beak, the back convex with transverse much elevated

ridges, translucent; upper invol.-glume slightly longer than the lower, broadly lanceolate, chartaceous, with a long acumen, the back flat or subconvex, with 5–7 short transverse ridges; lower floral glume $\frac{1}{5}$ in. long, lanceolate, hyaline, 2-nerved, glabrous, the palea narrow, acute, nerveless; upper floral glume $\frac{1}{5}$ in. long, ovate-lanceolate, hyaline, cleft to the middle, glabrous, 3-nerved, the lateral nerves running into the acute lanceolate lobes; awn inserted at the sinus, $\frac{3}{4}$–1 in. long, the column brown, twisted, equalling the yellow subulate portion; palea equalling the glume, oblong, acuminate. *Pedicel* of the obsolete upper spikelet longer than the sessile spikelet, linear, obtuse, curved, flat, ciliate on one margin. Fl. B. I. v. 7, p. 148; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Sept.

KONKAN: *Stocks!*, *Law!* DECCAN: Poona, *Woodrow*; Hewra, *Dalzell!*; near Nasik, *Edgeworth!* S. M. COUNTRY: Belgaum, *Ritchie*, 812!—DISTRIB. India (Central India, W Peninsula); Tropical Africa.

30. **ELIONURUS,** Humb. & Bonpl.

Aromatic cæspitose grasses, usually perennial. Raceme solitary, subsimple, clothed with silky hairs; rhachis fragile, jointed, flattened. Spikelets 2-nate (one sessile, the other pedicellate). *Sessile spikelets* dorsally compressed, 1-flowered. Glumes 4; lower invol.-glume subcoriaceous, often 2-toothed or 2-fid, dorsally flattened, 2-keeled, usually with fine filiform transparent oil-glands close to the ciliate keels; upper invol.-glume membranous, lanceolate, acute, not awned; lower floral glume hyaline, empty, paleate or not; upper floral glume small, hyaline, awnless, paleate or not. Lodicules 2, cuneate. Stamens 3. Stigmas laterally exserted. Grain dorsally compressed, oblong.—DISTRIB. Species about 15, in the tropical and subtropical regions of both hemispheres.

Annual; lower invol.-glume of sessile spikelet with penicillate tubercles on the margin, the floral glumes not paleate	1. *E. Royleanus.*
Perennial; margins of lower invol.-glume of sessile spikelet not tuberculate, the floral glumes paleate	2. *E. hirsutus.*

1. **Elionurus Royleanus,** *Nees, ex A. Rich. Tent. Fl. Abyss.* v. 2 (1851) p. 471. Annual; stems 3–12 in. high, slender, leafy, geniculate; nodes pubescent. Leaves 1½–4 by $\frac{1}{20}$ in., linear-lanceolate, acute or acuminate, rigid, suberect, at first green then together with the whole plant turning red, glabrous or sparsely hairy, fimbriate at the base; lower sheaths terete, much shorter than the internodes, the upper spathiform; ligule very short, membranous. Racemes 1–2 in. long, erect, yellowish-green or often variegated with purple, each enclosed in a long narrow flattened sheath; joints densely bearded at the apex with long white silky hairs, obliquely disarticulating, shorter than the sessile spikelets. *Sessile spikelets* nearly $\frac{1}{2}$ in. long (including the beak); callus about $\frac{1}{30}$ in. long, densely bearded. Glumes 4; lower invol.-glume coriaceous, nearly $\frac{1}{2}$ in. long (including beak), running out into a usually violet-colored, 2-fid beak about $\frac{1}{4}$ in. long, the lobes ciliate, linear, slightly divergent, the margins of the glume below the beak with a row of large violet-colored tubercles each carrying a pencil of whitish glistening hairs; upper invol.-glume as long as the body of the lower, linear-lanceolate, acuminate, finely mucronate, membranous, 1-nerved; lower floral glume

a little shorter than the invol.-glumes, oblong, acute, nerveless, glabrous, epaleate; upper floral glume much shorter than the lower, oblong, obtuse, nerveless. *Pedicellate spikelets*: pedicels $\frac{1}{8}$ in. long, ciliate on one margin. Spikelets linear-subulate. Lower invol.-glume $\frac{3}{8}$ in. long, narrowed almost from the base into a long narrow linear ciliate beak: upper invol.-glume $\frac{1}{4}$ in. long, ovate-lanceolate, concave, membranous, narrowed into a short scabrid purplish awn. Fl. B. I. v. 7, p. 161; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.

GUJARAT: Rajkot (Kathiawar), *Woodrow*. SIND: *Woodrow*.—DISTRIB. India (Upper Gangetic plain, W. Peninsula); Arabia, Abyssinia, Cape de Verd Islands.

2. **Elionurus hirsutus,** *Munro, ex Benth. in Journ. Linn. Soc.* v. 19 (1881) p. 68. Perennial; rootstock woody, branched; stems 1-2 ft., ascending from a branching base, stout, smooth, rigid, more or less scabrid or pubescent; nodes pubescent. Leaves 3-6 by $\frac{1}{10}$-$\frac{1}{6}$ in., linear, finely acuminate: sheaths terete, glabrous or nearly so, the upper sheaths shorter than the internodes, glaucous or nearly white. Raceme solitary, stout, 2-4 in. long, silvery silky all over; joints shorter than the sessile spikelets, subclavate, densely villous on the back. *Sessile spikelets* at each node of the rhachis, solitary or 2-nate, imbricate, reaching $\frac{3}{8}$ in. long or more (including the beak), pale green. Glumes 4; lower invol.-glume $\frac{3}{8}$ in. long (including beak), coriaceous, 7-9-nerved, the beak often as long as the body of the glume, deeply 2-fid, densely silky-villous, the lobes divergent; upper invol.-glume $\frac{1}{4}$ in. long, ovate, aristately acuminate, chartaceous, 3-5-nerved, the acumen ciliate at the tip; lower floral glume equalling the upper invol.-glume, hyaline, ovate-oblong, acute, 3-nerved, paleate, the palea lanceolate, acute, as long as the glume; upper floral glume shorter, ovate, acute, glabrous, with incurved margins. *Pedicellate spikelets* rather shorter than the sessile ones; pedicels about $\frac{1}{6}$ in. long, shorter than the joints, flattened, subclavate, hairy on the back and with ciliate margins. Fl. B. I. v. 7, p. 162; Boiss. Fl. Orient. v. 5, p. 466; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Watt, Dict. Econ. Prod. v. 3, p. 242. *Rottboellia hirsuta*, Vahl, Symb. part 1 (1790) p. 11; Hack. Monog. Andropog. in DC. Monog. Phan. v. 6 (1889) p. 311.

Dalzell without locality in Herb. Kew.! SIND: *Stocks*, 626!—DISTRIB. India (Panjáb, Rajputana, W. Peninsula); westwards to N. Africa.

31. **ANDROPOGON,** Linn.

Perennial or annual grasses of very varied habit. Leaves usually narrow. Spikelets similar or heteromorphous, 2-nate (one sessile, the other pedicellate), on the fragile rhachis of solitary, 2-nate, digitate fasciculate or paniculate racemes. *Sessile spikelets* 1-flowered; callus long or short. Glumes 3 or 4; lower invol.-glume coriaceous or chartaceous, 2-keeled, muticous; upper invol.-glume usually thinner with a median keel, rarely awned; lower floral glume hyaline or 0, neuter; upper floral glume hyaline, usually awned, often reduced to the dilated base of the awn, 2-sexual; palea various or 0. Lodicules 2, cuneate. Stamens 3-1. Stigmas laterally exserted. Grain various. *Pedicellate spikelets* usually smaller than the sessile.—DISTRIB. Species more than 200, in the warm parts of the world.

Internodes of racemes deeply cupped at the apex.

Subgenus 1. CYMBOPOGON. Racemes 2-nate, terminal on the stems, both together subtended by spathiform sheaths; spikelets differing in sex and form.

Roots aromatic ..... 1. *A. Iwarancusa.*

Subgenus 2. ARTHROLOPHIS. Racemes 2-nate (1 sessile, the other pedunculate), from spathiform sheaths; sessile spikelets alike in sex and form; joints opaque.

Cupular tips of joints toothed ..... 2. *A. pumilus.*

Internodes of racemes truncate but not cupped at the apex.

SECT. A. ISOZYGI. Sessile spikelets of all the pairs alike in sex and form.

Subgenus 3. HYPOGYNIUM. Raceme solitary, pedunculate, in the axil of a spathiform leaf-sheath; joints and pedicels obliquely truncate at the apex, opaque; pedicellate spikelets like the sessile.

Lower involucre-glume pitted ..... 3. *A. foveolatus.*

Subgenus 4. AMPHILOPHIS. Racemes 2 or more, fasciculate or paniculate, all pedunculate; joints of the raceme many to few, like the pedicels, linear, compressed, with a translucent median channel and thickened margins (except *A. concanensis*).

Racemes with many pairs of spikelets.
- Racemes digitate or fasciculate, not panicled, the lower longer than the rhachis of the inflorescence.
  - Lower involucre-glume of sessile spikelets villous below the middle.
    - Lower involucre-glume not pitted.
      - Upper involucre-glume mucronulate ..... 4. *A. compressus.*
      - Upper involucre-glume obtuse ..... 5. *A. Woodrowii.*
    - Lower involucre-glume pitted ..... 6. *A. pertusus.*
  - Lower involucre-glume of sessile spikelets glabrous below the middle (sparsely silky in *A. ensiformis*).
    - Nodes of stem densely bearded ..... 7. *A. Kuntzeanus.*
    - Nodes of stem glabrous.
      - Leaves reaching ½ in. broad ..... 8. *A. ensiformis.*
      - Leaves reaching ⅛ in. broad ..... 9. *A. concanensis.*
- Racemes panicled, the lower branches shorter than the rhachis of the inflorescence.
  - Non-odorous; sheaths terete ..... 10. *A. intermedius.*
  - Aromatic; sheaths compressed ..... 11. *A. odoratus.*

Racemes small, of 1-3 pairs of spikelets, often reduced to 3 spikelets, 1 sessile and 2 pedicellate.
- Stems more or less suffrutescent below, stiff, erect.
  - Stems often proliferously branched; nodes of stem glabrous; leaves reaching ¼ in. broad; callus shortly bearded ..... 12. *A. assimilis.*
  - Stems not proliferously branched; nodes of stem bearded; leaves reaching ½ in. broad; callus densely villous ..... 13. *A. Hugelii.*
- Stems decumbent and interlaced, very weak, filiform . 14. *A. filiculmis.*

Subgenus 5. SORGHUM. Racemes panicled, all pedunculate; rhachis

fragile; joints 1 or few, filiform, truncate, with ciliate margins; sessile spikelets dorsally compressed.

Perennial; stems up to 15 ft. high; leaves 1–2 ft. by ¾–2 in.; joints 3–7 ..... 15. *A. halepensis.*
Annual; stems less than 5 ft. long; leaves 8–10 by ¼–⅓ in.; joints rarely 3 ..... 16. *A. purpureo-sericeus.*

Subgenus 6. CHRYSOPOGON. Raceme solitary, 1-jointed (*i. e.* reduced to 1 sessile, 2-sexual, and 2 pedicellate male or neuter spikelets), on the bearded tips of the branches of the panicle; sessile spikelets laterally compressed.

Pedicels of the upper spikelets ½ as long as the sessile spikelets or longer.
  Pedicels of upper spikelets glabrous or nearly so ..... 17. *A. aciculatus.*
  Pedicels of upper spikelets ciliate with long reddish-brown hairs ..... 18. *A. lancearius.*
Pedicels of upper spikelets not ½ as long as the sessile spikelets.
  Stems reaching 4 ft. high; leaves up to 18 in. long; callus $\frac{1}{10}$ in. long, bearded on one side only ..... 19. *A. Monticola.*
  Stems reaching 18 in. high; leaves up to 4 in. long; callus $\frac{1}{16}$ in. long, villous all over ..... 20. *A. Aucheri.*

SECT. B. HETEROZYGI. Lowest one or more sessile spikelets in all racemes, or at least in one or two, differing from those above it in sex and form.

Subgenus 7. DICHANTHIUM. Racemes digitate (rarely solitary or paniculate); spikelets all alike in form, but differing in sex; lower 1–4 pairs of spikelets usually homogamous.

Raceme solitary, less than 1 in. long ..... 21. *A. Cookei.*
Racemes digitate (sometimes solitary in *A. caricosus*), 1 in. or more long.
  Lower invol.-glumes of the pedicellate spikelets armed with submarginal tubercular-based bristles ¼ in. long ..... 22. *A. armatus.*
  Lower invol.-glume not armed with marginal bristles.
    Pedicels ½ as long as the sessile spikelets; nodes of stem glabrous; ligule a shortly ciliate small membrane ..... 23. *A. caricosus.*
    Pedicels ¼ as long as the sessile spikelets; nodes of stem bearded; ligule large, oblong, obtuse, membranous ..... 24. *A. annulatus.*

Subgenus 8. HETEROPOGON. Raceme solitary, terminal on the stems and branches; lower sessile spikelets very unlike the upper, which are cylindric.

A dwarf erect grass not 1 ft. high ..... 25. *A. polystachyos.*
Tall grasses reaching several feet high.
  Lower invol.-glume dorsally deeply grooved; ligule a rounded membrane ..... 26. *A. triticeus.*
  Lower invol.-glume not dorsally grooved.
    Margins of lower invol.-glume of pedicellate spikelets equally winged, the keels studded with long yellow bristles; ligule of several narrow membranous segments ..... 27. *A. Ritchiei.*
    Margins of lower invol.-glume of pedicellate spikelets unequally winged, the keels not studded with bristles; ligule truncate, ciliolate ..... 28. *A. contortus.*

1. **Andropogon Iwarancusa,** *Jones, in Asiatic Research.* v. 4 (1795) p. 109. Whole plant of a pale often glaucous green, perennial; stems up to 6 ft. high, tufted on an annulate creeping rootstock; roots aromatic. Leaves flat or convolute, 6 in. to 2 ft. by $\frac{1}{10}$–$\frac{3}{8}$ in., linear with capillary tips, rigid or flexuous, glabrous or scaberulous, midrib slender; sheaths glabrous, the lower deciduous, splitting into flat often tortuous laminæ; ligule shortly oblong, membranous, ciliolate. Panicle very variable; branches distant or crowded, simple or branched; proper spathes $\frac{1}{3}$–$\frac{2}{3}$ in. long, longer than the peduncles of the racemes, narrowly lanceolate; racemes $\frac{1}{4}$–$\frac{3}{4}$ in. long, unequal; joints of rhachis and pedicels of upper spikelets subclavate, densely villous with long hairs, the hairs more or less concealing the sessile spikelet, the tops cupular, toothed; spikelets 3 or 4 pairs. *Sessile spikelets* reaching $\frac{1}{4}$ in. long, linear-lanceolate, acute; callus acute, densely bearded with long whitish hairs. Glumes 4; lower invol.-glume $\frac{1}{5}$ in. long, linear-lanceolate, thin, flat, glabrous, nerveless, keels scaberulous; upper invol.-glume $\frac{1}{6}$ in. long, ovate, acute, cymbiform, thinly membranous, 3-nerved; lower floral glume $\frac{1}{6}$ in. long, linear-oblong, obtuse, hyaline, 2-nerved; upper floral glume $\frac{1}{20}$ in. long, 2-fid, hyaline, ciliate; awn from the sinus $\frac{1}{3}$ in. long, slender, glabrous. *Pedicellate spikelets* scarcely longer than the sessile, narrowly lanceolate, purplish; pedicels $\frac{1}{10}$ in. long; lower invol.-glume 7–9-nerved, glabrous, with scaberulous keels; upper invol.-glume ovate-oblong, obtuse, 3-nerved, ciliate; lower floral glume oblong, obtuse, hyaline, ciliate. Fl. B. I. v. 7, p. 203; Grah. Cat. p. 238; Dalz. & Gibs. p. 301; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1200. *Andropogon laniger,* Watt, Dict. Econ. Prod. v. 1, p. 244 (partly).—Flowers: Dec.

Gujarat: Ahmedabad, *Dalzell & Gibson.* Sind: Karachi, *Dalzell & Gibson, Woodrow.*

Var. *laniger,* Hook. f. Fl. B. I. v. 7 (1896) p. 203. Stem short, subsimple; leaves junciform; lower sheaths hardened, persistent; panicle narrow, subsimple. *Andropogon laniger,* Desf. Fl. Atlant. v. 2 (1800) p. 379.—Flowers: July–Dec.

Sind: widely, *Woodrow, Stocks,* 816!; Jemadar ka Landa near Karachi, *Stocks!*

2. **Andropogon pumilus,** *Roxb. Fl. Ind.* v. 1 (1832) p. 273. Annual; stem 6–18 in. high, slender, suberect or geniculate and decumbent below, quite glabrous; nodes glabrous. Leaves 3–5 by $\frac{1}{10}$–$\frac{1}{6}$ in., linear, finely acuminate, glabrous; sheaths compressed, keeled, quite glabrous; ligule short, truncate, membranous, glabrous. Racemes $\frac{1}{2}$–$\frac{3}{4}$ in. long, in nearly equal pairs on a very slender peduncle which arises from a narrow flattened glabrous spathe $\frac{1}{4}$–$\frac{1}{2}$ in. long; joints $\frac{1}{10}$ in. long, very slightly clavate (almost linear), flattened, glabrous and often red on the back, with densely ciliate margins and a cup-shaped 2–3-toothed apex. *Sessile spikelets* reaching $\frac{1}{5}$ in. long; callus glabrous. Glumes 4; lower invol.-glume $\frac{1}{5}$ in. long, linear-lanceolate, acuminate, membranous, 2-cuspidate, the keels strong, running into the slender awns about $\frac{1}{30}$ in. long; upper invol.-glume as long as the lower, narrowly lanceolate, mucronate, coriaceous, 1-nerved; lower floral glume hardly $\frac{1}{8}$ in. long, linear-lanceolate, subacute, hyaline; upper floral glume $\frac{1}{10}$ in. long, narrowly linear, hyaline, cleft at the apex into 2 subulate lobes with an awn in the sinus between them; awn reaching $\frac{5}{8}$ in. long,

geniculate about the middle; the lower half brown, the upper white. Anthers $\frac{1}{12}$ in. long. *Pedicellate spikelets* not awned; pedicels $\frac{1}{8}$ in. long with ciliate margins. Glumes 3; lower involucel-glume $\frac{1}{6}$ in. long, ovate-lanceolate, acuminate, 5-nerved. Fl. B. I. v. 7, p. 170; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438. *Andropogon pachyarthrus*, Hack. Monogr. Andropog. in DC. Monogr. Phan. v. 6 (1889) p. 449.—Flowers: Dec. VERN. *Baerki*; *Gondval*.

There is an excellent drawing of this grass in *Icones Roxburghianæ* in Herb. Kew. No. 2020.

DECCAN: Khandesh, *Lisboa*. KANARA: Karwar, *Lisboa*. GUJARAT: Surat, *Dalzell!*, *Woodrow*.—DISTRIB. India (Nepal, Rajputana, Central Provinces, W. Peninsula).

3. **Andropogon foveolatus,** *Del. Descrip. de l'Egypte* (1812) p. 160, t. 8, fig. 2. Stems 1–2 ft. long, densely tufted, usually decumbent at the base, then geniculately ascending, very slender, glabrous; nodes bearded. Leaves 3–6 by $\frac{1}{20}$–$\frac{1}{10}$ in., linear, scaberulous beneath; sheaths shorter than the internodes, scabrous or glabrous, the basal sheaths silky-villous; ligule short, truncate, hyaline, ciliate. Racemes 1–1½ in. long, solitary; peduncles capillary, erect, usually far exserted beyond the slender spathe; joints and pedicels slender, ciliate on 2 opposite sides with long silky hairs, shorter than the sessile spikelets. Spikelets $\frac{1}{6}$ in. long (the sessile and pedicellate equal), oblong-lanceolate, glabrous, purplish; callus small, shortly hairy at the base; lower involucel-glume $\frac{1}{6}$ in. long, flat, lanceolate-oblong, subobtuse, with narrowly involute margins, 4-nerved, usually marked with a deep pit above the middle; upper involucel-glume equal to the lower, lanceolate, acute, obscurely 3-nerved; lower floral glume much shorter, oblong-lanceolate, glabrous, nerveless; upper floral glume reduced to an awn $\frac{1}{2}$–$\frac{5}{8}$ in. long, the column about equalling the subulate portion. Anthers $\frac{1}{10}$ in. long. *Pedicellate spikelets*: pedicels $\frac{1}{10}$ in. long. Glumes 2; lower involucel-glume $\frac{1}{6}$ in. long, lanceolate, acute, with slightly incurved margins, the keels above aculeately scabrid, 5-nerved, pitted or not; upper involucel-glume equalling the lower, linear-lanceolate, acute, 3-nerved. Fl. B. I. v. 7, p. 168; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201.—Flowers: Oct. VERN. *Ghandel*.

DECCAN: Poona, *Cooke!*, *Woodrow*, *Jacquemont*, 454!; Khandesh, *Lisboa*.—DISTRIB. Throughout the drier parts of India; westwards to the Cape Verd Islands.

4. **Andropogon compressus,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 172. A tall grass reaching 3–4 ft. high; stem as thick as a goose-quill at the base, erect, sparingly branched, leafy; nodes glabrous. Leaves 12–18 by $\frac{1}{4}$–$\frac{3}{8}$ in., linear, finely acuminate, flat, slightly scaberulous on both surfaces and on the margins, more or less hairy towards the base; sheaths strongly compressed and acutely keeled; ligule a glabrous membrane $\frac{1}{10}$ in. long. Panicles 4 5 in. long, of many subcorymbosely arranged pale flexuous silky racemes 1–2 in. long; joint $\frac{1}{10}$ in. long, slender, with a central translucent line, ciliate on 2 opposite sides with long silky hairs. *Sessile spikelets* $\frac{1}{5}$ in. long, ovate-lanceolate; callus bearded with long hairs; lower involucel-glume ovate-lanceolate, $\frac{1}{5}$ in. long, villous on the back below the middle, truncate or notched at the apex, with narrowly incurved margins and a hyaline tip, 5–7-nerved, not pitted; upper involucel-glume ovate, acute, mucronulate,

as long as the lower; lower floral glume $\frac{1}{6}$ in. long, linear-lanceolate, obtuse, hyaline, nerveless; upper floral glume represented by an awn reaching $\frac{5}{8}$ in. long, inconspicuously margined for $\frac{1}{10}$ in. at the base. *Pedicellate spikelets*: pedicels $\frac{1}{8}$ in. long, ciliate on 2 opposite sides with long silky hairs, very slender and with a central translucent line; lower invol.-glume 9–11-nerved; upper invol.-glume 3-nerved; lower floral glume oblong, obtuse, ciliolate, hyaline, nerveless. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Dec.

Deccan: *Lisboa*, 6 (*A. odoratus*)!; Máwal, *Woodrow*!; Poona, *Woodrow*.—Distrib. India, W. Peninsula, apparently endemic.

5. **Andropogon Woodrowii,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 173 (by misprint *Woodrovii*). A grass with a camphoraceous odor (*Woodrow*); rootstock woody; stems tufted, 3–4 ft. long, erect, compressed, thicker than a goose-quill at the base, obtusely 2-edged, solid, stiff, branched above; nodes glabrous. Leaves 12–24 by $\frac{1}{8}$–$\frac{1}{6}$ in., rigid, scaberulous on both surfaces and the margins; sheaths loose, keeled, quite smooth; ligule $\frac{1}{10}$ in. long, membranous, truncate, ciliate. Racemes 3–5, pale, $\frac{1}{2}$–1 in. long, on slender, stiff, smooth proper peduncles $\frac{1}{8}$–$\frac{1}{2}$ in. long, erect, silky; joints of the rhachis and the pedicels linear, with silky margins and a translucent centre, the hairs at the top $\frac{1}{2}$ as long as the spikelet. *Sessile spikelets* $\frac{1}{6}$ in. long, oblong-lanceolate; callus $\frac{1}{30}$ in. long, bearded; lower invol.-glume coriaceous, not pitted, ovate-oblong, truncate and hyaline-tipped at the apex, many-nerved, margins narrowly incurved, keels ciliolate; upper invol.-glume chartaceous, 3-nerved, oblong, subobtuse, as long as the lower; lower floral glume $\frac{1}{8}$ in. long, ovate-oblong, obtuse, hyaline, nerveless; upper floral glume reduced to an awn $\frac{5}{8}$ in. long with a hyaline flattened base $\frac{1}{10}$ in. long. *Pedicellate spikelets* rather narrower than the sessile; lower invol.-glume glabrous on the back; upper invol.-glume narrow, linear, acute; awn 0. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Dec.

Deccan: Khorbasa (Máwal districts), *Woodrow*; Paud, 20 miles west of Poona, *Woodrow*!—Distrib. India (W. Peninsula), apparently endemic.

6. **Andropogon pertusus,** *Willd. Sp. Pl.* v. 4 (1805) p. 922. Stem 1–2 ft. long, erect or geniculately ascending, leafy upwards, simple or sparingly branched; nodes bearded with spreading hairs. Leaves up to 1 ft. by $\frac{1}{8}$–$\frac{1}{6}$ in., narrowly linear, acute or acuminate, the lower often short and crowded at the base of the stem, glabrous or pubescent, or sometimes sparingly pilose, margins scabrid, base narrow, rounded; sheaths terete or slightly compressed, shorter than the internodes; ligule $\frac{1}{10}$ in. long, membranous, truncate, ciliate. Racemes 3–8, digitately fasciculate, 1–2 in. long, slender, silky, suberect, flexuous, on short usually glabrous peduncles which are often bearded in the axils: rhachis very slender; joints and pedicels $\frac{1}{10}$ in. long, densely ciliate with long silky hairs, the central translucent band very narrow. *Sessile spikelets* $\frac{1}{6}$ in. long, oblong-lanceolate, acuminate by the projection of the point of the upper invol.-glume; callus bearded; lower invol.-glume elliptic-oblong, obtuse or truncate, sometimes slightly emarginate, with a deep pit above the middle (sometimes 2 pits when one is above, the other at or about the middle), subchartaceous, more or less hairy below the middle, 5–9-nerved, margins narrowly incurved,

spinulosely ciliate; upper invol.-glume lanceolate, acuminate, finely pointed at the tip, the point slightly projecting beyond the lower glume, 3–5-nerved, membranous, glabrous; lower floral glume $\frac{1}{10}$ in. long, linear-oblong, obtuse, nerveless, glabrous; upper floral glume reduced to a slender awn reaching nearly $\frac{3}{4}$ in. long, geniculate about the middle, the lower half brown, the upper yellowish-white, with a narrow linear hyaline flattened base $\frac{1}{12}$ in. long which represents the glume; palea 0. *Pedicellate spikelets* like the sessile but narrower, not awned; lower invol.-glume acute, very rarely pitted, 7–13-nerved, ciliate; upper invol.-glume ovate-lanceolate, acute, 5-nerved, with incurved margins; lower floral glume linear-oblong, obtuse, hyaline, glabrous. Fl. B. I. v. 7, p. 173; Trim. Fl. Ceyl. v. 5, p. 230; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201; Watt, Dict. Econ. Prod. v. 1, p. 249.—Flowers: Sept. Lisboa (Journ. Bomb. Nat. v. 6 (1901) p. 202) says that the inflorescence of the grass is scented.

Deccan: Poona, *Cooke!*; Lanoli, *Woodrow*; Sattara, *Lisboa*; Sholapur, *Lisboa*. Kanara: *Lisboa*.—Distrib. More or less throughout India in the drier parts; Ceylon, Tropical Asia, Africa and Australia, Sicily.

7. **Andropogon Kuntzeanus,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 478. A tall grass 3–5 ft. high; stems ascending, as thick as a goose-quill below, with 2–3 slender flowering branches above, terete, small; nodes densely bearded. Leaves narrowly linear, 12 by $\frac{1}{8}$–$\frac{1}{3}$ in., glabrous, glaucous, smooth, with scaberulous margins, the upper cauline leaves short, rigid. Racemes 12–15, corymbosely fasciculate, slender, silky, purplish; proper peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. long, slender, glabrous; joints and pedicels $\frac{1}{10}$ in. long, with a translucent centre, slender, densely ciliate with very long erect hairs. *Sessile spikelets* $\frac{1}{5}$ in. long, linear-lanceolate; callus sparsely bearded at the base with very long hairs; lower invol.-glume ovate-lanceolate, thin, glabrous, usually pitted, 7–9-nerved, 2-toothed at the apex, the teeth about $\frac{1}{20}$ in. long; upper invol.-glume as long as the lower, lanceolate, acuminate, mucronate, ciliate; lower floral glume $\frac{1}{6}$ in. long, linear-lanceolate, glabrous, hyaline; awn $\frac{5}{8}$ in. long, the basal slightly flattened portion $\frac{1}{10}$ in. long. *Pedicellate spikelets* narrower than the sessile, male; lower invol.-glume 9–11-nerved, tip entire; upper invol.-glume 5-nerved, conspicuously ciliate; lower floral glume linear-oblong, hyaline, ciliate; upper floral glume small, narrowly linear or 0. Fl. B. I. v. 7, p. 175; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Oct.

Konkan: *Stocks!* Deccan: *Woodrow*, 153!; Máwal, *Woodrow*.—Distrib. India (Central Provinces, W. Peninsula).

8. **Andropogon ensiformis,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 175. Stems 2 ft. and upwards, densely tufted, stout, compressed, clothed with equitant leaf-sheaths; nodes glabrous. Leaves 8–10 by $\frac{1}{3}$–$\frac{1}{2}$ in., erect, strict, rigid, linear-lanceolate, acuminate, strongly nerved, glabrous or sparsely hairy, tips acicular, margins and both surfaces scaberulous; sheaths smooth, compressed, the lower equitant; ligule short, scarious. Racemes $\frac{1}{2}$–$\frac{2}{3}$ in. long, in an erect narrow thyrsus 3 in. long, pale purplish; proper peduncles $\frac{1}{8}$–$\frac{1}{4}$ in. long; joints and pedicels $\frac{1}{10}$ in. long, very slender, flat, with a translucent channel, ciliate with long

erect hairs. *Sessile spikelets* $\frac{1}{5}$ in. long, oblong-lanceolate, acute; callus small, densely bearded with hairs nearly $\frac{1}{2}$ as long as the spikelet; lower invol.-glume $\frac{1}{6}$ in. long, ovate-oblong, flat, truncate, often emarginate, shining, 5–7-nerved, not pitted, very sparsely silky-hairy below the middle, margins very narrowly incurved, keels slender; upper invol.-glume reaching $\frac{1}{5}$ in. long, ovate-oblong, acute, finely mucronate, slightly exceeding the lower, 3-nerved; lower floral glume less than $\frac{1}{6}$ in. long, linear-oblong, acute, hyaline; upper floral glume reduced to an awn reaching $\frac{7}{8}$ in. long, the flattened slightly dilated base $\frac{1}{16}$ in. long representing the glume. *Pedicellate spikelets* as long as the sessile, oblong-lanceolate; lower invol.-glume many-nerved; upper invol.-glume 5-nerved; lower floral glume as long as the sessile; upper floral glume 0. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Sept.

Dalzell without locality in Herb. Kew.! DECCAN: Lanoli, *Woodrow*.—DISTRIB. India (W. Peninsula), apparently endemic.

9. **Andropogon concanensis,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 174. Perennial; stems many from a nodose rootstock, 20–24 in. high, firm, smooth, terete, leafy; nodes glabrous. Leaves 8–10 by $\frac{1}{12}$–$\frac{1}{8}$ in., linear, finely acuminate, smooth on both surfaces; sheaths smooth, terete; ligule short, membranous, truncate, glabrous. Racemes 5–8, loosely fasciculate, 2–2$\frac{3}{4}$ in. long, slender, flexuous, pale; rhachis and proper peduncles filiform, glabrous, the latter $\frac{1}{2}$–$\frac{3}{4}$ in. long, with slightly bearded axils; joints and pedicels $\frac{1}{12}$ in. long, compressed, hardly grooved and not translucent in the centre, the sides not thickened, ciliate with long silky hairs. *Sessile spikelets* less than $\frac{1}{6}$ in. long, ovate-lanceolate, narrowly truncate; callus bearded; lower invol.-glume membranous, with incurved margins, glabrous, not pitted on the back, keels ciliate with short bristles, 7–9-nerved; upper invol.-glume as long as the lower, lanceolate, acuminate, ending in a fine point which just appears above the tip of the lower glume, faintly 3-nerved; lower floral glume much shorter than the others, oblong, obtuse, nerveless; upper floral glume a capillary yellowish awn reaching $\frac{3}{4}$ in. long with a slightly dilated base $\frac{1}{10}$ in. long. *Pedicellate spikelets* narrower than the sessile; lower invol.-glume 9-nerved; upper invol.- and lower floral glume as in the sessile spikelets; upper floral glume small, oblong, often unequally 2-fid, ciliate, nerveless. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Oct.

KONKAN: Matheran, *Woodrow*!

10. **Andropogon intermedius,** *Br. Prodr.* (1810) p. 202. Perennial; stem 2–4 ft. high or more, stout, erect or geniculately ascending, slightly flattened on one side, simple or sparingly branched, leafy upwards; nodes usually hairy. Leaves 6–18 by $\frac{1}{8}$–$\frac{1}{3}$ in., narrowly linear, glaucous, finely acuminate with capillary tip, subcoriaceous, glabrous or ciliate towards the base; sheaths terete, glabrous; ligule a narrow truncate membrane $\frac{1}{30}$ in. long, ciliate or not. Panicle 3–6 in. long, erect, pyramidal, thyrsiform or subcorymbose; rhachis glabrous; branches $\frac{1}{2}$–1$\frac{1}{2}$ in. long; racemes slender, fragile, pale-green or purplish, with a capillary rhachis; joints of the rhachis shorter than the spikelets with a translucent centre, ciliate. *Sessile spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in.

long; callus very short, bearded; lower invol.-glume thin, oblong, obtuse or truncate, 4–9-nerved, margins narrowly incurved, rigidly ciliate above the middle, not pitted; upper invol.-glume as long as the lower, oblong-lanceolate, acute, faintly 3-nerved, smooth; lower floral glume much shorter, oblong, obtuse, nerveless; upper floral glume represented by the hyaline slightly flattened base of the awn; palea 0; awn reaching $\frac{5}{8}$ in. long. *Pedicellate spikelets* linear-oblong or lanceolate, narrower than the sessile; pedicel $\frac{1}{10}$ in. long with a translucent centre, usually ciliate. Fl. B. I. v. 7, p. 175; Trim. Fl. Ceyl. v. 5, p. 230; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201.—Flowers: Dec.

Deccan: Poona, *Woodrow*; Máwal, *Woodrow*.—Distrib. More or less throughout India; Ceylon, China, Malaya, Pacific Islands, Africa.

11. **Andropogon odoratus,** *Dna. Lisboa, in Journ. Bomb. Nat.* v. 4 (1889) p. 123. Aromatic; stem erect, 3–4 ft. high, as thick as a swan's quill at the base, sometimes branching below, leafy; nodes bearded. Leaves 12–24 by $\frac{1}{6}$–$\frac{3}{8}$ in., linear-lanceolate, flat, acuminate, scaberulous on both surfaces and on the margins, bright green, with strong nerves; sheaths long, glabrous, smooth, compressed, the upper sheathing the base of the inflorescence; ligule small, membranous, truncate. Racemes numerous, purplish, silky, suberect, slender, flexuous, densely fascicled, pedicellate, crowded at the end of a long peduncle and forming a dense panicle 2–4 in. long; joints and pedicels flattened, with a translucent centre, silky-hairy, the joints $\frac{1}{16}$ in. long, the pedicels rather longer. *Sessile spikelets* purplish, $\frac{1}{8}$ in. long, oblong-lanceolate, acute; callus small, bearded with silky hairs; lower invol.-glume thin, oblong-lanceolate, truncate, 7-nerved, softly hairy below the middle, rarely pitted; upper invol.-glume very little longer than the lower and broader, thinly membranous, keeled; lower floral glume hyaline, oblong-lanceolate, shorter than the upper invol.-glume, nerveless; awn $\frac{1}{2}$–$\frac{3}{8}$ in. long, slightly dilated towards the base. *Pedicellate spikelets* as long as or slightly longer than the sessile; lower invol.-glume narrow, many-nerved, dorsally glabrous; upper invol.-glume 3-nerved, ciliate; lower floral glume shorter, oblong, obtuse, nerveless. The compressed sheaths, panicled racemes, villous lower invol.-glume of the sessile spikelets, and aroma seem to distinguish this from *Andropogon Kuntzeanus*, which it strongly resembles in a dry state (*Hooker*). Fl. B. I. v. 7, p. 177; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Oct. Vern. *Gavat-vedi.*

Konkan: Khardi (Thána districts), *Mrs. Lisboa*. Deccan: Lanoli, *Mrs. Lisboa*; Máwal (Poona districts), *Woodrow*; Khandesh, *Lisboa*.—Distrib. India (W. Peninsula), apparently endemic.

12. **Andropogon assimilis,** *Steud. in Zoll. Syst. Verz.* (1854) p. 58; *Syn. Gram.* (1855) p. 397. Suffruticose, fastigiately branched from a decumbent base; stems 1–2 ft. long, hard, smooth and polished, as thick as a goose-quill at the base, often proliferously branched; nodes glabrous or rarely bearded. Leaves 3–8 by $\frac{1}{10}$–$\frac{1}{4}$ in., linear-lanceolate, finely acuminate, glabrous or nearly so, with a strong white midnerve; sheaths usually glabrous, except at the mouth which is sometimes bearded, the upper sheaths appressed, the lower open, often divaricate;

ligule short, membranous, ciliate. Inflorescence in lax panicles; branches slender, almost capillary, with long hairs in the axils. Spikelets few, rather distant, pale-green; joints $\frac{1}{16}$ in. long, with a translucent centre, sparsely ciliate. *Sessile spikelets* $\frac{1}{10}$ in. long, ovoid-oblong; callus small, shortly bearded; lower invol.-glume $\frac{1}{10}$ in. long, ovate-oblong, shortly truncate, obscurely 4–6-nerved, ciliate chiefly in the upper half, not pitted; upper invol.-glume as long as the lower, lanceolate, acute; lower floral glume shorter, linear, obtuse; upper floral glume reduced to the scarcely flattened base of the awn; awn $\frac{3}{5}$–$\frac{1}{2}$ in. long, the lower half brown, the upper yellowish-white. *Pedicellate spikelets* $\frac{1}{8}$ in. long, not awned; pedicels $\frac{1}{16}$ in. long, sparsely ciliate; lower invol.-glume lanceolate, acute, the margins incurved and the keels ciliate in the upper part, 5–7-nerved; upper invol.-glume slightly shorter, lanceolate, 3-nerved; lower floral glume obovate-oblong, ciliate at the apex, hyaline; upper floral glume 0. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 179; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201. *Andropogon montanus*, Benth. Fl. Hongk. (1861) p. 423 (*not* of Roxb.); Hack. Monog. Androp. in DC. Monog. Phan. v. 6 (1889) p. 490; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Dec.

Deccan: Suvasni Ghát, *Woodrow*, 29! S. M. Country: Belgaum, *Ritchie*!—Distrib. India (Temperate Himalaya, Khasia, Behar, N. Bengal, W. Peninsula); Java, China, Japan.

13. **Andropogon Hugelii,** *Hack. Monog. Androp. in DC. Monog. Phan.* v. 6 (1889) p. 492. Stem often suffrutescent below, frequently red, branching from the base, the branches $2\frac{1}{2}$–$3\frac{1}{2}$ ft. long; nodes bearded. Leaves 4–8 by $\frac{3}{5}$–$\frac{1}{2}$ in., linear-lanceolate, acuminate, flat, flaccid, green, narrowed to the base, the margins scaberulous or sometimes ciliate; sheaths bearded at the mouth, otherwise glabrous; ligule membranous, ciliate. Panicle 2–$3\frac{1}{2}$ in. long; branches capillary with bearded axils; joints and pedicels ciliate. *Sessile spikelets* $\frac{1}{8}$ in. long, pale-green or purplish; callus densely villous; lower invol.-glume chartaceous, ovate, truncate, villous below the middle or glabrous, margins narrowly incurved, the keels ciliate with long hairs; upper invol.-glume as long as the lower, glabrous, narrowly truncate, shortly apiculate; lower floral glume $\frac{1}{16}$ in. long, hyaline, ovate, obtuse, glabrous; upper floral glume represented by the slender white not dilated base of the awn; awn reaching nearly 1 in. long. *Pedicellate spikelets* $\frac{1}{8}$ in. long, lanceolate, green or purple; lower invol.-glume subacute, 9–11-nerved, pubescent up the back and with ciliate keels; upper invol.-glume as long as the lower, acuminate, the keels minutely ciliate; lower floral glume oblong, obtuse, hyaline, nearly as long as the upper invol.-glume, nerveless; upper floral glume narrowly linear or 0. Fl. B. I. v. 7, p. 180; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Sept.

Deccan: Poona, *Woodrow*. S. M. Country: Belgaum, *Woodrow*.—Distrib. India (Central Provinces, Central India, W. Peninsula).

14. **Andropogon filiculmis,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 181. Stems 2–3 ft. long, decumbent and interlaced, copiously geniculately branched, weak, filiform, quite glabrous; internodes long; nodes

bearded. Leaves 2–4 by $\frac{1}{8}$–$\frac{1}{6}$ in., linear-lanceolate, finely acuminate with a filiform tip, glabrous above, glabrous or sparsely hairy beneath, flaccid, suddenly narrowed at the base, pale green, the midrib and nerves slender; sheaths bearded at the very tip, otherwise glabrous, the lower sheaths open below; ligule membranous, ciliate. Panicles 1–2 in. long.; branches few, filiform. Spikelets 2 or 3, pale-green or white; pedicels of upper spikelets ciliate with long hairs. *Sessile spikelets* $\frac{1}{8}$ in. long, oblong-lanceolate; callus densely villous; lower invol.-glume oblong-lanceolate, obtuse, membranous, 5–7-nerved, villous below the middle or all over, the keels ciliate; upper invol.-glume thinly membranous, lanceolate, acute, shortly mucronate, 3-nerved, glabrous; lower floral glume small, ovate, obtuse, nerveless, hyaline; upper floral glume represented by an awn $\frac{1}{2}$–$\frac{2}{3}$ in. long, the lower half dark brown, the upper half yellowish-white, the base not dilated, white for about $\frac{1}{12}$ in. *Pedicellate spikelets* as long as the sessile but narrower; lower invol.-glume ovate-lanceolate, acute, 7–9-nerved, ciliate; upper invol.-glume lanceolate, strongly 5-nerved; lower floral glume broadly oblong, obtuse, hyaline, nerveless, as long as the invol.-glumes; upper floral glume 0. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Nov.–Dec.

Deccan. Poona, *Jacquemont*, 310!; Dhonshi (Mawal districts), *Woodrow*, 26! and 116! Kanara: Sirsi, *Woodrow*.—Distrib. India (W. Peninsula), apparently endemic.

15. **Andropogon halepensis,** *Brot. Fl. Lusit.* v. 1 (1804) p. 89. Perennial; stems erect, tall, up to 15 ft. high, stout, simple or sparingly branched, glabrous, leafy; nodes minutely silky. Leaves 1–2 ft. by $\frac{3}{4}$–2 in., linear-lanceolate, tapering to a fine point, glabrous, smooth, margins scabridly serrulate, midrib stout, base narrowed or sometimes rounded; sheaths glabrous, striate; ligule short, membranous, ciliate. Panicle 6–18 in. long, decompound; rhachis nearly smooth; branches mostly alternate, suberect, filiform, the lower branches up to 8 in. long or more, the axils often bearded; racemes $\frac{1}{2}$–1 in. long, oblong; joints 3–7, more than $\frac{1}{2}$ as long as the sessile spikelets, more or less ciliate; pedicels similar. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in. long, ovoid-lanceolate, dorsally compressed, green or purplish; callus small, shortly bearded. Glumes 4; lower invol.-glume subchartaceous, ovate, acute, convex, more or less silky-hairy, 5–13-nerved, with involute margins; upper invol.-glume as long as the lower, lanceolate, acuminate, chartaceous, shining, 5–7-nerved; lower floral glume almost as long as the upper invol.-glume, elliptic-oblong, obtuse, hyaline, ciliate; upper floral glume $\frac{1}{12}$ in. long, oblong, 2-lobed, hyaline, ciliate; awn $\frac{1}{2}$ in. long, sometimes reduced to a bristle or suppressed. *Pedicellate spikelets* about as long as the sessile but much narrower, not awned, male or barren; lower invol.-glume herbaceous, 5–9-nerved, glabrous, the keels ciliate; upper invol.-glume similar, 3–5-nerved; lower floral glume as in the sessile spikelets; upper floral glume linear-oblong, hyaline. Fl. B. I. v. 7, p. 182; Trim. Fl. Ceyl. v. 5, p. 231; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201. *Sorghum halepense*, Pers. Syn. v. 1 (1805) p. 101; Watt, Dict. Econ. Prod. v. 6, part 3, p. 280.—Flowers: Dec. Vern. *Boru.*

Konkan: *Woodrow*; Bassein, *Lisboa*. Deccan: *Lisboa*; Poona, *Woodrow*; Dangs, *Woodrow*. Gujarat: *Lisboa*.—Distrib. Throughout India; Ceylon, most warm countries.

16. **Andropogon purpureo-sericeus,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* v. 2 (1851) p. 469. Annual, robust; stem 3–4 ft. high, erect, stout or slender, smooth and polished, glabrous; nodes villous. Leaves 8–10 by $\frac{1}{4}$–$\frac{1}{3}$ in., linear, finely acuminate, sparingly appressedly hairy on both sides, the margins scabrous; sheaths subcompressed, glabrous except the villous mouth; ligule very short, ciliate. Panicle 4–8 in. long, erect; rhachis glabrous; branches filiform, subflexuous, $\frac{1}{2}$–1 in. long, often bulbously swollen at their articulation with the rhachis; racemes 1–1$\frac{1}{2}$ in. long, rarely of 3 joints, sometimes of 1 sessile and 2 pedicellate spikelets; joints about $\frac{1}{2}$ as long as the sessile spikelets. *Sessile spikelets* reaching $\frac{1}{4}$ in. long, densely villous with red or white hairs; callus small, densely villous. Glumes 4; lower invol.-glume ovate, acuminate, concave, coriaceous or cartilaginous, 7-nerved, with the margins involute from the base to the tip, clothed with long red or white hairs; upper invol.-glume as long as or rather longer than the lower, oblong-lanceolate, coriaceous, concave, acuminate or aristulate, 5-nerved, the back clothed in the upper part with long hairs, the margins narrowly infolded; lower floral glume as long, membranous, densely ciliate, oblong-lanceolate, glabrous on the back; upper floral glume very fragile, $\frac{1}{10}$ in. long, hyaline, 2-lobed, ciliate; awn reaching 1$\frac{1}{2}$ in. long, the column dark brown, twisted, and ciliate with short erect hairs. *Pedicellate spikelets* equalling the sessile but paler and narrower; lower invol.-glume linear-lanceolate, acute, 5–9-nerved, shortly silky; upper invol.- and lower floral glumes as in the sessile spikelets; upper floral glume a little shorter, lanceolate, acuminate, hyaline, ciliate. Fl. B. I. v. 7, p. 185; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Nov.

Deccan: *Woodrow*, 129!; *Lisboa*; Kolhapur, *Woodrow*. S. M. Country: Belgaum, *Ritchie*, 887! Kanara: N. Kanara, *Woodrow*, 40!—Distrib. India (Central Provinces, W. Peninsula); Abyssinia.

17. **Andropogon aciculatus,** *Retz. Obs.* fasc. 5 (1789) p. 22. Rootstock woody, creeping; stems erect or ascending, 1–2 ft. long, slender, leafy chiefly at the base; lower internodes very short, the upper elongate; nodes glabrous. Leaves densely tufted, 1–5 by $\frac{1}{3}$–$\frac{1}{5}$ in., linear, obtuse or subacute, flat or with undulate margins, glaucous, usually glabrous, the margins more or less distantly spinulose; sheaths not auricled, the lower short, the upper elongate with a more or less hairy mouth; ligule a very short membrane. Panicles 1–3 in long, narrowly oblong, pale green or purplish; rhachis strict, filiform; branches short, spreading, at length erect, capillary, bearing few spikelets. *Sessile spikelets* $\frac{1}{8}$ in. long, dorsally compressed; callus elongate, decurrent on the peduncle and with it laterally fulvously bearded. Glumes 4; lower invol.-glume chartaceous, narrowed from a broad base to the usually bimucronulate tip, dorsally convex, glabrous on the back, the keels ciliate with short stiff erect hairs, obscurely 2–3-nerved; upper invol.-glume as long, lanceolate, acuminate or aristulate, 1-nerved, the keel setosely ciliate; lower floral glume shorter, linear-oblong, obtuse, 2-nerved; upper floral glume narrow, hyaline, ciliate; awn terminal, about $\frac{1}{5}$ in. long, not twisted. *Pedicellate spikelets* reaching $\frac{1}{5}$ in. long, lanceolate, cuspidately acuminate, purplish; pedicels nearly as long as the sessile spikelets, flattened, glabrous except for a small tuft of hairs at the base; lower

involucre-glume thin, lanceolate, acuminate, 3-nerved; upper involucre-glume a little shorter, acuminate, 3-nerved, ciliate; lower floral glume hyaline, oblong, acuminate, shorter than the involucre-glumes, nerveless; upper floral glume smaller, broader, 3-nerved, ciliate. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 188; Grah. Cat. p. 238; Dalz. & Gibs. p. 303; Trim. Fl. Ceyl. v. 5, p. 234; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1202; Watt, Dict. Econ. Prod. v. 1, p. 242.—Flowers: Oct.

Kanara: Karwar, *Woodrow*.—Distrib. More or less throughout India; Ceylon, Australia, Polynesia, Tropical Asia.

18. **Andropogon lancearius,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 190. Stem 2–3 ft. high or more, leafy upwards; nodes glabrous. Leaves 12–14 by $\frac{1}{3}$–$\frac{1}{2}$ in., lanceolate, acuminate, narrowed from below the middle to the base, smooth on both surfaces, flat, midrib broad, white above, margins minutely spinulose; sheaths keeled, quite glabrous; ligule a row of fine short hairs. Panicle 6 in. long, narrow, of many whorls of simple smooth erect branches bearing solitary erect racemes. *Sessile spikelets* $\frac{1}{4}$ in. long; callus about $\frac{1}{16}$ in. long, glabrous in front. Glumes 4; lower involucre-glume nearly $\frac{1}{4}$ in. long, oblong, chartaceous, truncate or notched, obscurely 5-nerved; upper involucre-glume $\frac{1}{5}$ in. long, oblong, chartaceous, shortly ciliate on the keels, otherwise glabrous, cleft at the apex into 2 acute lobes; lower floral glume $\frac{1}{6}$ in. long, linear-oblong, obtuse, hyaline; upper floral glume $\frac{1}{10}$ in. long, linear, hyaline; awn $1\frac{5}{8}$ in. long, the column much twisted and densely hairy with reddish-brown hairs. *Pedicellate spikelets* nearly $\frac{1}{3}$ in. long (not including the awn), lanceolate, acute, awned; pedicels nearly white, $\frac{1}{6}$ in. long, flattened, ciliate with long reddish-brown hairs. Lower involucre-glume lanceolate, acute, 2-toothed at the tip, with an awn about $\frac{1}{10}$ in. long between the acicular teeth, 7-nerved, membranous, glabrous; upper involucre-glume as long as the lower, lanceolate, acuminate, membranous, 5-nerved; lower floral glume shorter, linear-oblong, obtuse, ciliate, hyaline: upper floral glume hyaline. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1202.—Flowers: Oct.

S. M. Country: Castlerock, *Woodrow*.—Distrib. India (Sikkim Himalaya, Behar, Chota Nagpur, W. Peninsula).

This is included on the authority of Woodrow. I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew.

19. **Andropogon Monticola,** *Schult. Mant.* (1824) p. 665. Perennial; stems densely tufted, 1–4 ft. high, usually slender, erect, simple or branched, leafy chiefly at the base; nodes glabrous. Leaves 2–18 by $\frac{1}{8}$–$\frac{1}{4}$ in., erect, linear, acute, flat, rigid, glaucous, smooth or scaberulous; sheaths, the upper terete, the lower compressed; ligule a very short ciliate membrane. Panicle 2–5 in. long, ovate or oblong; rhachis slender, smooth or scaberulous; branches 1–2 in. long, whorled, capillary, spreading, at length erect; racemes reduced to a single sessile female and 2 pedicellate spikelets. *Sessile spikelets* $\frac{1}{4}$ in. long; callus about $\frac{1}{30}$ in. long, bearded on one side with rufous hairs. Glumes 4; lower involucre-glume $\frac{1}{5}$ in. long, linear, complicate, 2-toothed at the apex, chartaceous, 4-nerved, more or less scaberulous; upper involucre-glume $\frac{1}{4}$ in. long, ovate-lanceolate, concave, much broader than the lower, ciliate on

the keel with rufous hairs, very shortly toothed at the apex, with an awn $\frac{1}{3}$ in. long and with broadly hyaline margins, 3-nerved; lower floral glume oblong, obtuse, ciliate; upper floral glume narrowly linear, hyaline; awn $\frac{3}{4}$ in. long. *Pedicellate spikelets* as long as the sessile; pedicels $\frac{1}{12}$ in. long, ciliate with rufous hairs, flattened; lower invol.-glume lanceolate, acute or awned, 7-nerved, scaberulous; upper invol.-glume lanceolate, acuminate, or very shortly awned; floral glumes smaller, oblong, hyaline, ciliate. Fl. B. I. v. 7, p. 192; Trim. Fl. Ceyl. v. 5, p. 236; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1202.—Flowers: Oct. VERN. *Ayiva.*

Throughout the Presidency, *Lisboa.* DECCAN: Poona, *Woodrow*; Khandala, *Woodrow*; Kolhapur, *Woodrow.*—DISTRIB. More or less throughout India; Ceylon, Afghanistan, S. Africa.

I have not seen any specimens from the Bombay Presidency and am therefore unable to fix definitely the variety to which the Bombay species belong. They will probably belong to VAR. *Trinii*, H. f.

20. **Andropogon Aucheri,** *Boiss. Diag.* ser. 1, fasc. 5 (1844) p. 77. Densely tufted; stems 6–18 in. long, simple or sparingly branched, base thickened; nodes glabrous. Leaves 2–4 by $\frac{1}{10}$–$\frac{1}{6}$ in., linear, acute or acuminate, more or less pubescent, sometimes undulate, pale green, often ciliate near the base with bulbous-based hairs; sheaths usually glabrous, very pale, with a few hairs at the mouth; ligule a hairy ridge. Panicle 2–3 in. long; branches in whorls of 4–6, spreading, then suberect; racemes usually crowded, rarely 2-nate on a branch. *Sessile spikelets* $\frac{1}{4}$ in. long; callus $\frac{1}{16}$ in. long, villous all over with long silky hairs; lower invol.-glume $\frac{1}{5}$ in. long, linear, with 2 short acicular teeth at the apex, minutely ciliate on the margins, obscurely 5-nerved, chartaceous; upper invol.-glume as long as the lower, oblong, obtuse, 1-nerved, chartaceous, with hyaline margins, the keel ciliate above the middle with long silky hairs, and with a slender awn $\frac{1}{3}$ in. long, the awn ciliate below the middle with long hairs; lower floral glume linear, obtuse, hyaline; upper floral glume represented by the dilated base of the awn; awn $\frac{7}{8}$ in. long, base hyaline, dilated. *Pedicellate spikelets* slightly longer than the sessile, linear-lanceolate, acute; pedicels cuneate, silky-villous from base to apex, less than $\frac{1}{2}$ as long as the sessile spikelets; lower invol.-glume lanceolate, acute, $\frac{1}{4}$ in. long, 7-nerved; upper invol.-glume lanceolate, acuminate, 3-nerved; lower floral glume shorter, hyaline, oblong, acute; upper floral glume lanceolate, acute, 1-nerved, hyaline. Anthers $\frac{1}{8}$ in. long. Fl. B. I. v. 7, p. 195; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.

SIND: Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. Afghanistan, N. Africa.

21. **Andropogon Cookei,** *Stapf, ex Woodr. in Journ. Bomb. Nat.* v. 13 (1901) p. 438. A weak straggling much-branched annual; stems reaching 2 ft. long, very slender, smooth, quite glabrous; nodes glabrous. Leaves 3–6 by $\frac{1}{8}$–$\frac{1}{4}$ in., flaccid, finely pointed, sparsely clothed with bulbous-based hairs on both sides, scaberulous; sheaths glabrous; ligule hyaline, ovate, ciliolate. Racemes $\frac{1}{2}$–$\frac{3}{4}$ in. long, solitary on the apices of the stems and branches; joints between the 2 or 3 lowest nodes continuous, short, cylindric, glabrous, the others about $\frac{1}{15}$ in. long, distarticulating, subclavate, densely ciliate on one

side with long silky hairs which equal or exceed the pedicels; lowest pedicels very short, glabrous, the others $\frac{1}{12}$ in. long, ciliate on one side with long silky hairs, dilated into an oblique sac-like mouth above, and produced into a projecting flat horn. Spikelets closely imbricate, straw-colored, scarious. *Sessile spikelets* 2-sexual (except the lowest which is very often neuter); lower invol.-glume $\frac{1}{3}$ in. long, oblong or elliptic-oblong, acute, or shortly bifid, or sublacerate at the apex, the margins narrowly infolded, rigid, the keels deeply winged with subequal scarious wings about $\frac{1}{20}$ in. deep and more or less toothed on the margins, 7–9-nerved between the keels, the keel-nerves running into the points of the wings; upper invol.-glume shorter than the lower, oblong-lanceolate, obtuse, apiculate, 3-nerved, chartaceous, margins narrowly incurved, keels glabrous; lower floral glume $\frac{1}{6}$ in. long, oblong, obtuse, hyaline, nerveless, glabrous; upper floral glume reduced to the white flattened lanceolate base of the awn; awn $\frac{3}{4}$ in. long, the column much twisted. *Pedicellate spikelets* longer than the sessile, obliquely lanceolate; lower invol.-glume nearly $\frac{1}{2}$ in. long, acute, unequally winged, many-nerved; upper invol.-glume $\frac{1}{6}$ by $\frac{1}{12}$ in., lanceolate, acute, 5-nerved, chartaceous; lower floral glume $\frac{1}{8}$ in. long, oblong, obtuse, hyaline; upper floral glume $\frac{1}{10}$ in. long, oblong, obtuse, hyaline. Anthers $\frac{1}{16}$ in. long. Grain $\frac{1}{6}$ in. long, oblong, compressed. The plant does not agree with Hackel's subgenus *Dichanthium* very satisfactorily, but it is the only subgenus into which it will fit at all.

Deccan: Sakar-pathár hill near Lanoli, *Woodrow*!

22. **Andropogon armatus,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 197. Annual, erect; stems 12–18 in. long, tufted, slender, simple or branched above, glabrous and shining; nodes bearded. Leaves 4–6 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear, copiously hairy on both surfaces and with long bulbous-based hairs at the base; sheaths lax, glabrous except on the upper margins where they are more or less ciliate, the upper sheaths pale spathiform; ligule 0. Racemes $\frac{1}{2}$–$1\frac{1}{2}$ in. long, subdigitate, 2–5, flexuous; lowest pair of spikelets male; peduncles $\frac{1}{6}$–$\frac{1}{3}$ in. long, capillary, with whorls of long white hairs in their axils; joints and pedicels slender, not grooved, terete, ciliate with silky hairs. Spikelets 10–20 pairs. *Sessile spikelets* $\frac{1}{5}$ in. long; callus very short, bearded, with silky hairs; lower invol.-glume thin, pale, nerveless, silky below the middle, often with a deep dorsal pit, margins narrowly incurved, keels ciliate; upper invol.-glume ovate, acute, nerveless, subchartaceous, silky-villous on the back; lower floral glume oblong or linear, obtuse, flat, hyaline, nerveless; upper floral glume represented by a slender awn 1 in. long with an acute base. *Pedicellate spikelets* equalling the sessile but rather narrower; lower invol.-glume armed with spreading submarginal bulbous-based bristles often $\frac{1}{4}$ in. long or more, slightly convex, quite smooth between the bristles, many-nerved, keels ciliate; upper invol.-glume lanceolate, acute, 3-nerved, ciliate; lower floral glume oblong, obtuse, eciliate; upper floral glume very narrow. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.

Konkan: *Stocks*!—Distrib. India (W. Peninsula).

23. **Andropogon caricosus,** *Linn. Sp. Pl.* ed. 2 (1763) p. 1480. Stems erect or ascending from a creeping base, forming tufts at the

rooting nodes, 1–2 ft. high, stout or slender, grooved on one side, leafy; nodes usually glabrous, less frequently bearded. Leaves 6–8 by $\frac{1}{10}$–$\frac{1}{8}$ in., linear, finely acuminate, flat, glabrous, sometimes ciliate at the base, the margins scaberulous; sheaths glabrous, compressed, the mouth not auricled; ligule a narrow shortly ciliate membrane. Racemes 1–4 in. long, solitary, 2-nate or subdigitately paniculate, $\frac{1}{8}$–$\frac{1}{4}$ in. broad, pale green or silvery, the lower sometimes stipitate; joints and pedicels about $\frac{1}{3}$ as long as the sessile spikelets, ciliate on one margin. *Sessile spikelets* $\frac{1}{6}$ in. long; callus short, bearded; lower invol.-glume $\frac{1}{8}$ in. long, obovate, concave, ciliate at the rounded or truncate apex, 7–9-nerved, subchartaceous; upper invol.-glume longer than the lower, ovate-lanceolate, acute, often apiculate, subchartaceous, ciliate, 3-nerved; lower floral glume as long as the lower invol.-glume, ovate-oblong, subacute, hyaline, nerveless, ciliate; upper floral glume represented by the hyaline not dilated base of the awn; awn $\frac{7}{8}$ in. long, the hyaline base about $\frac{1}{8}$ in. long. *Pedicellate spikelets* nearly as long as the sessile; lower invol.-glume obovate, obtuse, with narrowly incurved margins and ciliate keels, many-nerved; upper invol.-glume as in the sessile spikelet; lower floral glume ovate-oblong, subacute, hyaline, ciliate; upper floral glume nearly as long as the lower, linear-oblong, obtuse, hyaline. Anthers $\frac{1}{10}$ in. long. Fl. B. I. v. 7, p. 196; Trim. Fl. Ceyl. v. 5, p. 237; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1202.—Flowers: Dec.

Dalzell without locality in Herb. Kew. DECCAN: Mâwal (Poona districts), *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*, 794!—DISTRIB. India (Bengal, Birma, Central Provinces, W. Peninsula); Ceylon, Mauritius, China.

24. **Andropogon annulatus,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 173. Perennial, densely tufted; stem erect or ascending, usually simple, 6–36 in. long; nodes usually bearded. Leaves 3–12 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear, finely acuminate, glaucous, glabrous or more or less sparsely hairy above with small bulbous-based hairs, the margins scabrid; sheaths bearded at the tip; ligule nearly $\frac{1}{8}$ in. long, oblong, obtuse, membranous, glabrous. Racemes 1–2½ in. long, subdigitately fascicled, pinkish or nearly white; peduncles glabrous, $\frac{1}{6}$–$\frac{1}{2}$ in. long; joints and pedicels $\frac{1}{2}$ as long as the spikelets, sparingly ciliate. *Sessile spikelets* about $\frac{1}{6}$ in. long, but variable in length, elliptic-oblong, closely imbricating; callus thick, shortly bearded at the base; lower invol.-glume elliptic-oblong, obtuse, ciliolate at the rounded or truncate apex, thin, margins narrowly incurved, the keels ciliate, the back hairy or glabrous, 5–9-nerved, the nerves not reaching the tip; upper invol.-glume equalling the lower but narrower, lanceolate, subacute, glabrous or ciliolate, 3-nerved; lower floral glume as long as the upper invol.-glume, linear-oblong, obtuse, nerveless, glabrous; upper floral glume represented by the flattened white base of a scabrid slender awn $\frac{3}{4}$ in. long. *Pedicellate spikelets* about equalling the sessile, male or neuter; lower invol.-glume elliptic-oblong, obtuse, 7–11-nerved, the keels bristly; upper invol.-glume narrower, 3-nerved; lower floral glume ciliate; upper floral glume small or obsolete. Fl. B. I. v. 7, p. 196; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1202. *Andropogon scandens*, Roxb. Fl. Ind. v. 1 (1832) p. 258;

Grah. Cat. p. 238; Dalz. & Gibs. p. 301.—Flowers: Oct. VERN. *Márvel.*

KONKAN: *Lisboa*! DECCAN: *Dalzell & Gibson*; Poona, *Woodrow*, 122! SIND: *Stocks*, 646!—DISTRIB. Throughout India; Tropical Africa, China, Australia, Pacific Islands.

25. **Andropogon polystachyos,** *Roxb. Fl. Ind.* v. 1 (1832) p. 261. A dwarf erect grass 6–10 in. high; stems slender, leafy above, corymbosely branched. Leaves 2–4 by $\frac{1}{20}$–$\frac{1}{16}$ in., the lower flat, the upper convolute, erect, hairy on both sides with long slender hairs, the margins thickened; sheaths hairy; ligule a short ciliate membrane. Racemes solitary, $\frac{1}{2}$–1 in. long, on very slender peduncles 2–4 in. long, with a very slender sheath and a small leaf about the middle, the 5 or 6 lower pairs of spikelets neuter; joints $\frac{1}{12}$ in. long, terete. *Sessile female spikelets* dark brown, $\frac{1}{5}$ in. long; callus bearded on one side with brown hairs; lower invol.-glume oblong when opened out, obtuse, with membranous tip and infolded margins, 7–9-nerved, pubescent on the back; upper invol.-glume linear-oblong with a coriaceous centre and broad hyaline margins; lower floral glume shorter, oblong, ciliate; upper floral glume represented by the acute base of the awn; awn 1½–2 in. long, hairy. *Pedicellate spikelets* $\frac{1}{4}$ in. long; pedicels $\frac{1}{20}$ in. long, glabrous; lower invol.-glume with a coriaceous many-nerved centre and broad hyaline wings; upper invol.-glume lanceolate, ciliate, 5-nerved. *Neuter spikelets*: lower invol.-glume like the pedicellate but broader, 2-toothed at the tip. Fl. B. I. v. 7, p. 202; Dalz. & Gibs. p. 301; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Nov.

DECCAN: Khandala, *Woodrow*; Mahableshwar, western side of the hill, *Dalzell & Gibson*.—DISTRIB. Peninsula of India.

A rare grass; there is but 1 sheet altogether in Herb. Kew. from Wight's Herbarium.

26. **Andropogon triticeus,** *R. Br. Prod.* (1810) p. 201. Perennial; roots of very stout tortuous fibres; stem 4–8 ft. high, as thick as a swan's quill below, hard, smooth, polished, leafy, simple or branched below. Leaves 1–2 ft. by $\frac{1}{4}$–$\frac{3}{4}$ in., narrowly linear, acuminate, glaucous, sparsely hairy, margins scabrous; sheaths compressed, keeled, smooth; ligule a rounded scarcely ciliolate membrane. Racemes 3–6 in. long; rhachis inarticulate except the 4–6 upper nodes, glabrous; spikelets very many, all, except the few terminal, closely imbricating, subsecund, awnless, male or neuter with a short glabrous callus. *Upper sessile spikelets* long-awned, $\frac{1}{3}$ in. long; callus long, acute, densely bearded with dark brown hairs; lower invol.-glume linear-oblong, subterete, rigidly coriaceous, with an obtuse rounded membranous ciliolate tip, dorsally deeply grooved, the margins involute, not winged; upper invol.-glume slightly longer than the lower, linear, subterete, rigidly coriaceous, scaberulous, with pale sigmoidly incurved chartaceous margins, obtuse, with membranous truncate or minutely 3-toothed tip; lower floral glume short, oblong, truncate, hyaline, nerveless; upper floral glume represented by the flattened white base of the awn; awn very stout, hirsute, 2–3 in. long. *Upper pedicellate spikelets* reaching $\frac{3}{4}$ in. long, neuter; pedicels very short, subclavate, glabrous; lower invol.-glume more or less twisted,

lanceolate, acuminate, many-nerved; upper invol.-glume rather shorter than the lower, linear-lanceolate, acuminate, ciliate, chartaceous, 3-nerved; lower floral glume shorter than the invol.-glumes, lanceolate, acuminate, ciliate; upper floral glume narrowly oblanceolate, 1-nerved, ciliate near the apex. *Lower spikelets* $\frac{1}{2}$–$\frac{3}{4}$ in. long, neuter or male, like the pedicellate ones. Fl. B. I. v. 7, p. 200; Trim. Fl. Ceyl. v. 5, p. 239; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Dec.

KONKAN: *Stocks*! DECCAN: Máwal (Poona districts), *Woodrow*.—DISTRIB. India (Central Provinces, Birma, W. Peninsula); Ceylon, Malaya, Australia.

27. **Andropogon Ritchiei,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 201. Stems stout, erect, rigid, 4 ft. and more high. Leaves 18 by $\frac{3}{8}$ in., linear from a narrow base, bluntly acuminate, flat, rigid, shortly hairy on both sides with bulbous-based hairs, the margins spinulosely serrulate; sheaths glabrous; ligule $\frac{1}{4}$ in. long, membranous, divided almost to the base into numerous narrow acute segments. Racemes 1–2 in. long, green, hispid, the lower 1–2 pairs of spikelets homogamous. *Sessile spikelets* rather more than $\frac{1}{4}$ in. long; callus nearly $\frac{1}{10}$ in. long, densely bristly with brown hairs; lower invol.-glume broadly ovate when opened out, bluntly acuminate, truncate, hairy on the back, the margins narrowly incurved, keels bristly, not channelled, dorsally obscurely nerved; upper invol.-glume linear-oblong with rounded and shortly apiculate apex, 3-nerved, with a coriaceous hispid centre and membranous margins; lower floral glume $\frac{1}{6}$ in. long, narrowly linear, subacute, hyaline, nerveless; upper floral glume represented by the acute not dilated base of the awn; awn more than $1\frac{1}{2}$ in. long, tortuous, with a dark brown more or less pubescent column, the upper part very slender. *Pedicellate spikelets* $\frac{1}{2}$ in. long; pedicels short, glabrous; lower invol.-glume lanceolate, acute, the margins equally winged and infolded, the keels with a row of long tubercular-based golden-yellow bristles; upper invol.-glume as long, lanceolate, 3-nerved; lower floral glume $\frac{3}{8}$ in. long, narrowly oblanceolate, hyaline; upper floral glume shorter, narrowly linear, acute. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Oct.–Dec.

DECCAN: hills near Poona, *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*!—DISTRIB. India (W. Peninsula).

28. **Andropogon contortus,** *Linn. Sp. Pl.* (1753) p. 1045. Perennial; stems 1–5 ft. long, densely tufted, erect or decumbent below, slender, leafy chiefly at the base, simple or subfastigiately branched, compressed towards the base. Leaves 6–12 by $\frac{1}{10}$–$\frac{1}{5}$ in., linear, often shortly and abruptly (rarely long)-acuminate, flat, suberect, rigid, often sparingly ciliate towards the base, sometimes with scattered bulbous-based hairs above, scaberulous below; sheaths compressed, keeled, glabrous, the mouth shortly auricled; ligule short, truncate, ciliolate. Racemes $1\frac{1}{2}$–3 in. long; internodes very short, the lower inarticulate; spikelets closely imbricating, subsecund, the lower 2–6 or more sessile, awnless, male or neuter, the upper sessile spikelets narrow, long-awned, female. *Sessile* (female) *spikelets* $\frac{1}{4}$ in. long; callus long, acute, pungent, bearded with reddish-brown hairs; lower invol.-glume linear-oblong, truncate, dark brown, many-

nerved, hispidulous, margins strongly incurved (not winged), tip membranous; upper invol.-glume linear, obtuse, concave, rigidly coriaceous, dark brown, hispidulous; lower floral glume short, oblong, truncate, nerveless; upper floral glume represented by the subulate white base of a hirsute awn which reaches 3 in. or more long. *Pedicellate spikelets* much longer than the sessile ($\frac{1}{3}$–$\frac{1}{2}$ in. long); pedicel very short; lower invol.-glume lanceolate, usually obliquely twisted, herbaceous, dorsally hispid with long bulbous-based hairs, the margins more or less (often unequally) winged, the wings serrulate; upper invol.-glume oblong-lanceolate, acuminate, 5-nerved, margins hyaline; lower floral glume oblong, 1-nerved; upper floral glume obovate-oblong, ciliate, nerveless. *Lower sessile spikelets* like the pedicellate, more or less covered with bulbous-based hairs. Fl. B. I. v. 7, p. 199; Grah. Cat. p. 238; Dalz. & Gibs. p. 300; Trim. Fl. Ceyl. v. 5, p. 238; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1202; Watt, Dict. Econ. Prod. v. 1, p. 244.—Flowers: Nov. VERN. *Kursali.*

Common throughout the Presidency. It is a very troublesome weed, the long awns twisting together like the strands of a rope and the sharp callus of the spikelets sticking into the hides of animals. It is a great annoyance to sportsmen, who come out of a patch of the grass with their lower garments covered with the awns. The grass is known to Anglo-Indians as *Spear Grass.*—DISTRIB. Tropics generally.

Andropogon Sorghum, Brot. Fl. Lusit. v. 1 (1804) p. 88. A tall handsome grass, usually very robust, with a decompound panicle, extensively cultivated throughout India for its grain. Whether originally a native of India is very doubtful; no Indian writer records having found it wild or naturalized. It is cultivated in the warmer parts of Europe, Asia and Africa, has been introduced into America and Australia, and is known as the *Great Millet.* Fl. B. I. v. 7, p. 183; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201. *Sorghum vulgare*, Pers. Syn. v. 1 (1805) p. 101; Watt, Dict. Econ. Prod. v. 6, part 3, p. 289. *Holcus Sorghum*, Linn. Sp. Pl. (1753) p. 1047; Grah. Cat. p. 238; Dalz. & Gibs. Suppl. p. 99.—VERN. *Jondla*; *Juári.*

Andropogon squarrosus, Linn. f. Suppl. (1781) p. 433. The *Khas-Khas*; cultivated but not apparently indigenous in Bombay. The roots are made into mats which are known as *tattis* and hung over doors and kept wet to cool the atmosphere during the hot season. The aroma from the wetted roots is very agreeable. Fl. B. I. v. 7, p. 186; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201. *Andropogon muricatus*, Retz. Obs. fasc. 3 (1783) p. 43; Grah. Cat. p. 238; Dalz. & Gibs. p. 302; Watt, Dict. Econ. Prod. v. 1, p. 245.

Andropogon Schœnanthus, Linn. Sp. Pl. (1753) p. 1046. The *Lemon-Grass*; cultivated extensively in the Bombay Presidency for the manufacture of *Lemon-Grass oil*, which is used as an external application in rheumatic affections. The oil is made largely in Khandesh and in the Panch Mahâls and sells at a high price. Fl. B. I. v. 7, p. 204; Grah. Cat. p. 238; Dalz. & Gibs. Suppl. p. 99; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1200; Watt, Dict. Econ. Prod. v. 1, p. 249.—VERN. *Sarwai.*

32. **PSEUDANTHISTIRIA,** Hook. f.

Annual grasses. Leaves narrow. Panicle leafy; branches slender, filiform, each bearing a single raceme clothed by a proper spathe, the racemes subumbellate, the umbel subtended by a common spathe. Proper spathes lanceolate or linear-lanceolate, acuminate, keeled. Spikelets within each proper spathe usually consisting of 1 sessile 2-sexual spikelet with 1 pedicellate male and a secund sessile 2-sexual spikelet with 2 pedicellate males. *Sessile 2-sexual spikelets* with a short callus; lower invol.-glume chartaceous, truncate, with inflexed margins, 4–7-nerved, the nerves apparent only towards the apex; upper invol.-glume equalling the lower, linear-lanceolate, glabrous, 3-nerved, membranous; lower floral glume small, quadrate; upper floral glume represented by the hyaline base of a long capillary geniculate awn. Lodicules cuneate. *Pedicellate male spikelets* on slender pedicels: lower invol.-glume thin, about 9-nerved, margins narrowly incurved; upper invol.-glume 3-nerved; lower floral glume very small, oblong. Stamens 3; anthers linear. Styles short; stigmas short, exserted. Grain small.—DISTRIB. India; species 4.

1. **Pseudanthistiria hispida,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 219. Annual; stem 1–2 ft. high, rather stout, erect, glabrous and polished; nodes glabrous. Leaves 2–5 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear, finely acuminate, sometimes with a bristle-point, hairy on both surfaces with bulbous-based hairs, more or less subspinulosely ciliate on the margins, strongly nerved; sheaths hairy on the upper part with bulbous-based hairs, usually glabrous below; ligule a truncate glabrous membrane much divided to the base into narrow segments, the tips minutely ciliolate. Panicle elongate, simple; branches very slender, reaching 3 in. long, often in pairs; fascicles $\frac{3}{4}$ in. broad, copiously hirsute with bulbous-based hairs; outer spathes $1\frac{1}{2}$ in. long or more; proper spathes much longer than the racemes, all hirsute on the margins with strong bristles from tubercular bases. *Sessile spikelets* $\frac{1}{6}$ in. long; callus shortly bearded; lower invol.-glume $\frac{1}{6}$ in. long, oblong, truncate at the membranous ciliolate apex, with narrowly infolded margins and obscure nerves, glabrous; upper invol.-glume as long as the lower, oblong, obtuse, 3-nerved with hyaline margins; lower floral glume small, quadrate; upper floral glume represented by the very acute base of the awn; awn 1–$1\frac{1}{4}$ in. long. *Pedicellate spikelets* lanceolate, hairy; pedicels finely hairy. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Oct.–Nov. VERN. *Pokalya.*

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks!*; Kalyan, *Woodrow.* DECCAN: Panchgani, *Woodrow.* S. M. COUNTRY: Londa, *Woodrow.*—DISTRIB. India (Central Provinces, W. Peninsula).

33. **THEMEDA,** Forsk. (1775).

ANTHISTIRIA, Linn. f. (1779).

Tall annual or perennial grasses. Leaves long, narrow. Spikelets heteromorphous, clustered on the articulate fragile rhachis of short solitary racemes subtended by proper spathes and crowded in paniculate fascicles; lowest 2 pairs of each raceme closely approximate, male or barren, awnless, sessile or subsessile, usually persistent, forming a

spurious tetramerous whorl enveloping the upper 1–3 pairs, each of which consists of a sessile hermaphrodite, and a pedicellate male spikelet, the latter much resembling those of the involucre. Florets 2, the lower reduced to an empty glume, the upper hermaphrodite in the sessile upper spikelets, male in the involucral and pedicellate spikelets or these more or less reduced or barren. *Bisexual spikelets*: invol.-glumes equal or subequal; lower usually coriaceous, at length hardened and often dark brown to almost black; upper obtusely keeled, coriaceous and channelled along the keel, with membranous margins; lower floral glume hyaline; upper very narrow, passing from a hyaline base into a usually stout awn, very rarely linear and awnless. Palea obsolete or 0. Lodicules 2, cuneate, glabrous. Stamens 3. Stigmas laterally or subterminally exserted. Grain linear-obovoid, biconvex, with 2 grooves on the anterior side. *Involucral and pedicellate spikelets*: invol.-glumes equal or subequal; lower herbaceous, dorsally flattened, 2-keeled, many-nerved; upper membranous, lanceolate, acute, 3-nerved, with ciliate margins; lower floral glume hyaline, 1-nerved or like the upper suppressed.—DISTRIB. Tropical and subtropical regions of the world; species about 10.

Involucral spikelets truly verticillate.	
Perennial	1. *T. imberbis.*
Annual	2. *T. ciliata.*
Involucral spikelets in closely superposed pairs.	
Inflorescence a decompound thyrsiform panicle; lower invol.-glume of bisexual spikelets not channelled	3. *T. cymbaria.*
Inflorescence a racemiform panicle; lower invol.-glume of bisexual spikelets deeply channelled	4. *T. tremula.*

1. **Themeda imberbis,** *T. Cooke.* Perennial, densely tufted; stem 1–3 ft. high, stout or slender, erect, or geniculate and ascending, subsimple or branched, glabrous, polished; nodes glabrous. Leaves 3–8 by $\frac{1}{10}$–$\frac{1}{5}$ in., narrowly linear, finely acuminate, coriaceous, flat, rather rigid, margins scabrid; sheaths compressed, keeled, smooth; ligule a narrow ciliolate membrane. Panicle narrow, racemiform, 3–8 in. long, sparingly branched; branches solitary or the upper 2–3-nate, filiform, bearing capituliform usually dense distant fascicles of racemes; spathes lanceolate, obtusely acuminate, about 1 in. long, usually bearded at the base, glabrous or sparsely hairy, greenish or tinged with red; racemes $\frac{1}{2}$–$\frac{3}{4}$ in. long. *Involucral spikelets* whorled, sessile, persistent, lanceolate, acute or acuminate, $\frac{1}{4}$–$\frac{5}{8}$ in. long, glabrous or with short bulbous-based hairs, male; glumes 3. *Pedicellate spikelets* linear-lanceolate, glabrous, on short glabrous or subglabrous pedicels. *Bisexual spikelet* solitary, $\frac{1}{4}$ in. long; callus reaching $\frac{1}{8}$ in. long, pungent, bearded with colored hairs. Lower invol.-glume obtuse or notched, smooth except the tip, dark brown, not dorsally channelled, obscurely 7–9-nerved; upper invol.-glume glabrous; lower floral glume glabrous, rather shorter than the invol.-glumes; upper floral glume awned; awn 1½–2½ in. long with a stout hispid column. Anthers $\frac{1}{12}$ in. long. Grain $\frac{1}{10}$ in. long, oblong, grooved ventrally. *Themeda Forskahlii* (*Forskalii*) var. *vulgaris*, Hack. Monog. Andropog. in DC. Monog. Phan. v. 6 (1889) p. 660. *Anthistiria imberbis*, Retz. Obs. fasc. 3 (1783) p. 11; Hook. f. Fl. B. I. v. 7, p. 211; Trim. Fl. Ceyl. v. 5, p. 248; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1207. *A. ciliata*, Retz. Obs. fasc. 3 (1783)

p 11 (*not* of Linn.); Grah. Cat. p. 239; Dalz. & Gibs. p. 304; Watt, Dict. Econ. Prod. v. 1, p. 265.

Common throughout the Presidency, largely used for hay.—DISTRIB. Hotter and drier parts of India; Ceylon, warm regions of the Old World.

2. **Themeda ciliata,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 664. Annual; stems suberect or geniculately ascending and rooting from the lower nodes, very slender, terete, 1–3 ft. high, glabrous, simple or branched. Leaves 6–12 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear, acute, flat, flaccid, glabrous or hairy; sheaths glabrous or the upper with scattered bulbous-based hairs towards the mouth; ligules membranous, rounded, $\frac{1}{12}$ in. long, glabrous. Panicle suberect, occupying $\frac{1}{2}$–$\frac{2}{3}$ of the stem, usually dense; lower branches solitary or 2–3-nate, filiform, glabrous, undivided often to the middle, then bearing at equal distances usually shortly pedunculate dense clusters of racemes; spathes linear to subulate from a broad lanceolate base, $\frac{2}{3}$–1 in. long, glabrous or with scattered bulbous-based bristles; racemes $\frac{1}{3}$–$\frac{1}{2}$ in. long, erect. *Involucral spikelets* whorled, sessile, persistent, linear-lanceolate, acute or acuminate, $\frac{1}{8}$–$\frac{1}{4}$ in. long, reddish, barren or imperfectly male; lower invol.-glume beset along the winged keels with stiff bristles from large tubercular bases, otherwise glabrous. *Pedicellate spikelets* narrow, not winged, glabrous. *Bisexual spikelet* solitary, not exserted from the involucre, $\frac{1}{6}$–$\frac{1}{5}$ in. long, narrow, linear-lanceolate; callus very short, subobtuse, bearded with short reddish hairs; lower invol.-glume obtuse, brown, shining, obscurely 6–7-nerved; upper invol.-glume glabrous; lower floral glume shorter than the invol.-glumes, sometimes 2-toothed; upper floral glume awned; awn 1–1$\frac{1}{2}$ in. long, slender. Anthers $\frac{1}{5}$ in. long. *Anthistiria ciliata,* Linn. f. Suppl. (1781) p. 113; Hook. f. Fl. B. I. v. 7, p. 213; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1207.—Flowers: Sept.-Jan.

KONKAN: S. Konkan, *Law!*; Salsette, *Jacquemont,* 717! DECCAN: *Woodrow!* S. M. COUNTRY: Belgaum, *Ritchie,* 886!—DISTRIB. India (North-west, Bengal, Central Provinces, W. Peninsula); S. Africa.

3. **Themeda cymbaria,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 668. Perennial; stems 3–8 ft. high, as thick as a swan's quill below, erect, branched, smooth, clothed at the base with broad strongly compressed equitant leaf-sheaths together 1$\frac{1}{2}$–2 in. across; internodes long; nodes glabrous or puberulous. Leaves 2–4 ft. by $\frac{1}{6}$–$\frac{1}{3}$ in., linear, finely pointed, glaucous beneath, green above, glabrous or ciliate at the base, scaberulous above, smooth beneath, margins scabrid; sheaths subcompressed, keeled, smooth, usually bearded at the mouth, the lower $\frac{1}{2}$ in. broad at the base; ligule reddish, membranous, glabrous. Panicle 1–2 ft. long, occupying nearly $\frac{1}{2}$ the stem, supra-decompound; branches loaded with small shortly pedunculate oblong fascicles $\frac{1}{2}$–$\frac{3}{4}$ in. long, of nearly glabrous racemes; proper spathes $\frac{1}{2}$–$\frac{2}{3}$ in. long, linear-lanceolate, boat-shaped, acuminate, finely pointed, glabrous or with hairy margins. *Involucral spikelets* $\frac{1}{6}$–$\frac{1}{4}$ in. long, contiguous in superposed pairs, glabrous. *Pedicellate spikelets* with glabrous pedicels. *Bisexual spikelets* solitary (rarely 2), subsessile; callus short, bearded with white hairs; lower invol.-glume $\frac{1}{4}$ in. long, dorsally convex, not channelled, smooth, polished, dark brown; awn $\frac{1}{2}$ in. long, slender, smooth. *Anthistiria Cymbaria,* **Roxb. Hort. Beng.**

(1814) p. 6; Grah. Cat. p. 239; Dalz. & Gibs. p. 304; Hook. f. Fl. B. I. v. 7, p. 215; Trim. Fl. Ceyl. v. 5, p. 249.

KONKAN: common.—DISTRIB. India (W. Peninsula); Ceylon.

4. **Themeda tremula,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 667. Annual?; stems erect or ascending from a creeping rootstock, 1–4 ft. high, stout or slender, leafy, subterete, simple or branched, smooth, polished, brown. Leaves 4–20 by $\frac{1}{6}$–$\frac{1}{3}$ in., finely acuminate with setaceous tips, rigid, suberect, green, glabrous or nearly so, margins scabrid; sheaths slightly compressed, smooth; ligule reduced to a very narrow membrane. Panicle 1–2 ft. long, occupying $\frac{1}{3}$–$\frac{1}{2}$ the stem, racemiform; fascicles of racemes rather distant, on capillary flexuous peduncles $\frac{1}{2}$–3 in. long, subflabelliform or subglobose, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, sometimes reduced to a few spathes and spikelets; outer spathes longer than the fascicles, 1–$1\frac{1}{2}$ in. long, more or less hairy with simple or bulbous-based hairs; proper spathes $\frac{1}{2}$–$\frac{3}{4}$ in. long, lanceolate, acute, compressed, glabrous or with some bulbous-based hairs, margins scarious. *Involucral spikelets* in contiguous superposed pairs reaching $\frac{1}{3}$ in. long, green tinged with red; lower invol.-glume linear-lanceolate, acuminate, covered with long often bulbous-based bristles, many-nerved; upper invol.-glume oblong-lanceolate, acuminate, 1-nerved, ciliate above the middle, margins inflexed; lower floral glume as long, very narrowly linear, hyaline, 1-nerved. *Lodicules* cuneate. Anthers $\frac{1}{10}$ in. long. *Pedicellate spikelets* like the involucral, but nearly glabrous. Glumes 3; lower invol.-glume winged on one margin, nerveless, the other two as in the involucral spikelets. *Bisexual spikelets* 2, sessile, $\frac{1}{6}$ in. long, linear-oblong, obtuse; callus small, with a short reddish beard; lower invol.-glume scabrid, deeply channelled dorsally, nerveless, tip hispid, narrowly truncate; awn $\frac{1}{2}$–1 in. long. *Anthistiria tremula*, Nees, ex Steud. Syn. Gram. (1855) p. 401; Hook. f. Fl. B. I. v. 7, p. 214; Trim. Fl. Ceyl. v. 5, p. 249; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Oct.

DECCAN: Poona, *Woodrow.*—DISTRIB. India (W. Peninsula); Ceylon.

34. **ISEILEMA,** Hack.

Small annual or perennial grasses; stems slender, compressed, many-noded. Leaves linear from a usually rounded equilateral base; sheaths compressed, keeled, shorter than the internodes. Panicle usually occupying $\frac{1}{2}$ the stem; branches usually fascicled and interspersed with scarious spathe-like bracts; proper spathes boat-shaped, acute, compressed, more or less herbaceous on the back, many-nerved, with scarious margins; racemes fasciculiform, solitary at the apex of the stem and branches, articulate with the peduncle below the lowest spikelets, at length all falling away from it. Spikelets dimorphous, the 4 lower whorled, male or neuter, forming an involucre round the inarticulate rhachis. *Involucral spikelets* pedicellate; pedicels short, flattened. Glumes 3; lower invol.-glume oblong-lanceolate, 3–5-nerved; upper invol.-glume similar, 3-nerved; floral glume hyaline, 1-nerved. Lodicules cuneate, retuse. Anthers violet. *Pedicellate spikelets* on long slender pedicels, similar to the involucral. *Bisexual spikelets* lanceolate or linear-lanceolate; lower invol.-glume truncate or shortly 2-fid at the

tip; upper invol.-glume as long, muticous, hyaline, glabrous; lower floral glume small, sometimes wanting; upper floral glume an awn longer than the spikelet.

As remarked by Hackel (Monog. Andropog. p. 679) the dispersion of the spikelets of *Iseilema* is by the wind carrying away all the spikelets in a body, whereas in *Themeda* the bisexual glumes alone disarticulate and are probably carried away by adhesion to the coats of animals.—DISTRIB. Tropical Asia and Australia; species 5.

Keel and submarginal nerves of the spathes granulate or tuberculate ..... 1. *I. Wightii.*
Keel and submarginal nerves of the spathe smooth ..... 2. *I. laxum.*

1. **Iseilema Wightii,** *Anders. in Nov. Act. Soc. Sc. Upsal.* ser. 3, v. 2 (1858) p. 251. Perennial; stems often prostrate and rooting at base, then ascending, 8–36 in. long, rarely as thick at the base as a goose-quill; nodes more or less bearded. Leaves 4–8 by $\frac{1}{12}$–$\frac{1}{8}$ in., linear, acute, glaucescent or sometimes as well as the whole plant reddish, smooth or scaberulous, the floral leaves scabrid with tuberculate margins; sheaths lax, sometimes with bulbous-based hairs; ligule short truncate, membranous, ciliate. Panicle occupying $\frac{1}{2}$ the stem or more, linear-oblong, more or less compound, erect, spreading; rhachis bearded at the nodes; lower branches 2, the upper as many as 5; proper spathes $\frac{1}{3}$–$\frac{1}{2}$ in. long, linear-lanceolate, with scarious margins. *Involucral spikelets* male or neuter, $\frac{1}{8}$ in. long, shortly pedicellate, lanceolate-oblong, green or tinged with violet; lower invol.-glume subacute, with 5 elevated ribs on the back, sulcate between the ribs; upper invol.-glume glabrous with broadly infolded margins, 1-nerved; lower floral glume much shorter, oblong, 2–3-toothed, nerveless, glabrous. Anthers $\frac{1}{16}$ in. long. *Pedicellate spikelets* on very slender pedicels. *Bisexual spikelets* $\frac{1}{16}$–$\frac{1}{8}$ in. long; lower invol.-glume acute (not acuminate nor beaked), obscurely 4-nerved; upper invol.-glume equalling the lower, elliptic-lanceolate, acute or subobtuse, often mucronate, obtusely keeled on the back, 3-nerved, glabrous; upper floral glume an awn $\frac{1}{4}$–$\frac{1}{2}$ in. long, the column exceeding the subulate part. Fl. B. I. v. 7, p. 218; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Watt, Dict. Econ. Prod. v. 4, p. 524. —Flowers: Nov.

DECCAN: Poona, *Woodrow.* S. M. COUNTRY: Belgaum, *Woodrow.* GUJARAT: Morvi (Kathiawar), *Woodrow.*—DISTRIB. Throughout India.

2. **Iseilema laxum,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 682. Perennial; stems 6–20 in. long, ascending from a stout hard sometimes shortly creeping rootstock, very slender, simple or sparingly branched; root-fibres wiry. Leaves all cauline or the lower radical with equitant sheaths, 3–6 by $\frac{1}{20}$–$\frac{1}{8}$ in., linear, obtuse or subobtuse, glabrous but often ciliate near the base, scaberulous above, smooth below, the margins scabrid; sheaths lax, quite glabrous; ligule short, truncate, membranous, ciliate. Panicle occupying $\frac{1}{3}$–$\frac{1}{2}$ the stem, racemiform, long, narrow, of distant axillary pedunculate fascicles $\frac{1}{4}$–$\frac{1}{2}$ in. long; outer spathes $\frac{1}{4}$–1 in. long, narrowly lanceolate, glabrous or with a few hairs near the margin; proper spathes $\frac{1}{3}$–$\frac{1}{2}$ in. long, elliptic-lanceolate. *Involucral spikelets* truly whorled, $\frac{1}{8}$ in. long, pedicellate, oblong-lanceolate, acute; pedicels short, flattened, bearded at

the base; lower invol.-glume acute, sparsely ciliate, 3–5-nerved; upper invol.-glume oblong-lanceolate, acuminate, sparsely ciliate, 3-nerved lower floral glume linear, glabrous, hyaline. Lodicules cuneate, retuse. Anthers long, narrow. *Pedicellate spikelets* on long ciliate pedicels, lanceolate, glabrous. *Bisexual spikelets* narrowly lanceolate, $\frac{1}{5}$ in. long, narrowed into a slender stipe, glabrous; lower invol.-glume chartaceous, 2-fid or truncate at the tip, margins scaberulous in the upper third, thin; faintly 3–5-nerved; upper invol.-glume lanceolate, acuminate, 1-nerved, tip scaberulous; upper floral glume a very slender geniculate awn, $\frac{1}{3}$–$\frac{1}{2}$ in. long, the column equalling the subulate part. Fl. B. I. v. 7, p. 218; Trim. Fl. Ceyl. v. 5, p. 251; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1208; Watt, Dict. Econ. Prod. v. 4, p. 524.—Flowers: Nov.–Dec.

KONKAN: *Lambert*! DECCAN: *Woodrow*!; Poona, *Jacquemont*, 439! S. M. COUNTRY: Belgaum, *Ritchie*, 799!—DISTRIB. India (Upper Gangetic plain, W. Peninsula).

35. **COIX,** Linn.

Tall leafy monœcious annual or perennial grasses; stem branching, spongy within. Leaves long, flat, broad. Racemes many, axillary and terminal; lower spikelets solitary, female, enclosed in an ultimately hardened, polished, nut-like bract, through the apex of which the male portion of the spike protrudes. MALE SPIKELETS 2–3-nate at each node of the rhachis, 1 sessile and 1 or 2 pedicellate, lanceolate. Glumes 4; invol.-glumes subequal, empty, rigid or herbaceous; lower invol.-glume winged along the inflexed margin; upper invol.-glume not winged; floral glumes hyaline, paleate, triandrous or empty. FEMALE SPIKELETS ovoid, acuminate. Glumes 4; lower invol.-glume chartaceous, the other 3 glumes becoming successively thinner; upper floral glume paleate. Lodicules 0. Staminodes minute. Ovary ovoid; styles 2, free, slender. Grain orbicular, ventrally furrowed, enclosed in the hardened globose ovoid or cylindric involucre.—DISTRIB. Species 3 or 4, in the warmer regions of the globe.

1. **Coix Lachryma-Jobi,** *Linn. Sp. Pl.* (1753) p. 972. Stem 3–5 ft. high or more, stout, rooting at the lower nodes; internodes smooth, polished. Leaves 4–18 by 1–2 in., narrowed from a broad cordate base to an acuminate tip, smooth on both surfaces, with slender nerves and spinulosely serrate margins; midrib stout; sheaths long, smooth; ligule a very narrow membrane. Racemes 1–2½ in. long, nodding or drooping from long peduncles; rhachis within the bract slender, above the bract stout, notched at the nodes. MALE SPIKELETS $\frac{3}{8}$–$\frac{1}{2}$ in. long, subsecund, imbricating. Lower invol.-glume $\frac{3}{8}$ in. long, elliptic-lanceolate, acute, concave, many-nerved, with inflexed margins and with a narrow wing arising from a little above the edge of the margin with many branched green veins; upper invol.-glume similar to the lower but not winged, 5–9-nerved; lower floral glume oblong-lanceolate, hyaline, paleate, triandrous, faintly 3–5-nerved; upper floral glume similar, paleate, triandrous or empty. Anthers $\frac{1}{5}$ in. long, orange. FRUIT from broadly ovoid to globose, bluish-grey, $\frac{1}{4}$–$\frac{3}{8}$ in. long, smooth, polished. Fl. B. I. v. 7, p. 109; Trim. Fl. Ceyl. v. 5, p. 192; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain,

Beng. Pl. p. 1210. *Coix Lachryma*, Linn. Syst. ed. 10 (1751) p. 1261; Grah. Cat. p. 240; Dalz. & Gibs. p. 289; Watt, Dict. Econ. Prod. v. 2, p. 492.—Flowers: Oct. VERN. *Rán-jondhala.*

KONKAN: *Graham.* DECCAN: *Graham*; Lanoli, *Woodrow*; Panchgani Ghát, *Cooke!* GUJARAT: *Graham.*—DISTRIB. Throughout the hotter and damper parts of India, wild or cultivated; Ceylon, Tropical Asia, cultivated in Africa and America.

36. **POLYTOCA,** Br.

Tall stout erect branching annual or perennial leafy monœcious grasses; stem spongy within; nodes bearded; flowering branches fascicled. Leaves long, flat. Inflorescence of spike-like racemes, terminating the branches, at first enclosed in spathiform bracts; racemes all male or with one or more female spikelets at the base. MALE SPIKELETS 2-flowered, sometimes imperfect. Glumes 4 (with sometimes a terminal rudimentary one), all subequal in length; invol.-glumes empty; lower invol.-glume herbaceous, shallowly concave, many-nerved, with a narrow membranous margin; upper invol.-glume narrower, ovate, acuminate, 5–9-nerved; lower floral glume membranous, oblong, acuminate, 3–5-nerved, paleate, triandrous; upper floral glume very slender, linear, hyaline, paleate, triandrous or empty. Lodicules 2, cuneate. Anthers long. FEMALE SPIKELETS broadly oblong, 1-flowered; lower invol.-glume thickly coriaceous, closely embracing the rhachis of the spike by its involute margins, with many obscure nerves, the other 3 glumes enclosed in the lower invol.-glume, hyaline; upper invol.-glume oblong, many-nerved; lower floral glume narrower, oblong, 3–5-nerved, empty; upper floral glume very narrow, truncate, 3-nerved, paleate. Styles very long; stigmas slender. Grain small, fusiform, terete, enclosed in the nut-like polished hardened glume.—DISTRIB. Species 8, tropical Asiatic and Australian.

Leaves 18–24 by 2–3 in.; lower invol.-glume of female spikelet 3-lobed at the tip ..... 1. *P. Cookei.*
Leaves 6–12 by ¼–⅛ in.; lower invol.-glume of female spikelet entire at the tip ..... 2. *P. barbata.*

1. **Polytoca Cookei,** *Stapf, in Hook. Icon. Plant.* v. 24 (1895) t. 2333. Annual; stem 3 ft. (or more) high, smooth; nodes bearded. Leaves 18–24 by 2–3 in., linear-lanceolate, acuminate, more or less hispid on both sides with bulbous-based hairs, and with thickened and ciliate margins; sheaths rather loose, striate, hairy with bulbous-based hairs; ligule short, subhyaline, hairy with yellowish hairs. Flowering branches fasciculately crowded in the axils of the upper leaves, each with a linear acuminate pubescent bract at the base. Male panicles reaching 3 in. long. MALE SPIKELETS ⅓ in. long, geminate, one longer than the other, shortly pedicellate or sessile. Glumes 4; lower invol.-glume lanceolate, acuminate, pubescent, many-nerved, with a hyaline more or less inflexed margin; upper invol.-glume slightly shorter and thinner than the lower one, with slender nerves. Floral glumes slightly shorter than the lower invol.-glume, glabrous, few-nerved, hyaline. Anthers 3, linear. FEMALE SPIKELETS ⅓ in. long; lower invol.-glume crustaceous, oblong, the margins connate at the base, closely embracing the upper invol.-glume, the apex with a 3-lobed crest the lateral lobes of which are obliquely truncate, the

midlobe emarginate; upper invol.-glume slightly shorter than the lower, oblong, acuminate; lower floral glume about equalling the upper invol.-glume, oblong, suddenly apiculate, 13–15-nerved; upper floral glume shorter than the lower, hyaline, nerveless, sometimes 2-fid. Fl. B. I. v. 7, p. 101; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers: Sept. VERN. *Kurisal.*

KONKAN: *Stocks*!, *Law*!, *Lisboa*; Bombay, *Dalzell*!; Salsette, *Jacquemont*, 706! DECCAN: Mahableshwar, *Woodrow*!, *Cooke*! KANARA: N. Kanara, *Lisboa*.—DISTRIB. India (W. Peninsula).

2. **Polytoca barbata,** *Stapf, in Fl. B. I.* v. 7 (1896) p. 102. Stem 3–6 ft. high, as thick as the little finger below, terete, smooth; nodes softly bearded. Leaves 6–12 by $\frac{1}{4}$–$\frac{7}{8}$ in., linear, acuminate, scabrid above, with a stout midrib and scabrid margins; sheaths long, smooth, glabrous or hairy; ligule a narrow ridge. Racemes paniculate, on slender peduncles; spathiform sheaths 1 in. long (or more), with a long awn at the tip; proper sheaths $\frac{1}{2}$ in. long, oblong, awned; male portion of the raceme appearing as if sessile on the top of the female spikelet, articulate with the internode below it which is embraced by the margins of the outer glume of the female spikelet; rhachis hardly articulate between the male spikelets. MALE SPIKELETS reaching $\frac{3}{8}$ in. long. Lower invol.-glume $\frac{1}{3}$ by $\frac{1}{6}$ in., ovate, acute, concave, pubescent. FEMALE SPIKELETS $\frac{1}{6}$ in. long, glabrous. Glumes 4; lower invol.-glume thickly coriaceous, white, shining, closely wrapped round the rhachis of the spike and the other glumes, obscurely many-nerved; tip entire. Trim. Fl. Ceyl. v. 5, p. 194; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1209. *Coix barbata*, Roxb. Fl. Ind. v. 3 (1832) p. 569; Dalz. & Gibs. p. 289.—Flowers: Sept. VERN. *Kánta-karvel.*

DECCAN: high hills round Junnar (Poona districts), *Dalzell & Gibson*; Poona, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Java.

37. **ARUNDINELLA,** Raddi.

Perennial or annual erect grasses. Leaves narrow. Spikelets paniculate, continuous with or imperfectly jointed on the pedicels; rhachilla not produced beyond the upper floret. Glumes 4, membranous, chartaceous or thinly coriaceous; invol.-glumes acute or acuminate, 3–5-nerved, the upper usually the longer; lower floral glume equalling the lower invol.-glume or slightly longer, 3–7-nerved, paleate, male or neuter (rarely 2-sexual); upper floral glume much shorter than the lower one, thin, 2-sexual (or sometimes ?female), entire or minutely 2-fid, 3–7-nerved, awnless or 1–3-awned (if 3-awned, the 2 lateral awns bristle-like, straight, the median awn geniculate). Paleæ of floral glumes linear or oblong, 2-keeled; flaps more or less auricled. Lodicules 2, minute. Stamens 3; anthers linear-oblong. Styles 2, distinct; stigmas short, laterally exserted. Grain oblong to ellipsoid, free within the upper floral glume and palea.—DISTRIB. Species about 25, mainly in Tropical Asia and America.

Upper floral glume with 3 awns.
Leaves less than 4 in. long; annuals.
A weak straggling grass; leaves glabrous or sparsely hairy, auricled and pectinately ciliate at the base; lateral awns from a triangular base ..... 1. *A. arenacea.*

An erect grass; leaves hispid with bulbous-based hairs, rounded at the base; lateral awns acicular ..... 2. *A. tuberculata.*
Leaves 6–12 in. long; a perennial grass ..... 3. *A. setosa.*
Awn of upper floral glume solitary.
Spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. long (smallest of the genus) ..... 4. *A. tenella.*
Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long.
Plant scarcely 6 in. high; leaves 1–1½ in. long ..... 5. *A. pygmæa.*
Plants exceeding 6 in. high.
Annuals.
Stems reaching 1½ ft. high; leaves 1–4 in. long and as well as the sheaths clothed with long soft hairs. 6. *A. agrostoides.*
Stems reaching 3 ft. high; leaves 4–6 in. long and as well as the sheaths glabrous or nearly so ..... 7. *A. Metzii.*
Perennial; stem reaching 4 ft. high; leaves 8–12 in. long, sparsely hairy; sheaths glabrous or nearly so, auricled at the mouth ..... 8. *A. Lawii.*
Spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. long.
Panicle branched; leaves 6–12 in. long.
Rootstock hard, creeping, not tuberous; panicle pyramidal or thyrsiform; rhachis angular, glabrous ... 9. *A. brasiliensis.*
Rootstock tuberous; panicle oblong; rhachis filiform, scaberulous ..... 10. *A. capillaris.*
Panicle spicate; leaves 1–1½ in. long ..... 11. *A. spicata.*
Upper floral glume awnless; a tall grass 6 ft. high; leaves 12–24 in. long ..... 12. *A. gigantea.*

1. **Arundinella arenacea,** *Munro, ex Thw. Enum. Pl. Zeyl.* (1864) p. 362. An annual weak straggling slender grass; stems ascending, leafy, 6–12 in. long, rooting at the lower nodes; nodes glabrous. Leaves ¾–2 by ¼–⅜ in., ovate-lanceolate, acute, flat, glabrous or sparsely hairy, strongly nerved, from an amplexicaul pectinately ciliate 2-auricled base; sheaths glabrous, the margins naked or ciliolate in the upper part; ligule linear, small, membranous. Panicle ½–1 in. long, ovoid-oblong, compact; branches very short. Spikelets ⅛ in. long (excluding the awns). Glumes 4; invol.-glumes distant at the base, 3–5-nerved, membranous; lower invol.-glume ⅛ in. long (including awn), lanceolate, acute, narrowed into a scaberulous awn; upper invol.-glume rather longer, notched at the tip, with a long scaberulous awn in the sinus; lower floral glume shorter than the upper invol.-glume, oblong, obtuse, dorsally mucronate, paleate, neuter or male, the palea oblong-obovate, 2-fid at the apex; upper floral glume 2-sexual or female, shorter than the upper invol.-glume, oblong, membranous, with 2 lateral tufts of white hairs, divided at the apex into 2 triangular lobes from each of which slender capillary awns issue; median awn about ⅜ in. long, the lower half brown, twisted, the upper half geniculate, pale, scabrid, subulate; palea linear-oblong, 2-fid at the apex. Fl. B. I. v. 7, p. 69; Trim. Fl. Ceyl. v. 5, p. 176; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434. *Arundinella Campbelliana,* Lisboa, in Journ. Bomb. Nat. v. 5 (1891) p. 346.—Flowers: Oct.

Dalzell without locality in Herb. Kew. KONKAN: Ratnagiri, *Woodrow.* DECCAN: Mahableshwar, *Lisboa*; Tiger Leap near Lanoli, *Woodrow*! S. M. COUNTRY: Rám Ghát, *Ritchie,* 890!; Castlerock, *Woodrow.*—DISTRIB. India (Khasia, Birma, W. Peninsula); Ceylon.

2. **Arundinella tuberculata,** *Munro, ex Lisboa, in Journ. Bomb. Nat.* v. 5 (1891) p. 344. Annual; stem erect or slightly decumbent at the base, 12–18 in. high, glabrous. Leaves 1–3½ by ⅛–½ in., linear-

lanceolate, acute, hispid with white bulbous-based hairs, base rounded; sheaths reaching 2 in. long, hispid with long white bulbous-based hairs; ligule a ridge of hairs. Panicle 3–6 in. long, narrowly oblong; rhachis angular; branches ½–1 in. long, scaberulous. Spikelets ovoid, acute, pedicellate, single or geminate, ⅛ in. long (excluding awns), clothed with long bulbous-based hairs. Glumes 4; lower invol.-glume ⅛ in. long (including an awn of about $\frac{1}{25}$ in. long), 3-nerved, with bulbous-based hairs along the nerves, subcoriaceous; upper invol.-glume ⅛ in. long (excluding the beak), ovate, acute, 5-nerved, with bulbous-based hairs along the nerves, narrowed into a beak as long as the body of the glume, subcoriaceous; lower floral glume rather more than ⅛ in. long, elliptic-oblong, obtuse, 2-fid, glabrous, subcoriaceous, with incurved margins, paleate, male, the palea as long as the glume, oblong-lanceolate acute; upper floral glume rather more than $\frac{1}{10}$ in. long, lanceolate, acute, when ripe subcrustaceous, brown and scabrid; median awn reaching ½ in. long, the lower half brown, twisted or not, the upper half straight, whitish, scaberulous; lateral awns acicular, transparent, $\frac{1}{12}$–$\frac{1}{10}$ in. long. Fl. B. I. v. 7, p. 69; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Oct.

Dalzell without locality in Herb. Kew. KONKAN: *Stocks*! DECCAN: Poona, *Woodrow*.—DISTRIB. Central India.

3. **Arundinella setosa,** *Trin. Gram. Panic.* (1826) p. 63. Perennial; stem 1–3 ft. high, erect from a hard rootstock, slender, rigid, subtuberous at the base; nodes glabrous. Leaves 6–12 by ⅛–¼ in., linear, finely acuminate, glabrous, pubescent or sometimes hispidly hairy; sheaths glabrous; ligule very small. Panicle 3–10 in. long, lax; branches 2–5 in. long, distant, suberect, filiform. Spikelets (including the mucro of the upper invol.-glume) reaching ¼ in. long (or more). Glumes 4; lower invol.-glume ¼ in. long, ovate-lanceolate, aristately acuminate, 3-nerved, hairy or almost glabrous; upper invol.-glume rather more than ¼ in. long, oblong-lanceolate, narrowed into a long awn with truncate tip, 5-nerved; lower floral glume ⅛ in. long, obtuse, paleate, male, the palea ⅛ in. long, oblong-lanceolate, subacute; upper floral glume ⅛ in. long, ovate-lanceolate, acuminate, 2-sexual; palea as long as the glume, narrowly oblong-lanceolate, subacute; median awn more than ¼ in. long, brown below, pale above; lateral awns capillary, $\frac{1}{20}$ in. long. Fl. B. I. v. 7, p. 70; Trim. Fl. Ceyl. v. 5, p. 177; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1215.

KONKAN: near Bombay, *Ritchie*!—DISTRIB. India (W. Himalaya, Khasia Hills, Central India); Ceylon, Tonkin, China, Philippines.

4. **Arundinella tenella,** *Nees & Wight, ex Steud. Nom.* ed. 2, part 1 (1840) p. 143. Annual, nearly glabrous; stems solitary or tufted, erect, glabrous or with a few scattered hairs. Leaves 1–3 by ⅛–¾ in., ovate to linear-lanceolate, acuminate, membranous, many-nerved, sprinkled with a few slender soft hairs, base narrowed; sheaths usually glabrous with ciliate margins. Panicle 2–10 in. long, effuse, copiously branched; rhachis slender, strict, erect; branches alternate or the lower subverticillately fascicled, each with widely spreading capillary branches and branchlets. Spikelets the smallest of the genus, $\frac{1}{16}$–$\frac{1}{12}$ in. long; pedicels long, slender. Glumes 4; lower invol.-glume $\frac{1}{20}$–$\frac{1}{16}$ in. long, ovate-lanceolate, acute, thinly membranous, 3-nerved; upper invol.-

glume longer, $\frac{1}{16}$–$\frac{1}{12}$ in. long, ovate-lanceolate, cuspidately acuminate, 5-nerved; lower floral glume $\frac{1}{16}$ in. long, ovate, obtuse, paleate; upper floral glume $\frac{1}{25}$ in. long, lanceolate, scabrid above; awn solitary, about $\frac{1}{10}$ in. long, the lower part brown, slightly twisted, the upper part pale. Fl. B. I. v. 7, p. 71; Dalz. & Gibs. p. 292; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1215. *Arundinella pumila*, Steud. Syn. Pl. Gram. (1855) p. 114; Lisboa, in Journ. Bomb. Nat. v. 5 (1891) p. 345.—Flowers: Nov.

Bombay, *Lambert*! DECCAN: Karli and Khandala, *Jacquemont*, 631!; Lanoli, *Woodrow*; Mahableshwar, common under the shade of trees, *Dalzell*!, *Cooke*!, *Woodrow*, *Lisboa*.—DISTRIB. India (W. Himalaya, Behar, Central India, Khasia Hills W. Peninsula); Abyssinia.

5. **Arundinella pygmæa,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 72. A small slender plant scarcely 6 in. high; stem very slender. Leaves chiefly radical, 1–1½ by $\frac{1}{10}$ in., linear-lanceolate, nerveless except the strong midrib, with a few scattered long hairs and finely serrulate margins; sheaths glabrous. Panicle erect, effuse; rhachis filiform; branches few, capillary. Spikelets $\frac{1}{8}$ in. long (including the cuspidation of the upper invol.-glume), ovoid-lanceolate, hispidly hairy; pedicels very long, capillary. Glumes 4; lower invol.-glume $\frac{1}{12}$ in. long, ovate, 3-nerved, hispid with long hairs; upper invol.-glume $\frac{1}{8}$ in. long, ovate-lanceolate, cuspidately acuminate, 5-nerved, hispid with long hairs; lower floral glume $\frac{1}{12}$ in. long, ovate, obtuse, coriaceous, with incurved margins, obscurely 5-nerved; upper floral glume about $\frac{1}{25}$ in. long, elliptic-oblong; awn solitary, $\frac{1}{5}$–$\frac{1}{3}$ in. long, the lower half brown, the upper half pale. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Sept.

KONKAN: crest of W. Ghâts, *Woodrow*. KANARA: N. Kanara, *Lisboa*. There is only one half sheet of very poor specimens in Herb. Kew., collected in N. Kanara by Dr. Lisboa.

6. **Arundinella agrostoides,** *Trin. Sp. Gram. Icon.* v. 3 (1836) t. 265. Annual; stem 8–18 in. long, stout or slender. Leaves 1–4 by $\frac{1}{4}$–$\frac{1}{2}$ in., flat, narrowed to the base, clothed with long soft hairs; sheaths softly hairy; ligule a ridge of hairs. Panicle 1–8 in. long, contracted; branches fascicled, suberect. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long, ovoid-lanceolate, the lower half usually bristly; pedicels reaching $\frac{1}{5}$ in. long, slender, glabrous or nearly so. Glumes 4; lower invol.-glume ovate, acuminate, 3-nerved, usually with a few bristles on the lower half; upper invol.-glume $\frac{1}{8}$ in. long, ovate, cuspidately acuminate, 5-nerved; lower floral glume rather more than $\frac{1}{10}$ in. long, ovate-lanceolate, coriaceous, paleate, 3-nerved, the palea ovate-lanceolate, acuminate; upper floral glume about $\frac{1}{20}$ in. long, elliptic, obtuse, usually female; palea oblong, obtuse; median awn reaching $\frac{1}{5}$ in. long, the lower half twisted, brown, the upper half pale, geniculate above the twisted column; lateral awns 0. Fl. B. I. v. 7, p. 71; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.

KONKAN: *Wight*.

I have seen no specimens from Bombay. Woodrow includes the plant in his list of grasses in the 'Journal of the Bombay Natural History Society,' but does not appear to have collected it, as he gives no habitat.

7. **Arundinella Metzii,** *Hochst. in Miq. Anal. Bot. Ind.* part 2 (1851) p. 19. Annual, 1–3 ft. high; stems slender, erect. Leaves 4–6 by $\frac{1}{4}$–$\frac{1}{3}$ in., linear, glabrous or sparsely hairy; sheaths glabrous or sparsely hairy. Panicle 1–8 in. long, effuse; rhachis slender, smooth or subscaberulous; branches elongate, alternate or fascicled, 1–4 in. long. Spikelets $\frac{1}{8}$ in. long, ovoid-lanceolate. Glumes 4; lower invol.-glume $\frac{1}{10}$ in. long, ovate-lanceolate, with a slender mucro about $\frac{1}{30}$ in. long, strongly 3-nerved; upper invol.-glume $\frac{1}{8}$ in. long, similar, with a mucro about $\frac{1}{20}$ in. long, 5-nerved; lower floral glume elliptic, obtuse, $\frac{1}{10}$ in. long, 3-nerved, paleate, empty or male, the palea $\frac{1}{16}$ in. long, oblong-lanceolate, acute, hyaline; upper floral glume $\frac{1}{20}$ in. long, ovate, obtuse; palea as long as the glume, linear-lanceolate, subobtuse; awn solitary, $\frac{1}{2}$ in. long, the lower half brown, the upper pale. Fl. B. I. v. 7, p. 72; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Oct.

DECCAN: Lanoli, *Woodrow.* KANARA: *Thomson!*—DISTRIB. India (W. Peninsula).

8. **Arundinella Lawii,** *Hook. f. in Trim. Fl. Ceyl.* v. 5 (1900) p. 180. Perennial; stems tufted, erect, 2–4 ft. high, leafy, smooth; nodes hairy. Leaves 8–12 by $\frac{1}{4}$ in., linear, finely acuminate, flat, sparsely hairy, with nearly smooth margins; sheaths elongate, glabrous or nearly so, auricled and ciliate at the mouth; ligule a tomentose lunate ridge. Panicle 12–20 in. long., pyramidal, decompound, effuse, drooping; rhachis slender, smooth; lower branches reaching 6 in. long, in distant fascicles, filiform, spreading, flexuous; branchlets capillary. Spikelets numerous, usually hairy, rather more than $\frac{1}{10}$ in. long (excluding the awns); pedicels very long. Glumes 4; lower invol.-glume about $\frac{1}{12}$ in. long (including a short slender awn about $\frac{1}{40}$ in. long), lanceolate, acute, 3-nerved, hairy on the nerves, thinly membranous; upper invol.-glume similar to the lower but longer (nearly $\frac{1}{8}$ in. long, including an awn of nearly $\frac{1}{10}$ in. long), 5-nerved, hairy on the nerves, thinly membranous; lower floral glume rather less than $\frac{1}{10}$ in. long, shorter than the upper invol.-glume, oblong, subobtuse, faintly 5-nerved, not awned, hyaline, paleate, the palea narrowly oblong, subobtuse with a faint median nerve; upper floral glume $\frac{1}{20}$–$\frac{1}{16}$ in. long, elliptic-lanceolate, acute, hyaline, usually 3-nerved, with incurved margins and a long filiform awn reaching $\frac{1}{2}$ in. long, 2-sexual. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435. *Arundinella agrostoides,* Hook. f. Fl. B. I. v. 7 (1896) p. 71 (partly).

KONKAN: *Woodrow,* 35!; N. & S. Konkan, *Law!*—DISTRIB. India (W. Peninsula); Ceylon.

9. **Arundinella brasiliensis,** *Raddi, Agrost. Bras.* (1823) p. 37, t. 1, fig. 3. Perennial; rootstock stout, hard, creeping and sending out stout sheathed branches sometimes as thick as a goose-quill, or tufted and intricately branched; stems 1–5 ft. long, stout or slender, simple or branched, hairy or almost glabrous; nodes glabrous or pubescent. Leaves 6–12 by $\frac{1}{6}$–$\frac{2}{3}$ in., usually ciliate at the narrow base, glabrous or hairy; sheaths usually glabrous; ligule a minute ridge fringed with long hairs. Panicle pyramidal, thyrsiform or subcorymbose, 4–18 in. long; rhachis angular, usually glabrous; branches 1–10 in. long, few or many, fasciculate or subverticillate. Spikelets $\frac{1}{8}$ $\frac{1}{6}$ in. long, subsecund, pedicellate, ovoid-lanceolate, usually glabrous. Glumes 4; lower invol.-

glume $\frac{1}{8}$ in. long, ovate-lanceolate, acuminate, subacute, 3-nerved, glabrous or (rarely) sparingly setose; upper invol.-glume $\frac{1}{5}$ in. long, ovate-lanceolate, acuminate, 5-nerved; lower floral glume $\frac{1}{8}$ in. long, elliptic-oblong, obtuse or shortly 2-fid, 3–5-nerved, paleate, empty or male, the palea $\frac{1}{8}$ in. long, lanceolate, hyaline; upper floral glume less than $\frac{1}{8}$ in. long, bearded at the base, narrowly ovate-lanceolate, scaberulous, 2-sexual; awn $\frac{1}{8}$ in. long, straight or slightly twisted, brown below, pale above; palea narrowly lanceolate, acute, as long as the glume. A very variable plant. The measurements have been taken from specimens with full-sized spikelets. *A. Ritchiei*, Munro, has smaller glumes and spikelets. The inflorescence of the Indian plant is generally more lax than that of the Brazilian, and the spikelets somewhat larger. Fl. B. I. v. 7, p. 73; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1215. *Arundinella striata*, Nees, in Kew Journ. Bot. v. 2 (1850) p. 102; Dalz. & Gibs. p. 293. *A. nepalensis*, Trin. Gram. Panic. (1826) p. 62; Lisboa, in Journ. Bomb. Nat. v. 5 (1891) p. 343. *A. Ritchiei*, Munro, ex Lisboa, in Journ. Bomb. Nat. l. c.—Flowers: Oct.

DECCAN: Mahableshwar, *Dalzell & Gibson, Lisboa*; Panchgani, *Woodrow*; Lanoli, *Lisboa*; Khandala, *Lisboa*. KANARA: N. Kanara, *Lisboa*.—DISTRIB. Throughout the hilly parts of India; China, Malaya, Australia, Tropical America.

10. **Arundinella capillaris,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 74. Perennial, very slender; stem erect from a tuberous rhizome which is clothed with the woolly bases of leaf-sheaths; nodes glabrous. Leaves 6–12 by $\frac{1}{6}$–$\frac{1}{3}$ in., linear, acuminate, glabrous or hairy; sheaths glabrous, striate; ligule a ridge of hairs. Panicle oblong, 5–7 in. long; rhachis filiform, scaberulous; branches alternate, slender, 4–6 in. long. Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long, glabrous, solitary or geminate; pedicels long, capillary, angular. Glumes 4; lower invol.-glume $\frac{1}{5}$ in. long, ovate, acute, with a long slender mucro, 3-nerved, with a scaberulous keel; upper invol.-glume reaching $\frac{1}{5}$ in. long, ovate-lanceolate, narrowed into a subcuspidate acuminate tip, 5-nerved; lower floral glume rather more than $\frac{1}{8}$ in long, ovate-oblong, subacute, 3-nerved, paleate, the palea $\frac{1}{8}$ in. long, oblong-lanceolate, acute, hyaline; upper floral glume $\frac{1}{8}$ in. long, lanceolate, acute, slightly scabrid; palea oblong-lanceolate, acute; awn nearly $\frac{1}{4}$ in. long, geniculate about the middle, easily breaking off. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435. *Arundinella mutica*, Nees, ex Steud. Syn. Gram. (1855) p. 116.—Flowers: Oct. VERN. *Kotir.*

KONKAN: Parel near Bombay, *Woodrow*. KANARA: Kála naddi, *Woodrow*.—DISTRIB. India (W. Peninsula).

11. **Arundinella spicata,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 293. A small grass in appearance resembling a *Setaria*; stem 6–12 in. high, erect, simple. Leaves 1–1½ by $\frac{1}{4}$ in., linear-lanceolate, acute, densely hispid with long hairs; sheaths densely hispid; ligule a minute hairy ring. Inflorescence of cylindric racemes $\frac{3}{4}$–2 in. long. Spikelets $\frac{1}{4}$ in. long to top of upper invol.-glume; pedicels very short. Glumes 4; lower invol.-glume $\frac{1}{6}$–$\frac{1}{2}$ in. long, lanceolate, acuminate, with a few long bulbous-based hairs, 3-nerved; upper invol.-glume reaching $\frac{1}{4}$ in. long, narrowly lanceolate, attenuated into a long acuminate point, folded round and completely concealing the upper floral glume and its awn,

3-nerved and with a few scattered long hairs; lower floral glume $\frac{1}{10}$ in. long, lanceolate, acute, thinly membranous, glabrous, paleate, empty or male, the palea $\frac{1}{16}$ in. long, lanceolate, acute; upper floral glume $\frac{1}{20}$ in. long, oblong, obtuse, female or 2-sexual; palea lanceolate, acute, hyaline; awn $\frac{1}{8}$ in. long, the lower half brown, the upper pale, geniculate about the middle. Fl. B. I. v. 7, p. 77; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435.—Flowers: Nov.

DECCAN: common on the Mahableshwar Hills, *Dalzell & Gibson, Woodrow*!, *Cooke*!—DISTRIB. India, Western Peninsula, apparently endemic.

12. **Arundinella gigantea,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 293. A tall grass; stems erect, smooth, terete, 6 ft. high, as thick as a goose-quill at 18 in. below the panicle; nodes glabrous. Leaves 1–2 ft. by $\frac{7}{8}$–$1\frac{1}{4}$ in., linear-lanceolate, finely acuminate, glabrous or sparsely hairy, many-nerved, base rounded or cordate; sheaths striate, sparsely hairy or almost glabrous; ligule a narrow glabrous membrane. Panicle subcorymbosely thyrsiform, 5–7 by 2–3 in.; rhachis stout, scabrid, angular, concealed by the numerous erect angular branches which are 2–4 in. long. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long. Glumes 4; lower invol.-glume $\frac{1}{12}$ in. long, broadly ovate, acute, strongly 3-nerved, with a scaberulous keel; upper invol.-glume $\frac{1}{10}$–$\frac{1}{8}$ in. long, ovate, narrowed into an acuminate point, 5-nerved; lower floral glume $\frac{1}{12}$–$\frac{1}{10}$ in. long, ovate, subobtuse, 3–5-nerved, paleate, the palea $\frac{1}{16}$ in. long, elliptic, hyaline; upper floral glume $\frac{1}{16}$ in. long, elliptic, thickly coriaceous, white, without an awn. Fl. B. I. v. 7, p. 76; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435.—Flowers: Oct.

KONKAN: *Stocks*!; Kineshvar below the Ghâts, *Dalzell & Gibson*. S. M. COUNTRY: Castlerock, *Woodrow*.—DISTRIB. India (W. Peninsula).

38. **TRISTACHYA,** Nees.

Perennial, usually coarse grasses. Leaves various. Spikelets 2-flowered (lower flower male, the upper 2-sexual), large, lanceolate to linear, sessile or shortly pedicellate, in clusters of 3 at the tips of the branchlets of a raceme or panicle; rhachilla not produced beyond the upper floret. Glumes 4; invol.-glumes more or less unequal, not awned, persistent, 3-nerved, membranous or subcoriaceous; lower floral glume membranous, 3–7-nerved, not awned; upper floral glume membranous or ultimately cartilaginous, 2-lobed, with a long twisted awn in the sinus (copiously bearded above the middle in the Indian species); palea hyaline, 2-keeled. Lodicules 2, cuneate, fleshy. Stamens 3. Styles slender; stigmas plumose, laterally exserted. Grain narrow, free.—DISTRIB. Africa, Arabia, India, Beluchistan, Tropical America; species 11–12.

1. **Tristachya barbata,** *Nees, ex Steud. Syn. Pl. Gram.* (1855) p. 238. Stem 6–18 in., branched and woody at the base, geniculately ascending, the base clothed with tomentose leaf-sheaths; nodes woolly. Leaves 1–3 by $\frac{1}{10}$–$\frac{1}{6}$ in., linear-lanceolate from a rounded base, finely acuminate, pungent, rigid, glaucous, many-nerved, with a subserrulate thickened margin. Panicle 1–2 in. long and nearly as broad, sparingly branched; branches solitary and 2-nate, capillary. Spikelets nearly $\frac{1}{2}$ in. long (excluding the awn); callus glabrous. Glumes 4;

lower invol.-glume $\frac{1}{4}$ in. long, ovate-lanceolate, subacute, 3-nerved; upper invol.-glume $\frac{1}{3}$ in. long, oblong-lanceolate, 3-nerved; lower floral glume nearly $\frac{1}{2}$ in. long, male, lanceolate, acuminate, interruptedly 7-nerved, with a linear-lanceolate palea $\frac{1}{4}$ in. long; upper floral glume $\frac{1}{3}$ in. long, 2-sexual, densely hairy on the back above the middle with very slender hairs nearly $\frac{1}{6}$ in. long, 2-lobed, the lobes lanceolate, acute, aristate, each lobe 3-nerved, $\frac{1}{6}$ in. long with an awn $\frac{5}{8}$ in. long from the sinus; palea lanceolate, acute, $\frac{1}{4}$ in. long. Fl. B. I. v. 7, p. 272; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440. *Tristachya Stocksii*, Boiss. Fl. Orient. v. 5 (1881) p. 552.

SIND: *Stocks*, 1217! and 648!—DISTRIB. Arabia, Nubia.

39. **THYSANOLÆNA,** Nees.

A large glabrous reed-like grass; stems solid. Leaves broad, flat. Spikelets innumerable, very minute, 1-flowered, jointed on very short pedicels and subsecund on the very numerous crowded, long, filiform, compound, suberect branches and branchlets which form a very large effuse pyramidal panicle; rhachilla produced but not beyond the floret. Glumes 4; invol.-glumes small, concave, awnless, faintly nerved or nerveless; lower floral glume rather longer than the upper, empty, acuminate, epaleate; upper floral glume ovate, acute, ciliate with long erect white hairs; palea short, truncate. Stamens 2–3; anthers short. Styles free. Grain very minute, free within the hardened glumes.—DISTRIB. Tropical Asia; species 1.

1. **Thysanolæna Agrostis,** *Nees, in Edinb. N. Phil. Journ.* v. 18 (1835) p. 180. A large handsome grass; stem 4–12 ft. high, reaching sometimes $\frac{3}{8}$ in. in diam., glabrous, polished. Leaves very large, 1–2 ft. by 2–4 in., coriaceous, linear-lanceolate, tapering to a fine point, many-veined, base cordate; sheaths glabrous, striate, hairy at the mouth; ligule small, ciliate. Panicle large, 1–2 ft. long, soft, glabrous; branches very numerous, suberect, filiform, with many short branchlets carrying small spikelets. Spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. long, ovoid-lanceolate, acuminate, pedicellate; rhachilla produced into a linear-lanceolate point about $\frac{1}{50}$ in. long. Glumes 4; invol.-glumes less than $\frac{1}{30}$ in. long, subequal, about $\frac{1}{2}$ as long as the floral glumes, ovate, subacute, hyaline, obscurely 1-nerved; lower floral glume longer than the upper, lanceolate, acuminate, membranous, glabrous, epaleate, empty, 1-nerved; upper floral glume ovate-lanceolate, acuminate, ciliate with long white erect hairs. Fl. B. I. v. 7, p. 61; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1172. *Thysanolæna acarifera*, Arn. & Nees, in Nov. Act. Cur. v. 19, Suppl. 1 (1843) p. 181; Duthie, Fodd. Grass. N. Ind. (1888) p. 21; Watt, Dict. Econ. Prod. v. 6, part 4, p. 48.—Flowers: Jan. VERN. *Barucha.*

KONKAN: Thána, *Lisboa.* DECCAN: Khandesh, *Lisboa*; Dangs, *Woodrow*; Nasik, *Lisboa.* GUJARAT: Bansda (Surat districts), *Woodrow.*—DISTRIB. Throughout India; Penang, eastwards to New Guinea.

40. **PHRAGMITES,** Trin. (ex parte).

Tall perennials with a creeping rhizome; stem stout, hollow, leafy upwards. Leaves long, flat. Panicle lax, usually very large and

decompound. Spikelets conspicuously silky from the long hairs on the callus, loosely 3–10-flowered, awnless; rhachilla disarticulating above the lower and between the following floral glumes, slender, penicillate with long hairs, not produced beyond the flowering glumes. Glumes glabrous; invol.-glumes unequal, oblong-lanceolate, acute, 3-nerved, membranous, persistent; floral glumes heteromorphous, the lowest linear-lanceolate, much exceeding the invol.-glumes, the following very thin, more or less caudate-acuminate, hyaline, 3-nerved; callus long, slender, densely clothed with very long silky hairs. Paleæ linear-oblong, about ½ as long as their glumes, 2-keeled. Lodicules 2 (sometimes 3 in the lower floret). Stamens 3 (sometimes 2 in the lower floret). Styles 2, distinct, rather short; stigmas laterally exserted, densely plumose. Grain oblong, semiterete. — DISTRIB. Species 2 (perhaps reducible to 1), almost cosmopolitan.

1. **Phragmites karka,** *Trin. ex Steud. Nom.* ed. 2, part 2 (1841) p. 324. Stems reaching 10 ft. high, smooth, simple or branched, covered with the leaf-sheaths. Leaves close, bifarious, linear, acuminate, reaching 1½ in. broad, coriaceous, smooth, base contracted, margins smooth; sheaths loose, glabrous, the mouth auricled; ligule a ciliate line. Panicle 1–2 ft. long, erect, oblong; branches widely spreading, filiform. Spikelets when fully expanded about ½ in. broad across the glumes; pedicels capillary, smooth; callus densely clothed with long silky hairs. Glumes glabrous; lower invol.-glume ⅛ in. long, oblong-lanceolate, acute, 3-nerved; upper invol.-glume rather less than ¼ in. long, oblong-lanceolate, acute, 3-nerved; lower floral glume less than ½ in. long; upper floral glume rather longer than the lower; palea $\frac{1}{10}$ in. long, linear-oblong. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 303; Trim. Fl. Ceyl. v. 5, p. 287; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1218. *Phragmites Roxburghii*, Steud. Nom. ed. 2, part 2 (1841) p. 324; Watt, Dict. Econ. Prod. v. 6, part 1, p. 216.

Not common in the Bombay Presidency. DECCAN: Dhond, *Lisboa* ex *Woodrow*. SIND: *Stocks*, 1211!—DISTRIB. More or less throughout India; Tropical Asia, Afghanistan, Japan, Africa, Australia.

Woodrow in his list (Journ. Bomb. Nat.) gives *P. communis* as grown in gardens under the name of *Gardener's Garter*, but the *Gardener's Garter* which is commonly grown is *Phalaris arundinacea* var. *variegata*.

41. **ARISTIDA,** Linn.

Annual or perennial tufted grasses. Leaves flat or convolute. Spikelets panicled, 1-flowered, not articulate on their pedicels, laterally compressed; rhachilla not produced beyond the flowering glume. Glumes 3; invol.-glumes very narrow, long, 1-nerved, keeled, persistent, with or without a terminal awn; floral glume very narrow, cylindric, coriaceous, 3-nerved, tipped by 3 very long capillary awns (the 2 lateral awns occasionally short or obsolete); callus long, articulate at the base; palea minute, convolute round the ovary and grain. Lodicules 2, long, narrow, hyaline. Stamens 3; anthers long, narrow. Styles free, short; stigmas penicillate, laterally exserted. Grain long, narrow, cylindric, free in the convolute closely enveloping glume.—DISTRIB. Species about 100, in warm countries.

Awns not articulate on the floral glume, tripartite from the base without a column.
- Invol. glumes not awned ..... 1. *A. Adscenscionis.*
- Invol.-glumes awned.
  - Awns of invol.-glumes $\frac{1}{8}$ in long; spikelets $\frac{5}{8}$ in. long. 2. *A. setacea.*
  - Awns of invol.-glumes $\frac{1}{12}$ in. long; spikelets $\frac{3}{8}$ in. long. 3. *A. Hystrix.*

Awns with a twisted column.
- Column of awns articulate on the floral glume.
  - Awn plumose ..... 4. *A. hirtigluma.*
  - Awn not plumose.
    - Stems less than 6 in. high; lower invol.-glume $\frac{1}{8}$ in. long ..... 5. *A. hystricula.*
    - Stems reaching 2 ft. high; lower invol.-glume $\frac{1}{6}$ in. long. 6. *A. funiculata.*
- Column of awns not truly articulate on the floral glume, though readily separating; lower invol.-glume $\frac{1}{4}$ in. long ..... 7. *A. redacta.*

1. **Aristida Adscenscionis,** *Linn. Sp. Pl.* (1753) p. 82. Annual or perennial; stems 9–24 in. long, densely tufted, very slender, erect or ascending, simple or branched; branches erect, smooth. Leaves 3–12 by $\frac{1}{25}$–$\frac{1}{12}$ in., convolute, filiform, smooth or scaberulous; sheaths smooth, with rounded auricles; ligule of fine short hairs. Panicle 3–12 in. long, contracted, subsecund; rhachis filiform, smooth; branches short; pedicels short, capillary. Spikelets erect, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Lower invol.-glume $\frac{1}{6}$ in. long, oblong-lanceolate, acute, membranous, often purple, with a scaberulous keel; upper invol.-glume lanceolate, $\frac{1}{4}$ in. long, 2-toothed and apiculate at the tip, the keels smooth; floral glume $\frac{1}{3}$ in. long, 3-nerved, smooth; awns 3, not articulate on the glume, the middle one larger than the lateral, $\frac{3}{8}$–$\frac{3}{4}$ in. long; callus long, pointed, hairy at the base; palea minute, oblong, hyaline, retuse. Fl. B. I. v. 7, p. 224; Trim. Fl. Ceyl. v. 5, p. 252; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1211. *Aristida depressa,* Retz. Obs. fasc. 4 (1786) p. 22; Dalz. & Gibs. p. 295; Watt, Dict. Econ. Prod. v. 1, p. 312.—Flowers: Oct.–May.

On dry hills, *Dalzell & Gibson.* DECCAN: Poona, *Cooke!, Woodrow*; Bowdhan hill near Poona, *Woodrow,* 38! GUJARAT: Jetalsar (Kathiawar), *Woodrow,* 43!—DISTRIB. Throughout the plains and low hills of India; Ceylon, most warm countries.

A troublesome grass for those who have to walk through a patch of it; the ripe spikelets, which are easily detached, are like barbed arrows.

2. **Aristida setacea,** *Retz. Obs.* fasc. 4 (1786) p. 22. Perennial; stem 2–3 ft. high, stout, erect or geniculately ascending from a woody base, with stout wiry root-fibres, hard, smooth and polished, simple or subfastigiately branched. Leaves 6–12 by $\frac{1}{12}$–$\frac{1}{6}$ in., usually convolute, coriaceous, smooth; sheaths long, smooth; ligule of short hairs. Panicle various, 6–12 in. long, inclined, sometimes subsecund, open or contracted; rhachis slender, smooth; branches long or short, the lower sometimes reaching 4 in. long, filiform or capillary, usually fascicled and erect. Spikelets $\frac{5}{8}$ in. long (excluding awns), erect; pedicels capillary. Lower invol.-glume awned, $\frac{5}{8}$ in. long (including an awn of $\frac{1}{6}$ in. long), 1-nerved; upper invol.-glume a little longer than the lower (with an awn about $\frac{1}{6}$ in. long), notched at the insertion of the awn, and with hyaline margins, 1-nerved; floral glume $\frac{5}{8}$ in. long, 3-nerved; awns 3, inarticulate at the base, 1–1$\frac{1}{4}$ in. long, subequal or the middle the longest; callus long, bearded with long hairs. Stamens 3; anthers

$\frac{1}{8}$ in. long. Fl. B. I. v. 7, p. 225; Grah. Cat. p. 235; Dalz. & Gibs. p. 295; Trim. Fl. Ceyl. v. 5, p. 253; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1211; Watt, Dict. Econ. Prod. v. 1, p. 312.

KONKAN: *Stocks*!; Salsette, *Graham*. DECCAN: Khandala, *Graham*. GUJARAT: Rajkot (Kathiawar), *Woodrow*.—DISTRIB. India (W. Peninsula, Behar); Ceylon, Mascarene Islands.

The grass is largely used for making the screens known as "tatties."

3. **Aristida Hystrix,** *Linn. f. Suppl.* (1781) p. 113. Perennial; stems 6–24 in. long, from a creeping rootstock, diffuse, ascending, sometimes proliferously branched. Leaves rather glaucous, $1\frac{1}{2}$–4 by $\frac{1}{16}$–$\frac{1}{8}$ in., convolute; sheaths glabrous, striate; ligule of soft hairs. Panicle 4–6 in. long and as broad as long, rigid; rhachis stout, flexuous and angular; branches and branchlets smooth. Spikelets (excluding awns) $\frac{3}{8}$ in. long, straw-colored. Lower invol.-glume $\frac{3}{8}$ in. long (including awn), lanceolate, acuminate, 1-nerved, with an awn of $\frac{1}{16}$ in. long, chartaceous; upper invol.-glume more than $\frac{1}{2}$ in. long (including an awn of $\frac{1}{16}$ in. long), lanceolate, acuminate, chartaceous, 1-nerved, quite glabrous, minutely toothed at the tip at the base of the awn; floral glume $\frac{3}{8}$ in. long; callus $\frac{1}{16}$ in. long, pointed, shortly villous; awns 3, not articulate with the glume, subequal or the middle one sometimes the longest, scabrid. Fl. B. I. v. 7, p. 225; Grah. Cat. p. 235; Dalz. & Gibs. p. 295; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Oct.

S. M. COUNTRY: Badami, *Cooke*!, *Woodrow*.—DISTRIB. India (Central Provinces, W. Peninsula).

4. **Aristida hirtigluma,** *Steud. Nom.* ed. 2 (1840) part 1, p. 131, *et Syn. Gram.* (1855) p. 144. Perennial: stems tufted, 1–2 ft. high, smooth, glabrous, terete, shining; nodes glabrous. Leaves 2–6 in. long, reaching $\frac{1}{20}$ in. broad when opened out, convolute, filiform with capillary tips; sheaths quite glabrous except for a few long hairs at the mouth, close; ligule a very narrow densely ciliate membrane. Panicle slender: branches short, erect, capillary. Spikelets pale green or straw-colored, linear-lanceolate. Lower invol.-glume $\frac{1}{3}$ in. long, linear-oblong, acute, scarious; upper invol.-glume a little longer, but similar; floral glume slightly muricate; callus about $\frac{1}{50}$ in. long, pointed, shortly villous; column of awn $\frac{1}{10}$–$\frac{1}{8}$ in. long, plumose with long slender hairs, articulated on the glume; middle branch $1\frac{1}{2}$ in. long or more, plumose in the lower half with long delicate hairs; lateral branches very slender, hair-like, about $\frac{1}{2}$ in. long, not plumose. Fl. B. I. v. 7, p. 227; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Aug.

SIND: *Dalzell*!; hill near Bullo Khan, *Woodrow*, 200!—DISTRIB. India (Panjáb, Peshawar, Sind); Egypt, Abyssinia.

5. **Aristida hystricula,** *Edgew. in Journ. Linn. Soc.* v. 6 (1862) p. 208. Annual, dwarf, slender, about 1–3 in. high, pale; stems many from the root, $\frac{1}{2}$–1 in. high, densely crowded; nodes glabrous. Leaves subulate, curved, convolute, acuminate, glabrous, less than 1 in. long; sheaths glabrous; ligule a small line of hairs. Panicle without the awns $\frac{1}{2}$–1 in. long, shorter than the awns, narrow, few-flowered;

branches few, short, erect. Spikelets $\frac{3}{8}$ in. long or more. Lower involucre-glume $\frac{1}{6}$–$\frac{1}{5}$ in. long, much shorter than the upper, ovate lanceolate, acute, apiculate, scarious; upper involucre-glume $\frac{3}{8}$ in. long, linear, running out into a slender awn or often cleft at the tip into 2 subulate lobes $\frac{1}{16}$ in. long; lower floral glume $\frac{1}{6}$ in. long; column of awn $\frac{1}{2}$ in. long, twisted, the 3 branches subequal, extremely slender, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Fl. B. I. v. 7, p. 227; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.

Sind: Jemadar ka Landa near Karachi, *Stocks*, 1187!—Distrib. India (Panjáb, Sind); Beluchistan.

6. **Aristida funiculata,** *Trin. & Rupr. in Mém. Acad. Pétersb.* sér. 6, v. 7 (1849) p. 159. Annual, very slender; stems 10–24 in. long, many, geniculately ascending. Leaves 2–6 by $\frac{1}{20}$–$\frac{1}{12}$ in., convolute or flat, ciliate at the base; sheaths glabrous; ligule a small ciliate membrane. Panicle 4–10 in. long, lax, narrow; rhachis angular; branches short, erect, capillary. Spikelets variable in length, $\frac{1}{2}$–$\frac{7}{8}$ in. long. Lower involucre-glume reaching $\frac{7}{8}$ in. long, linear-lanceolate, acute, 1-nerved, tapering into a slender awn; upper involucre-glume somewhat shorter than the lower, similar in shape and similarly awned; floral glume small, smooth, awned; awn articulate on the glume, the column $\frac{1}{2}$–$\frac{3}{4}$ in. long, twisted, with 3 capillary branches of which the middle is the longest, reaching $1\frac{1}{4}$ in. long. Fl. B. I. v. 7, p. 226; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439. *Aristida Royleana,* Trin. & Rupr. in Mém. Acad. Pétersb. sér. 6, v. 7 (1849) p. 160; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 358.—Flowers: Oct.

Deccan: Poona, *Lisboa*; Sattara, *Lisboa*; Sholapur, *Lisboa*; Dapuri near Poona, *Jacquemont*, 489! S. M. Country: Belgaum, *Woodrow*. Sind: Jam village, *Woodrow*, 19!—Distrib. India (Panjáb, Rajputana, W. Peninsula); Beluchistan, Arabia, Tropical Africa.

7. **Aristida redacta,** *Stapf, in Kew Bullet.* (1892) p. 85. Annual or sometimes perennial (and then more robust); stems tufted, 6–24 in. high, simple, or proliferously branched in robust specimens; nodes glabrous. Leaves 4–6 in. long, very slender, convolute, hairy above, smooth below, margins rough; sheaths glabrous; ligule narrow, shortly and densely ciliate. Panicle 9–10 in. long by $7\frac{1}{2}$ in. broad; branches usually twin, remote, at length spreading; pedicels unequal, shorter than the glumes. Spikelets on long or short capillary pedicels, green or purplish. Lower involucre-glumes subequal, narrowly lanceolate, finely acuminate, shortly aristate, reaching $\frac{1}{2}$ in. long; floral glume with a hairy callus, usually purplish, armed with an awn $1\frac{1}{4}$ in. long; column of awn capillary, twisted, easily separating from the glume but not truly articulate; branches 3 from the top of the column, the lateral much shorter than the middle one, sometimes 0. Fl. B. I. v. 7, p. 227; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439. *Stipa aristoides,* Stapf, ex Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 358; Prain, Beng. Pl. p. 1211.—Flowers: Oct.

Lisboa without locality in Herb. Kew. 5!; *Woodrow* without locality, 19! Deccan: *Woodrow*, 124!, *Lisboa*; Lanoli, *Woodrow*; Junnar (Poona districts), *Woodrow*. S. M. Country: Dharwar, *Talbot*, 2910! Kanara: *Law*!—Distrib. India (Central India, Nagpur, W. Bengal, W. Peninsula); S. Persia.

42. **HELEOCHLOA,** Host.

Rigid annual or perennial erect or prostrate grasses. Leaves flat or convolute. Spikelets 1-flowered, densely imbricate, in cylindric spike-like panicles laterally compressed; rhachilla not produced beyond the floral glume. Glumes 3, scarious, the invol.-glumes subequal or the lower shorter, keeled, 1-nerved, persistent; floral glume equalling the upper invol.-glume or longer, ovate or oblong, loosely 1-nerved, enwrapping the grain, membranous; palea oblong, obtuse or 2-fid, 2-nerved. Lodicules 2. Stamens 2 or 3. Styles elongate. Grain ovoid or ellipsoid, loose in the glume and palea.—DISTRIB. Species few, Oriental.

Annual; stems prostrate; panicles less than 1 in. long; filaments of anthers not thickened at the base; a herb of dry ground ..... 1. *H. schœnoides.*
Perennial; stems erect or ascending; panicles reaching $3\frac{1}{2}$ in. long; filaments of anthers thickened at the base; a herb of salt-water creeks ..... 2. *H. dura.*

1. **Heleochloa schœnoides,** *Host, Gram.* v. 1 (1801) p. 23, t. 30. Annual; stems prostrate, spreading in a circle round the root, 1–6 in. long, glabrous, smooth, more or less striate, rigid; nodes glabrous. Leaves 1–2 in. long, narrowly lanceolate, acuminate; sheaths more or less inflated, ribbed, hairy at the mouth and with membranous (sometimes ciliate) margins; ligule a dense ring of long slender hairs. Inflorescence a spike-like ovoid-oblong, compressed panicle $\frac{1}{2}$–$\frac{3}{4}$ in. long, sessile on the greatly dilated sheath of the uppermost leaf. Spikelets densely imbricate, $\frac{1}{8}$ in. long. Glumes 3; lower invol.-glume $\frac{1}{10}$ in. long, linear-lanceolate, folded, glabrous except for the ciliate keel, scarious, 1-nerved; upper invol.-glume a little longer than the lower, ovate-lanceolate, acute, scarious, with ciliate keel, 1-nerved; floral glume nearly $\frac{1}{8}$ in. long, broadly ovate, acute, membranous, 1-nerved, the keel nearly glabrous; palea oblong, obtuse. Stamens usually 3; filaments very long, not thickened at the base; anthers small. Grain $\frac{1}{20}$ in. long, oblong-ellipsoid, compressed. Fl. B. I. v. 7, p. 235; Duthie, Fodd. Grass. N. Ind. p. 48; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Dec.

SIND: Bhubak, *Cooke!, Woodrow.*—DISTRIB. India (Panjáb, W. Himalaya, Kashmir, Bandelkand, Sind); westward to the Atlantic.

2. **Heleochloa dura,** *Boiss. Fl. Orient.* v. 5 (1881) p. 477. Perennial, pale, clothed all over with minute velvety pubescence; stems stout, ascending, 6–10 in. long, densely fastigiate from a woody inclined base which is clothed with leaf-sheaths, about $\frac{1}{10}$ in. in diam., hard, few-leaved; nodes glabrous. Leaves 3–6 in. long, involute, terete, rigid, pungent; sheaths short, coriaceous, glabrous; ligule a narrow line of hairs. Inflorescence a spike-like panicle reaching $3\frac{1}{2}$ by $\frac{1}{6}$ in., solitary at the top of the stem. Spikelets densely imbricate, $\frac{1}{10}$ in. long. Glumes 3, all 1-nerved and with ciliate keels; lower invol.-glume $\frac{1}{16}$ in. long, linear-oblanceolate, acute, apiculate; upper invol.-glume $\frac{1}{12}$ in. long, linear-oblanceolate, apiculate; floral glume $\frac{1}{10}$ in. long, elliptic-oblong, obtuse, mucronate; palea $\frac{1}{12}$ in. long, 2-fid, with obtuse ciliate lobes, 2-nerved. Stamens usually 2, less commonly 3; filaments very long, thickened at the base; anthers short. Fl. B. I.

v. 7, p. 236; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Dec.

Dalzell without locality in Herb. Kew.! GUJARAT: Dwarka (Kathiawar), *Woodrow*. SIND: salt-water creeks, *Stocks*, 455!—DISTRIB. Arabia.

43. **WOODROWIA,** Stapf.

Annual. Leaves narrow, flat. Panicle terminal, contracted, pedunculate; rhachis short; branches very slender, simple. Spikelets 2–5, girt at the base with short shining hairs, 1-flowered, arranged along the inarticulate branches of the panicle, articulated with the pedicel which is dilated at the apex, laterally compressed, the flower hermaphrodite. Glumes 3; invol.-glumes empty, acute, more or less thickened on the rounded back, obscurely 1-nerved; lower invol.-glume longer and broader than the upper; floral glume about as long as the upper invol.-glume, hyaline, 1-nerved, 2-lobed at the apex, with a slender geniculate awn between the lobes; palea hyaline. Lodicules 2, cuneate, lobulate. Stamens 2. Styles distinct; stigmas narrowly plumose, laterally exserted. Grain slender, cylindric, free within the glumes.—DISTRIB. W. Peninsula of India; species 1.

1. **Woodrowia diandra,** *Stapf, in Hook. Icon. Pl.* (1896) t. 2447. An annual grass 1½–2 ft. high. Lower leaves 3–4 by $\frac{1}{12}$–$\frac{1}{6}$ in., narrowly linear, setaceously acuminate; uppermost leaves reduced or entirely suppressed, hirsute, margins scabrid; sheaths close, glabrous or hairy at the mouth; ligule short, truncate, ciliolate. Panicle about 2 in. long; rhachis slender; pedicels very short, $\frac{1}{25}$ in. long; branches of panicle about 4. Spikelets ¼ in. long, rather distant, green or tinged with violet. Glumes 3; lower invol.-glume more or less dorsally hairy, with ciliolate margins; upper invol.-glume with a densely ciliate keel; floral glume 2-lobed, with a geniculate awn about ½ in. long from the sinus; column of awn ⅛ in. long, spirally ciliate, brown, the upper part of the awn yellow, longer than the column; palea obovate-oblong, hyaline, nerveless. Lodicules unequally lobed. Grain yellow, glabrous, ¼–⅓ in. long. Fl. B. I. v. 7, p. 241; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Sept.–Oct. VERN. *Kotir.*

DECCAN: Lanoli, *Woodrow*, 24!—DISTRIB. India, W. Peninsula.

44. **GARNOTIA,** Brongn.

Erect, perennial (rarely annual), stout or slender grasses. Leaves flat or convolute. Spikelets paniculate, very small, narrow, terete, 1-flowered, solitary or 2-nate, jointed on their pedicels; rhachilla not produced beyond the floret. Glumes 3; invol.-glumes subequal, lanceolate, acute, acuminate or awned, strongly 3-nerved, empty; floral glume as long as the invol.-glumes, lanceolate, acuminate or awned, thinly coriaceous or membranous, quite smooth, faintly 1-nerved, paleate, 2-sexual, tip acute or minutely 2-dentate; awn rarely jointed, sometimes geniculate, slender, scaberulous; palea as long as the glume, linear, the lobes minutely auricled at the base. Lodicules 2. Stamens 3; anthers linear. Styles free; stigmas with simple hairs, laterally exserted. Grain linear or oblong, dorsally compressed, free within

the glume and palea.—DISTRIB. Species about 20, Asiatic and Polynesian.

Leaves 1–2 in. long; a small plant 2–8 in. high growing on trees amongst moss ..... 1. *G. arborum.*
Leaves 3–8 in. long; a terrestrial plant 1–2 ft. high..... 2. *G. stricta.*

1. **Garnotia arborum,** *Stapf, MS. ex Woodrow, in Journ. Bomb. Nat.* v. 13 (1901) p. 439. A low stiff erect annual grass 2–8 in. high, growing on trees amongst moss; stems tufted, terete, smooth, shining, glabrous, often tinged with red; nodes pubescent. Leaves 1–2 by $\frac{1}{16}$–$\frac{1}{8}$ in., linear, acuminate, glabrous; sheaths glabrous, striate; ligule a narrow lacerate membrane. Inflorescence paniculate; branches 2–3, fascicled on the rhachis, the clusters $\frac{1}{4}$–$\frac{3}{4}$ in. apart, angular, stout, truncate. Spikelets 1-flowered, articulate on the ends of the branches, early deciduous. Lower invol.-glume $\frac{1}{10}$–$\frac{1}{8}$ in. long, membranous, 3-nerved, the nerves hispid, the midrib produced into an awn equalling the glume or less; upper invol.-glume similar; floral glume nearly equalling the invol.-glumes, but more coriaceous, 2-toothed, with an awn $\frac{3}{4}$ in. long from between the teeth, obscurely nerved; palea hyaline, slightly smaller than the glume, acute, with large flaps at the base, nerveless. Stamens 3; anthers $\frac{1}{40}$ in. long. Grain $\frac{1}{10}$ in. long, ovoid-lanceolate, acute at the apex, rounded at the base.—Flowers: Sept.

DECCAN: on trees at Nandgaon on the crest of the Ghâts 10 miles S. of Lanoli, *Woodrow*, 30!—DISTRIB. India (W. Peninsula).

2. **Garnotia stricta,** *Brongn. in Duperr. Voy. Bot.* (1829) p. 133, t. 21. Annual?; stems 1–2 ft. long, tufted, geniculate and often branched at the base, smooth, glabrous. Leaves 3–8 by $\frac{1}{10}$–$\frac{3}{8}$ in., lanceolate or linear-lanceolate, glabrous or hirsute, or scabrous above, the margins flat or hirsute; sheaths usually glabrous; ligule a narrow ciliate membrane. Panicle 2–8 in. long, very narrow; branches in distant fascicles, scaberulous. Spikelets pale, $\frac{1}{10}$–$\frac{1}{8}$ in. long, sparsely hairy at the base. Lower invol.-glume ovate-lanceolate, finely acuminate, 3-nerved, the midnerve sometimes excurrent; upper invol.-glume similar; floral glume entire or notched, usually awned, the awn $\frac{1}{2}$ in. long or less. Fl. B. I. v. 7, p. 243; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1214; Watt, Dict. Econ. Prod. v. 3, p. 483.

KONKAN: between Neral and Karjat, *Woodrow*!—DISTRIB. India (Himalayas, Khasia Hills, Behar, W. Peninsula); Sandwich Islands.

45. **TRACHYS,** Pers.

A diffuse softly villous annual grass. Leaves ovate-lanceolate. Inflorescence of 2–3 spikes radiating from the top of a long peduncle; rhachis broad, herbaceous, jointed, each joint bearing on the under surface at the articulation a solitary globose cluster of 2–3 perfect 1-flowered glabrous spikelets surrounded by many short spinescent glumes of imperfect ones. Glumes 4, very unequal; lower invol.-glume minute, tooth-like; upper invol.-glume elongate, linear-lanceolate, very acute, membranous, strongly nerved; lower floral glume much the largest, obliquely ovate or obovate-oblong, cuspidately acuminate, rigidly coriaceous, 9–many-nerved, paleate, empty, the palea minute; upper

floral glume much shorter and narrower than the lower one, linear-oblong, acuminate, chartaceous, smooth, dorsally convex, with incurved margins, 2-sexual; palea as long as the glume, acuminate, hyaline, the margins inflexed below the middle. Lodicules very minute or 0. Stamens 3; anthers linear. Styles very long; stigmas slender, penicillate, exserted at the top of the glume. Grain oblong, compressed, free within the glume and palea.—DISTRIB. India, Ceylon; species 1.

1. **Trachys mucronata,** *Pers. Syn.* v. 1 (1805) p. 85. Stems 6–18 in. long, ascending or prostrate, leafy, glabrous; nodes villous. Leaves 1–4 by $\frac{1}{4}$–$\frac{1}{2}$ in., ovate-lanceolate, acuminate, flaccid, softly villous on both surfaces, margins often crisped, base rounded; sheaths glabrous or hairy; ligule a thin membrane. Peduncles reaching 8 in. long, slender, shining. Spikes 1–2 by $\frac{1}{10}$–$\frac{1}{6}$ in., stipitate, the stipes $\frac{1}{10}$–$\frac{1}{4}$ in. long, glabrous and more or less angular; rhachis rigidly herbaceous, with a broad flat midrib and broad closely nerved wings. Clusters of spikelets reaching $\frac{1}{4}$ in. in diam., often partially sunk in a concavity of the rhachis; perfect spikelets reaching $\frac{1}{4}$ in. long, the imperfect much shorter. Glumes 4; lower invol.-glume $\frac{1}{16}$–$\frac{1}{12}$ in. long, lanceolate, acute; upper invol.-glume $\frac{1}{6}$ by $\frac{1}{18}$ in., linear-lanceolate, very acute, 3-nerved, hyaline; lower floral glume $\frac{1}{5}$ by $\frac{1}{8}$ in., broadly and obliquely ovate or obovate, cuspidately acuminate, with many green nerves, paleate, the palea $\frac{1}{20}$ in. long, oblong, obtuse, hyaline; upper floral glume $\frac{1}{5}$ by $\frac{1}{16}$ in., ovate, acute. Fl. B. I. v. 7, p. 96; Trim. Fl. Ceyl. v. 5, p. 186; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435. *Panicum squarrosum,* Retz. Obs. fasc. 4 (1786) p. 15; Roxb. Cor. Pl. v. 3, t. 206.—Flowers: Aug. VERN. *Devabhata.*

S. M. COUNTRY: Dharwar, *Woodrow*; Badami, *Cooke*!, *Woodrow*!—DISTRIB. India (W. Peninsula); Ceylon.

46. **TRAGUS,** Haller.

Annual or perennial grasses; stems erect, ascending or decumbent. Leaves linear, rather rigid, with cartilaginous spinulously ciliate margins; ligule a delicate ciliate rim. Spikelets in deciduous clusters of 2–4, on the filiform continuous axes of cylindric spike-like racemes or panicles. Lower invol.-glume minute, hyaline or suppressed; upper invol.-glume 5-ribbed or 5-nerved, membranous between the hispid or spinous-hooked ribs or nerves, exceeding the floral glume; floral glume solitary, lanceolate or oblong-lanceolate, membranous, 3-nerved, 2-sexual; palea as long as the glume, 2-nerved. Lodicules 2, broad, cuneate, fleshy. Stamens 3. Styles distinct, very slender; stigmas narrow, plumose, exserted from the top of the glume. Grain oblong to ellipsoid, free within the glume and palea.—DISTRIB. Species 2; one in South Africa, the other throughout the warmer parts of both hemispheres.

1. **Tragus racemosus,** *Scop. Introd.* (1777) p. 73. Stems tufted, leafy below, simple or branched, the branches often fasciculate and densely leafy, geniculate, ascending from a decumbent base or wholly decumbent, from a few inches to 1 ft. long; nodes glabrous. Leaves variable in length, $\frac{1}{4}$–$1\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{6}$ in., linear-lanceolate, acuminate, flat or undulate, rigid, very glaucous, subpungent, smooth, with pectinately

ciliate margins, closely striate; lowest sheaths short, broad, pale, the intermediate ones more or less herbaceous, the uppermost tumid, usually embracing the base of the panicle; ligule a slender ciliate rim. Inflorescence a cylindric spike-like panicle $\frac{3}{4}$–3 in. long; rhachis slender, straight or slightly undulate, pubescent. Spikelets $\frac{1}{8}$ in. long, acute, usually 2 facing each other and appearing like a single spikelet with 2 equal echinate glumes; pedicels stout, about $\frac{1}{30}$ in. long. Glumes 3 or 2; lower invol.-glume very minute, about $\frac{1}{50}$ in. long, hyaline, often suppressed; upper invol.-glume $\frac{1}{8}$ in. long, slightly curved, involute, enveloping the floral glume, strongly 5-ribbed, with rows of stout hooked spines along the ribs, thin between the ribs; floral glume solitary, $\frac{1}{15}$ in. long, oblong-lanceolate, shortly apiculate. Fl. B. I. v. 7, p. 97; All. Fl. Pedem. v. 2 (1785) p. 241; Trim. Fl. Ceyl. v. 5, p. 187; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1186. *Lappago biflora*, Roxb. Fl. Ind. v. 1 (1832) p. 281; Grah. Cat. p. 234. *Lappago aliena*, Spreng. Neue Entdeck. v. 3 (1822) p. 15; Dalz. & Gibs. p. 295.—Flowers: Sept.

Konkan: Salsette, *Graham* Deccan: Bijapur, *Cooke*!, *Woodrow*!; Poona, *Jacquemont*, 386! S. M. Country: Badami, *Woodrow*! Gujarat: Domas, near Surat, *Law* ex *Graham*; Rajkot (Kathiawar), *Woodrow*. Sind: *Stocks*!, *Dalzell & Gibson*.—Distrib. More or less throughout the dry plains of India; Ceylon, all warm countries, Southern Europe.

47. **LATIPES,** Kunth.

A perennial rather rigid grass. Leaves subulate, convolute. Spikelets 1-flowered, in simple spike-like racemes, 2-seriate (1 usually imperfect), persistent on the flattened truncate spreading articulate pedicels; rhachis flexuous. Glumes 3; invol.-glumes thickly coriaceous; lower invol.-glume usually the longest, narrow, recurved, 3-nerved, with pectinate margins, dorsally smooth; upper invol.-glume lanceolate, spinulously tuberculate, embracing the floral glume; floral glume solitary, shorter than the upper invol.-glume, oblong, acute, hyaline; palea minute, linear-oblong. Lodicules 2, hyaline. Stamens 3; anthers oblong. Styles free. Grain free, obliquely ovoid-lanceolate.—Distrib. India, Beluchistan, Arabia, Abyssinia, Senegal; species 1.

1. **Latipes senegalensis,** *Kunth, Revis. Gram.* v. 1 (1829) p. 261, t. 42. Stems 3–12 in. long, wiry, creeping, with many erect or spreading branches, leafy. Leaves 1–3 in. long, subulate, convolute; sheaths glabrous, the mouth hairy; ligule 0. Racemes 2–6 in. long; rhachis glabrous; pedicels distant, $\frac{1}{10}$ in. long, cuneate, flattened, with winged and ciliate margins, bearing at the broad apex 2 purplish-brown spikelets one perfect, the other not. Glumes 3; lower invol.-glume rather more than $\frac{1}{8}$ in. long, lanceolate, narrow, recurved, 3-nerved, with pectinate margins, purplish-brown; upper invol.-glume rather more than $\frac{1}{10}$ in. long, ovate-lanceolate, purplish-brown, tuberculate on the back; floral glume solitary, $\frac{1}{16}$ in. long, ovate-oblong, acute, hyaline. Fl. B. I. v. 7, p. 97; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435.—Flowers: Sept.

Sind: Jemadar ka Landa near Karachi, *Stocks*, 1186!; 20 miles N. of Karachi, *Woodrow*.

48. **ZOYSIA,** Willd.

A small rigid glabrous grass, with a long wiry rootstock giving off short erect leafy branches terminating in solitary pedunculate spike-like racemes. Leaves distichous, subulate, concave, pungent. Spikelets ovoid, laterally compressed, 1-flowered, articulate on short or rather long stout angular pedicels appressed to a rigid rhachis. Glumes 2; invol.-glume empty, rigidly coriaceous, the margins closely appressed as if connate, with a membranous tip, nerveless; floral glume much smaller than and completely enclosed in the invol.-glume, ovate-lanceolate, hyaline, 1-nerved; palea linear-oblong, hyaline. Lodicules 0. Stamens 3; anthers long. Styles very long, connate below; stigmas plumose, exserted at the top of the spikelet. Grain oblong, free within the glume and palea.—DISTRIB. Tropical Asia, Australia, and Mauritius; species 1.

1. **Zoysia pungens,** *Willd. in Ges. Naturf. Fr. Neue Schrift.* v. 3 (1801) p. 441. Rootstock rigid, wiry, up to 2–3 ft. long, the branches interlaced and rooting, sending up short leafy stems 6–10 in. high. Leaves 1–3 in. long, coriaceous, dorsally rounded, subulate, concave, pungent; sheaths short; ligule a narrow ciliolate membrane. Racemes 1–1½ in. long, strict, erect. Spikelets ⅛ in. long, erect; pedicels usually short, angular. Invol.-glume biconvex, much compressed at the membranous tip, smooth and shining, thickly coriaceous; floral glume shorter and much narrower, hyaline; palea linear-oblong, nerveless. Fl. B. I. v. 7, p. 99; Trim. Fl. Ceyl. v. 5, p. 188; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1186.

GUJARAT: Damaun, *Lisboa*. I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew.—DISTRIB. of the genus.

49. **PEROTIS,** Ait.

Small annual or subperennial grasses; stems tufted, leafy. Leaves usually broad, rigid and ciliate; ligules hyaline or 0. Spikelets very small, linear-lanceolate, sessile or subsessile on the continuous rhachis of a spike or a lax spike-like raceme, articulate on and falling entire from the rhachis or the very short pedicels. Glumes 3; invol.-glumes equal, empty, linear-lanceolate, rigidly membranous, with a strong midrib produced into a long capillary awn; floral glume solitary, lanceolate, acute, hyaline, 1-nerved, 2-sexual; palea narrow, hyaline, nerveless. Lodicules 2, broad, cuneate. Stamens 3. Styles short; stigmas plumose, laterally exserted. Grain cylindric, slender, exserted from the unchanged floret and enclosed with it in the invol.-glumes.—DISTRIB. Species 2 or 3, in the Tropics of the Old World and in subtropical Australia.

1. **Perotis latifolia,** *Ait. Hort. Kew.* v. 1 (1789) p. 85. Stems tufted, geniculate, suberect, ascending, 3–15 in. long, glabrous. Leaves ½–1½ by ⅛–⅓ in., ovate or lanceolate, from a broad amplexicaul base, acute or acuminate, flat or somewhat undulate, glaucous, with rigidly ciliate margins; ligule 0. Racemes slender, 2–8 in. long, dense; rhachis subterete, glabrous. Spikelets 1/12 in. long, narrowly linear, subterete, scaberulous. Invol.-glumes equal and similar, often purple, linear-lanceolate, each with a long scaberulous awn reaching sometimes

as much as $\frac{5}{8}$ in. long, purple or yellow; floral glume solitary, very narrowly linear, rather shorter than the invol.-glumes. Grain $\frac{1}{16}$ in. long, almost cylindric. Fl. B. I. v. 7, p. 98; Grah. Cat. p. 237; Dalz. & Gibs. p. 296; Trim. Fl. Ceyl. v. 5, p. 189; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1186.—Flowers: Oct.–Aug. VERN. *Kuras.*

KONKAN: Malwán, *Woodrow.* S. M. COUNTRY: Badami, *Cooke!*, *Woodrow!* GUJARAT: Baroda, *Cooke!*; Surat, *Lisboa*; Domas (near Surat), *Dalzell & Gibson.*—DISTRIB. More or less throughout India; Ceylon, S. Africa.

50. **SPOROBOLUS,** Br.

Perennial (rarely annual) glabrous grasses, erect or prostrate, or creeping. Leaves narrow, flat or convolute. Spikelets 1-flowered, small or minute, in effuse or contracted panicles, articulate on their pedicels; rhachilla not produced beyond the palea. Glumes 3, usually membranous, 1-nerved or nerveless; invol.-glumes empty, unequal, separately caducous; floral glume not articulate at the base, ovate or oblong, obtuse or acute; callus very short, glabrous; palea as long as the glume and of similar texture, broadly oblong, often dorsally narrowly inflexed along the median line, with a nerve-like ventral ridge along which the palea splits between the two very close often very obscure nerves. Lodicules very minute or 0. Stamens 2–3; anthers short or long. Styles 2, free; stigmas very short. Grain oblong, obovoid or pyriform, free within the glume and palea, with a loose hyaline pericarp.—DISTRIB. Species about 70, in tropical and subtropical regions of both hemispheres.

Invol.-glumes both shorter than the floral glume.
- Stamens 2.
  - Stems 1–3 ft. high; panicle reaching 10 in. long; spikelets $\frac{1}{20}$–$\frac{1}{8}$ in. long ..... 1. *S. diander.*
  - Whole plant scarcely 6 in. high; panicle $\frac{3}{4}$–1 in. long; spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. long ..... 2. *S. sindicus.*
- Stamens 3.
  - Panicle narrow, $\frac{1}{2}$–$\frac{3}{4}$ in. broad; spikelets reaching $\frac{1}{10}$ in. long ..... 3. *S. indicus.*
  - Panicle reaching 3 in. broad.
    - Panicle 12–18 in. long; spikelets $\frac{1}{25}$ in. long ..... 4. *S. multiflorus.*
    - Panicle 4–6 in. long; spikelets $\frac{1}{12}$ in. long ..... 5. *S. ioclados.*

Lower invol.-glume as long as the floral glume or nearly so; panicle interrupted ..... 6. *S. glaucifolius.*

Lower invol.-glume much shorter than either of the two others; upper invol.-glume as long as or longer than the floral glume.
- Panicle contracted.
  - Annual; upper invol.-glume longer than the floral glume ..... 7. *S. piliferus.*
  - Perennial; upper invol.-glume about equalling the floral glume ..... 8. *S. orientalis.*
- Panicle effuse.
  - Spikelets $\frac{1}{10}$ in. long ..... 9. *S. arabicus.*
  - Spikelets $\frac{1}{20}$ in. long ..... 10. *S. coromandellianus.*

1. **Sporobolus diander,** *Beauv. Agrost.* (1812) p. 26. Annual or perennial; stems tufted, 1–3 ft. high, slender, smooth; nodes glabrous. Leaves 4–10 by $\frac{1}{25}$–$\frac{1}{16}$ in., with filiform tips, flat or convolute, smooth,

strongly nerved; sheaths smooth, ribbed, the lower short, the upper very long; ligule a very narrow ridge of minute hairs. Panicle reaching 10 by 2 in., erect, narrowly pyramidal; rhachis slender, quite smooth; branches capillary, erect or spreading, naked at the base, ¼–2 in. long, with numerous very minute spikelets racemosely arranged along the branchlets. Spikelets $\frac{1}{20}$–$\frac{1}{18}$ in. long; pedicels very short. Glumes 3; lower invol.-glume very short, scarcely $\frac{1}{50}$ in. long, broadly oblong, nerveless, hyaline, with erose tip; upper invol.-glume about $\frac{1}{30}$ in. long, broadly elliptic-oblong, hyaline, obscurely 1-nerved; floral glume $\frac{1}{20}$–$\frac{1}{18}$ in. long, broadly ovate-oblong, subacute, 1-nerved; palea plicate in the median line. Stamens 2. Grain obovoid, truncate, obtusely quadrangular, umbonate by the loose pericarp, red-brown, rugulose. Fl. B. I. v. 7, p. 247; Dalz. & Gibs. p. 296; Trim. Fl. Ceyl. v. 5, p. 260; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1213; Watt, Dict. Econ. Prod. v. 6, part 3, p. 341.

Deccan: Poona, *Jacquemont*, 352!—Distrib. Throughout India; Ceylon, Asia, Tropical Australia.

2. **Sporobolus sindicus,** *Stapf, MS. in Herb. Kew.* A low perennial 4–5 in. high; roots stout, wiry; stems densely tufted, the barren ones subwoody, $\frac{1}{12}$ in. in diam., clothed below with numerous withered leaf-sheaths, the flowering stems lateral from the barren ones, slender. Leaves pungent, those of the barren stems crowded, short, ovate-lanceolate to narrowly lanceolate, ¼–½ in. long, with spinous margins, those of the flowering stems narrowly linear, acuminate, distant, often with distantly spinous margins; sheaths closely appressed to the stem, ribbed; ligule a very narrow ciliate membrane. Panicle ¾–1 in. long, contracted, often spike-like; branches erect or ascending, filiform, densely clothed with spikelets. Spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. long, ovoid, acute; pedicels short. Glumes 3, hyaline; lower invol.-glume $\frac{1}{25}$ in. long, ovate, acute, nerveless; upper invol.-glume $\frac{1}{20}$ in. long, oblong, obtuse, nerveless; floral glume $\frac{1}{16}$ in. long, ovate, obtuse (acute when folded), 1-nerved; palea shorter than the glume, oblong, truncate. Stamens 2. Grain $\frac{1}{30}$ in. long, broadly obovoid, compressed, reddish-brown.—Flowers: Nov.

Sind: 20 miles from Karachi, *Woodrow*! There is but one sheet of this plant in Herb. Kew., collected by Woodrow.

3. **Sporobolus indicus,** *Br. Prodr.* (1810) p. 170. Perennial; stems 2–3 ft. high, densely tufted, stout; internodes long; nodes glabrous. Leaves mostly crowded near the base, 1–2 ft. long, very slender, wiry, flexuous, convolute (rarely flat), with long filiform tips, quite smooth; sheaths smooth, ribbed; ligule a ridge of minute hairs. Panicles 1–1½ ft. long by ½–¾ in. broad, often interrupted; rhachis slender, smooth; branches very short, densely crowded, erect, covered to the base with imbricate green spikelets. Spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. long; pedicels very short. Glumes 3; lower invol.-glume about $\frac{1}{50}$ in. long, broadly oblong, nerveless, hyaline; upper invol.-glume $\frac{1}{25}$ in. long, broadly oblong, hyaline, nerveless; floral glume $\frac{1}{12}$–$\frac{1}{10}$ in. long, broadly ovate, 1-nerved; palea plicate in the median line. Stamens 3. Grain $\frac{1}{20}$ in. long, obovoid, quadrangular, truncate, umbonate by the loose pericarp, red-brown, rugulose. Fl. B. I. v. 7, p. 247; Trim. Fl. Ceyl. v. 5,

p. 261; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1213; Watt, Dict. Econ. Prod. v. 6, part 3, p. 341.—Flowers: Oct.

DECCAN: Kolhapur, *Woodrow*.—DISTRIB. Throughout India; Ceylon, most warm countries.

4. **Sporobolus minutiflorus,** *Link, Hort. Reg. Berol.* v. 1 (1827) p. 88. Stem 2–3 ft. high, slender, smooth; nodes glabrous. Leaves 6–10 by $\frac{1}{12}$–$\frac{1}{8}$ in., flat, finely acuminate, with smooth margins; sheaths long, ribbed, smooth; ligule a minute ring. Panicle 12–18 in. long, reaching 3 in. broad, effuse, supra-decompound; branches capillary. Spikelets $\frac{1}{25}$ in. long, dark-colored. Glumes 3; lower invol.-glume about $\frac{1}{60}$ in. long, subquadrate; upper invol.-glume $\frac{1}{50}$ in. long, broadly ovate, subobtuse, nerveless; floral glume $\frac{1}{25}$ in. long, ovate-oblong, subobtuse, nerveless; palea shorter, broad, truncate. Stamens 3, quickly falling with age. Grain $\frac{1}{30}$ in long, obovoid, compressed. Fl. B. I. v. 7, p. 248; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Oct.

KONKAN: Parel (Bombay), *Woodrow*!—DISTRIB. India (W. Peninsula).

5. **Sporobolus ioclados,** *Nees, Fl. Afr. Austr.* (1841) p. 161. An elegant perennial grass; stems 10–18 in. long, densely tufted, rather stout, erect, smooth, glabrous; nodes glabrous. Leaves 2–4 by $\frac{1}{10}$–$\frac{1}{8}$ in., flat or convolute, linear, tapering to a fine point; sheaths ribbed, glabrous, smooth; ligule a pubescent ridge. Panicle 4–6 by 2–3 in., ovate or subpyramidal, effuse; branches opposite, or alternate, or the lower whorled, spreading, remotely branched, filiform, smooth. Spikelets $\frac{1}{12}$ in. long, oblong-lanceolate, pale. Glumes 3; lower invol.-glume $\frac{1}{30}$ in. long, oblong-lanceolate, hyaline; upper invol.-glume $\frac{1}{18}$ in. long, ovate, acute, 1-nerved; floral glume $\frac{1}{12}$ in. long, ovate-lanceolate, acute, 1-nerved; palea slightly shorter than the glume, oblong, obtuse. Stamens 3, anthers $\frac{1}{30}$ in. long. Grain linear-oblong, $\frac{1}{30}$ in. long. Fl. B. I. v. 7, p. 249; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.

SIND: *Stocks*!—DISTRIB. S. Africa.

6. **Sporobolus glaucifolius,** *Hochst. in Flora*, v. 25, part 1 (1842) *Beibl.* p. 133 (*nomen nudum*), et ex *Steud. Syn. Pl. Gram.* (1855) p. 154 (under *Vilfa*). Perennial; stems 12–18 in. long, densely tufted, leafy; nodes glabrous. Leaves 1½–5 by $\frac{1}{10}$–$\frac{1}{8}$ in., narrowed from a subcordate base to an acuminate tip, strict, glaucous, flat or undulate, not pungent; sheaths ribbed, glabrous; ligule a line of hairs. Panicle 3–5 in. long, contracted, interrupted, pale yellowish-white; branches short, erect. Spikelets crowded, $\frac{1}{12}$ in. long; pedicels very short. Glumes 3; lower invol.-glume $\frac{1}{16}$ in. long, lanceolate, hyaline, acutely acuminate, 1-nerved; upper invol.-glume $\frac{1}{12}$ in. long, broader than the lower, ovate-lanceolate, acutely acuminate, hyaline, 1-nerved; floral glume $\frac{1}{16}$ in. long, ovate, acute, 1-nerved; palea as long as the glume. Stamens 3; filaments very short; anthers $\frac{1}{30}$ in. long. Fl. B. I. v. 7, p. 250; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Nov.

Dalzell without locality in Herb. Kew.! SIND: *Stocks*, 666!; Karachi, *Woodrow*, 18!—DISTRIB. India (Panjáb, W. Peninsula); Tropical Africa.

7. **Sporobolus piliferus,** *Kunth, Enum. Pl.* v. 1 (1833) p. 211 (var. *a*). Annual; stems 3–12 in. high, tufted, erect; roots fibrous. Leaves 1–4 by $\frac{1}{16}$–$\frac{1}{10}$ in., chiefly radical, narrowed from the base to a fine point, flat or convolute, with scabrid or subserrulate margins; sheaths hairy at the mouth; ligule a minute narrow line. Panicle linear, 1–3 in. long, strict, erect, dense-flowered, often interrupted; branches very short, erect. Spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. long, pale brown; pedicels short. Glumes 3; lower invol.-glume $\frac{1}{20}$ in. long, ovate-lanceolate, hyaline, nerveless; upper invol.-glume $\frac{1}{12}$ in. long, oblong-lanceolate, 1-nerved, slightly longer than the floral glume; floral glume $\frac{1}{16}$ in. long, oblong, obtuse, 1-nerved; palea oblong. Stamens 2. Grain ellipsoid, compressed, with a very loose pericarp, reddish-brown. Fl. B. I. v. 7, p. 251; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.

S. M. COUNTRY: Belgaum, *Ritchie*, 836!—DISTRIB. India (W. Himalaya, Khasia Hills, Nilghiri Hills, W. Peninsula); Malacca.

8. **Sporobolus orientalis,** *Kunth, Enum. Pl.* v. 1 (1833) p. 211. Stoloniferous, growing on saline soils; stolons stout or slender, rooting at the nodes; stems 6–18 in. high, stout at the base, hard, branching; branches and flowering stems usually geniculate below. Leaves coriaceous, variable, 1–8 by $\frac{1}{10}$–$\frac{1}{8}$ in., usually more or less pungent, tapering to the tip, glabrous or hairy above and with scabrous or subserrulate margins; sheaths close, glabrous; ligule a slender ciliate membrane. Panicle narrow, oblong; branches $\frac{1}{2}$–$\frac{3}{4}$ in. long, suberect. Spikelets $\frac{1}{10}$ in. long. Glumes 3, hyaline; lower invol.-glume $\frac{1}{35}$ in. long, ovate-oblong, obtuse, nerveless; upper invol.-glume $\frac{1}{10}$ in. long, ovate, subobtuse, 1-nerved; floral glume ovate-oblong, obtuse, scarcely longer than the upper invol.-glume, 1-nerved; palea ovate-oblong, obtuse, slightly shorter than the glume. Fl. B. I. v. 7, p. 251; Dalz. & Gibs. p. 295; Trim. Fl. Ceyl. v. 5, p. 263; Duthie, Fodd. Grass. N. Ind. p. 49; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Watt, Dict. Econ. Prod. v. 6, part 3, p. 341.—Flowers: Nov.

GUJARAT: Umrat, on salt land, *Woodrow*.—DISTRIB. India (Panjáb, W. Peninsula); Ceylon.

9. **Sporobolus arabicus,** *Boiss. Diagn.* ser. 1, fasc. 13 (1853) p. 47. Perennial; stems many from a woody stoloniferous base, sometimes as thick as the middle finger, and sending out rigid often geniculate stolons and stout or slender flowering branches 6–24 in. high. Leaves 1–10 by $\frac{1}{8}$–$\frac{1}{6}$ in., rigid, narrowed to the tip from the rounded base, flat or convolute, scaberulous above, with finely ciliato-serrulate margins; sheaths glabrous; ligule a fringe of hairs. Panicle 2–6 in. long, effuse; branches whorled, capillary, reaching $1\frac{1}{2}$ in. long, naked below, with spikelets spicately arranged on the short branchlets. Spikelets $\frac{1}{10}$ in. long; pedicels short. Glumes 3; lower invol.-glume $\frac{1}{30}$ in. long, ovate, subobtuse, hyaline, nerveless; upper invol.-glume $\frac{1}{10}$ in. long, oblong, obtuse, 1-nerved; floral glume as long as the upper invol.-glume, oblong, obtuse, 1-nerved; palea as long as the glume. Grain subglobose. Fl. B. I. v. 7, p. 252; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

SIND: *Stocks*, 667!; Jemadar ka Landa near Karachi, *Stocks*, 663!; Karachi, *Woodrow*; between Karachi and Magar Peer, *Wykeham Perry*!—DISTRIB. India (Panjáb); Beluchistan, Arabia.

10. **Sporobolus coromandellianus,** *Link, Hort. Reg. Berol.* v. 1 (1827) p. 89 (*in note*); *Kunth, Revis. Gram.* v. 1 (1829) p. 68. Annual, densely tufted; stems 4–12 in. long, erect, ascending or often spreading from the root, copiously leafy at the base. Leaves 1–3 by $\frac{1}{8}$–$\frac{1}{4}$ in., linear-lanceolate, narrowed from the subcordate base to the acuminate tip, spinulosely toothed especially towards the base; lower sheaths short, terete or compressed, the upper long, hairy at the mouth; ligule a narrow membrane fringed with long fine hairs. Panicle 2–4 by 1–$2\frac{1}{2}$ in., ovate or pyramidal; branches capillary in rather distant whorls of 3–6, horizontally spreading, naked below, sparingly shortly divided upwards, bearing short minute red spikelets about $\frac{1}{20}$ in. long on short pedicels. Glumes 3, hyaline; lower involucel-glume very minute, suborbicular, nerveless; upper involucel-glume $\frac{1}{20}$ in. long, ovate-oblong, subacute, 1-nerved; floral glume as long, oblong, obtuse, 1-nerved; palea as long as the glume. Stamens 3; anthers small. Grain broadly ellipsoid, compressed, smooth, enclosed in the loose somewhat fleshy reticulate pericarp, pale reddish-brown. Fl. B. I. v. 7, p. 252; Dalz. & Gibs. p. 296; Trim. Fl. Ceyl. v. 5, p. 264; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1213. *Agrostis coromandelliana*, Retz. Obs. fasc. 4 (1786) p. 19; Grah. Cat. p. 235.—Flowers: Jan.

KONKAN: Bombay, *Law*! SIND: Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Panjáb, Orissa, Birma, W. Peninsula); Ceylon, Africa, Afghanistan.

51. **ERAGROSTIS,** Beauv.

Annual usually slender glabrous grasses of various habit; stems erect or ascending. Leaves narrow; ligule usually reduced to a line of hairs. Spikelets 2–many-flowered, in open or contracted panicles (rarely spicate), strongly laterally compressed, ovate-oblong or linear, not (or rarely) articulate on their pedicels on a simple terminal rhachis; rhachilla disarticulating above the involucel-glumes and between the floral ones, or tough and persistent, not produced beyond the upper floret. Glumes many, broad, obtuse, acute or mucronate, never awned, thin, dorsally rounded and keeled; involucel-glumes much shorter than the spikelet, equal or unequal, empty, persistent or separately deciduous, 1 (rarely 3)-nerved, usually membranous; floral glumes imbricating, at length deciduous from the rhachilla, 3-nerved, all 2-sexual or the uppermost and rarely the lowest imperfect, ovate to lanceolate, membranous to chartaceous, usually glabrous, the lateral nerves short, not reaching the midnerve; paleæ equal to their glumes or slightly shorter, membranous, 2-keeled, deciduous or persistent on the rhachilla. Lodicules 2, small, cuneate, more or less fleshy. Stamens 3 (rarely 2). Styles distinct; stigmas plumose, laterally exserted. Grain minute, globose, oblong, ovoid or obovoid, free in the glume and palea.—DISTRIB. In warm countries; species about 100.

Spikelets panicled.
  Rhachilla of spikelets more or less jointed and breaking up from above downwards.
    Panicle spiciform, compact, 2–3 by $\frac{1}{2}$ in.; rhachis bearded at the nodes; margins of flowering glumes ciliate ..... 1. *E. ciliata.*
    Panicle open or more or less contracted; margins of flowering glumes not ciliate.
      Spikelets $\frac{1}{5}$ in. long; panicle large, lax, thyrsiform, 8–20 by 4–6 in. ..... 2. *E. aspera.*

Spikelets $\frac{1}{10}$ in. long; panicle short, compact, cylindric, $\frac{1}{2}$–$1\frac{1}{2}$ in. long ..... 3. *E. ciliaris* var. *brachystachya*.

Spikelets $\frac{1}{20}$–$\frac{1}{8}$ in. long; panicles 2–8 in. long.
Grain ovoid; stamens 3.
Stem and rhachis of panicle not viscid below.
Panicle open; nodes bearded ..... 4. *E. tenella* var. *plumosa*.
Panicle very narrow, contracted; rhachis glabrous ..... var. *riparia*.
Stem and rhachis of panicle viscid below ..... var. *viscosa*.
Grain obovoid; stamens 2; panicle narrow, often interrupted, 6–18 in. long ..... 5. *E. interrupta* var. *Kœnigii*.

Rhachilla of spikelets tough, persistent; flowering glumes falling away from its base upwards.
Spiklets pedicellate.
Spikelets flat, ovate-elliptic or oblong; lateral nerves of flowering glumes very prominent, straight, almost percurrent; paleæ deciduous with their glumes ..... 6. *E. amabilis*.
Spikelets less compressed, linear or linear-oblong; lateral nerves less prominent; when spikelets compressed or lateral nerves prominent, then with persistent paleæ.
Spikelets more or less fascicled on the primary or secondary branches or shortly pedicellate in narrow racemes.
Leaves glaucous; grain oblong ..... 7. *E. gangetica*.
Leaves not glaucous; grain globose or nearly so ..... 8. *E. stenophylla*.
Spikelets not fascicled; long-pedicellate, more or less divaricate when ripe.
Leaf-margins glandular.
Lower invol.-glume 1–3-nerved; upper invol.-glume 3-nerved ..... 9. *E. major*.
Both invol.-glumes 1-nerved ..... 10. *E. minor*.
Leaf-margins eglandular; invol.-glumes 1-nerved.
Spikelets versatile, 1 in. or more long, narrowly linear; branches of panicle solitary ..... 11. *E. tremula*.
Spikelets small, $\frac{1}{4}$ in. long or less.
Perennial; mouth of leaf-sheath naked; branches of panicle solitary or 2-nate. 12. *E. tenuifolia*.
Annual; mouth of leaf-sheath bearded; branches of panicle usually more or less whorled ..... 13. *E. pilosa*.
Spikelets sessile and jointed on the very short densely crowded branchlets of a tall narrow raceme-like panicle, deciduous, acute, much compressed, imbricate and secund ..... 14. *E. cynosuroides*.
Spikelets distichously spreading, secund, in a long simple terminal spike; keels of palea winged ..... 15. *E. bifaria*.

1. **Eragrostis ciliata,** *Nees, Agrost. Bras.* (1829) p. 512, Obs. 1 (*nomen nudum*). Perennial; stems 1–$2\frac{1}{2}$ ft. long, erect or geniculately ascending, terete. Leaves linear-lanceolate, finely acuminate, spreading, 2–6 by $\frac{1}{10}$–$\frac{1}{8}$ in., flat or convolute, smooth, glabrous; sheaths bearded at the mouth; ligule of a few hairs. Panicle spiciform, 2–3 by $\frac{1}{3}$ in., cylindric, compact; branches much shortened; rhachis finely bearded at the nodes. Spikelets $\frac{1}{10}$–$\frac{1}{6}$ in. long, much compressed, 6–12-flowered. Invol.-glumes ovate, acute, hyaline, ciliate; floral glumes $\frac{1}{16}$–$\frac{1}{8}$ in. long,

broadly ovate, cuspidately acuminate, subhyaline, very minutely scaberulous, the margins ciliate and the nerves prominent; palea shorter than its glume with ciliate keels. Grain ovoid to ellipsoid, $\frac{1}{50}$ in. long, terete. Fl. B. I. v. 7, p. 313; Dalz. & Gibs. p. 298; Prain, Beng. Pl. p. 1220: *Poa ciliata*, Roxb. Fl. Ind. ed. Wallich, v. 1 (1820) p. 336.

Gujarat: Domas near Surat, *Dalzell & Gibson*.

This plant has been included on the authority of Dalzell & Gibson in their 'Bombay Flora.' I have seen no specimens from Bombay, nor does Woodrow include the plant in his list in the 'Bombay Journal of Natural History.' Dalzell's description of the plant is accurate.—Distrib. India (Chota Nagpur, W. Peninsula); Cochinchina.

2. **Eragrostis aspera,** *Nees, Fl. Afr. Austr.* (1841) p. 408. Annual; stems 8–20 in. high (excluding the panicle), stout, suberect, usually tufted, smooth and shining; nodes glabrous. Leaves 8–18 by $\frac{1}{6}$–$\frac{1}{4}$ in., linear, flat, glabrous; sheaths bearded at the mouth, otherwise glabrous; ligule a fringe of long hairs. Panicle lax, open, thyrsiform, oblong to obovate-oblong, 8–20 by 4–6 in.; rhachis terete, scaberulous, bearded at the nodes; branches solitary or falsely whorled, capillary, loosely and repeatedly divided from near the base; pedicels longer than the spikelets, very slender. Pedicels scattered, linear-oblong, $\frac{1}{5}$ by $\frac{1}{25}$ in., erect, 4–16-flowered; rhachilla very slender, breaking up. Involl.-glumes subequal, oblong, obtuse, $\frac{1}{25}$ in. long, 1-nerved; floral glumes about $\frac{1}{16}$ in. long, obliquely ovate-oblong, with prominent nerves; palea obscurely and obtusely 3-lobed, the keels scabrid. Stamens 3; anthers $\frac{1}{50}$ in. long. Grain subglobose, about $\frac{1}{60}$ in. in diam. Fl. B. I. v. 7, p. 314; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 386; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.

Konkan: *Lisboa*! Kanara: N. Kanara, *Lisboa*!—Distrib. India (S. India, W. Peninsula); Ceylon, Tropical and S. Africa, Isle of France.

3. **Eragrostis ciliaris,** *Link, Hort. Reg. Berol.* v. 1 (1827) p. 192. Var. **brachystachya,** *Boiss. Fl. Orient.* v. 5 (1881) p. 582. Stems 6–10 in. long, tufted, geniculately ascending, glabrous, smooth. Leaves 2–3 by $\frac{1}{20}$–$\frac{1}{12}$ in., linear, tapering to a fine point; sheaths striate, usually bearded at the mouth with long hairs; ligule a fringe of short hairs. Panicle short, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, oblong, cylindric, appearing hairy from the long cilia of the paleæ; branches short, suberect. Spikelets $\frac{1}{10}$ in. long, crowded, 6–12-flowered, strongly compressed; rhachilla breaking up; pedicels very short. Involl.-glumes subequal, ovate-lanceolate, acute, reaching $\frac{1}{16}$ in. long; floral glumes $\frac{1}{20}$ in. long, oblong, subtruncate, mucronulate, spreading; paleæ equal to their glumes and falling with them, the keels with long rigid cilia. Stamens 3; anthers very short. Grain elongate-ovoid, about $\frac{1}{50}$ in. long. Fl. B. I. v. 7, p. 314; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—Flowers: Nov.

Dalzell without locality in Herb. Kew.! Gujarat: Baroda, *Woodrow*. Sind: *Stocks*!; Jemadar ka Landa near Karachi, *Stocks*!—Distrib. India (Upper Gangetic plain, W. Peninsula); Arabia, Tropical Africa.

4. **Eragrostis tenella,** *Roem. & Schult. Syst.* v. 2 (1817) p. 576. A very variable annual with slender densely tufted stems, of which the following varieties are found or said to be found in the Bombay Presidency.

VAR. 1. *plumosa*, Stapf, in Hook. f. Fl. B. I. v. 7 (1896) p. 315. Stems tufted, sometimes reaching 15 in. high or more, and as well as the panicle eglandular. Panicle delicate, open, often flexuous; rhachis bearded at the nodes; pedicels distinct, often long. Spikelets 3–9-flowered, $\frac{1}{20}$–$\frac{1}{8}$ in. long. Invol.-glumes unequal, the lower distinctly shorter than the upper; floral glumes $\frac{1}{30}$ in. long; keels of the palea pectinately ciliate with long hairs; anthers minute. Grain ovoid, about $\frac{1}{60}$ in. long. Trim. Fl. Ceyl. v. 5, p. 291; Prain, Beng. Pl. p. 1220. *Eragrostis plumosa* (sp.), Link, Hort. Reg. Berol. v. 1 (1827) p. 192 (*not* of Boiss.); Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 385; Watt, Dict. Econ. Prod. v. 3, p. 255. *E. tenella*, Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—Flowers: Nov. VERN. *Woya*; *Bakrálu*.

KONKAN: common, *Lisboa*. DECCAN: Poona, *Cooke!*, *Woodrow*. GUJARAT: Surat, *Woodrow*.—DISTRIB. Throughout India; Ceylon.

VAR. 2. *riparia*, Stapf, in Hook. f. Fl. B. I. v. 7 (1896) p. 315. Stems and panicle eglandular. Panicle delicate, contracted, very narrow, flaccid, 1–3 by $\frac{1}{6}$–$\frac{1}{3}$ in., subcylindric; rhachis glabrous; branches very short, erect, smooth, glabrous. Spikelets crowded. Invol.-glumes unequal, the lower $\frac{1}{3}$ shorter than the upper; floral glumes $\frac{1}{25}$ in. long. Anthers about $\frac{1}{100}$ in. long. Grain $\frac{1}{60}$ in. long, ovoid. Prain, Beng. Pl. p. 1220. *Eragrostis riparia* (sp.), Steud Syn. Gram. (1855) p. 265. *Poa tenella*, Roxb. Fl. Ind. v. 1 (1832) p. 337; Grah. Cat. p. 236. This has been included on the authority of Graham (*l. c.*), who, however, gives no habitat. I have seen no specimens from the Bombay Presidency.

VAR. 3. *viscosa*, Stapf, in Hook. f. Fl. B. I. v. 7 (1896) p. 315. Stems and rhachis of the panicle more or less viscid. Panicle stiff, stouter and with firmer and more strongly nerved glumes than in vars. *plumosa* and *riparia*, oblong to linear, 2–3 by $\frac{1}{2}$–1 in.; branches spreading, filiform, often very short; rhachis usually glabrous (rarely obscurely bearded at the nodes). Spikelets 5–20-flowered, often purplish. Invol.-glumes nearly equal or the lower very slightly shorter than the upper; floral glumes $\frac{1}{25}$–$\frac{1}{16}$ in. long. Anthers about $\frac{1}{100}$ in. long. Grain ovoid, $\frac{1}{60}$–$\frac{1}{50}$ in. long. Trim. Fl. Ceyl. v. 5, p. 291; Prain, Beng. Pl. p. 1220. *Eragrostis viscosa*, Trin. in Mém. Acad. Pétersb. sér. 6, v. 1 (1831) p. 397; Dalz. & Gibs. p. 298; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 386. *Poa viscosa*, Retz. Obs. fasc. 4 (1786) p. 20; Roxb. Fl. Ind. v. 1 (1832) p. 336; Grah. Cat. p. 236.

KONKAN: Malabar Hill (Bombay), *Graham*, *Dalzell & Gibson*, *Lisboa*; Chowpatti (Bombay), *Lisboa*. The viscid substance on the plant has a balsamic odor (*Dalzell & Gibson*).—DISTRIB. India (southern districts); Ceylon, Tropical and S. Africa.

5. **Eragrostis interrupta,** *Beauv. Agrost.* (1812) p. 71 (*not* of Roem. & Schult. nor of Trin.). VAR. **Kœnigii,** *Stapf, in Hook. f. Fl. B. I.* v. 7 (1896) p. 316. A tall glabrous annual or perennial grass; stem erect, 1–3 ft. high or more, smooth and polished; nodes glabrous. Leaves 3–10 in. long, narrow, flat; sheaths glabrous, close; ligule a fimbriate membrane. Panicle erect, 6–18 in. long, contracted; branches filiform, often distant, 2 or more proceeding from the same level and giving the panicle a verticillate appearance. Spikelets small, $\frac{1}{12}$–$\frac{1}{8}$ in. long, usually 6–14-flowered, smooth, often tinged with red, pedicellate; rhachilla articulate between the flowering glumes, glabrous, disarticulating from above downwards. Invol.-glumes subequal, about $\frac{1}{30}$ in.

long, ovate-oblong, obtuse, hyaline, 1-nerved; floral glumes about $\frac{1}{30}$ in. long, ovate-oblong, obtuse; palea linear-oblong, with smooth or slightly scaberulous keels. Stamens 2; anthers small. Grain obovoid. Trim. Fl. Ceyl. v. 5, p. 292; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1220. *Eragrostis Kœnigii*, Link, Hort. Reg. Bot. Berol. v. 2 (1833) p. 294 in syn. *Eragrostis nutans*, Nees, ex Wight, Cat. (1833) n. 1776, et ex Steud. Nom. ed. 2, part 1 (1840) p. 563; Dalz. & Gibs. p. 297; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 381; Watt, Dict. Econ. Prod. v. 3, p. 255.—Flowers: Nov. VERN. *Chiksi.*

KONKAN: Bassein, *Lisboa*; Thána, *Lisboa*. DECCAN: Bhowdan near Poona, *Woodrow*. GUJARAT: in water-holes, *Dalzell & Gibson*; Surat, *Cooke!*, *Woodrow*.—DISTRIB. Throughout India; Ceylon, Tropical Asia and Africa.

6. **Eragrostis amabilis,** *Wight & Arn. ex Nees, in Hook. & Arn. Bot. Beech. Voy.* (1841) p. 251 (*not* of Linn.). Annual, glabrous; stems 6–18 in. long, tufted, slender, erect or geniculately ascending, leafy chiefly at the base; internodes long. Leaves 3–6 by $\frac{1}{10}$–$\frac{1}{6}$ in., narrowed from a broad subcordate base to an acute tip, smooth; sheaths smooth, glabrous; ligule 0 or obscure. Panicle oblong or ovoid, 2–4 in. long, sparingly branched; rhachis and nodes glabrous. Spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. long, compressed, ovoid-elliptic or oblong, 20–50-flowered, shortly pedicellate, often purple; rhachilla tough, internodes very short. Glumes elegantly distichous, spreading, keeled; invol.-glumes subequal or the upper slightly longer than the lower, $\frac{1}{25}$–$\frac{1}{16}$ in. long, ovate, acute, 1-nerved; floral glumes broadly ovate or suborbicular, mucronulate, $\frac{1}{12}$ in. long, punctulate; palea shorter than its glume and deciduous with it. Stamens 3; anthers minute. Grain obovoid or ellipsoid, laterally compressed, about $\frac{1}{30}$ in. long, orange-brown, smooth. Fl. B. I. v. 7, p. 317; Trim. Fl. Ceyl. v. 5, p. 293; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1220. *Eragrostis unioloides*, Nees, ex Steud. Syn. Gram. (1855) p. 264; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 383. *Poa unioloides*, Retz. Obs. fasc. 5 (1789) p. 19; Roxb. Fl. Ind. v. 1, p. 339; Grah. Cat. p. 236. *Uniola indica*, Spreng. Syst. v. 1 (1825) p. 349; Dalz. & Gibs. p. 298.—Flowers: Sept.–Nov.

KONKAN: Parel (Bombay); Bassein, *Woodrow*. DECCAN: Poona, *Woodrow*, Lanoli, *Woodrow*, 165! S. M. COUNTRY: marshes N. of Belgaum, *Ritchie*, 846!—DISTRIB. Throughout India; Ceylon, Tropical Asia.

7. **Eragrostis gangetica,** *Steud. Syn. Gram.* (1855) p. 266. Perennial; stems tufted, 1–3 ft. long, stout, smooth, shining, simple or branched, suberect. Leaves few, 2–8 in. long, very narrow, convolute, rigid, quite smooth, glaucous, linear, tapering to a fine point; sheaths glabrous except the mouth which is sometimes bearded; ligule a minutely ciliolate rim. Panicle oblong, 2–6 in. long, nodding; branches solitary, rather distant, often long, suberect or the lower spreading; rhachis glabrous; pedicels of spikelets short. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ in. long, linear to linear-oblong, 10–30-flowered; rhachilla tough, glabrous, persistent, the internodes short. Lower invol.-glume $\frac{1}{16}$ in. long, ovate-oblong, acute, 1-nerved; upper slightly larger, 1-nerved; floral glumes broadly ovate, subacute, reaching to nearly $\frac{1}{10}$ in. long; palea deciduous, slightly shorter than its glume, with scaberulous keels.

Stamens 3; anthers about $\frac{1}{25}$ in. long, yellow. Grain oblong, about $\frac{1}{32}$ in. long, brown. Trim. Fl. Ceyl. v. 5, p. 293; Stapf, in Dyer, Fl. Capen. v. 7 (1900) p. 617; Prain, Beng. Pl. p. 1221. *Eragrostis elegantula*, Stapf, in Hook. f. Fl. B. I. v. 7 (1896) p. 318 (*not* of Nees); Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441. *E. Brownei*, Nees, ex Wight, Cat. n. 1780; Watt, Dict. Econ. Prod. v. 3, p. 253.—Flowers: Dec.–Apr.

DECCAN: Borkas, Máwal (Poona districts), *Woodrow*.—DISTRIB. Throughout India; Ceylon.

8. **Eragrostis stenophylla,** *Hochst. ex Miq. Analect. Bot. Ind.* part 2 (1851) p. 27. Perennial; stems densely tufted, 12–18 in. high, erect or geniculately ascending, simple or branched; upper internodes long. Leaves 3–5 in. long, very narrow, strict, rather stiff, usually convolute, smooth, quite flat, glabrous, not glaucous; sheaths smooth; ligule a narrow membranous line. Panicle ovate, or oblong, or sublinear, suberect or nodding; branches rather distant, alternate, obliquely spreading when ripe, much divided upwards; rhachis slender, smooth; pedicels of spikelets filiform. Spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. long, linear-oblong, 20–30-flowered; rhachila zig-zag. Lower invol.-glume $\frac{1}{30}$ in. long, ovate-oblong, subacute; upper invol.-glume slightly longer, both hyaline, 1-nerved; floral glumes broadly ovate, subacute, about $\frac{1}{16}$ in. long, with smooth keels; palea linear-oblong, caducous with the glumes, the keels scabrid. Stamens 3; anthers minute. Grain globose or globosely ellipsoid, $\frac{1}{10}$ in. long, reddish-brown, smooth. Fl. B. I. v. 7, p. 318; Trim. Fl. Ceyl. v. 5, p. 294; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1221. *Eragrostis Brownei*, Nees, in Wight, Cat. (1833) n. 1780 (partly); Watt, Dict. Econ. Prod. v. 3, p. 253.

KONKAN: Malwán, *Woodrow*. DECCAN: Borkas, Máwal (Poona districts), *Woodrow*. —DISTRIB. More or less throughout India; Ceylon, Tropical Asia and Africa.

9. **Eragrostis major,** *Host, Gram. Austr.* v. 4 (1809) p. 14, t. 24. Annual; stems 1–3 ft. high, usually stout and branched, leafy, erect or geniculately ascending, smooth, polished. Leaves reaching 8 by $\frac{1}{3}$ in., narrowed to a fine point, flat, smooth, flaccid, glandular along the margins; sheaths sparingly bearded; ligule a ciliolate ridge. Panicle 2–8 in. long, erect, oblong or ovate-oblong, open or sometimes contracted, usually stiff; rhachis strict, rather stout, smooth; branches spreading or suberect, capillary, stiff or flexuous, again branching from near the base, the branchlets short, capillary. Spikelets longer than their pedicels, usually crowded, ovate and $\frac{1}{6}$–$\frac{1}{4}$ in. long with 6–8 glumes, to linear-oblong rather narrowed upwards, and $\frac{1}{3}$–$\frac{1}{2}$ in. long or more with many (up to 60) glumes, olive-grey or yellowish; rhachilla tough, zig-zag, the internodes short, smooth. Invol.-glumes ovate, acute, with scabrid keels; lower smaller than the upper, 1 (sometimes 3)-nerved; upper slightly larger than the lower, 3-nerved; floral glumes broadly ovate, acute, sometimes apiculate, $\frac{1}{12}$ in. long, strongly nerved; palea obovate, much curved, shorter than its glume, with ciliolate keels. Stamens 3; anthers $\frac{1}{60}$ in. long. Grain globose, $\frac{1}{40}$ in. in diam., microscopically rugulose, reddish-brown. Fl. B. I. v. 7, p. 320; Trim. Fl. Ceyl. v. 5, p. 297; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1221. *Eragrostis megastachya*, Link, Hort.

Reg. Berol. v. 1 (1827) p. 187; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 382; Watt, Dict. Econ. Prod. v. 3, p. 254.—Flowers: Nov.–Jan.

DECCAN: Poona, *Jacquemont*, 349!, *Woodrow*. S. M. COUNTRY: Badami, *Woodrow*! GUJARAT: Morvi (Kathiawar), *Woodrow*. SIND: *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, westwards to S. Europe, tropical and subtropical Asia.

10. **Eragrostis minor,** *Host, Gram. Austr.* v. 4 (1809) p. 15 (*in note*) et in *Pl. Austriac.* v. 1 (1827) p. 135. Annual; stems 6–18 in. high, densely tufted, slender. Leaves 1½–6 by $\frac{1}{10}$–$\frac{1}{3}$ in., linear, acute, usually glandular along the margins, flat; sheaths shortly bearded at the mouth; ligule a pubescent ridge. Panicle oblong or ovate, rather stiff, 2–6 in. long; rhachis glabrous; branches spreading when mature. Spikelets linear to ovate, ¼ by $\frac{1}{20}$ in., up to 12-flowered, pale green to purplish- or olive-grey; pedicels shorter than the spikelets, except the terminal ones; rhachilla tough. Involucral-glumes subequal or the upper slightly larger, about $\frac{1}{20}$ in. long, ovate, acute, 1-nerved; floral glumes about $\frac{1}{16}$ in. long, ovate, acute, strongly nerved; palea obovate-oblong, about $\frac{1}{25}$ in. long, shorter than the persistent glumes, the keels scabrid or slightly ciliolate. Stamens 3; anthers about $\frac{1}{100}$ in. long. Grain $\frac{1}{50}$ in. long or more, dorsally rounded or slightly flattened. Fl. B. I. v. 7, p. 321; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1221.—Flowers: Nov.

Not very plentiful in the Bombay Presidency. KONKAN: Bombay, *Lambert*! DECCAN: Poona, *Jacquemont*, 350!; Nasik, *Lisboa*. GUJARAT: Godra, *Woodrow*; Panch Mahâls, *Woodrow*.—DISTRIB. More or less throughout India (plentiful in N. India); S. and Central Europe, N. Asia, N. Zealand, Philippines.

11. **Eragrostis tremula,** *Hochst. ex Steud. Syn. Gram.* (1855) p. 269. Annual; stems densely tufted, suberect, 6–24 in. long. Leaves 2–5 by $\frac{1}{12}$–$\frac{1}{6}$ in., linear-lanceolate, tapering to a fine point; sheaths bearded at the mouth; ligule a minutely hairy line. Panicle large, ovate, very diffuse; branches solitary, filiform; pedicels very slender, from ½ the length of the spikelets to longer than them; rhachis glabrous or bearded at the nodes. Spikelets 1 in. or more long, linear, narrower upwards, from 10–60-flowered. Involucral-glumes subequal, $\frac{1}{20}$–$\frac{1}{16}$ in. long, subobtuse, thin, 1-nerved; rhachilla tough, glabrous; floral glumes closely set, broadly ovate, subobtuse, $\frac{1}{16}$–$\frac{1}{12}$ in. long, with strong nerves; palea obovate-oblong, slightly shorter than its glume, persistent, with scabrid keels. Stamens 3; anthers minute. Grain scarcely $\frac{1}{30}$ in. in diam., globose or nearly so. Fl. B. I. v. 7, p. 320; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 382; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1221. *Eragrostis multiflora*, Trin. in Mém. Acad. Pétersb. sér. 6, v. 1 (1831) p. 401; Dalz. & Gibs. p. 298. *E. rhachitricha*, Hochst. ex Miq. Analect. Bot. Ind. part 2 (1851) p. 25; Watt, Dict. Econ. Prod. v. 3, p. 256.—Flowers: Nov.

DECCAN: Lanoli, *Lisboa*. GUJARAT: *Woodrow*; Gogo (Kathiawar), *Dalzell & Gibson*, *Woodrow*.—DISTRIB. India (Panjâb, Bengal, Birma, W. Peninsula); Afghanistan, Tropical Africa.

12. **Eragrostis tenuifolia,** *Hochst. in Flora*, v. 24, part 1 (1841), *Intelligenz.* p. 20 (*nomen nudum*). Perennial; stem 2–3 ft. high, erect, slender, branched. Leaves long, very narrow; mouth of sheath naked.

Panicle 3–6 in. long, oblong to ovate, very open; rhachis glabrous; branches solitary or 2-nate, distant. Spikelets $\frac{1}{4}$ in. long or less, linear, 5–15-flowered. Invol.-glumes very unequal; lower minute, hyaline; upper remote from and larger than the lower, about $\frac{1}{30}$ in. long, ovate, subacute, usually nerveless; floral glumes $1\frac{1}{2}$ in. long, ovate, subacute or apiculate; palea shorter than its glume, strongly curved, persistent, with scabrid keels. Stamens 3; anthers $\frac{1}{25}$ in. long. Grain $\frac{1}{12}$ in. long, oboveid-oblong, slightly compressed, dorsally grooved. Fl. B. I. v. 7, p. 322; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1221.

S. M. Country: Belgaum, *Ritchie*!—Distrib. India (W. Peninsula); Tropical Africa.

13. **Eragrostis pilosa,** *Beauv. Agrost.* (1812) p. 71. Annual; stems 6–24 in. high, tufted, erect or geniculately ascending, slender, flaccid. Leaves usually short and narrow (rarely elongate), generally convolute; sheaths appressed, glabrous, bearded at the mouth; ligule a softly hairy ridge. Panicle 2–6 in. long, erect or inclined, oblong to pyramidal, open or contracted; rhachis glabrous or hairy, filiform; branches fascicled or whorled, capillary, much divided. Spikelets scattered (not fascicled), $\frac{1}{8}$–$\frac{1}{5}$ by $\frac{1}{30}$–$\frac{1}{20}$ in., linear, 5–12-flowered, often purplish; pedicels longer or shorter than the spikelets; rhachilla tough, smooth, flexuous. Glumes all hyaline; invol.-glumes very unequal; lower ovate, nerveless; upper much larger, ovate-lanceolate, acuminate, 1-nerved; floral glumes $\frac{1}{16}$–$\frac{1}{10}$ in. long; palea subpersistent, the keels scaberulous or nearly smooth. Grain ellipsoid, $\frac{1}{18}$–$\frac{1}{15}$ in. long, laterally apiculate at the base. Fl. B. I. v. 7, p. 323; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 381; Trim. Fl. Ceyl. v. 5, p. 296; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1221; Watt, Dict. Econ. Prod. v. 3, p. 255.

Deccan: Waghoti, Máwal (Poona districts), *Woodrow*, 9!; Poona, *Cooke*!; Nasik, *Lisboa*. S. M. Country: Dharwar, *Woodrow*. Sind: *Woodrow*.—Distrib. Throughout India; Ceylon, S. Europe and most warm countries.

14. **Eragrostis cynosuroides,** *Beauv. Agrost.* (1812) p. 71 & p. 162. Perennial, tall, branched from the base; rootstock stout, creeping; stolons very stout, covered with shining sheaths; stems 1–3 ft. high, tufted, smooth, erect, stout. Leaves many, the basal fascicled, reaching sometimes 20 in. long and $\frac{3}{8}$ in. broad at the base, rigid, acuminate, with filiform tips and hispid margins; sheaths glabrous; ligule a hairy line. Panicle 6–18 by $\frac{1}{2}$–$1\frac{1}{2}$ in., strict, erect, narrowly pyramidal or columnar, often interrupted; rhachis puberulous; branches many, short, scarcely reaching 1 in. long, crowded, clothed from the base with sessile imbricating spikelets. Spikelets sessile, secund, 2-seriate and crowded, deflexed, pale brown, rather shining, $\frac{1}{2}$ in. long, up to 30-flowered; rhachilla tough. Invol.-glumes very unequal; lower $\frac{1}{50}$ in. long; upper $\frac{1}{16}$ in. long, obtuse; floral glumes $\frac{1}{16}$–$\frac{1}{12}$ in. long, ovate, acute, coriaceous; palea shorter than its glume, subcoriaceous, with minutely scabrid keels. Stamens 3; anthers $\frac{1}{30}$ in. long. Grain $\frac{1}{50}$–$\frac{1}{40}$ in. long, obliquely ovoid, laterally compressed, obscurely 3-gonous. Fl. B. I. v. 7, p. 324; Dalz. & Gibs. p. 298; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 387; Woodr. in Journ. Bomb. Nat. v. 13 (1901)

p. 441 ; Prain, Beng. Pl. p. 1221; Watt, Dict. Econ. Prod. v. 3, p. 253. *Poa cynosuroides*, Retz. Obs. fasc. 4 (1786) p. 20 ; Grah. Cat. p. 236.—Flowers: Dec. VERN. *Darbha*; *Kusha*.

DECCAN: Nasik, *Lisboa*. GUJARAT: *Lisboa*; Mandvi (Kathiawar), *Woodrow*. SIND: Hyderabad, *Woodrow*.—DISTRIB. Throughout India in hot and dry places; Nubia, Egypt, Syria.

15. **Eragrostis bifaria,** *Wight, ex Steud. Nom.* ed. 2, part 1 (1840) p. 562. Perennial ; stems 1–3 ft. high, densely tufted, erect, simple, subcompressed, glabrous, clothed at the base with the soft fibres of old sheaths. Leaves 2–4 in. long, narrow, linear, acute, rigid, smooth; sheaths glabrous, keeled; ligule a pubescent line. Spikelets secund, distichously spreading in a long simple terminal spike 10–12 in. long. Spikelets ovoid to oblong, 15–20-flowered, $\frac{1}{4}$–$\frac{1}{3}$ in. long (rarely linear, reaching $\frac{2}{3}$ in. long and up to 40-flowered), laterally compressed, olive-grey or -green. Invol.-glumes strongly 1-nerved and keeled; lower invol.-glume $\frac{1}{6}$ in. long, acutely acuminate, with scaberulous keel; upper invol.-glume $\frac{1}{12}$ in. long, with stout rounded keel; floral glumes broadly ovate, subacute, $\frac{1}{8}$ in. long; palea slightly shorter than its glume, with winged keels, the wings $\frac{1}{100}$ in. wide, ciliolate. Stamens 3; anthers $\frac{1}{25}$ in. long. Fl. B. I. v. 7, p. 325; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 387; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—Flowers: Aug.

DECCAN: Khandala, *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*.—DISTRIB. India (W. Peninsula); Tropical Africa.

52. HALOPYRUM, Stapf.

A tall stout perennial glabrous grass with a branching creeping sheathed rootstock. Leaves narrow, rigid, convolute. Spikelets large, many-flowered, sessile or shortly pedicellate on the short alternate branches of an elongate panicle, ovoid, strongly laterally compressed, not jointed on their pedicels, nor are the pedicels jointed on the branches; rhachilla articulate at the base and between the flowering glumes, silkily hairy. Glumes many, closely distichously imbricate, dorsally rounded, coriaceous, keeled; invol.-glumes subequal, ovate-lanceolate, acuminate or apiculate; lower invol.-glume 1–3-nerved; upper invol.-glume 5-nerved; floral glumes 6–10, rather shorter than the involucral, mucronulate, 3-nerved; palea as long as the glume, subacute, 2-keeled. Lodicules 2, obcordate. Stamens 3. Styles short, free; stigmas elongate. Grain ellipsoid, compressed, deeply hollowed anticously, free.—DISTRIB. Coasts of India and Ceylon, Arabia, Tropical Africa; species 1.

1. **Halopyrum mucronatum,** *Stapf, in Hook. Icon. Pl.* v. 25, t. 2448 (1896). Rootstock sending up hard woody stems 12–18 in. high and as thick as a crow-quill, smooth, shining, with strict vermiform roots, the branches often fascicled and clothed at the base with pale coriaceous shining mucronate sheaths. Leaves 8–12 by $\frac{1}{8}$–$\frac{1}{6}$ in., convolute (rarely flat), very narrow, glaucous, coriaceous, striate, quite smooth; sheaths terete, appressed, striate, hard, with villous mouth; ligule a few hairs. Panicle 12–16 in. long, erect or nodding; rhachis and branches quite smooth, angular, wiry. Spikelets $\frac{1}{2}$–$\frac{5}{8}$ in. long, flat,

sessile or shortly pedicellate, 10-15-flowered, smooth, white or pale yellowish; rhachilla very short, the hairs half as long as the glumes. Lower invol.-glume ¼ in. long, scarcely longer than the lowest flowering glume, ovate-lanceolate, apiculate; upper invol.-glume ⅓ in. long, strongly 5-nerved. Fl. B. I. v. 7, p. 328; Trim. Fl. Ceyl. v. 5, p. 299; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—Flowers: Nov.

GUJARAT: Porbandar (Kathiawar), *Bhiva*! SIND: *Stocks*!—DISTRIB. Ceylon, Arabia, East Tropical Africa.

53. **DIPLACHNE,** Beauv.

Tall tufted perennial (?) grasses; stems erect or ascending, stout or slender, simple or sparingly branched. Leaves flat or convolute, narrow. Spikelets few- or many-flowered, sessile, 1-seriate on the slender spike-like branches of a contracted subsimple erect panicle, not articulate at the base, strongly laterally compressed; rhachilla articulate between the flowering glumes, not produced beyond the uppermost neuter. Invol.-glumes unequal, membranous, 1-nerved, obtuse, persistent; floral-glumes rather longer, elliptic-oblong, 1-3-nerved, the tip 2-4-toothed, mucronate or awned; palea linear. Lodicules 2, broadly cuneate. Stamens 3; anthers short. Styles short, distinct, with distant bases and short plumose laterally exserted stigmas. Grain oblong, stipitate, concavo-convex, free in the glumes.—DISTRIB. Species about 20, in warm regions.

1. **Diplachne fusca,** *Beauv. Agrost.* (1812) p. 163. Stems tufted, 2-4 ft. high, stout, erect or geniculately ascending, simple or branched (sometimes proliferously), terete, polished, with long internodes. Leaves 6-10 by $\frac{1}{20}$-$\frac{1}{10}$ in., flat or convolute, strict, erect, smooth, finely acuminate; sheaths smooth, the mouth truncate (not auricled); ligule oblong, membranous, lacerate. Panicle 6-12 in. long, erect, narrowly oblong; rhachis smooth; branches spike-like, the lower 1-4 in. long. Spikelets erect, rather distant, ¼-½ in. long, linear-oblong, 4-10-flowered; rhachilla slender; pedicels short. Lower invol.-glume $\frac{1}{12}$ in. long, oblong-lanceolate; upper invol.-glume nearly ⅛ in. long, ovate-oblong, subacute, broader than the lower; floral glumes ⅛ in. long (including mucro), elliptic, thinly coriaceous, 3-nerved, the tip 2-toothed, mucronate by the produced midrib; palea oblong, obtuse, the keels silkily hairy. Anthers $\frac{1}{20}$ in. long. Fl. B. I. v. 7, p. 329; Trim. Fl. Ceyl. v. 5, p. 300; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1225.

KONKAN: Matunga near Bombay in rice-fields, *Woodrow*, 10!—DISTRIB. India (upper Gangetic plain, Bengal, W. Peninsula); Ceylon, Egypt, Tropical Asia, Africa, and Australia.

54. **GRACILEA,** Kœn.

Small tufted grasses. Leaves short. Spikelets 2-flowered, collected in turbinate fascicles which are secund, sessile and articulate on a slender spike. Spikelets not articulate at the base; rhachilla usually produced beyond the upper glume, filiform, scaberulous; callus 0. Glumes 4; invol.-glumes elongate-subulate, rigid, ciliate at the base and ending in rigid scabrid awns, persistent, collateral at base and laterally attached to base of spikelet; lower without hyaline margins;

the upper with rather wide ones; lower floral glume 2-sexual, chartaceous, ovate-oblong, cymbiform, shortly awned, 3-nerved, the palea as long as the glume, 2-cuspidate and with scaberulous keels, the lodicules minute, cuneiform, truncate; upper floral glume like the lower, but much smaller, bicuspidate, male; sometimes an imperfect flower of 2 empty glumes at the end of the rhachilla. Stamens 3; anthers of 2-sexual flowers large, of male flowers small. Styles free; stigmas slender, with short simple hairs, laterally exserted. Grain linear-oblong, free within the glumes.—DISTRIB. Species 2, Indian and African.

1. **Gracilea Royleana,** *Hook. f. in Fl. B. I.* v. 7 (1896) p. 284. Annual; stems 3–8 in. high, densely tufted, very slender. Leaves 1–2 in. long, scarcely reaching $\frac{1}{16}$ in. broad, flat or convolute, linear-lanceolate, acutely pointed, glabrous or nearly so, the margins ciliate; sheaths with a few long scattered hairs; ligule a hairy ridge. Spikes filiform, $\frac{1}{2}$–2 in. long, flexuous, often recurved; rhachis 3-gonous, smooth. Clusters of spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long (including the awns), green or purple; awns of invol.-glumes longer than the glumes; awn of floral glumes short. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1226. *Melanocenchris Royleana*, Nees, in Proc. Linn. Soc. v. 1 (1841) p. 95 (*nomen nudum*); Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 370. *M. Jacquemontii*, Jaub. & Spach, Illustr. Pl. Or. v. 4 (1850–1853) p. 36, t. 325. *M. Rothiana*, Dalz. & Gibs. Bo. Fl. p. 297 (*not* of Nees).

KONKAN: *Law!*, *Woodrow*. DECCAN: near Poona, *Jacquemont*, 383! S. M. COUNTRY: Belgaum, *Stocks!*, *Ritchie*, 831!—DISTRIB. India (Behar, Rajputana, W. Peninsula); Socotra, Nubia.

VAR. *plumosa*, Hook. f. Fl. B. I. (*l. c.*) p. 284. Clusters of spikelets larger, $\frac{1}{2}$ in. long, including the awns. *Melanocenchris plumosa*, Jaub. & Spach, Illustr. Pl. Or. v. 4 (1850–1853) p. 37.

SIND, *Stocks*, 646!; Jemadar ka Landa near Karachi, *Stocks*, 646!—DISTRIB. India (the Panjáb); Arabia, Abyssinia.

55. MICROCHLOA, R. Br.

Slender usually perennial grasses. Leaves narrow, often subsetaceous; ligule a minutely ciliate rim. Spikelets 1-flowered, small, sessile, unilateral, crowded on the flattened rhachis of a solitary terminal slender curved spike, alternately 2-seriate from near the margins of the rhachis or in a single row; rhachilla disarticulating above, the invol.-glumes more or less produced. Floret hermaphrodite. Glumes 3; invol.-glumes subpersistent, strongly 1-nerved, flattened on the back or keeled, subequal; floral glume small, oblong, hyaline, awnless; palea nearly equalling the glume, 2-keeled. Lodicules 2, cuneate, glabrous. Stamens 3; anthers linear. Styles distinct; stigmas plumose, laterally exserted. Grain oblong, glabrous, free within the glumes.—DISTRIB. Species 7, one widely distributed throughout the Tropics, 3 in Africa, 3 in Australia.

1. **Microchloa setacea,** *R. Br. Prodr.* (1810) p. 208. Perennial; stems tufted, 2–6 (rarely reaching 10) in. high, very slender, branched or almost simple, compressed below, glabrous, smooth. Leaves $\frac{1}{2}$–$1\frac{1}{2}$ in.

long, crowded at the base, subsetaceous with an acute or callous point, plicate, firm, the lower often curved, usually glabrous. Spike solitary, 1–3 in. (rarely reaching 6 in.) long; very slender, usually curved, often purplish; rhachis minutely ciliate. Spikelets 1-flowered, dorsally compressed, in a single row, $\frac{1}{12}$–$\frac{1}{8}$ in. long, erect glabrous. Invol.-glumes subequal, lanceolate-oblong, acute or acuminate; floral glume up to $\frac{1}{15}$ in. long, abruptly and shortly acuminate, sometimes mucronulate, hairy along the nerves; palea ciliate on the nerves. Anthers about $\frac{1}{40}$ in. long. Grain oblong, subfusiform, $\frac{1}{20}$ in. long, smooth. Fl. B. I. v. 7, p. 283; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1226. *Rottboellia setacea*, Roxb. Fl. Ind. v. 1 (1832) p. 357; Cor. Pl. v. 2, t. 132.—Flowers: Aug.

S. M. Country: Dharwar, *Woodrow*.

Usually a very small plant growing on old walls. It rarely exceeds 3 inches high, though occasionally, under favorable conditions, it grows higher.—Distrib. Tropics of the Old and New World.

56. **CYNODON,** Pers.

Perennial glabrous grasses; stems creeping, rooting at the nodes and emitting from them fascicles of barren shoots and flowering stems. Spikes 2–6, in terminal umbels. Spikelets 1-flowered, laterally compressed, sessile, imbricate, alternately 2-seriate and unilateral on a slender keeled rhachis; rhachilla disarticulating above the invol.-glumes, produced or not beyond the floral glume. Floret hermaphrodite. Invol.-glumes narrow, keeled, acute or subulato-mucronate, the upper usually deciduous with the floral glume, the lower subpersistent; floral glume exceeding the invol.-glumes, navicular, firmly membranous, 3-nerved, awnless, the keel ciliate; palea somewhat shorter than the glume, 2-keeled. Lodicules 2, minute, obovate-cuneate, glabrous. Stamens 3. Ovary glabrous; styles distinct, slightly shorter than the plumose stigmas. Grain oblong, subterete, free within the glumes.—Distrib. Species 2, of which 1 occurs in S. Africa, the other almost cosmopolitan.

1. **Cynodon dactylon,** *Pers. Syn.* v. 1 (1805) p. 85. Stem slender, prostrate, widely creeping, forming matted tufts, with slender erect or ascending flowering branches 3–12 in. high. Leaves $\frac{3}{4}$–4 by $\frac{1}{20}$–$\frac{1}{8}$ in., narrowly linear or lanceolate, finely acute to pungent, more or less glaucous, soft, smooth, usually conspicuously distichous in the barren shoots and at the base of the stems; sheaths tight, glabrous or hairy, sometimes bearded at the mouth; ligule a very fine ciliate rim. Spikes 2–6, radiating from the top of a slender peduncle, 1–2 in. long, green or purplish; rhachis slender, compressed or angled, scaberulous. Spikelets $\frac{1}{15}$–$\frac{1}{10}$ in. long; rhachilla produced, very slender, equalling $\frac{1}{2}$ the length of the spikelet. Invol.-glumes lanceolate, acute to subulato-mucronulate, the lower $\frac{1}{25}$–$\frac{1}{16}$ in. long, the upper slightly longer; floral glume obliquely oblong to semiovate, about $\frac{1}{12}$ in. long. Anthers oblong, $\frac{1}{25}$ in. long. Grain $\frac{1}{24}$ in. long. Fl. B. I. v. 7, p. 288; Dalz. & Gibs. p. 297; Trim. Fl. Ceyl. v. 5, p. 274; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 365; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1227; Watt, Dict. Econ. Prod.

v. 2, p. 678. *Panicum dactylon*, Linn. Sp. Pl. (1753) p. 58; Grah. Cat. p. 236.—VERN. *Harâli.*

The well-known *Harâli* grass of the Deccan, extensively used as fodder in the Bombay Presidency.—DISTRIB. Throughout India, Birma, and Ceylon, ascending to 5000 ft. in the Himalayas; most warm countries.

57. **CHLORIS,** Sw.

Annual or perennial grasses. Leaves flat or convolute. Spikes solitary or several, in terminal umbels or short racemes, erect or stellately spreading. Spikelets of 2-4 florets (1 only or rarely more fertile), sessile, crowded, unilateral, 2-seriate on a slender rhachis; rhachilla disarticulating above the invol.-glumes, more or less produced; lowest floret hermaphrodite, the second male or barren (rarely fertile), the following if present barren, often minute (some occasionally fertile in *C. tenella*). Involucral glumes 2, persistent, narrow, keeled, membranous, 1-nerved, acute, mucronate or the upper awned. HERMAPHRODITE FLORET: floral glume narrow or broad, 3-nerved, acute or obtuse, minutely 2-toothed, usually awned from below the apex, often ciliate; palea almost equalling the glume, 2-keeled. Lodicules 2, minute. Stamens 3. Ovary glabrous; styles distinct, short; stigmas laterally exserted. MALE FLORET: glume and palea as in the hermaphrodite flower but smaller and glabrous. RUDIMENTARY FLORETS glabrous, awned or awnless, small to minute, usually without a trace of a palea.—DISTRIB. Species 40–45, in tropical and subtropical regions of both hemispheres.

Annual; spike solitary; spikelets cuneate, 3-awned; glumes 5-6; glume of hermaphrodite floret cuneate, the upper margin naked	1. *C. tenella.*
Perennial; spikes 1-3; spikelets obconic, 4-awned; glumes 5; glume of hermaphrodite floret broadly ovate, with broad hyaline margins, hirsute all over	2. *C. villosa.*
Perennial; spikes 4-6, in terminal whorls; spikelets narrowly fusiform; glumes 4, the uppermost minute on the produced rhachilla; glume of hermaphrodite floret oblong-lanceolate.	3. *C. incompleta.*
Perennial; spikes 5-20 in a truncate fascicle; spikelets 3-awned; margins of glume of hermaphrodite floret densely bearded above the middle, not hyaline	4. *C. barbata.*

1. **Chloris tenella,** *Roxb. Fl. Ind.* v. 1 (1832) p. 329. Annual, very slender; stems 10–18 in. long, weak, slender, branched from the base. Leaves 3–8 by $\frac{1}{8}$–$\frac{1}{4}$ in., flaccid, linear-lanceolate, finely acuminate, the margins more or less ciliate towards the base; sheaths glabrous; ligule large, membranous, truncate. Spike solitary, 1–2 in. long, erect, flat. Spikelets large, reaching $\frac{1}{4}$ in. long, cuneate, bifarious, 3-awned. Glumes 5 or 6; lower invol.-glume $\frac{1}{6}$ in. long, strongly 1-nerved; upper invol.-glume longer and broader, with a strong midnerve which is produced into a short awn; glume of hermaphrodite floret $\frac{1}{5}$ in. long, broadly cuneate, the upper margin truncated, naked, and with a scaberulous awn $\frac{1}{6}$ in. long from the back below the apex, the palea elliptic with ciliate margins, and the callus densely hairy, the next or second floral glume smaller but similar, with a similar palea, the others still smaller fan-shaped awned. Sometimes one or more of the normally infertile glumes are found to be fertile, at other times all are barren; both forms may be found among the specimens in

Herb. Kew. Fl. B. I. v. 7, p. 290; Dalz. & Gibs. p. 296; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 368; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

DECCAN: Bijapur, *Woodrow*. GUJARAT: Surat on the city walls, *Dalzell*! SIND: Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (W. Peninsula); Arabia, Abyssinia.

2. **Chloris villosa,** *Pers. Syn.* v. 1 (1805) p. 87. Perennial, stout; stems 6–10 in. long from a densely tufted stout woody base, clothed with equitant leaf-sheaths. Leaves 1–3 by $\frac{1}{16}$–$\frac{1}{10}$ in., linear, acute, flat, convolute or twisted, rigid; ligule obscure. Spikes 1–3, erect, pale yellow, $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{3}$–$\frac{1}{2}$ in. Spikelets $\frac{1}{8}$ in. long, obconic, with 4 unequal awns. Glumes 5; lower invol.-glume $\frac{1}{8}$ in. long (including a short awn), oblong-lanceolate, hyaline; upper invol.-glume $\frac{1}{8}$ in. long, oblong, hyaline, 2-toothed at the tip and shortly awned; glume of the hermaphrodite floret $\frac{1}{8}$ in. long, broadly ovate or suborbicular, concave, with an awn $\frac{1}{4}$ in. long or more, and broad hyaline margins bounded by the lateral nerves, hirsute all over with long silky hairs which are much longer than the glume, the palea elliptic-obovate with ciliate margins, hyaline; the next glume (4th) barren, about $\frac{1}{2}$ as long, also hirsute, the next (5th) small, cuneate, the 6th reduced to an awn. Fl. B. I. v. 7, p. 291; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440. *Chloris tetrapogon*, Beauv. Agrost. (1812) p. 158. *Tetrapogon villosus*, Desf. Fl. Atlant. v. 2 (1798) p. 389, t. 255.

SIND: *Stocks*, 644!—DISTRIB. India (Panjáb, Rajputana); westward to the Canaries.

3. **Chloris incompleta,** *Roth, Nov. Pl. Sp.* (1821) p. 60. Perennial; stems procumbent, or erect when growing amongst bushes, reaching a height of 5 ft., ending in a very long naked peduncle. Leaves 6–12 by $\frac{1}{6}$–$\frac{1}{2}$ in., narrowed into a fine point, flat, glabrous or slightly hairy; sheaths long, smooth, the mouth hairy; ligule of long hairs. Spikes 4–6, in terminal whorls, 4–9 in. long; rhachis filiform, scabrid. Spikelets $\frac{1}{5}$ in. long (excluding the awns), narrowly fusiform, imbricating, erect, closely appressed; rhachilla slender, bearing $\frac{1}{16}$ in. from its base a tuft of hairs, a little above which is a barren glume terminated by a long awn reaching $\frac{1}{3}$ in. long. Glumes 4; lower invol.-glume $\frac{1}{10}$ in. long, lanceolate, acute; upper invol.-glume $\frac{1}{5}$ in. long (excluding awn), narrowly lanceolate, membranous, 2-toothed at the apex, with a strong midnerve which is produced into an awn $\frac{1}{20}$ in. long; floral glume of fertile floret as long as the upper invol.-glume, oblong-lanceolate, 2-toothed at the apex, with an awn $\frac{3}{8}$ in. long; palea as long as the glume, acuminate; callus bearded; fourth glume small, rudimentary. Sir J. Hooker (Fl. Ceyl. v. 5, p. 275) describes the barren 4th glume as a swelling of the rhachilla which it much resembles. Fl. B. I. v. 7, p. 290; Trim. Fl. Ceyl. v. 5, p. 275; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1227. *Chloris digitata*, Steud. Syn. Gram. (1855) p. 207; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 369. *Melica digitata*, Roxb. Fl. Ind. v. 1 (1832) p. 326; Grah. Cat. p. 236.—Flowers: Feb.

KONKAN: Thána, *Lisboa*. DECCAN: Nasik, *Lisboa*. KANARA: (N. Kanara), *Woodrow*. —DISTRIB. Throughout the plains of India; Ceylon, Afghanistan, China.

4. **Chloris barbata,** *Sw. Fl. Ind. Occ.* v. 1 (1797) p. 200. Perennial; stems tufted, with strong root-fibres, rather stout, 2–3 ft. high, geniculately ascending, branching upwards, leafy, quite smooth; lower internodes 2–3 in. long, as thick as a crow-quill, shining; upper very long, slender; nodes often bearing equitant tufts of leaves. Leaves 6–18 in. long, narrowly linear, flat or folded, finely acuminate; sheaths smooth, the lower open; ligule a very narrow membrane. Spikes 5–20, digitately arranged in a truncate fascicle, ½–4 in. long, on a slender peduncle, often purplish. Spikelets $\frac{1}{10}$ in. long (excluding the awns), green or purple, 3-awned; rhachilla produced, but not beyond the fertile glume, bearing 2 small turgid obovate awned barren glumes $\frac{1}{16}$ in. long, the awns $\frac{1}{8}$–$\frac{1}{6}$ in. long. Invol.-glumes hyaline, lanceolate, acute (not awned); lower $\frac{1}{16}$ in. long; upper $\frac{1}{10}$ in. long; floral glume of hermaphrodite floret $\frac{1}{10}$ in. long, broadly elliptic, shortly apiculate, with a slender awn $\frac{1}{8}$–$\frac{1}{6}$ in. long and with densely bearded margins above the middle; palea nearly as long as the glume, oblanceolate. Fl. B. I. v. 7, p. 292; Grah. Cat. p. 234; Dalz. & Gibs. p. 296; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 367; Woodr. in Journ. Bomb. Nat v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1227; Watt, Dict. Econ. Prod. v. 2, p. 269.—Flowers: Nov. VERN. *Gondvel.*

Throughout the Presidency. DECCAN: *Woodrow.* SIND: *Woodrow.*—DISTRIB. Throughout the plains of India; Ceylon, Tropics generally.

58. **TRIPOGON,** Roth.

Slender densely tufted grasses; stems erect, leafy below. Leaves narrow, rigid, flat or convolute. Spikelets usually many-flowered (all except 1–2 terminal perfect), 2-seriate and unilateral on a very slender terminal spike, not articulate at the base; rhachilla produced between the glumes but not beyond them, slender, articulate at the base. Glumes many; invol.-glumes unequal, distantly superposed, membranous, 1-nerved; lower invol.-glume usually lodged in a furrow of the rhachis, toothed or lobed on one side; upper invol.-glume entire or notched below the mucronate or apiculate tip; floral glumes ovate, dorsally convex, 2-fid and awned in the cleft or 4-fid with the outer lobes awned, the inner lobes membranous and rarely awned, awns all straight; callus short, bearded; palea broad or narrow, complicate, truncate, with ciliate keels. Lodicules 2, cuneate. Stamens 3; anthers long, linear-oblong. Styles short, distant at the base; stigmas short, plumose. Grain narrow, free in the glumes.—DISTRIB. Tropical and Subtropical Asia and Africa; species about 12.

Awn as long as its glume or longer; lateral lobes of floral glume awned.
- Under 3 in. high; leaves 1 in. long; ligule membranous, ovate ..... 1. *T. pauperculus.*
- 6–18 in. high; cauline leaves 6–8 in. long; ligule a ridge ..... 2. *T. capillatus.*

Awn shorter than its glume; lateral lobes of floral glume not awned.
- Leaves 12–24 in. long; spikelets 5–12-flowered; lower invol.-glume $\frac{1}{2}$ in. long, lanceolate ..... 3. *T. Lisboæ.*
- Leaves 2–8 in. long; spikelets 10–20-flowered; lower invol.-glume $\frac{1}{8}$ in. long with a projecting lobe at one side ..... 4. *T. Jacquemontii.*

1. **Tripogon pauperculus** (by misprint *pauperulus*), *Stapf, in Hook. Icon. Pl.* t. 2442 (1896). Dwarf, 2–2½ in. high, annual, glabrous; stems capillary, densely tufted, leafy to the tip. Leaves setaceous, acute, ½–1 in. long, involute; sheaths, the lowest lax, the uppermost close, striate; ligule membranous, ovate, obtuse. Spikelets 2–3, remote (distant more than their own length from each other), or solitary at the apex of the stems, ⅓ in. long (excluding the awns). Lower invol.-glume ⅙ in. long, symmetrical, narrowly lanceolate, 1-nerved, very acute; upper invol.-glume ¼ in. long, lanceolate, cuspidately acuminate; floral glumes 4–1, with one or two empty above them, ⅕–¼ in. long (excluding the awn), linear-oblong, 3-nerved, the lateral lobes with capillary awns; median awn geniculate, twisted below the knee, nearly ½ in. long; palea oblong with ciliolate keels. Anthers 3, minute, subglobose. Grain narrowly linear, cylindric. Fl. B. I. v. 7, p. 285; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.—Flowers: Sept.

KONKAN: *Stocks*! DECCAN: on the crest of the Western Ghâts (1800 ft.), 8 miles S. of Lanoli, on *Ficus glomerata*, in company with mosses and *Utricularia orbiculata*, *Woodrow*, 25!; on rocks near Karli (Poona districts), *Woodrow*!—DISTRIB. India (W. Peninsula).

2. **Tripogon capillatus,** *Jaub. & Spach, Illustr. Pl. Or.* v. 4 (1850–53) p. 47, t. 332. Whole plant 6–18 in. high; stems densely tufted, erect or geniculately ascending, subfiliform, smooth. Leaves rigid, green, convolute, the radical leaves very short or reduced to sheaths, the cauline erect, elongate, 6–8 by ⅛ in., narrowly linear, finely pointed; sheaths glabrous, striate; ligule reduced to a ridge. Spikes 5–12 in. long, filiform or capillary, flexuous. Spikelets 3–4-flowered, distant (⅓ in. apart or more) along the rhachis of the spike, with many slender long awns. Invol.-glumes lanceolate, thinly membranous; lower invol. glume $\frac{1}{10}$ in. long, cuspidately acuminate; upper invol.-glume ⅕ in. long (including a short awn); floral glume ⅙ in. long, ovate-lanceolate, 2-cleft at the apex, the lobes slender, shortly awned, the median awn reaching ½ in. long or more; palea as long as its glume, narrow, oblanceolate-oblong, hyaline. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 285; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1229.—Flowers: Sept.

KONKAN: *Stocks*!, *Law*!; on trees at Matheran, *Woodrow*, 17!, *Lisboa*. DECCAN: on trees about Poona, *Jacquemont*, 580! S. M. COUNTRY: Belgaum, on trees on Samboti Hill, *Ritchie*, 866!—DISTRIB. India (Behar, W. Peninsula).

3. **Tripogon Lisboæ,** *Stapf, in Kew Bull.* (1892) p. 84. Perennial, 2–3 ft. high; stem stout or slender. Leaves 12–24 by ⅛–⅓ in., rigid, quite smooth, flat or convolute; sheaths glabrous; ligule obsolete. Spikes 6–10 in. long, narrow. Spikelets usually densely crowded, ⅙–½ in. long, 5–12-flowered. Glumes coriaceous; invol.-glumes very unequal; lower invol.-glume $\frac{1}{12}$ in. long, lanceolate, acute; upper invol.-glume ⅕ in. long, linear-oblong, with a single tooth or unequally 2-toothed at the apex; floral glumes ⅛ in. long, ovate, shortly 2-toothed at the apex; the lobes not awned, but with a slender awn about $\frac{1}{30}$ in. long from the sinus; palea oblong, obtuse, shortly 2-fid. Grain narrowly oblong, terete, glabrous. Fl. B. I. v. 7, p. 286; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

Lisboa without locality in Herb. Kew.! KONKAN: *Stocks*!, *Law*! DECCAN: Karli between Poona and Lanoli, *Jacquemont*, 581!—DISTRIB. India (Rajputana).

4. **Tripogon Jacquemontii,** *Stapf, in Kew Bull.* (1892) p. 85. Perennial, 1–2 ft. high. Leaves filiform, 2–8 in. long, convolute, glabrous. Spikes 4–8 in. long, narrow. Spikelets $\frac{1}{3}$–$\frac{3}{4}$ in. long, narrow, oblong, 10–20-flowered. Glumes subcoriaceous, the uppermost empty; invol.-glumes very dissimilar; lower invol.-glume $\frac{1}{8}$ in. long, acute, with a large projecting blunt tooth or lobe at one side extending $\frac{1}{2}$ way up; upper invol.-glume $\frac{1}{6}$ in. long, lanceolate-oblong, acute; floral glume $\frac{1}{8}$ in. long, elliptic, shortly 2-fid at the apex, without lateral awns but with a median awn $\frac{1}{20}$ in. long. Grain narrowly oblong, terete, glabrous. Fl. B. I. v. 7, p. 286; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 371; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

Konkan: Bombay districts without precise locality, *Lisboa*!; Matheran, *Woodrow*, 16! Deccan: *Woodrow*, 79!; Poona, *Jacquemont*, 353!, *Woodrow*!; Sholapur, *Pinwill*!; near Ahmednagar, *Miss Shatuck*!—Distrib. India (Bengal, Central India, W. Peninsula).

59. **ELEUSINE,** Gærtn.

Annual or perennial grasses. Leaves long or short. Spikelets 3–12-flowered (flowers all perfect except the terminal), sessile, 2–3-seriate and secund, forming digitate capitate or whorled spikes laterally compressed not jointed at the base; rhachilla continuous between the flowering glumes. Glumes few or many, keeled; invol.-glumes shorter than the floral ones, subequal or unequal, persistent; lower invol.-glume ovate or lanceolate; upper invol.-glume lanceolate, acute or acuminate, or broadly ovate or didymous, with a short stout recurved awn; floral glumes like the involucral, 3-nerved; palea complicate, strongly 2-keeled. Lodicules 2, cuneate. Stamens 3; anthers short. Styles short, free; stigmas slender, laterally exserted. Grain small, free; pericarp hyaline, loose. Seed rugose.—Distrib. Species about 7, in most warm countries.

Spikelets pointing forwards at an acute angle with the rhachis of the spike; upper invol.-glume ovate or lanceolate.	
Annual, erect; leaves 1–2 ft. long	1. *E. indica.*
Perennial, prostrate; leaves $\frac{1}{2}$–$1\frac{1}{2}$ in. long	2. *E. flagellifera.*
Spikelets spreading, at right angles to the rhachis of the spike; upper invol.-glume orbicular, abruptly awned.	
Annual; grain subglobose	3. *E. ægyptiaca.*
Perennial; grain ovoid	4. *E. aristata.*

1. **Eleusine indica,** *Gærtn. Fruct.* v. 1 (1788) p. 8. Annual, erect; stem 1–2 ft. high, tufted, slightly compressed, glabrous; roots of strong fibres. Leaves distichous, flat or folded, as long as the stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad, linear, glabrous or sparsely hairy, with nearly smooth margins; sheaths compressed, the mouth not auricled but often with a few hairs; ligule a thin slightly hairy membrane. Spikes 2–7 or more, 2–5 in. long, with sometimes one or two detached spikes below the umbel, digitate, suberect or slightly recurved, the axils hairy and glandular; rhachis flattened. Spikelets pointing forward at an acute angle with the rhachis of the spike, variable in size, $\frac{1}{10}$–$\frac{1}{6}$ in. long, 3–6-flowered, glabrous. Invol.-glumes unequal, membranous; lower $\frac{1}{16}$ in. long, ovate-oblong, acute, 1-nerved; upper $\frac{1}{10}$ in. long, ovate-oblong, subacute, very shortly apiculate, with 3–7 green nerves; floral glumes gibbously ovate-oblong, obtuse, $\frac{1}{8}$ in. long; palea shorter than the glume, oblong-lanceolate, subacute. Anthers $\frac{1}{30}$ in. long. Grain oblong, obtusely

trigonous, obliquely striate, reddish-brown. Fl. B. I. v. 7, p. 293; Grah. Cat. p. 235; Trim. Fl. Ceyl. v. 5, p. 277; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 375; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1229; Watt, Dict. Econ. Prod. v. 3, p. 241.—Flowers: Jan. VERN. *Mahar-nâchni.*

Throughout the Presidency, *Lisboa.* DECCAN: Poona, *Woodrow.* — DISTRIB. Throughout the plains of India; Ceylon, Tropics of the Old World.

2. **Eleusine flagellifera,** *Nees, in Linnæa,* v. 16 (1842) p. 220. Perennial, prostrate, proliferously branched, glaucous; stems smooth, stiff, widely spreading, rooting at the distant thickened leafy nodes and sending up slender branches; internodes 4–8 in. long. Leaves ½–1½ by $\frac{1}{16}$–⅛ in., linear-lanceolate, acuminate, rigid, distant, flat or tortuous, recurved, the upper very short; sheaths glabrous; ligule a hairy line. Spikes 3–6, digitate, ¾–1½ by ⅛–⅓ in.; rhachis slender, flexuous, pubescent. Spikelets imbricate, subsessile or very shortly pedicellate, 4–6-flowered, ⅛–⅓ in. long. Lower invol.-glume rather less than ⅓ in. long, ovate, acute, membranous; upper invol.-glume ⅙ in. long, lanceolate, aristate, coriaceous, with broad membranous margins; floral glumes ⅕ in. long, ovate, acute, apiculate, chartaceous, 3-nerved, the midnerve compound, the margins membranous, hairy below; palea oblong with ciliate keels. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 294; Duthie, Fodd. Grass. N. Ind. p. 57; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 377; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Watt, Dict. Econ. Prod. v. 3, p. 241.

DECCAN: Poona, *Lisboa*; Khandesh, *Lisboa.* SIND: *Dalzell!, Stocks,* 765!—DISTRIB. India (Panjáb, W. Peninsula); Afghanistan, N. Africa.

3. **Eleusine ægyptiaca,** *Desf. Fl. Atlant.* v. 1 (1798) p. 85 (*ægyptia*). Annual of variable habit, 1–1½ ft. high: stems sometimes prostrate, rooting from the proliferously branched nodes, geniculately ascending, compressed, glabrous, smooth. Leaves linear, 1–5 by $\frac{1}{12}$–⅛ in., tapering to a fine point, flat, glaucous, glabrous or hairy or hispidly ciliate with bulbous-based hairs; ligule a slightly ciliolate line. Spikes 2–6, digitately radiating, ½–1½ in. long; rhachis trigonous or dorsally flattened, rigid, often excurrent into a pungent mucro. Spikelets many, 3–5-flowered, spreading at right angles to the rhachis, up to ⅛ in. long. Glumes divaricate; lower invol.-glume ovate, acute, $\frac{1}{12}$ in. long; upper invol.-glume $\frac{1}{12}$ in. long (excluding the awn), suborbicular, the midnerve produced into a usually curved awn often as long as or sometimes longer than the glume; floral glumes gibbously ovate, up to ⅛ in. long, mucronate or awned; palea rather shorter than its glume, ovate-oblong, obtuse or 2-fid. Anthers about $\frac{1}{20}$ in. long. Grain subglobose, reddish, very rugose, $\frac{1}{25}$ in. in diam. Fl. B. I. v. 7, p. 295; Grah. Cat. p. 235; Trim. Fl. Ceyl. v. 5, p. 279; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 374; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1229; Watt, Dict. Econ. Prod. v. 3, p. 236. *Dactyloctenium ægyptiacum,* Willd. Enum. Hort. Berol. (1809) p. 1029; Dalz. & Gibs. p. 297.—Flowers: Sept.–Nov.

KONKAN: Ratnagiri, *Woodrow,* 41! DECCAN: Poona, *Jacquemont,* 399! and 486!; Sharanpur, near Nasik, *Woodrow.* S. M. COUNTRY: Badami, *Woodrow,* 12! SIND: *Stocks,* 637!—DISTRIB. Widely spread throughout tropical and subtropical regions.

4. **Eleusine aristata,** *Ehrenb. ex Boiss. Fl. Orient.* v. 5 (1881) p. 557. Perennial, slender, prostrate, proliferously branched; stem smooth, stiff, widely spreading, rooting at the distant thickened woody leafy nodes and sending up very slender branches 4–12 in. long; internodes 2–4 in. long. Leaves 1–4 by $\frac{1}{16}$–$\frac{1}{10}$ in., acuminate or pungent, glaucous, sparsely hairy, and the margins ciliate with bulbous-based hairs; sheaths glabrous or sparsely hairy; ligule obsolete. Spikes 3 or more, $\frac{1}{4}$–$\frac{1}{2}$ in. long, spreading or decurved, bearded at the base; rhachis excurrent into a pungent point. Spikelets about $\frac{1}{8}$ in. long (including the awns). Lower invol.-glume $\frac{1}{10}$ in. long, ovate, acute or apiculate, 1-nerved, with ciliate keel; upper invol.-glume $\frac{1}{8}$ in. long (including an awn $\frac{1}{30}$ in. long), suborbicular; floral glumes nearly $\frac{1}{8}$ in. long, broadly ovate, acute, cuspidate, glabrous, keeled, membranous, with a strong midnerve and weak lateral nerves; palea broad, the keels scaberulous. Anthers $\frac{1}{20}$–$\frac{1}{12}$ in. long. Grain ovoid, rugose. Fl. B. I. v. 7, p. 296; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440. *Eleusine sindica,* Duthie, Fodd. Grass. N. Ind. (1888) p. 58; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 377. *Dactyloctenium sindicum,* Boiss. Diag. sér. 2, fasc. 4 (1859) p. 131.

KONKAN: Ratnagiri, *Woodrow.* GUJARAT: Ahmedabad, *Woodrow.* SIND: *Stocks,* 637!; Mundgiro, *Stocks,* 637!—DISTRIB. India (Panjáb, Rajputana, W. Peninsula); Beluchistan, Afghanistan, Arabia, Nubia.

Eleusine coracana, Gærtn. Fruct. v. 1 (1788) p. 8, t. 1. Stem 2–5 ft. high, often as thick as the thumb; leaves broad; spikes stout, $\frac{1}{2}$ in. broad and reaching 6 in. long; grain globose. Only known in cultivation; very like *Eleusine indica,* from which it has probably originated. It is extensively grown in the hilly districts of the Bombay Presidency, and the grain is largely consumed by the poorer classes. Fl. B. I. v. 7, p. 294; Grah. Cat. p. 235; Dalz. & Gibs. Suppl. p. 97; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 373; Prain, Beng. Pl. p. 1229; Watt, Dict. Econ. Prod. v. 3, p. 237.—VERN. *Náchni*; *Nágli.*

60. **DINEBRA,** Jacq.

An annual leafy grass. Leaves flat. Spikelets 2–3-flowered, 2-seriate, secund and imbricating on short slender spreading or deflexed spikes collected in narrow pyramidal racemes, not jointed at the base; rhachilla slender, jointed at the base, produced beyond the flowering glumes and bearing an imperfect glume. Glumes 4–5; invol.-glumes persistent, much longer than the floral, lanceolate, awned, 1-nerved, keeled; lower invol.-glume shorter than the upper; floral glumes small, broadly ovate, subacute, hyaline, 1-nerved; palea hyaline, shorter than the glume, linear-oblong, obtuse, with finely ciliolate keels. Lodicules 2, minute. Stamens 3; anthers minute, didymous. Styles free, short; stigmas exserted at the apex of the glume, shortly penicillate. Grain narrowly ovoid, obscurely trigonous.—DISTRIB. India, W. Peninsula, Ceylon, Afghanistan, and westward to Senegal.

1. **Dinebra arabica,** *Jacq. Fragm.* (1809) p. 77. Stems 1–3 ft. high, tufted, stout or slender, erect or geniculately ascending, leafy

throughout; nodes glabrous. Leaves 3-8 by $\frac{1}{8}$-$\frac{1}{5}$ in., linear, finely acuminate, flaccid, glabrous or sparsely hairy, contracted at the insertion; sheaths thin, loose, glabrous; ligule a narrow lacerate membrane. Spikes $\frac{1}{2}$–$1\frac{1}{2}$ in. long, racemosely arranged along the axis of an inflorescence 4–12 in. long, alternate, single or in fascicles of 2–3 together; rhachis dorsally flattened, ventrally trigonous. Spikelets $\frac{1}{6}$ in. long (including the awns), alternate, sessile. Invol.-glumes lanceolate, hyaline, keeled, with slightly recurved minutely scaberulous awns, the lower invol.-glume shorter than the upper; floral glumes reaching $\frac{1}{10}$ in. long, ovate-oblong, subacute, white. Anthers $\frac{1}{40}$ in. long. Grain ellipsoid-oblong, trigonous, $\frac{1}{20}$ in. long, pale brown. Fl. B. I. v. 7, p. 297; Trim. Fl. Ceyl. v. 5, p. 280; Duthie, Fodd. Grass. N. Ind. p. 55; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 372; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1230; Watt, Dict. Econ. Prod. v. 3, p. 115. *Leptochloa calycina*, Kunth, Revis. Gram. v. 1 (1829) p. 91; Dalz. & Gibs. p. 296.—Flowers: Aug.

KONKAN: *Law!*, *Stocks!* DECCAN: Poona, *Woodrow*. GUJARAT: banks of the Tapti above Surat, *Dalzell & Gibson*; Surat, *Woodrow*; Morvi (Kathiawar), *Woodrow*. —DISTRIB. India (W. Peninsula); Ceylon, Afghanistan, and westward to Senegal.

61. **ENNEAPOGON,** Desv.

Perennial grasses. Leaves narrow, often convolute; ligules reduced to a line of hairs. Spikelets 3-flowered, in contracted or spike-like panicles; rhachilla disarticulating above the glumes; lowest floret hermaphrodite, the intermediate male or barren, the uppermost rudimentary. Invol.-glumes persistent, membranous, acute, obtuse or minutely truncate, 3–9-nerved. HERMAPHRODITE FLORET: glume very broad, much shorter (excluding the awns) than the invol.-glumes, 9-nerved, 9-awned, the awns subulate, equal or subequal, plumose, ciliate, or scaberulous; callus minute, short; palea ovate-oblong, 2-keeled. Lodicules 2, minute, cuneate, fleshy. Stamens 3. Ovary glabrous; styles distinct, short; stigmas laterally exserted, plumose. Grain oblong. INTERMEDIATE FLORET like the lower, but the floral glume shorter, glabrous, the ovary rudimentary or suppressed. UPPERMOST FLORET rudimentary or reduced to a tuft of hairs.—DISTRIB. Species about 6, in the dry warm regions of the Old World and in Australia; 1 species in Western N. America.

1. **Enneapogon elegans,** *T. Cooke*. Stem 3–18 in. high, slender, wiry, erect or ascending from a subwoody often thickened base; nodes often tomentose. Leaves $\frac{1}{2}$–5 in. long, usually convolute, pungently pointed, more or less softly pubescent; sheaths puberulous; ligule a line of hairs. Panicle 1–3 in. long; branches very short; rhachis villous. Spikelets with their awns up to $\frac{1}{4}$ in. long or more, sessile and pedicellate, softly tomentose, nearly white. Lower invol.-glume $\frac{1}{6}$ in. long, lanceolate, acute, 5–7-nerved; upper invol.-glume $\frac{1}{5}$ in. long, lanceolate, acute, 7-nerved; glume of hermaphrodite floret orbicular below, cleft above into 9 subulate awn-like lobes which are plumose in the lower half; palea ovate, 2-keeled, the keels pubescent. *Pappophorum elegans*, Nees, in Wight, Cat. n. 1771 (1833); Fl. B. I. v. 7, p. 301; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

SIND: Karachi district, *Woodrow*.—DISTRIB. India (Peshawar, Birma, W. Peninsula).

62. **HYGRORHIZA,** Nees.

A floating glabrous grass; stems stoutish, diffusely branched, rooting in dense masses at the nodes; branches short, erect, leafy. Leaves oblong, obtuse. Spikelets few, erect, 1-flowered, articulated on the pedicels, but tardily deciduous, long-awned, lanceolate, on the few widely-spreading branches of a shortly pedunculate panicle. Involglumes 0; floral glume solitary, thinly chartaceous, narrowed to an erect scaberulous awn, strongly 5-nerved, the nerves scabrid and ciliate, the lateral nerves marginal; palea much narrowed, 3-nerved, acuminate, with ciliate keel. Lodicules minute, suborbicular. Stamens 6; anthers long, very slender. Styles 2, free; stigmas plumose, laterally exserted. Grain oblong, narrowed at the base, obtuse, free within the glume and palea.—DISTRIB. India, Ceylon, Tonkin; species 1.

1. **Hygrorhiza aristata,** *Nees, in Edinb. N. Phil. Journ.* v. 15 (1833) p. 380. A glabrous floating grass; stem 1 ft. (and more) long, spongy, with feathery whorled roots at the nodes; internodes long or short. Leaves 1–3 by $\frac{1}{2}$–$\frac{3}{4}$ in., linear or ovate-oblong, obtuse, more or less scaberulous above, smooth and glaucous beneath, subcoriaceous, with smooth or slightly scaberulous margins, base rounded or subcordate; midrib short; sheaths smooth, inflated, somewhat auricled at the mouth, compressed, with ciliate margins; ligule a narrow membrane. Panicle about 2 in. long and broad, triangular; rhachis and branches slender, stiff, smooth, the lower branches sometimes deflexed. Spikelets very narrow, $\frac{3}{4}$ in. long (including the awn), sessile or pedicellate. Floral glume about $\frac{3}{8}$ in. long (excluding the awn), lanceolate, with 5 strong nerves, the lateral nerves forming thickened margins, hairy on the nerves outside, tapering into a long scaberulous awn as long as the body of the glume; palea as long as the glume. Fl. B. I. v. 7, p. 95; Trim. Fl. Ceyl. v. 5, p. 185; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1185; Wall, Dict. Econ. Prod. v. 4, p. 317. *Leersia aristata*, Roxb. Fl. Ind. v. 2 (1832) p. 207; Grah. Cat. p. 235. —Flowers: Apr.

GUJARAT: Chikli, *Woodrow.*—DISTRIB. of the genus.

63. **LEERSIA,** Sw.

Tall perennial slender marsh-grasses. Leaves narrow, flat. Spikelets 1-flowered (the florets 2-sexual), in slender contracted usually flaccid panicles with very slender branches, articulate on the pedicels above the rudimentary glumes, strongly laterally compressed. Involglumes reduced to an obscure hyaline entire or 2-lobed rim; floral glume solitary, oblong, acute, awnless, thinly chartaceous, 3–5-nerved, the lateral nerves forming the thickened margins of the glume, the keel and margins pectinately ciliate; palea narrow, linear or linear-lanceolate, as long as the glume, rigid, 3-nerved, dorsally ciliate and with hyaline margins. Lodicules 2. Stamens usually 6 (rarely 3 or fewer). Styles short, distinct; stigmas plumose, laterally exserted from the glume. Grain ovoid or oblong, compressed, free within the glume and palea.—DISTRIB. Species 6 or 7, mostly in the tropical and subtropical regions of both hemispheres.

1. **Leersia hexandra,** *Sw. Prod. Veg. Ind. Occ.* (1797) p. 131. Perennial; stems rooting in the mud, with floating flexuous branches several feet long, sending up erect or ascending slender leafy branches 2–4 ft. high, usually slender and weak, smooth, striate; nodes hairy with deflexed hairs. Leaves 3–8 by $\frac{1}{8}$–$\frac{1}{3}$ in., linear, tapering to a fine point, suberect, rather rigid, nearly glabrous, with scaberulous margins, base narrow; sheaths nearly smooth, glabrous, the margins eciliate; ligule short, obliquely truncate or 2-lobed, membranous. Panicle 2–4 in. long, pedunculate, oblong, laxly branched, narrow; rhachis filiform; branches filiform, flexuous, angular, smooth. Spikelets nearly $\frac{1}{6}$ in. long. Floral glume nearly $\frac{1}{6}$ in. long, ovate-oblong, somewhat boat-shaped, acute, shortly mucronate, strongly keeled, ciliate on the keel and margins, 5-nerved, the lateral nerves forming a thickened margin; palea as long as the glume, linear-lanceolate, subacute. Fl. B. I. v. 7, p. 94; Trim. Fl. Ceyl. v. 5, p. 184; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1185; Watt, Dict. Econ. Prod. v. 4, p. 619. *Leersia ciliata*, Roxb. Fl. Ind. v. 2 (1832) p. 207.—Flowers: Oct.

S. M. COUNTRY: Londa, *Gammie* ex *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Africa, America, Australia.

64. **ORYZA,** Linn.

Tall annual or perennial grasses. Leaves long, narrow, flat. Spikelets 1-flowered, loosely arranged on the branches of an elongate panicle, disarticulating above the 2 lowest glumes. Glumes 5; the 2 lower invol.-glumes below the articulation of the spikelet minute, scale-like (rarely absent); the 2 next invol.-glumes above the articulation of the spikelet subulate; floral glume solitary, dimidiate-oblong, coriaceous or chartaceous, 5–9-nerved, awnless or with a short or long straight terminal awn; palea linear or lanceolate, as long as the glume, 3–5-nerved, coriaceous, with membranous margins. Lodicules 2, entire or 2-lobed. Stamens 6; anthers linear. Style short, free; stigmas laterally exserted from the glume. Grain narrowly oblong, compressed, closely covered by or adnate to the glume and the palea.—DISTRIB. Species 5 or 6, tropical.

1. **Oryza coarctata,** *Roxb. Fl. Ind.* v. 2 (1832) p. 206. Stem 4–6 ft. high, erect from a stout creeping rhizome, smooth, hard and polished. Leaves 6–15 by $\frac{1}{4}$–$\frac{1}{2}$ in., coriaceous, linear, caudate-acuminate, with spinulose margins; sheaths glabrous, polished, reticulate like basket-work; ligule very narrow, fringed with short hairs. Panicles 4–8 in. long, spike-like; rhachis and branches trigonous, stiff, smooth. Spikelets reaching $\frac{5}{8}$ in. long (including the awn). Glumes 5, the outer (below the articulation of the spikelet) consisting of 2 opposite minute appressed rounded or truncate thick scales, one attached lower than the other; the 2 glumes above the articulation of the spikelet subulate, the lower of the pair $\frac{1}{10}$ in., the upper $\frac{1}{8}$ in. long. Floral glume solitary, $\frac{5}{8}$ in. long, lanceolate, boat-shaped, rounded and with a large projecting wing on the back, cuspidate with a stout hard glabrous white awn about $\frac{1}{8}$ in. long, 7–9-nerved, the lateral nerve forming a thickened margin to the glume. Palea (upper floral glume of some authors) $\frac{1}{2}$ in.

long, linear-lanceolate, cuspidately acuminate, with 5 strong nerves and hyaline margins. Lodicules large, membranous, subquadrate or trapeziform. Fl. B. I. v. 7, p. 93; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1184.

SIND: Karachi in Herb. Kew. without collector's name!; Shikarpur, *Dr. King's Collector*!—DISTRIB. India (Sundribans, W. Peninsula).

Oryza sativa, Linn. Sp. Pl. (1753) p. 333. The cultivated rice-plant which is the staple food of millions of the inhabitants of India. The wild form is said to be indigenous in Rajputana, Sikkim, Bengal, the Khasia Hills, Central India, the Circars, and Pegu. Watt, Dict. Econ. Prod. v. 5, pp. 498–654, gives an exhaustive account of the mode of culture and distribution of the rice-plant in India. Fl. B. I. v. 7, p. 92; Grah. Cat. p. 235; Dalz. & Gibs. Suppl. p. 98; Trim. Fl. Ceyl. v. 5, p. 182; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1183.

65. **CENTOTHECA,** Desv.

Tall leafy perennial grasses. Leaves broadly oblong or lanceolate, with trabeculate veins. Spikelets 1–3-flowered, on the long spike-like branches of a lax subsimple panicle, not articulate at the base, laterally compressed, all perfect or 1 or more upper neuter; rhachilla slender, articulate at the base and between the flowering glumes, not produced beyond the uppermost. Invol.-glumes distant at their insertions, ovate-oblong, persistent, empty, 3–5-nerved; upper invol.-glume larger than the lower; floral glumes broadly ovate, obtuse, apiculate, dorsally rounded, 7-nerved, naked or the upper usually bearing soft erect at length deflexed tubercle-based spines or bristles; palea narrow, with ciliolate keels. Lodicules 0. Stamens 2–3; anthers linear. Styles short, free; stigmas narrow, with short hairs. Grain ovoid, acute, terete, free within the glumes.—DISTRIB. Tropical Asia, Africa, Australia; species doubtfully 3.

1. **Centotheca lappacea,** *Desv. in Nouv. Bull. Soc. Philom.* v. 2 (1810) p. 189, *et in Journ. Bot.* (1813) v. 1, p. 71. A stout erect grass; stem 1–3 ft. high, erect from a woody rootstock with stout root-fibres. Leaves 4–10 by 1–1¼ in., oblong-lanceolate, acute or acuminate, more or less unequal-sided, thin, smooth, glabrous or sparsely hairy, 9–11-nerved, base narrowed; sheaths usually glabrous except at the mouth; ligule a broad sometimes lacerate membrane. Panicle 8–10 in. long and broad, branches slender, suberect. Spikelets ⅛ in. long, oblong-lanceolate, acute. Invol.-glumes distant; lower $\frac{1}{10}$–$\frac{1}{8}$ in. long, ovate, acute, apiculate, 3-nerved; upper $\frac{1}{8}$–$\frac{1}{6}$ in. long, ovate-oblong, acute, apiculate, 3–5-nerved; lower floral glume $\frac{1}{6}$–$\frac{1}{5}$ in. long, broadly ovate-oblong, obtuse, apiculate, 7-nerved; upper floral glume about as long as the lower, oblong, obtuse, 7-nerved, finely apiculate, usually with 2 rows of tubercle-based ultimately deflexed bristles close to each margin in the upper part of the glume, sometimes naked; palea $\frac{1}{10}$–$\frac{1}{8}$ in. long, narrowly lanceolate, acute, with ciliolate keels. Fl. B. I. v. 7, p. 332; Trim. Fl. Ceyl. v. 5, p. 304; Woodr. in

Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1217. *Melica diandra*, Roxb. Fl. Ind. v. 1 (1832) p. 327; Grah. Cat. p. 236.—Flowers: Oct.

KANARA: Kadgal (N. Kanara).—DISTRIB. India (Himalayas, Khasia Hills, Central India, Birma); Ceylon, Malaya, China, Polynesia, Tropical Africa.

66. **ELYTROPHORUS,** Beauv.

An annual, erect, glabrous grass. Leaves very narrow, flat. Inflorescence of globose clusters of minute sessile spikelets crowded together in long continuous or interrupted catkin-like spikes (rarely on the short spike-like branches of a very contracted raceme). Spikelets short (many imperfect or reduced to empty glumes), strongly laterally compressed, not articulate at the base, 4–6-flowered; rhachilla very short, articulate at the base and between the flowering glumes, but not beyond the upper. Invol.-glumes subequal, lanceolate, aristately acuminate, hyaline, 1-nerved, glabrous or ciliate, keeled; floral glumes rather longer, with a long awn, 3-nerved, with ciliate margins, the uppermost neuter; palea shorter than the glume, very broad, truncately 3-lobed, the lobes ciliate, keels distant, winged, smooth. Lodicules 2, obliquely oblong. Stamens 1–3; anthers minute. Styles free, long; stigmatic hairs very short. Grain minute, fusiform or narrowly oblong; pericarp loose at both ends.—DISTRIB. Tropical Asia, Africa, and Australia.

1. **Elytrophorus articulatus,** *Beauv. Agrost.* (1812) p. 67. Annual, 6–24 in. high; stems erect from a densely fibrous root, as thick as a crow-quill or less. Leaves longer or shorter than the stem, linear, acute, $\frac{1}{10}$–$\frac{1}{8}$ in. broad, smooth, flaccid, base narrow; sheaths membranous, loose; ligule small, membranous, lacerate. Inflorescence 6–12 in. long, often longer than the rest of the plant. Spikelets $\frac{1}{5}$ in. long (including awns), as broad as long. Lower invol.-glume $\frac{1}{10}$ in. long; upper invol.-glume $\frac{1}{8}$ in. long; floral glume (including awn) $\frac{1}{5}$ in. long, ovate-lanceolate; palea $\frac{1}{10}$ in. long, broadly oblong, truncately 3-lobed. Fl. B. I. v. 7, p. 306; Trim. Fl. Ceyl. v. 5, p. 288; Duthie, Fodd. Grass. N. India, p. 61; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 379; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1218.—Flowers: Nov.–Feb. VERN. *Jangli-rála.*

KONKAN: *Law!*; Kalyan, *Woodrow.* S. M. COUNTRY: Londa, *Woodrow.* GUJARAT: Godra, *Woodrow.*—DISTRIB. More or less throughout India; Ceylon, Tropical Asia, Africa, and Australia.

67. **ÆLUROPUS,** Trin.

Low much-branched very rigid perennial leafy grasses. Leaves distichous, short, strict, usually convolute, coriaceous, pungent. Spikelets 6-many-flowered, minute, sessile, densely crowded in terminal villous heads, laterally compressed, not articulate at the base; rhachilla obscurely jointed at the base, not produced beyond the upper glume; internodes very short. Glumes many, oblong, membranous, apiculate, the margins and tips broadly hyaline. Invol.-glumes unequal, persistent; lower invol.-glume narrowly oblong, 1–3-nerved; upper invol.-

glume much larger, 5–7-nerved from below the hyaline tip; floral glumes oblong, apiculate, 7–9-nerved; palea very large, broadly cuneate, 3-lobed, the lobes erose, flaps broad, keels nearly smooth or ciliolate. Lodicules obliquely truncate. Stamens 3; anthers minute. Styles short, free; stigmas short, plumose. Grain oblong or obovoid, free within the glumes.—DISTRIB. From the Mediterranean and Caspian regions to the Panjáb, Sind, and S. India; species few.

1. **Æluropus villosus,** *Trin. ex L. Mey. Verz. Pflanz. Cauc.* (1831) p. 18. Perennial, rigid, tufted; stems 3–8 in. long, crowded on a woody rootstock with stout root-fibres, as thick as a crow-quill, simple or branched, smooth and polished; branches sometimes elongate, divaricate, 6–10 in. long, resembling stolons, giving off branchlets at the nodes but not rooting; nodes glabrous; internodes short or long. Leaves $\frac{1}{6}$–1 in. long, narrowly lanceolate, acuminate, flat or convolute and subulate, erect or spreading, glabrous or sparsely ciliate; sheaths short, terete or inflated, glabrous or ciliate; ligule a shortly hairy ridge. Heads of spikelets shortly pedunculate, subglobose or oblong. Spikelets reaching $\frac{1}{8}$ in. long, 4–8-flowered, crowded, sessile, villous with soft hairs, pale green or white. Lower invol.-glume $\frac{1}{10}$ in. long, ovate-oblong, subacute, hairy and with ciliate margins; upper invol.-glume $\frac{1}{8}$ long, similar; floral glumes $\frac{1}{8}$ in. long, ovate, subobtuse, apiculate, many-nerved, hairy and ciliate, the lower 2–4 sometimes neuter; palea broad, 3-lobed. Anthers $\frac{1}{16}$ in. long, oblong. Grain $\frac{1}{40}$ in. long, obovoid-oblong, dorsally compressed. Fl. B. I. v. 7, p. 334; Trim. Fl. Ceyl. v. 5, p. 304; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441. *Æluropus lagopodioides,* Trin. ex Thw. Enum. (1864) p. 374; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 389. *Dactylis lagopoides,* Linn. Mantiss. 1 (1767) p. 33; Grah. Cat. p. 236; Dalz. & Gibs. p. 298 (*lagopodioides*).—Flowers: Nov.–Dec.

KONKAN: *Stocks!, Law!*; on the salt ground near the sea, *Graham, Lisboa*; Salsette, *Wight,* 53! SIND: *Dalzell!*; near salt creeks in Sind, *Stocks,* 506!; Karachi, *Woodrow.*—DISTRIB. India (Panjáb, W. Peninsula, in salt ground); Ceylon, Mediterranean region, Arabia, Persia, Afghanistan, Caspian regions.

68. **OROPETIUM,** Trin.

Dwarf densely-tufted erect perennial or annual grasses. Leaves short, filiform. Florets 1–3, hermaphrodite or the upper rudimentary, shorter than the upper invol.-glume. Spikelets minute, half immersed in the alternating distichous cavities of a simple slender curved inarticulate spike, sessile, not articulate on the rhachis; rhachilla bearded, articulate at the base, not produced beyond the flowering glume. Lower invol.-glume minute, hyaline, persistent; upper invol.-glume linear-lanceolate, rigid, recurved in fruit, tip subobtuse or emarginate; floral glumes concealed by the upper invol.-glume which closes the cavity in which the floral glume is hidden, sessile, ovate or elliptic, hyaline, 1-nerved; callus very short, bearded with silky hairs; palea as long as the glume; keels smooth. Lodicules very minute, obliquely cuneiform. Stamens 3; anthers oblong. Styles short; stigmas plumose, laterally exserted. Grain oblong, smooth, brown, free in the glume.—DISTRIB. Species 6, in India, Algeria, and S. Africa.

1. **Oropetium Thomæum,** *Trin. Fund. Agrost.* (1820) p. 98. Whole plant 2–3 in. high, forming hard tufts with capillary root-fibres; stems compressed. Leaves shorter or longer than the stems, erect or curved, filiform, acute, coriaceous, striate, sparsely ciliate with long hairs; sheaths membranous, compressed; ligule an erect lacerate membrane. Spikes 1–1½ by $\frac{1}{30}$ in., erect, straight or slightly curved; rhachis undulating, 4-gonous. Spikelets reaching $\frac{1}{10}$ in. long, acute, 1-flowered. Lower invol.-glume minute, hyaline; upper invol.-glume $\frac{1}{12}$ in. long, linear-lanceolate, rigid, recurved in fruit; floral glume $\frac{1}{16}$ in. long, semicircular in profile, 2-fid, hyaline; callus bearded. Anthers $\frac{1}{50}$ in. long. Grain $\frac{1}{30}$ in. long, somewhat fusiform, reddish-brown. Fl. B. I. v. 7, p. 366; Dalz. & Gibs. p. 300; Trim. Fl. Ceyl. v. 5, p. 271; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1231.

On old walls, *Dalzell & Gibson.* DECCAN: Poona, *Woodrow*; Junnar near Poona, *Woodrow.*—DISTRIB. Throughout the plains of India; Ceylon.

69. **BAMBUSA,** Schreb.

Shrubs or trees usually large and cæspitose (rarely climbing); stem-sheaths broad, the blade often triangular. Leaves shortly petiolate, not tessellate by nervules but sometimes so by pellucid glands; sheaths variously auricled. Spikelets 1-flowered, usually arranged in a large leafless panicle bearing heads or spiciform branches, or in leafy panicles, or in paniculate spikes. Lower glumes 1–4, empty or bulbiferous; flowering glumes ovate-lanceolate, the uppermost imperfect; palea 2-keeled. Lodicules 2 or 3, membranous, ciliate, rarely obsolete. Stamens 6, free. Ovary oblong or obovoid, with a hairy tip; styles short or long; stigmas 2–3. Grain oblong or linear-oblong, furrowed on one side; pericarp thin, adherent to the seed.—DISTRIB. Species about 50, Eastern Asia, 1 in Australia.

1. **Bambusa arundinacea,** *Willd. Sp. Pl.* v. 2 (1799) p. 245. Thorny; stems many, tufted on a stout rootstock, 80–100 ft. high by 6–7 in. in diam., usually graceful and curving; nodes prominent (the lowest rooting), the lower emitting horizontal, almost naked shoots armed at the nodes with 2–3 stout recurved spines sometimes 1 in. or more long; internodes up to 18 in. long; walls 1–2 in. thick; stem-sheaths coriaceous, variable in shape, up to 12–15 by 9–12 in., striate, with rounded tip and plaited margins, when young orange-yellow streaked with green or red and thickly ciliate with golden hairs, blade up to 4 in. long, triangular, acuminate, glabrous outside, densely hirsute inside, the margins decurrent, thickly ciliate; ligule narrow, entire or fringed with pale hairs. Leaves up to 7–8 by 1 in., linear or linear-lanceolate, tip stiff, glabrous or puberulous beneath, one or more margins scabrous, base rounded, ciliate, midrib narrow, nerves 4–6 with 7–9 intermediate and a few transverse pellucid glands; leaf-sheath ending in a thick callus and shortly bristly auricle; ligule short. Inflorescence an enormous panicle often occupying the whole stem; branchlets bearing loose clusters of pale, suberect, lanceolate, acute, glabrous spikelets ½–1 by ⅕ in. Invol.-glumes 2 or 0, ovate-lanceolate, acute or mucronate, ⅕–⅓ in. long, many-nerved, empty; floral glumes 3–7, the uppermost

1–3 male or neuter; palea subacute with 2 ciliate keels. Lodicules 3, ovate or subovate, hyaline, ciliate, 1–3-nerved. Anthers yellow, obtuse. Style short. Grain $\frac{1}{5}$–$\frac{1}{3}$ in. long, oblong, beaked by the style-base, grooved on one side. Fl. B. I. v. 7, p. 395; Grah. Cat. p. 239; Dalz. & Gibs. p. 299; Gamble, Bamb. Brit. Ind. (1896) p. 51; Trim. Fl. Ceyl. v. 5, p. 313; Talb. Trees, Bomb. ed. 2, p. 347; Bedd. For. Man. in Fl. Sylvat. p. ccxxxi; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442; Prain, Beng. Pl. p. 1232; Watt, Dict. Econ. Prod. v. 1, p. 390. *Bambusa Arundo*, Klein & Nees, in Linnæa, v. 9 (1834) p. 471; Dalz. & Gibs. p. 299.—VERN. *Kalak*.

KONKAN: Western Ghâts, *Gamble*. GUJARAT: *Gamble*; Dangs, *Woodrow*.—DISTRIB. Throughout India except the Himalayas; Ceylon.

Bambusa vulgaris, Schrad. in Wendl. Collect. v. 2 (1810) p. 26, t. 47. Unarmed; stems 20–50 ft. high by 2–4 in. in diam., rather distant, green, yellow, or striped; nodes hardly raised; internodes 10–18 in. long; stem-sheaths 6–10 by 7–9 in., the top rounded, retuse. Leaves 6–10 by $\frac{2}{3}$–$1\frac{2}{3}$ in., pale, linear-lanceolate, petiolate, 6–8-nerved; leaf-sheaths striate, laxly hairy; ligule short, ciliate. Panicle large, leafy. Spikelets $\frac{5}{8}$–$\frac{7}{8}$ in. long, in bracteate clusters of 3–10. Invol.-glumes 1–2, ovate, acute, empty; floral glumes 6–10, larger, then 1 imperfect flower above. Cultivated in Bombay, Poona, Sattara, and Kolhapur, but not indigenous. Fl. B. I. v. 7, p. 391; Dalz. & Gibs. p. 299; Bedd. For. Man. in Flor. Sylvat. p. ccxxxii; Gamble, Bamb. Brit. Ind. (1896) p. 43; Trim. Fl. Ceyl. v. 5, p. 314; Talb. Trees, Bomb. ed. 2, p. 347; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442; Prain, Beng. Pl. p. 1232; Watt, Dict. Econ. Prod. v. 1, p. 394.—VERN. *Udha-bâns*.

VAR. *striata*, Gamble, l. c. p. 44. Rather smaller in size, has the stems striped with yellow and green, while the branchlets are yellow and the leaves somewhat smaller and paler. A very handsome variety well deserving of a place in gardens. There is an excellent plate in the Bot. Mag. (6079) which shows the variegated stem well. It is supposed to be a native of China and Japan, and is probably the result of cultivation (*Gamble*). *Bambusa striata* (sp.), Lodd. ex Lindl. in Penny Cyclop. v. 3 (1835) p. 357.

Bambusa nana, Roxb. Hort. Beng. (1814) p. 25. A thickly-growing evergreen cæspitose shrub; stems 6–10 ft. high, green when young, afterwards yellow. It is a native of China and Japan, and is sometimes grown in gardens. It makes a good hedge. Fl. B. I. v. 7, p. 390; Gamble, Bamb. Brit. Ind. (1896) p. 40; Trim. Fl. Ceyl. v. 5, p. 315; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442; Prain, Beng. Pl. p. 1232; Watt, Dict. Econ. Prod. v. 1, p. 392.—VERN. *Bârik*; *Bámbu*.

70. **OXYTENANTHERA,** Munro.

Arborescent or scandent bamboos, usually of a medium or small size, unarmed, often gregarious; rootstock stout, usually creeping and stoloniferous; stem-sheaths various, usually rather narrow, the imperfect blade also narrow. Leaves variable, shortly petiolate. Inflorescence a large panicle of spicate heads of few or many spikelets. Spikelets

narrow, elongate, conical, 1–3-flowered, the uppermost usually fertile. Involucre-glumes 1–3, empty; floral glumes ovate, elongate, mucronate. Palea of lower florets 2-keeled, of upper florets convolute with obscure or obsolete keel. Lodicules 0. Stamens 6; filaments connate in an ultimately elongated membranous tube. Ovary ovoid; style slender; stigmas 1–3, more or less plumose. Grain elongate, beaked, grooved, smooth.—DISTRIB. Species 9, of which 8 are found in S. India, Birma, and Malaya, the remaining 1 a native of Tropical Africa.

Spikelets 1-flowered; style glabrous; anthers bristly-apiculate. 1. *O. monostigma.*
Spikelets 2-flowered; style hairy; anthers acute, not apiculate. 2. *O. Stocksii.*

1. **Oxytenanthera monostigma,** *Bedd. For. Man. in Flor. Sylvat.* (1873) p. ccxxxiii, *et Icon. Pl. Ind. Or.* (1874) p. 56, t. 234. A medium-sized bamboo; stems 10–15 ft. high by about 1 in. in diam., solid, covered with soft pale yellow velvety tomentum; nodes not very prominent; internodes long; stem-sheaths 6–9 in. long by 3 in. broad at the base, narrowed to the 2-lobed tip; blade in the sinus imperfect, about 3 in. long, linear-lanceolate, striate; ligule long, fimbriate. Leaves variable, pale green, 6–8 by 1½ in., linear-lanceolate, acuminate, unequally rounded at the base into a flat petiole, ending above in a setaceous twisted point, glabrous or nearly so above, sparsely hairy and pale beneath; midrib below yellow, shining; nerves 7–12; leaf-sheaths striate; ligule often ⅓ in. long, acute or rounded. Panicle large, terminal, of spicate branches bearing dense globular often large heads of spikelets up to 2½ in. in diam. Spikelets ¾–1 in. long, less than 1 in. broad, 1-flowered, with a long spinous apiculation, very numerous, the fertile and sterile about equal in numbers. Involucre-glumes 2–3, mucronate, empty; floral glume long, narrow, linear-lanceolate, convolute, with a long mucro; palea shorter than its glume, concave, not keeled, obtuse. Stamens exserted; anthers long, bristly-apiculate, the bristle somewhat hairy at the tip. Style long, glabrous; stigma at length curved, thickened. Grain narrow, linear-oblong, grooved, tipped with the conic style-base. Fl. B. I. v. 7, p. 402; Gamble, Bamb. Brit. Ind. (1896) p. 74, t. 65; Talb. Trees, Bomb. ed. 2, p. 347; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442.—VERN. *Choua.*

KONKAN: Ghâts, *Talbot, Woodrow.* DECCAN: Sákhar-Pathár hill near Lanoli, *Woodrow*; Sattara Ghâts, *Brandis*; Mahableshwar, *Fagan*; Poona districts, *Wroughton*; Ahmednagar, *Wilkins.* S. M. COUNTRY: *Ritchie,* 820. KANARA: N. Kanara, *Woodrow, Talbot.*—DISTRIB. India (W. Peninsula).

2. **Oxytenanthera Stocksii,** *Munro, in Trans. Linn. Soc.* v. 26 (1868) p. 130. A slender bamboo; stems 30 ft. high by 1–1½ in. in diam., grey-green, covered when young with a white or grey deciduous tomentum; nodes with a softly pubescent ring; internodes 6–12 in. long; stem-sheaths 6–9 in. long by 3–7 in. wide at the base, tapering upwards to a concavely truncate top, appressedly brown-hairy on the back, ciliate on the margins; blade imperfect, subulate, acuminate, rounded at the base and again expanded into a rounded, waved, long-fringed auricle on the top of the sheath; ligule ⅓ in. long, deeply fimbriate, conspicuous. Leaves 4–8 by ⅜–¾ in., rounded or attenuate at the base into a very short petiole $\frac{1}{10}$ in. long, the top ending in a setaceous point, glabrous or nearly so above, glabrous or hairy below, with scabrous margins; midrib narrow; nerves 5–6; leaf-sheaths

striate, glabrous or at first pubescent; ligule long, dentate. Panicle large, of spicate heads reaching 1 in. in diam., with many closely packed spinous spikelets, the heads supported by rounded chaffy bracts. Spikelets $\frac{3}{8}$–$\frac{1}{2}$ in. long, narrow, glabrous, mucronate, many fertile mixed with a few sterile. Invol.-glumes 2, ovate, mucronate, 5–7-nerved, then 2 hermaphrodite florets; floral glumes ovate, subacute, with a strong mucro from the back; palea of the lower floret as long as the floret, 5-nerved between the 2 ciliate keels, obtuse, that of the upper floret concave, convolute, obtuse. Stamens long-exserted; anthers short, acute. Ovary ovoid, hairy; style long, hairy; stigma simple, plumose. Fl. B. I. v. 7, p. 403; Bedd. For. Man. in Flor. Sylvat. p. cexxxiii; Gamble, Bamb. Brit. Ind. (1896) p. 75, t. 66; Talb. Trees, Bomb. ed. 2, p. 348; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442. —Flowers: Nov. VERN. *Chivari*; *Konda*.

KONKAN: *Stocks*. DECCAN: Panchgani (planted), *Woodrow*. KANARA: Kumpta, *Talbot*; commonly cultivated along the coast; rare in the Ghát forests of N. Kanara, *Talbot*.—DISTRIB. India (W. Peninsula).

71. **DENDROCALAMUS,** Nees.

Arborescent unarmed bamboos with densely branching rootstocks. Leaves shortly petiolate, the transverse nervules represented by pellucid glands. Spikelets in globose clusters on the long branches of a compound panicle, ovoid, 2–6-flowered. Invol.-glumes 2–3, empty, ovate, acute, many-nerved; floral glumes like the empty; palea of lower florets keeled, of the upper dorsally rounded, ciliate. Lodicules rare. Stamens 6; filaments free. Ovary hairy above, often depressed; stigma usually simple. Grain small; pericarp coriaceous or crustaceous. —DISTRIB. Species 16; South-eastern Asia.

1. **Dendrocalamus strictus,** *Nees, in Linnæa*, v. 9 (1834) p. 476. A deciduous densely tufted bamboo with strong stems 20–50 ft. high by 1–3 in. in diam., which are solid or only with a small cavity, glaucous-green when young, dull green or yellowish when old; nodes swollen, the lower often rooting; internodes 12–18 in. long; upper branches decurved; stem-sheaths variable, the lower 3–12 in. long, covered on the back with golden-brown stiff hairs (or in dry localities sometimes glabrous), striate, rounded on the top, ciliate on the margins, very slightly auricled, the imperfect blade triangular-subulate, hairy on both sides, especially so within; ligule narrow. Leaves 1–2 in. long in dry localities, up to 10 in. long in moist ones, $\frac{1}{4}$–$1\frac{1}{4}$ in. broad, rounded suddenly at the base into a short petiole, gradually narrowed upwards into an acuminate twisted point, rough and often hairy above, softly hairy beneath, with scabrous margins; nerves 3–6 pairs, with interposed pellucid glands; leaf-sheaths striate, hairy, callus prominent, auricle short, ciliate with a few wavy deciduous hairs; ligule narrow, serrate. Inflorescence a large branching panicle of dense globular heads about 1 in. in diam., $1\frac{1}{2}$–2 in. apart; rhachis rounded, smooth. Spikelets usually hairy, spinescent, the fertile intermixed with many sterile smaller ones, $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{5}$ in., with 2–3 fertile florets. Invol.-glumes 2 or more, ovate, spinescent, many-nerved; floral glumes ovate, ending in a sharp spine, surrounded by ciliate tufts of hairs; palea

ovate or obovate, emarginate, the lower ones 2-keeled, the uppermost keelless, 6–8 nerved. Stamens long-exserted; anthers yellow, shortly apiculate. Ovary stipitate, turbinate; style long; stigma simple, plumose. Grain ½ in. long, ovoid to subglobose, brown, shining, hairy above, beaked with the persistent style-base. Fl. B. I. v. 7, p. 404; Bedd. Flor. Sylvat. t. 325, et For. Man. p. ccxxxv; Gamble, Bamb. Brit. Ind. (1896) p. 78, tt. 68, 69; Talb. Trees, Bomb. ed. 2, p. 347; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442; Prain, Beng. Pl. p. 1234; Watt, Dict. Econ. Prod. v. 3, p. 72. *Bambusa stricta*, Roxb. Hort. Beng. (1814) p. 25; Dalz. & Gibs. p. 299.—VERN. *Kania báns*; *Més.*

Throughout the Presidency in deciduous forests, *Talbot*. KONKAN: planted, *Woodrow*. DECCAN: rocky hills, *Gamble*. GUJARAT: Panch Mahâls, *Woodrow*.—DISTRIB. Throughout India; Java. This bamboo is known as the "male bamboo."

Dendrocalamus giganteus, Munro, in Trans. Linn. Soc. v. 26 (1868) p. 150. A gigantic bamboo sometimes grown in gardens, a native of the Malay Peninsula and Penang. It is perhaps the largest bamboo known, the stems reaching 100 ft. high with a diameter of 8–10 in. Stem-sheaths very large, 20 in. long and about as broad at the base, the imperfect blade 5–15 in. long and reaching 3½ in. broad. Leaves up to 20 by 4 in., cuspidately acuminate; ligule broad, fimbriate, sometimes cleft in the middle. Inflorescence a very large panicle with slender curved branches. Spikelets ½–⅝ by ⅓ in., many-flowered, ovate, acute, spiny. Anthers ⅓–⅖ in. long, acuminate at the tip. Fl. B. I. v. 7, p. 406; Gamble, Bamb. Brit. Ind. (1896) p. 87, t. 76; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442.—DISTRIB. Malay Peninsula; Penang.

72. **OCHLANDRA,** Thw.

Shrubby gregarious reed-like bamboos; stems small, thin-walled, erect; internodes rather long; stem-sheaths thin, persistent, auricles small. Leaves small to moderate-sized, linear or oblong-lanceolate, acuminate, shortly petiolate; leaf-sheaths striate, fringed; ligule usually short. Inflorescence a terminal spike or spike-like panicle on a leafy branchlet; spikelets verticillate, partly fertile, partly sterile. Spikelets 1-flowered, often very large. Invol.-glumes 2–6, variable, usually mucronate, empty; floral glume similar to the last invol.-glume, mucronate. Palea membranous, not keeled. Lodicules 1–several, conspicuous, variable, usually appressed to the filaments. Stamens many, from 6 to 120; anthers large, narrow, usually apiculate. Ovary narrow; style elongate; stigmas 4–6, plumose or papillose. Grain large or very large, ovoid, long-beaked, supported by the persistent glumes; pericarp very thick, fleshy.—DISTRIB. India (W. Peninsula), Ceylon, Malay Peninsula; species 7.

1. **Ochlandra Talboti,** *Brandis, Ind. Trees* (1906) p. 684. Stems numerous in dense clumps, slender, ½–¾ in. in diam., hollow, sometimes scandent; nodes thickened, shining, glabrous. Leaves glabrous, pale, lanceolate, long-acuminate, 8–12 by 1½–2½ in., on a petiole ¼ in. long;

leaf-sheaths glabrous, the bristles at the mouth early deciduous; ligule bearded. Spikelets in half whorls on a terminal erect spike 4–8 in. long, glabrous or with a few soft hairs at the tips of the glumes, the fertile spikelets few, 1¼ in. long. Invol.-glumes 3–6, empty. Lodicules 6, linear, nerved. Stamens 25–40; anthers ½ in. long, minutely apiculate; filaments long, slender. Ovary prolonged into a slender style 1½ in. long; stigmas 5, papillose (*Talbot*). Grain ovoid, 2–3 by ⅓ in., narrowed into a long beak, supported by 4 persistent glumes. Flowered in 1896 in N. Kanara and had not been seen in flower for many years till then in that district. *Ochlandra Rheedei* var. *sivagiriana*, Talbot, Trees, Bomb. p. 348 (*not* of Gamble). *O. stridula*, Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442 (*not* of Thwaites).—VERN. *Huda*.

KANARA: *Talbot*.

This bamboo has been identified with *O. Rheedei* var. *sivagiriana* and with *O. stridula*, both of which plants flower annually, while this flowers at long intervals according to Mr. Talbot.—DISTRIB. India, W. Peninsula.

The following non-indigenous plants not belonging to any of the foregoing genera are grown for ornament or for economic use:—

Zea Mays, Linn. Sp. Pl. (1753) p. 971. The well-known *Maize* or *Indian Corn*, a tall stout annual monœcious grass, a native of America, is cultivated widely to afford a forage for cattle. It is not very largely cultivated for flour in the Bombay Presidency, though on the Panch Mahâls it ranks as a staple. It is grown widely for use as a vegetable, the unripe cobs being boiled or roasted. Fl. B. I. v. 7, p. 102; Grah. Cat. p. 240; Dalz. & Gibs. Suppl. p. 100; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1209; Watt, Dict. Econ. Prod. v. 6, part 4, p. 327.—VERN. *Buta*; *Maka*.

Avena sativa, Linn. Sp. Pl. (1753) p. 79. The common *Oat*, so well known and largely used as food for horses in Europe, is rarely cultivated in the Bombay Presidency. It has been grown in Hyderabad (Sind), but has not been found as good for horse-feeding as the *Gram* (*Cicer arietinum*). Fl. B. I. v. 7, p. 275; Dalz. & Gibs. Suppl. p. 97; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1217; Watt, Dict. Econ. Prod. v. 1, p. 356.—VERN. *Jai*.

Arundo Donax, Linn. Sp. Pl. (1753) p. 81. A native of the Lower Himalayas, the Panjâb, Naga, Nilgiri and Kurg Hills, extending to Europe and N. Africa, is often grown as an ornamental grass in clumps in large gardens or on lawns. It is a tall grass 6–10 ft. high, with flowers in large erect thyrsiform decompound panicles 1–2 ft. long. A variegated variety is also grown. Fl. B. I. v. 7, p. 302; Woodr. Gard. in Ind. ed. 5 (1889) p. 548; Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1218; Watt, Dict. Econ. Prod. v. 1, p. 336.

Triticum sativum, Lam. Flor. Fr. ed. 1, v. 3 (1778) p. 625. *Wheat*, widely cultivated, but nowhere found wild. Duthie, Fodd. Grass. N. Ind. (1888) p. 68; Watt, Dict. Econ. Prod. v. 6, part 4, p. 89.

Triticum æstivum, Linn. Sp. Pl. (1753) p. 85; Roxb. Fl. Ind. v. 1, p. 359; Grah. Cat. p. 234; Dalz. & Gibs. Suppl. p. 97. *T. vulgare*, Villars, Hist. Pl. Dauph. v. 2 (1787) p. 153; Hook. f. Fl. B. I. v. 7, p. 367; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1231.—VERN. *Gahu*; *Ghui*. The specific name *sativum* is 9 years prior to that of *vulgare*.

As is not uncommon in the case of plants under cultivation for a long period, under varying conditions of climate and soil, many varieties or forms exist, of which the two following are those chiefly cultivated in the Bombay Presidency :—

VAR. *spelta*. *Covered-Grain Wheat*; *Spelt Wheat*. An inferior hard red wheat, the grain covered with a husk of indurated glumes, cultivated widely in the Bombay Presidency. *Triticum Spelta* (sp.), Linn. Sp. Pl. (1753) p. 86; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 (*Speltum*).—VERN. *Khapala*; *Jod-Gahu*.

VAR. *pilosa*. Cultivated widely. The outer glumes are covered with much soft tomentum (*Dalzell & Gibson*). *Triticum pilosum* (sp.), Dalz. & Gibs. Bo. Fl. (1861), Suppl. p. 97; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—VERN. *Bakshi*; *Kala-Kusali*; *Kahno*.

Hordeum vulgare, Linn. Sp. Pl. (1753) p. 84. *Barley*. Annual, 2-3 ft. high, supposed by De Candolle to have originated in Western temperate Asia. It is extensively cultivated in N. India, less extensively in the Bombay Presidency, where it is grown chiefly in Gujarat and Sind, less commonly in the Deccan. Fl. B. I. v. 7, p. 371; Prain, Beng. Pl. p. 1231; Watt, Dict. Econ. Prod. v. 4, p. 274. The three following varieties are cultivated :—

VAR. *hexastichon*, Aitch. Cat. Pb. & Sind Pl. (1869) p. 171. The most commonly cultivated kind. Spikelets in 6 rows. Fl. B. I. v. 7, p. 371; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Watt, Dict. Econ. Prod. v. 4, p. 275. *Hordeum hexastichon* (sp.), Linn. Sp. Pl. (1753) p. 85; Grah. Cat. p. 234; Dalz. & Gibs. Suppl. p. 96.—VERN. *Satu*; *Jau*.

VAR. *distichon*. Cultivated in Sind. Spikelets in 2 rows. Fl. B. I. v. 7, p. 371; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Watt, Dict. Econ. Prodr. v. 4, p. 274. *Hordeum distichon* (sp.), Linn. Sp. Pl. (1753) p. 85.—VERN. *Jau*.

VAR. *nudum*, a beardless variety with spikelets in 2 rows and with the grain free from the palea, known as "*Naked or Loose-grained Barley*," is cultivated in Gujarat and Sind. Fl. B. I. v. 7, p. 372; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442. *Hordeum nudum* (sp.), Arduini, ex Schult. Mantiss. v. 2 (1824) p. 437. *Hordeum gymnodistichon* (var.), Duthie, Fodd. Grass. N. Ind. (1888) p. 70; Watt, Dict. Econ. Prod. v. 4 (1890) p. 274.—VERN. *Ua*; *Ujan*.

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