REVISION OF THE FLORA OF THE BOMBAY PRESIDENCY

Part III. By E. Blatter, S.J., Ph.D., F.L.S.

See F.I. (pars. 63)

Muntingia calabura

Blatta no. 24

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(1)
REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY

BY
E. BLATTER, S.J., Ph.D., F.L.S.

PART III
(Continued from page 917 of Vol. xxxi)

GRAMINEÆ (Cke. ii, 907)

BY
E. BLATTER AND C. McCANN

We have decided to take up the Gramineae for several reasons. Since Cooke's publication of this family several new species have been described and McCann has added over 50 species which are new to the Presidency. More important than the numerical additions are the changes made during the last fifteen years with regard to the general arrangement of the grasses and the definition of certain genera. A great amount of work has been done in Europe as well as in America. In Europe it was chiefly O. Stapf who, with his vast experience of the grass-flora of many countries and the rich material of the Kew Herbarium at his disposal, has advanced our knowledge of the grasses and their systematic co-ordination more than anybody else. A comparison of his monograph of the grasses in the Flora of Tropical Africa which is still in progress with that of the Flora Capensis shows at once in which direction and to what extent progress has been made. As regards the second sub-family Pooidae the two works reveal only minor changes; but considerable changes were found necessary in the first sub-family Panicoideæ. Here again it is chiefly the genera Andropogon and Panicum and their allies which have been affected. In this respect, especially where the tribe of Paniceæ is concerned, we owe a good deal to American botanists. It was chiefly the fact that there were no definite dividing lines for the genera of Andro- pogoneæ and Panicëæ, that induced Stapf not to unite the groups wherever intermediate links can be detected, which would bring about endless confusion, but to be satisfied with approximately definable groups, which can on the whole be easily grasped and remembered. In other words, it is preferable from a practical point of view to adopt smaller genera than unmanageable large genera for merely theoretical reasons. As the Kew Herbarium, as far as the grasses are concerned, owes its systematic arrangement entirely to Stapf, and as colonial workers will always appeal to Kew in their difficulties, we thought it advisable to follow Stapf in the definition and sequence of the tribes as laid down in the Flora of Tropical Africa. As of late the grass-problems have received renewed attention by the Agricultural Departments in India, we do not consider it superfluous to bring the systematic account of the grasses of Bombay up-to-date.

An asterisk in front of a name means that the particular genus or species has been introduced.

Two complete keys, one natural and one artificial will be given at the end.

SUBFAMILY I. PANICOIDEÆ

The mature spikelets fall entire from their pedicels or with them, all are alike or differ in sex and structure. Perfect spikelets with 2 heteromorphous florets, the upper hermaphrodite, the lower male or barren. Rhachilla not continued beyond the upper floret.

TRIBE I. Mayideæ.—Sexes borne on different inflorescences on the same plant or the female spikelets at the base of the inflorescence, and the male above them. The male spikelets in pairs, one sessile, the other pedicelled, or both pedicelled, in spike-like solitary or panicled racemes, 2-flowered. Glumes
membranous or chartaceous, enclosing the florets. Valves more or less hyaline, awnless. The female spikelets solitary with or without a rudimentary pedicelled companion, 1-flowered. Glumes firm, at least the lower which ultimately often becomes bony, or both thin and more or less hyaline. Valves hyaline awnless.

1. Male and female spikelets in separate inflorescences.
   Male spikelets in a large terminal panicle. The female spikelets in the axils of the leaves
   (a) Female spikes distinct, articulated ... ... *1. Euchlæna.
   (b) Female spikes grown together with a spongy more or less cylindrical body ... ... *2. Zea.

2. Male and female spikelets in separate portions of the same spike, the female below.
   (a) Grain enclosed in the usually globose or ovoid ivory-like capsuliform supporting sheath ... ... 3. Coix.
   (b) Grain enclosed in the hardened outer glumes ... ... 4. Polytoca.


Vern. name: Teosinte.

Description: A large, very succulent, strong growing, annual grass, 30 cm.-3 m. high. Leaves long, 5-7.5 cm. broad. Male spikelets 8-9 mm. long, crowded in long spikes in a corymb 15-25 cm. long. Female spikes in the leaf-axils. Styles very long, protruding from the top of the enclosing leaf-sheath. The spike of the female spikelets breaking up at maturity into rhomboidal seed-like joints. Nearly allied to Maize and resembling it in its tassel of male flowers and broad leaves. A single plant often sends up 100 stems.

Locality: Cultivated in the Ganeshkhind Botanic Garden.

Distribution: A native of Guatemala.

Uses: Cultivated for green fodder, but it does not stand drought well. Horses are fond of it.


Tall, stout, annual grasses with large leaves, the axils of the lower bearing the female inflorescences (cob), tightly enveloped by large membranous bracts. Sexes in different inflorescences on the same plant. Male inflorescence terminal, of panicked spike-like racemes with 2-nate spikelets shortly unequally pedicelled or one sessile on the inarticulate rachis, both similar, 2-flowered, awnless. Glumes subequal, membranous, convex, obscurely 2-keeled, 9-10-nerved. Valves more or less hyaline, 3-5-nerved; valvules similar, 2-nerved, obscurely keeled; lodicules 2, fleshy. Stamens 3; anthers linear. Female spikelets 2-nate in 4-11 longitudinal rows, slightly immersed in the spongy axis of the cob, with a lower barren and an upper fertile floret, awnless. Glumes similar, very broad, fleshy below, hyaline above, nerveless, ciliate. Lower valve resembling the glumes, but shorter and ciliate, with or without a similar but smaller valvule; upper valve similar to the lower with a valvule about as long as the ovary. Lodicules 0. Ovary obliquely ovoid. Style very long, 2-6 at the tip, papillose upwards, exserted in long silky tassels from the sheathing bracts. Grain large, subglobose or dorsally more or less flattened, surrounded by the dried up glumes, valves and valvules; scutellum large, equaling or exceeding ½ of the grain.

Species 1.—A native of America.


**Vern. Names**: Maize, Buta, Maka.

**Description**: Culms up to 3 m. high, sometimes more. Leaf-sheaths terete, more or less hairy upwards along the margin; ligule short, truncate, thinly membraneous, more or less pubescent; blades linear-lanceolate, up to over 90 cm. long and 10 cm. wide, glabrous or almost so, tips often drooping. Male panicle up to over 20 cm. long; rachis pubescent; spikelets up to 12 mm. long; anthers 6 mm. long. Female spike (cob) and grains varying much in size and shape, the grains also in colour.

**Locality**: Cultivated widely in the Presidency as a forage for cattle and as a vegetable and for flour.

**Origin**: The origin of Maize is a much discussed question. Some are of opinion that it has been developed from Teosinte (Euchlaena), others that the original wild form has become extinct. A more acceptable opinion is that it is a hybrid between Teosinte and an unknown or extinct species resembling podcorn, a variety of *Zea mays* in which each kernel is enveloped in the elongated floral bracts.

Kuwada who studied the number of chromosomes in Maize came to the conclusion that *Zea mays* was originally derived from the hybridization between *Euchlaena* and some unknown species of the tribe Andropogonaceae, long chromosomes belonging to the former and short ones to the latter, and that the nuclei of its various individuals possess both kinds of chromosomes in various combinations according to the law of chance.

To explain the structure of the ear of Maize, Collins published evidence which indicated that the ear may have developed through the twisting of yoked pairs of spikelets. Weatherwax tries to refute this opinion. He contends that dropping of rows of seeds is due to the discontinuance of a row of paired spikelets and not to the loss of the pedicelled spikelets from yoked pairs, and that there is no indication that short rows represent long rows partially aborted, but that the abortion of spikelets or of rows in the ear seems to be much more constant as a characteristic of theories than of real ears.

**Genetics of Maize**: Those interested in Maize from a genetic point of view are referred to the more recent publications mentioned in the foot-note.

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8 Emerson, R. A.—The nature of bud variations as indicated by their mode of inheritance. Amer. Nat., 56 (1922), 64-79.
Species 5 or 6.—Hot countries of the Old World.


**Locality:** Sind:—Umarkot, sandy plains (Sabnis B717!); Chuar Chemali, Indus River (Blatter and McCann D680!); Mirpur Sakro (Blatter and McCann D681! D683!); Gharo (Blatter and McCann D682!), —**Gujarat:** (Graham).—**Khandesh** (McCann!) —**Konkan:** Gokhiwara, Bassein (Ryan 25!); Matheran (Paranjipe!); Dohe Foresta (Ryan 713!); Junga Hill. Thana (Paranjipe!); Alibag, rice fields (Ezekiel!); Kenery Caves, foot (McCann 9876!); Sion (McCann 8433!); Bhandup, near tank (McCann 5098!); Horse-shoe Valley, Ghatkoper (McCann 9877!).—Common along line from Kalyan to Kasara in streams (McCann!).—**Deccan:** Lonavla (Garade! McCann! Woodrow); Khandaala, common all over (McCann 9405!); Purandhar (McCann 5005!); Igatpuri (McCann 4346!); Panchgani Ghat (Cooke); Panchgani (Blatter!).—**S. M. Country:**—Devari (Sedgwick and Bell 4426!); Dharwar (Sedgwick 1856!); **Kanara** (McCann!); Common all through the Konkan and Deccan during the rains, filling up the banks of streams and fields.

**Distribution:**—Tropical Asia, cultivated in Africa and America.

**Uses:**—Used as fodder for cattle. Duthie says that they fatten on it. Haines calls it a poor fodder for cattle. Of the false fruits there are several varieties differing much in size, shape and colour, and used for decorative purposes in the place of beads. According to Stapf one variety with thin shells is an important cereal in Burma and in the Farther East. Waxy endosperm, first found in maize from China, Burma and the Philippines, has been found now in **Coix Lacroyma-Jobi** from the same region.¹

4. **Polytoca, Br.** (Cke. ii, 998)


**Locality:** Kathiawar: Junagad (Blatter).—**Konkan:** Tungar forest, Bassein (Bhide); Bombay (Dalzell); Salsette (Jacquemont 706!). **Deccan:**—Khandala (McCann 9881!); Igatpuri (McCann 9880!); near Mahableshwar (Woodrow¹); Mahableshwar (Woodrow, Cooke). **Kanara:** (Lisboa).

**Distribution:**—Apparently endemic in the Bombay Presidency.

2. **Polytoca barbata**, Stapf in Hook. f. F. B. i. vii (1896), 102; Cke. ii, 599.


**Locality:** **Gujarat:** Chharodi farm (Gammie 15536!); Nadiad farm (Herb. Econ. Bot. Poona!); Surat (Sedgwick!); Junagad, Kathiawar (Blatter 3784!). **Khandesh:**—Tornamal (McCann 9883!); Taloda (Golne!). **Konkan:** Between Worli Port and Hornby-Villard Road on bank, Bombay (Sabnis 9884!); Thana (McCann!). **Deccan:**—High hills round Junnar, Poona District (Dalzell and Gibson); Poona (Woodrow); College of Science, Poona (Herb. Econ. Bot. Poona!); Ganeshkhind Bot. Gard. (Herb. Econ. Bot. Poona!); Haveli (Herb. Econ. Bot. Poona!); near Sholapur (Woodrow!). **S. M. Country:**—S. W. of Dharwar (Sedgwick and Bell 4433!); Kunernellalli (Sedgwick 1947!); Kholapur (Woodrow!, Herb. Econ. Bot. Poona!). **Kanara:** Gersoppa Falls (Thall!).

**Distribution:**—India, Ceylon, Java.


¹ Kempton, J. H. Waxy endosperm in **Coix** and *sorghum*. Jour. Heredity, 12 (1921), 396-400.
TRIBE II. _Andropogoneae._—Spikelets usually in pairs, one sessile, the other pedicelled, very rarely both pedicelled, those of each pair usually alike as to sex (homogamous) or different (heterogamous) on the axes of variously arranged, often spike-like racemes. Glumes more or less rigid and firmer than the valves, and the lower always longer than the florets. Valves membranous, often hyaline, that of the upper floret awned or reduced to an awn or mucous.

The key to the genera of this tribe will be given below.

5. DIMERIA, R. Br.

*Woodrowia diandra*, Stapf. must be referred to this genus. The genus *Woodrowia*, therefore, disappears from the Bombay Flora, 

I. Spikelets in 2-3-nate racemes. Annuals
   (a) Rachis nearly straight. Awn long............ 1. _D. ornithopoda._
      (b) Rachis circinately curved. Awn short........ 2. _D. Woodrowii._

II. Spikelets in many-nate racemes. Perennial
   3. _D. gracilis._

III. Spikelets in panicles. Annual
   4. _D. diandra._

The species of this genus usually inhabit open, flat, dry, gravelly plains which are well drained during the monsoon, and several species may be found associated with each other in the same locality to the exclusion of every other plant. Where _D. ornithopoda_, _gracilis_ and _diandra_ grow together, the two former are more numerous.


**Description**: Cke. i.e.

**Locality**: _Konkan_: Kankeshwar Hills, Alibag (Bhide!); Marmagao (Telbot!); Vetora (Sabnis 33715!).—_Deccan_: Mahableshwar (Dalzell and Gibson, Lisboa); Lingmala to Mahableshwar, 4,000 ft., rain 200 inch. (Sedgwick and Bell 4653!); Lonavla (Bhide!, Lisboa); Khandala, Tata’s Lake, very common (McCann A309!, 9885!, Woodrow); Sakkhar-Pathar, Lonavla (Gammie 15948!); Panchgani (Blatter and Hallberg B1214!, B1219!, B1279!, B1289!, Woodrow).—_S. M. Country_: Castle Rock (Bhide!), Londa (Woodrow!).—_Kanara_: Yellapore (Sedgwick 3124!); Birchy (Telbot 2251!); Karwar (Hallberg and McCann A307!); Siddhapur to Sirsi, open grass land (Hallberg and McCann A313!); Jagalbet, N. Kanara (Telbot 1565).

**Distribution**: All over India, Malay Islands, Japan, Tropical Australia.

2. _Dimeria Woodrowii_, Stapf in Hook. f. in F. B. I. vii, 104; Cke. ii, 945.

**Description**: Cke. i.e.

**Locality**: _Konkan_: Marmagao (McCann!, Bhide!, Telbot 2557!); Karanjee, Ratnagiri Dist. (Herb. Econ. Bot. Poona!); Ratnagiri (Herb. Dhura!, Woodrow).—_Kanara_: Mirjan (Hallberg and McCann!); Honavar, open rocks (McCann!).

**Distribution**: W. Peninsula.


**Description**: Cke. i.e.

**Locality**: _Konkan_: Penn, hills (Bhide!); Vetora (Sabnis 3714!).—_Deccan_: Lonavla (Bhide!, Woodrow); Khandala (McCann A318!); on the Ghats (Lisboa!).—_S. M. Country_: Castle Rock (Bhide!); Anmod to Castle Rock (Sedgwick 3254!);—_Kanara_: Bell and Sedgwick 3165!; Supa (Sedgwick and Bell 4880!); Arball Ghat (Sedgwick and Bell 5015!); Sirsi (Gammie!); Kumwada (Telbot 2250!); Yellapare (Telbot 1527!); Kadra (Telbot!); Sumpkhund (Hallberg and McCann A308!); Sirsi to Siddhapur (Hallberg and McCann A311!); Devimani (Telbot!).

**Distribution**: W. Peninsula, Ceylon.

Where this species is growing together with other species of _Dimeria_ it can easily be recognized by its overtowering the others.

Description : Cke. i.c. except for the number and description of the glumes, this part of the diagnosis must read like this : Glumes 4 : Lower involuclar glume more or less dorsally hairy, with ciliate margins; upper involuclar glume with a densely ciliate keel; lower floral glume obovate-oblong, hyaline, nerveless; upper floral glume 2-lobed, with a geniculate awn about 12 mm. long from the sinus, column of awn 4 mm. long, spirally ciliate, brown, the upper part of the awn yellow, longer than the column.

Locality : Konkan : Vasco da Gama (Bhide !) ; Marmagoa (Talbot 2557 !) — Deccan : Khandala, open grass land (Saxton and Bhide !, McCann A317 !) — S. M. Country : Castle Rock (Bhide !). — Kanara : Kumberwada (Talbot 2261 !); Kadra (Talbot 2822 !); Devimani (Talbot 3547 !); Jog to Siddharapur, open grass land, rocky soil (Hallberg and McCann A314 !); Mirjan (Hallberg and McCann A315 !).

Distribution : W. Peninsula.

6. *Ischcemum*, Linn. (Cke. ii, 957)

Species about 50.— All belonging to the Old World, except 3 found in tropical America.

Cooke, i. c. describes 12 species. Of these *Ischcemum angustifolium* has to go under *Pollinidium* and *Ischcemum laxum*, sulcatum and *spathiflorum* under Schima. Instead 3 species new to the Presidency will be added to the genus *Ischcemum*, viz. *I. impressum*, Hack., *I. conjungatum*, Roxb. and *I. timorensis*, Kth.

In *Ischcemum* the racemes are gyneminate or digitate.

A. Margins of lower involuclar glume of sessile spikelet inflexed or incurved from base to apex.

I. Leaves rounded at the base (slightly cordate in *I. mollis*), sessile on the sheath.

1. Pedicel of upper spikelet less than 1/3 the length of the lower spikelet.
   (a) Lower involuclar glume of sessile spikelets with nodulose margins
   (b) Lower involuclar glume of sessile spikelets closely transversely ribbed
   (c) Lower involuclar glume of sessile spikelets dorsally villous all over, not transversely ridged nor with nodulose margins

2. Pedicel of upper spikelet 1/3 the length of the lower spikelet or more.
   (a) Upper involuclar glume of sessile spikelets 2-fid, 3-nerved
   (b) Upper involuclar glume of sessile spikelets acuminate, 5-nerved

II. Leaves hastate or cordate at the base, often petiolate.

1. Pedicel of upper spikelet not 1/3 of the lower spikelet.
   (a) Leaves 7.5—13 cm. long
   (b) Leaves 25—35 cm. long

2. Pedicel of upper spikelets as long as the lower spikelet, or longer

3. *I. mollis*.

4. *I. diplopegon*.

5. *I. pilosum*.

B. Margins of lower involuclar glume of sessile spikelets broadly incurved below the middle.

I. Keel of upper involuclar glume winged above the middle.

1. Sessile spikelets 3 mm. long ; callus large, glabrous ; awn 4 mm. long...
2. Sessile spikelets 5 mm. long ; callus short, bearded ; awn 12 mm. long

II. Keel of upper involuclar glume not winged.

[6]

**Description:** Cke. l.c.

This grass is a very variable one, so variable, indeed, that it is almost impossible to distinguish good varieties, in spite of Hackel’s and Hook. f.'s efforts.

**Locality:** Khandesh: W. Khandesh (Blatter !).—Konkan: Bassein (McCann 4474!); Sion Bombay (McCann 5233!); Bhandup (McCann 8991!); Parsik, railway line (McCann 9901!); Matung near Bombay (Woodrow 4).

**Deccan:** Khandala, on rocks (McCann 9908!); Lohagad, half way up (McCann 9906!); Deolali (Blatter and Hallberg 4584!); Igatpuri (Blatter and Hallberg 5169!); Mahabaleshwar (Talbot 4534!); Lonayla (Garade!); Panchgani (Blatter and Hallberg B1216!); Vasarni Ghat (Blatter and Hallberg B1307!).—S. M. Country: Devarayi (Sedgwick and Bell 4456!); Castle Rock (Blatter!)—Belgaum (Ritchie 812/2).

**Distribution:** India (also on higher hills), Ceylon, China, Malay.


**Locality:** Konkan: Bombay Island (Blatter!); Kankeshwar Hills, Ali Bag (Blatter!); Bassein (McCann 4479!).—Deccan: Khandala, common, Echo-Point in a dry pool (McCann 9903!); Igatpuri, common (McCann 4348!); Poona (Woodrow).—Kauara: Halyal (Talbot 2140!).

**Distribution:** India, Ceylon, China, Malay.


**Locality:** Konkan: Sion creek (Sabnis 9900!);—Deccan: Lonavla (Blatter!; Woodrow!), Igatpuri (McCann 9543!); Khandala, railway line (McCann 9941!).

**Distribution:** W. Peninsula, Central Provinces.


**Locality:** Konkan: Matheran (Woodrow).—Deccan: Mahabaleshwar (Woodrow 4); Mahabaleshwar, wet rocks in a stream (Sedgwick and Bell 4595!); Amberwadi, Nasik District (Patwardhan); Sakar Pathar, Lonavla (Gammie 15963!); Khandala (McCann!); Bhorkas near Poona (Woodrow 3!).

**Distribution:** W. Peninsula.


**Vern. Names:** Khavo (Broach), Kunda (Poona), Nuth, Kanigyanhullu (Bijapur).

**Locality:** Gujarat: Surat, roadside (Sedgwick!).—Khandesh: (Lisboa); Amalner (Blatter and Hallberg 4397!).—Deccan. Ganshkhind Bot. Gard. Kirkie (Gammie!); Mangri, 8 miles E. of Poona (Herb. Econ. Bot. Poona!); Yerowda (Herb. Econ. Bot. Poona!); Chattrashinji Hill. Poona (Ezekiel!); Kirkie (Talbot!); Poona (Blatter!); Sholapur (Lisboa); Satara (Lisboa).—S. M. Country: Kunemelihali (Sedgwick 2138!); Dharwar (Sedgwick and Bell 5341!); black soil field, Haveri (Talbot 2185!); Gadag (Talbot 2185!); black soil field, 7 miles S. of Hubli (Sedgwick 5341!).

**Distribution:** W. Peninsula, Central Provinces, Rajputana.


**Locality:** Khandesh: W. Khandesh (McCann!).—Konkan: Kenery Caves (McCann 9,914!); Sion, Bombay (McCann 5,251!); Bassein (McCann 4482!); Sewri, Bombay (McCann 3586!); Marmagao (Talbot 2560!); Parle, Bombay (Woodrow); Thana (Lisboa).—Deccan: Mahabaleshwar, in forests (Sedgwick and Bell 4802!); Lonayla (Blatter! Woodrow); Khandala, very common (McCann 9613!); Igatpuri, very common (McCann 4319!); Satara (Lisboa).—S. M. Country: Castle Rock (Blatter!); Dudsagar Falls (McCann!).—Kanara: Anmod (Sedgwick 3273!); Supa (Talbot 2092!); Jugglepeth (Talbot 2089!); Yellapur (Talbot, 735). A very common grass growing usually in the shade of trees. It is common throughout the S. part of the Presidency.
Distribution: Bengal, W. Peninsula, Ceylon.

Var. dasyantha, Hack. Monogr. Androp. (1889). 209; Cke. ii, 962

Locality: Konkan (Stocks ex. Cke.).—Kanara (Woodrow!)


Description: An annual. Stem spreading from the root and creeping, then geniculately ascending, 30-35 cm. high, slender, stiff, purplish, repeatedly branching upwards. Leaves short, 25-35 mm. long, base hastate or broadly, deeply cordate, acuminate, broadest at the base, rather rigid, striate, lower petiolo; sheath of the upper ventricose and often open; ligule short, glabrous. Spikes 2, short, 25-35 mm. long, sessile, villous; joints very short, quadrately clavate, plano-convex, ciliate. Sessile spikelets 3 mm. long, pale. Glumes 4. Lower involucral glume oblong, obtuse, flat, 2-toothed, villous from below or above the middle to nearly the top, margins narrowly inflexed, not winged, upper half often greener, even or lower margins obscurely noded. Upper involucral glume lanceolate, acuminate, strongly keeled, puberulous. Lower floral glume paleate. Upper floral glume cleft to about the middle, awn dorsally inserted at or below the cleft, slender, about twice as long as the spikelet. Pedicelled spikelets subsessile, almost awnless. Lower involucral glume as in the sessile.

Locality: Konkan: Okda Forest (Ryan, 712!). Deccan: Mahableswar to Pratabagad (Bhide!); Khandala (Garade!); College Farm, Poona (Pawar!).—Kanara: Gersoppa Falls (Chibber!).

Distribution: Bengal, W. Peninsula, naturalized in Ceylon.


Stem 10-20 cm. high, slender, prostrate below, branching upwards, quite glabrous. Leaves 5-8 cm. long, upper 18 mm. broad, ovate or oblong-lanceolate, cordate, lower narrower, petiolo, sparingly hairy beneath, margin thickened, scaberulous, sometimes crenulate; sheath compressed, glabrous; ligule oblong. Spikes 2, yellow; joints and pedicels stout, clavate, ciliate with rigid hairs, forked at the top. Sessile spikelets 6-8 mm. long, shining; callus short, broad, bearded. Lower involucral glume linear-oblong, flat, dorsally broadly irregularly depressed with shallow subsemilunar pits in the lower 2/3, above it winged and 2-cuspidate, narrowed and margins subnudulate at the base, wings rose. Upper involucral glume obtuse, chartaceous, ciliate, dorsally rounded with a median gibbosity and an auricle-like wing above it. Lower floral glume oblong-lanceolate, hyaline, 3-nerved, ciliate. Upper floral glume much shorter, glabrous, cleft to above the middle. awn short, geniculately inserted at the cleft. Pedicelled spikelets smaller than the sessile. Lower involucral glume obtuse, glabrous, many-nerved, winged on one margin. Upper involucral glume 7-nerved. Upper floral glume mucronate.

Locality: Deccan: Mahableswar (Sedgwick and Bell, 4514!); Panchgani, Tableland (Blatter, 5083! B12211, B1285!); Igatpuri (Blatter!); Khandala, Echo-Point (McCann 9943!); Lonavla (Bhide!).

Distribution: We have found this species only in the W. Ghats. Hooker f. mentions the Konkan, but with a sign of interrogation. As we have never met it in the Konkan, it is not likely to occur in that region. Where Huetgen’s specimen comes from we cannot say, and will in all probability never be known. We think it is quite safe to say that I. impressum is endemic in the W. Ghats of the Bombay Presidency.


Locality: Kanara: N. Kanara (Lisboa); Karwar (Talbot 2209!, McCann!), A rare grass, apparently endemic in N. Kanara.


Locality: Konkan: Bassein (Ryan 445!); St. Xavier’s College Comp., Bombay (McCann 4594!); Parel, Bombay (Woodrow); Compoli (McCann [8]
9415 I); Alibag, sandy shore (Ezekiel!); Uran (McCann 5126 I); Salsette (Jacquemont 710). —Deccan: Khandala, very common (McCann 9612 I); Ganeshkhind Bot. Gard. (Herb. Econ. Bot. Poona); Igatpuri (Blatter and Hall. 3927A I).—S. M. Country: Murad, hill-side (Sedgwick 1823 I); Castle Rock (Bhide).—N. Kanara: Yellapore (Talbot 1526 I); Halyal, borders of rice fields (Talbot 2141 I); Ankola (Mamlataar of Ankola!); Karwar, sea coast, sandy soil near Gaol (Talbot 2821 I); Gersoppa Falls (McCann!); Common throughout Kanara (McCann!); Kakti (Woodrow).

Distribution: India, Ceylon, China, Malaya, Australia.


Stem 15-45 cm. high, slender, branched, straggling, nodes glabrous, or sparingly bearded. Leaves 2-5-10 cm. long, sessile and petiolate, line-lanceolate, acuminate, glabrous or sparsely hairy, base of upper rounded. of lower rounded; sheath lax, mouth hairy; ligule obscure. Spikes 2-3, 25-50 mm. long, rather slender, sparingly villose; joints and pedicels about half as long as the spikelets, nearly equal, shortly ciliate. Sessile spikelets 2-5-3 mm. long, greenish or with green nerves; callus narrow, long-bearded. Lower involucral glume ovate or ovate-lanceolate, acuminate, bicuspidate, 5-9-nerved, base ventricose, margins broadly involute below, substridiced, dorsally convex, polished, nerves strong. Upper involucral bracts longer, acuminate or aristulate, dorsally rounded, recurved, 3-5-nerved, tip 2-toothed, dorsally usually ciliate. Lower floral glume lanceolate, falcate, palea linear-oblong. Upper floral glume short, 2-lobed, glabrous, awn in the cleft very slender, shortly exerted. Pedicelled spikelets like the sessile awned.

Locality: Sind: Sukkur (Mamlatdar of Sukkur I).—Deccan: Mahableshwar, common (Sedgwick and Bell 4503 I); Lonavla (Bhide I); khandala, behind the Saddle (McCann 9915 I).—S. M. Country: Deciduous forests W. of Dhawar (Sedgwick and Bell 4501 I); Devikop (Sedgwick 2170 I); S. W. of Dhawar (Sedgwick and Bell 4429 I); Londa (Bhide I).—Kanara: Suppa (Talbot 2101 I); Yellapore (Talbot 2327 I); Dandeli (Talbot 2494 I).

Distribution: Burma, Chittagong, Bengal, Central Provinces, Sind, W. Peninsula, Ceylon, Malaya, Pacific Islands.

7. Thelepogon, Roth. (Cke. ii, 971).

Species 1.—India and tropical Africa.


Vern. Names: Bodga (Kaira), Bhatad (Thiana), Bangadi (Poona), Pharoda (Ahmednagar).

Description: Cke. l.c.

Locality: Gujar: Ahmedabad (Sedgwick !); Kaira (ex Burns).—Konkan: Matheran (D’Almeida A257 I); Thana (ex Burns).—Deccan: Najar to Posur Rd. (Paranjpe !); Lina Hill, Nasik District (Blatter and Hallberg A79!, 4541 I); Katraj Ghat (Gammie!); Bairawadi, Purandhar (McCann 5053 I); Panchgani (Blatter and Hall. B1267 !); Poona (Woodrow); Hewra (Dalzell); near Nasik (Edgeworth); Ahmednagar (ex Burns).—S. M. Country: Dhawar (Sedgwick 1824 !); Alnawar (Talbot 2303 I); Belgaum (Ritchie 812).—Kanara: Halyal (Talbot 2094 I, 2142 !).

Distribution: Central India, W. Peninsula, Tropical Africa.

Uses: Eaten by horses, although very bitter (Dalzell).


Arab. 178; Stapf. in Fl. Trop. Afr. ix, 35.

Annual or perennial grasses. Blades convolute when young, at length flat, narrow; ligules a line of stiff hairs. Racemes usually gently curved, dorsiventrally and laterally compressed, with the pedicelled spikelets converging over the convex side, joints and pedicels sublinear and parallel. Sessile and pedicelled spikelets heteromorphous. Spikelets 2-nate, those of each pair
differing in sex, one sessile, the other pedicelled on the articulate fragile rhachis of solitary spike-like racemes, the pedicelled tardily separating from their pedicles, the sessile deciduous together with the adjacent joint of the rhachis and the pedicel. Florets 2; lower male, upper bisexual in the sessile, male or neuter in the pedicelled spikelets. Sessile spikelets: glumes equal or subequal; lower grooved, rarely flat, 2-dentate or 2-mucronate, more or less chartaceous, upwards acutely 2-keeled with inflexed margins, keels winged; upper glume boat-shaped, keeled upwards with a bristle-like awn. Valves hyaline, of lower floret entire, muticus, of upper 2-fid and awned from the sinus. Valvules more or less equalling their valves, hyaline. Lodicules 2, cucunete. Stamens 3. Stigmas linear-oblong, laterally exserted. Grain oblong, obtusely trigonous; embryo reaching to the middle of the grain. Pedicelled spikelets flat, with 2 florets resembling the lower floret of the sessile spikelets, the lower or both more or less reduced and barren.

Species about 5.—India, Tropical Africa, N. America.

A. Racemes enclosed in long narrow spathes ... 1. S. spathiflorum.

B. Racemes not enclosed in spathes—

I. Sessile spikelets 6-7 mm. long. Lower involucral glume of sessile spikelet 6-nerved ... 2. S. nervosum.

II. Sessile spikelets 7-11 mm. long. Lower involucral glume of sessile spikelet 5-3-nerved ... 3. S. ischecmoides.

III. Sessile spikelet 9 mm. long. Lower involucral glume of sessile spikelet 2-nerved ... 4. S. subulatum.

1. Sechima spathiflorum, nov. comb. Blatter and McCann.—Ischecmoid spathiflorum, Hook. f. in F. B. I., vii (1896), 138; Cke. ii, 963.

Description: Cke. 1. c.

Locality: Khandes: Toranmal (McCann 9922 !).—Konkan: Penn (Bhide !); Matheran (Paranjpe !); Bassein (Ryan 2300 !); Kenery Caves (McCann 9920 !); Island of Salsette in hilly stony places (Jacquemont 797).—Deccan: Lonavla (Bhide !); Khandala (Woodrow); Khandala, in watercourses, very common (McCann 9928 !); Palasdar on the Bhor Ghat, G. I. P. Railway (Woodrow); Lohagad, plain (McCann 9919 !); Bairawadi, Purandhar (McCann 5054 !); Igatpuri (Blatter and Hallberg 3836 !, McCann !).

Distribution: Endemic.


Description: A perennial, densely tufted grass. Stems erect, 60 cm. to 1 m. high, on a short rootstock, simple or nearly so, slender, terete, about 4-noded, middle and upper internodes exserted, smooth or slightly rough below the inflorescence, glabrous. Leaves 15-30 cm. long, 2-4 mm. broad, erect, linear, narrowed into long capillarv tips, flat, smooth, striate, glaucous, more or less scabrid, lateral nerves about 3 on each side, like the midrib whitish and prominent on both sides; sheaths shorter than the internodes, tight, terete, striate, smooth or nearly so, glabrous or sparingly hirsute from tubercle-based hairs; ligule a line of short stiff hairs. Racemes solitary, 5-10 cm. long, erect, slightly curved, pale, fragile; joints and pedicels parallel, sublinear, slightly compressed, 3-4-5 mm. long, densely ciliate with white hairs along the angles, otherwise glabrous, tips more or less oblique. Sessile spikelets lanceolate-linear to linear, acuminate, 6-25-7 mm. long, pale green, with a shortly bearded calyx. Glumes subequal; lower subchartaceous to chartaceous, with an unequally 2-toothed, flat and membranous beak, the teeth of which sometimes run out into ciliate mucros, deeply grooved, especially below the middle, acutely 2-keeled, outer keel generally winged upwards, intracarinal nerves 4, with transverse veins in the upper part, like these green and raised on a white.
ground; upper glume subchartaceous, slightly shorter, boat-shaped, sublinear in profile, keeled above, with the keel widened at the apex and passing into a fine bristle 11-12.5 mm. long. 3-nerved with fine transverse veins, ciliate. Lower floret: valve faintly 2-nerved, hyaline, ciliate, 4.5 mm. long, with a narrow, linear valvule of about equal length and a male flower. Upper floret bisexual: valve oblong-lanceolate, 4 mm. long, 2-fid, with narrow lobes, hyaline, 3-nerved, ciliate; awn up to 43 mm. long slender, column spirally twisted, bronze colour, very minutely ciliate along the spiral, bristle whitish, as long as the column or slightly longer; valvule as long as the valve, linear, subacute, 2-nerved, ciliate. Anthers 3 mm. long. Styles and stigmas pale, 2 mm. long. Pedicelled spikelet lanceolate, acuminate, green or tinged with purple, 7-8.5 mm. long, glabrous; lower glume slightly 2-toothed, long-ciliate from the hairs of the tightly flexed margin, keels very narrowly or obscurely winged, wing rigidly ciliate, intracarinal nerves 5, the inner 3 very prominent and rough; upper glume lanceolate, long and finely acuminate, hyaline, ciliate, 3-nerved; lower floret as in the sessile spikelet; upper floret very much like the lower. Stamens smaller in the lower floret or both florets reduced and empty.

Locality: Gujurat: Porbandar (Bhide!); Junagad, Kathiawar (Blatter 3739!); Surat, city walls (Herb. St. X. C. 9498!); Ahmedabad (Sedgwick!).—Khandesh: (Lisboa); Umalla village, on Tapti river (Blatter and Hallberg 5160!); Toranmal, common on the slopes (McCann 9916!).—Deccan: Pirandur Fort (Bhide!, McCain 5106!); Khandala, St. X. Villa compound (McCain 9419!); Deolali (Blatter and Hallberg 4548!); Lonavla (Bhide!); Panchgani (Blatter and Hallberg B1259!); Poona (Woodrow); Poona to Karli (Jacquemont 530).—S. M. Country: Dhawar (Bhide!); Haveri (Talbot 2186!).

Distribution: Bengal, Behar, Central Provinces, Rajputana, W. Peninsula, Ceylon, Tropical Australia, SomaIlnd, Abyssinia, Eritrea. Cape de Verde Islands.

Uses: Used for thatching in Khandesh (Lisboa). Considered to be one of the best fodder grasses and is eaten by cattle even after the fall of the spikes (Haines).


An annual herb. Stems usually in small fascicles, rarely over 45 cm. high, slender, terete, simple, 2- or 3 noded, middle and upper internodes slightly exerted, smooth, glabrous. Leaves glaucous, linear, tapering to a long fine point, up to 15 cm. long, 1.5-3.1 mm. broad, more or less scabrid, midrib fine like the 1 or 2 primary lateral nerves. Racemes solitary, or sometimes an additional 1 or 2 from the upper nodes, 2.5-7.5 cm. long, erect, or slightly nodding; joints and pedicels parallel, sublinear, slightly compressed, 3-1 mm. long, very densely ciliate from white hairs along the angles, otherwise glabrous, tips more or less obsolete. Sessile spikelets linear 7-11 mm. long, pale green, with a shortly bearded callus; lower glume subchartaceous to chartaceous, with an unequally 2-toothed flat and membranous long beak, the teeth of which run out into mucros, deeply grooved, especially below the middle, acutely 2-keeled, the outer keel generally winged upwards, intracarinal nerves 3-5, raised, rough, only distinct just above the groove; upper glume and florets as in Sehima nervosum, excepting the bristle of the glume which is over 15.5 mm. long and the awn, which is generally more brown than bronze in colour and has much longer cilia along the spirals. Pedicelled spikelets narrowly lanceolate, long-acuminate, pale green, up to 12.5 mm. long, glabrous; lower glume with two long setaceous teeth, sparingly hairy on the back, otherwise the spikelet as in Sehima nervosum.

Locality: Deccan (Woodrow 147, Law, ex. Stapf.)

Distribution: Tropical Arabia, Yemen, Abyssinia, Sudan, Kordofan, Nubia, Cameroons, Cape de Verde Islands.

**Description**: See Cke. 1.c.

**Locality**: Hack: Satara (Lisboa); Malsiras, Sholapur Taluka (Lisboa).—S. M. **Country**: Black soil banks 35 miles S. of Dharwar (Sedgwick 3745!); banks of black soil fields 7 miles S. of Hubli (Sedgwick and Bell 53421!); Dharwar, common (Sedgwick 1819!, McCann!).

**Distribution**: Central Provinces, W. Peninsula.


As far as we can make out the diagnosis of this genus was published for the first time in Haines’ Botany of Bihar and Orissa, pt. 5 (1924), 1020.

Densely tufted, perennial herbs with woolly rootstock and basal sheaths. Leaves convolute when old, wiry, mouth of sheaths ciliate. Spikelets digerate or fascicled, fascicles with filiform peduncles on a more or less branched panicle. Spikelets 2-nate, sessile and pedicelled, similar, on the articulate, fragile, compressed, not stout rachis. Callus densely clothed with long brown hairs. Glumes 4: Lower involucral glume flattened, 2-3-dentate, dorsally hairy at base, 5-7-nerved, margins inflexed; upper involucral glume cymbiform, minutely cupulitate, 3-5-nerved, with a slender awn. Lower floral glume hyaline, sparsely ciliate, elliptic, palea finely ciliate; upper floral glume narrow, conduplicate, entire or 2-toothed shortly awned from the tip or minute sinus, palea broad and nearly as long as the glume, densely ciliate on the top.


**Description**: Cke. 1.c.

**Locality**: Hack: Rajkot (Woodrow).—Kokan: Victoria Gardens, Bombay (McCann 4302!).—Deccan: College Garden, Poona (Grade!); cultivated at Poona (Woodrow).

**Distribution**: Afghanistan, India, China, Philippines.

Leaves: In Bihar and Orissa the Sabai grass is used for strings, ropes and mats (the Baib matting of Calcutta) and is very largely employed for paper-making. Fines improve the crop by removing shade. It is easily grown by division of the rootstock or from seed. From seed it yields a crop in about three years. Cattle do not eat it (Haines). For Bombay see Cke. 1.c.

10. *Apocopis*, Nees. (Cke. ii, 967)


**Description**: Cke. 1.c.

**Locality**: Hack: Ahmedabad, field (Sedgwick!).—Kokan: Kalyan (Woodrow).—S. M. **Country**: Forests W. of Dharwar (Sedgwick!); Kanara: Haiyal (Talbot 2379!); N. Kanara (Woodrow).

**Distribution**: Bihar, Central India, Deccan and W. Peninsula, Burma, Ceylon.

11. **Lophophogon**, Hack.


**Description**: Cke. 1.c.

**Locality**: Khandesh: Tapti, Bhusawal (Blatter and Hallberg 5457!).—Deccan: Agricultural College compound, Kirkee (Bhide!); Bapodi near Poona (Gammie 15315!); Bowadhar near Poona (Garade!); Rahuri (Nana A80!); Igatpuri (McCann 4572?); Chattarshinji Hill, Poona (Ezekiel!); Deolali (Blatter 9620!); Jeur, Sholapur Dist. (Woodrow!).—S. M. **Country**: Dharwar, on dry gravelly uplands 2,400 ft., rain 34 inches (Sedgwick 3010!).

**Distribution**: Central Provinces, W. Peninsula.
12. **Apluda, Linn.** (Cke. ii, 956)


As our Bombay specimens must be referred to the var. aristata and as Cooke's description comprises also other varieties we give in the following Stapf's description of the variety *Apluda aristata*. This must not prevent botanists from paying attention to the possible occurrence of other varieties in the Presidency.

**Description:** Mostly annual, branched from the base. Stems densely tufted, erect, 30-180 cm. high, or geniculately ascending and often rooting from the nodes, many-noded, terete, smooth and polished. Leaves 10-45 cm. by 4-15 mm., linear-lanceolate, long-attenuated towards the base, almost petioled, tapering upwards to a fine setaceous point, convolute in bud, then flat, somewhat rigid or flaccid, glaucous below, glabrous or very rarely sparingly hairy, slightly rough above, scabrid along the margins, midrib white above, stouter towards the base, primary lateral nerves, 5-8 on each side, fine; sheaths terete, tight and glabrous or very rarely sparingly hairy, those supporting the flowering branches wider and shorter with reduced blades; ligules short, rounded off, glabrous or ciliate. Panicle up to 50 cm. long, much compound, primary branches long, those of the following orders gradually shorter, bearing clusters of trios of spikelets; spathe at the base of the trios ovate to ovate-oblong, mucronate or bearing rudimentary blades, glabrous, green or tinged with purple, 4-4.5 mm. long; butteous basal joint up to 1.5 mm. long, whitish. Sessile spikelets lanceolate-oblong, acute, up to 4.5 mm. long. Lower involucral glume chartaceous, firmer below, many-nerved; upper involucral glume somewhat gibbous on the back, scabrousul on the keel. Lower floret: Valve oblong-lanceolate, acute, slightly shorter than the glumes, 3-nerved, glabrous; valvule linear-lanceolate, almost as long as the valve, 2-nerved. Upper floret: valve 3.1 mm. long, 2-fid to beyond the middle, awn up to 9.3 mm. long, very fine, with or without a distinct twisted column; valvule generally much shorter, oblong or broad-ovate, nerveless. Anthers 2.3-3.1 mm. long. Stigmas purple, up to 4.5 mm. long. Grain about 1.1 mm. long. Pedicels 2.3-3.1 mm. long, sparingly ciliate. Lateral pedicelled spikelet 4.5 mm. long. Glumes similar, subherbaceous, lanceolate, acute, many-nerved; lower glume rather flat on the back, upper not or obscurely keeled and not gibbous. Florets as in the sessile spikelet but the upper not awned, both are male more or less reduced. Terminal spikelet reduced to a short striate glume, continuing the pedicel.

**Locality:** Gujarat: Broach (Chhibber!); Nadiad Farm (Herb. Econ. Bot. Poona!); Surat (Gammie 16467!, Cooke); Karu Roa, Cutch (Blatter 3776!); Kala Pacham Island (Blatter 3735!); Garvi Dangs (Sedgwick!); Ahmedabad (Cooke).—Khandesh: Muravat, Tapti bank (Blatter and Hallberg 4434!); N. slope of Chanseli Hill (McCan 183!); Toranmal (McCan 184!); Munmad, Ankal Hill (Blatter 146!).—Kokan: Dhapli forest (Roan!); extremely common throughout the islands of Bombay and Salsette (McCan!); Bassein (McCan 1480!); Alibag, margin of water-works (Ezekiel!).—Deccan: Purandhar (McCan 508!, Bhide!); Khadala, very common (McCan 5294!); Diva Ghapat (McCan 186!); Shopur (D'Almeida 187!); Jugalpur, very common (McCan 1435!, 1434!); Panchgani (Blatter 53-8!, Bhide!, Blatter and Hallberg B1322!).—S. M. Country: Dharwar (Sedgwick and Bell 4489, 2400 ft., rain 34 inches; Londa (Gammie 15851!); Belgaum (Ritchie 824).—Kanara: Hayal (Telbot 2495!); Juggleput (Telbot!); Kawarwad (Telbot 2246!).

**Distribution:** Socotra, India, Ceylon, E. Tropical Asia, Malaya, Australia, Pacific Islands.

**Uses:** A fairly good fodder grass, and readily eaten by cattle when young (Duthie).

13. **Hemarthria, R. Br.** (Stapf in Fl. Trop. Afr. ix, 54)

Decumbent or ascending perennial grasses with branched, many-noded stems. Leaves linear, conduplicate in bud, then flat. Ligules very short, membranous.

[13]
Racemes compressed, often curved, tips more or less subulate from the upper terminal spikelet; rhachis not or tardily breaking up. Spikelets pseudo-opposite owing to the fusion of joints and pedicels, each pair made up of a sessile (secondary) spikelet and the pedicelled companion of the sessile spikelet of the next lower node. Spikelets two-nate on the tough or tardily disarticulating rhachis of spike-like, spathe-supported racemes which terminate the culms and their often fascicled branches, alike in sex and shape, or at least similar; joints and pedicels fused into roughly semicylindric internodes, hollowed out on the inner face for the reception of the sessile spikelet; disarticulation at a right angle to the rhachis or slightly oblique, tips of joints truncate, not hollowed out or appendaged. Sessile spikelet: Florets 2, lower reduced to a barren valve, upper bisexual, awnless. Glumes equal or subequal, lower flat on the back, 2-keeled, very narrowly inflexed along the margins, coriaceous or subcoriaceous, closing up the cavity formed by the adjacent joint and pedicel, upper membranous, adhering to the inner face of the cavity. Valves hyaline, of lower floret 2-nerved, of upper usually nerveless. Valvule of upper floret hyaline, small, nerveless. Lodicules 2, cuneate. Stamens 3. Stigmas laterally exserted. Grain oblong, dorsally slightly compressed; embryo about \( \frac{3}{4} \) the length of the grain: hilum conspicuous, punctiform, subbasal. Pedicelled spikelet with more elongated acuminate glumes, especially the terminal, the upper glume mucronate or aristate.

Species about 8. Throughout the warm countries of the Old World,lace in America, but probably introduced.


A word of explanation is required regarding the new name. Haines in his Botany of Bihar and Orissa, pt. VI (1924), 1061, mentions a species under the name of Hemarthria compressa, R. Br. and gives as synonym Rottbellaia compressa, Linn. f. which, in our opinion, is not correct. Hemarthria compressa, R. Br. Prodr. Flore Novæ Hollandiae et insulae Van Diemen, p. 207, represents only partly Rottbellaia compressa, Linn. f. Besides, Stapf in Fl. Trop. Afr. ix, 55 has separated Rottbellaia compressa, Linn. f. var. fasciculata from the type and described it under the specific name Hemarthria fasciculata, Kunth Rev. Gram. i, 153.

He was allowed to use this old name, because Hemarthria fasciculata is the same plant as Hackel's var. fasciculata (Monogr. Androp. 287.) As to the species under consideration, it coincides with Hackel's Rottbellaia compressa Linn. var. genuina. With this Hemarthria compressa, Kunth Enum. i, 465 agrees closely and this name cannot, therefore, be adopted. There are only two names left which can be considered: Rottbellaia glabra and Hemarthria coromandelina. Of these the former is the older and should, therefore, be retained, but as the species is being transferred to the genus Hemarthria, the plant has to be called Hemarthria glabra, nob.

Description: A perennial grass. Stems creeping below, then erect, scendent, 1-5 to 6 m. long (Roxb.). Blade of leaf short, slowly getting narrower upwards, but at the apex slightly obtuse; sheath at the nodes glabrons. Racemes slender, compressed, 6-10 cm. long, solitary or the upper ones often fascicled. Spikelets 2-nate, 4-4.5 mm. long; callus 1 mm. long, obconical, obtuse, glabrous. Sessile spikelets: Lower involucral glume broad, ovate lanceolate, obtuse, at the apex emarginate or obtusely bidentate, not in the least acuminate, scarcely constricted below the apex. Pedicelled spikelets: Pedicel adnate. Glumes acute or subacuminate.

Locality: Sind: Bughar, Indus River (Blatter and McCann D661!); Mirpur SIKRO (Blatter and McCann D662!). Gujarat: Kankaria Tank, Ahmedabad (Sedgwick!).—Khandesh: Tapti, Dhusawal N. E. (Blatter and Hallberg 5495 l).—Kanara: Sirsi to Sidhirpur (Hallberg and McCann A781). We have not included the localities mentioned by Cke. ii, 952 as some of his specimens might belong to another species.

Distribution: We do not know of any definite record as to the distribution of this species. Hooker f. calls it common in India. Hackel gives Bengal, Sarampur, Punjab, Nepal, Ceylon, China. Duthie says it occurs in moist [14]
places in the plains, and at low elevations on the hills of N. India, and extends to Australia. It would apparently be correct to say that this plant is found all over India and Ceylon. We are not so sure about Australia.

The question now arises whether Hemarthria fasciculata, Kunth occurs in the Presidency. Wight, Roxburgh, Hook. f. and Duthie mention it for other parts of India and Duthie found it in the same localities where he gathered the previous species, but we have no reliable information at hand to say that it has been found in the Bombay Presidency. In all probability it does occur in our parts. In order to help botanists to clear up this point we add Stapf’s description and synonymy of H. fasciculata, Kunth. At the same time it will be good to remember what Hackel says under Rottboellia compressa, Linn. f.: ‘Species valde polymorpha; varietates sequentes in speciminius typicus salis distinctae, ed et ipse ita variables, ut nullus earum characterum constans, formaque intermedia frequentes.’


Description: A perennial grass. Stems erect or more often ascending, sometimes from a long decumbent rooting base, usually branched, 30 cm., to 1.5 m. high, many-noded, compressed, glabrous. Leaves linear, gradually tapering, acute, very variable in length and width, up to 23 cm. by 4 mm.; sheaths shorter or the lower longer than the internodes, compressed, keeled, often ciliate towards the mouth, otherwise glabrous or almost so; ligules membranous, very short, ciliate. Racemes usually fascicled, straight or curved. Tapering to a slender point formed by the terminal spikelet, ultimately more or less fragile. Sessile spikelet linear—oblong to oblong, from a short obtusangular more or less conspicuous glabrous callus, 4–5.5 mm. long, glabrous. Lower glume coriaceous, opaque, usually more or less constricted below the obtuse entire or emarginate, 2-keeled and very narrowly winged tips, smooth, intracinal nerves about 7; upper broadly oblong-lanceolate, acute, membranous except at the hardened tip, 3-nerved. Lower floret: Valve oblong, subobtuse, distinctly shorter than the glumes, 2-nerved. Upper floret: Valve slightly shorter, ovate-oblong, obtuse, nerveless. Anthers 1.5–2.3 mm. long. Stigmas about 1.5 mm. long, laterally exserted. Grain oblong, dorsally compressed, about 1.5 mm. long, reddish; scutellum exceeding half the length of the grain; hilum punctiform, subbasal. Pedicelled spikelet similar in sex and shape to the sessile, but slightly longer, with the lower glume more acuminate and acute, and the upper sharply mucronate, the macro somewhat exceeding the lower glume.

Distribution: British E. Africa, Mozambique District, throughout Africa in the Mediterranean region (Stapf), India, America, probably introduced.


Species 1.—Throughout the tropics.


Locality: Gujarat: Charodi (Gammie 16534 !)—Konkan: Wada Taluka (Ryan 600 !); Mulgaun in Salsette, open grass land (McCann 3642 !).—Deccan: Poona (Woodrow! Cooke); Deolali (Blatter and Hallberg 4552 !); Igatpuri (McCann 4573 !); Railway Line, Kirkee to Poona (Garade 8231 !); Chattar (bhimji Hill, Poopa (Ezekiel !); Khandala (Woodrow), behind Hotel

[15]
Annual or perennial short grasses with slender, much-branched, rarely simple stems. Leaves linear, narrow, conduplicate in bud, then flat; ligules short, membranous. Racemes much compressed, rather slender, straight or curved, very conspicuously dorsiventral. Spikelets pseudo-opposite owing to the fusion of joints and pedicels, each pair made up of a sessile (secondary) spikelet and the pedicelled companion of the sessile spikelet of the next lower node. Spikelets 2-nate on the rachis of spike-like, spathé-supported racemes which terminate the stems and their branches, different in sex and shape. Joints and pedicels fused into somewhat stout internodes, convex on the back, hollowed out on the inner face for the reception of the sessile spikelet; disarticulation at a right angle to the rachis, tips of internodes truncate with two concavities corresponding to the next upper sessile and the adjacent pedicelled spikelet. Sessile spikelet dorsally much compressed. Florets 2, lower male or neuter and then with or without a valvule, upper bisexual, a wlanless. Glumes equal or the upper shorter; lower ciliateous, transversely rugose or muricate, conspicuously winged from the keels, upper membranous, immersed in the cavity formed by the joint and pedicel, usually 3-nerved, keeled, often indistinct. Valves hyaline, nerveless or 2-3-nerved. Valvule filiform, if present, hyaline, nerveless or 2-nerved. Lodicules 2, cuneate. Stamens 3. Stigmas linear, laterally exerted low down. Grain oblong; embryo equaling the grain. Pedicelled spikelet male or neuter. Lower glume ciliateous, smooth, asymmetrically or unilaterally winged, upper variously winged from the keel. Florets as in the sessile spikelet but male or barren.

Species 5.—India (4) and Tropical Africa (1).

1. Lower involucreal glume 2—aristate
   II. Lower involucreal glume with a simple awn or acuminate.
   1. Lower involucreal glume broadly ovate, acuminate (not awned) ... 2. P. acuminatus.
   2. Lower involucreal glume lanceolate with a slender scabrid awn ... 3. P. Talbotii.

Peltophorus divergens, comb. nov. Blatter and McCann.


Description: Cœ. i. c.

Locality: Konkan: Trombay (McCann A71!).—Deccan: Mahabaleshwar, 4,500 ft., rain 270 inches (Sedgwick and Bell 4560; Lisboa); Panchgani (Blatter and Hallberg B125!, B1250!, B1286!); behind the Tableland on rocks (Blatter 3895!); Satara (Lisboa); Lonavla (Bhide!); Khandala (Woodrow), Saddle, very common all over (McCann 9616!).—S. M. Country: Amboli Ghaṭ (Talbot 4305!); Belgaum (Ritchie 808, 827).—Karara: Castle Rock, 1,800 ft., rain 300 inches (Sedgwick and Bell 4293!), Karwar (Talbot 3171!).—Usually growing on rocks in tufts.

Note. The spikes are very brittle when dry and always fall off.

Distribution: W. Peninsula.

2. Peltophorus acuminatus, comb. nov. Blatter and McCann.


Description: Cœ. i. c.—We have examined Talbot’s specimen No. 1291 and found that the lower involucreal glume is much longer than 8 mm. (1/3 in.) going up to 10 and 12 mm.

Locality: Konkan: Marmagoa (Talbot 2572!, 1291); Vasco da Gama (Herb. St. X. C. 9483!); Malwan (Woodrow).—Karara: Karwar (Talbot 3171, 2539, Hallberg and McCann A75!, Lisboa); Katgal (Hallberg and McCann 9934!); Castle Rock (Bhide!).

Distribution: W. Peninsula. Hooker f., but not Cooke, mentions also the Deccan Peninsula collected in by G. Thomson.
3. Peltophorus Talboti, comb. nov. Blatter and McCann.—*Rottboellia Talboti*, Hook. f. in F. B. l. vii, 155; Cke. ii, 954.

**Description:** Cke. l. c.

**Locality:** Konka: Vasco da Gama (Bhide!); Marmagoa (Talbot 2572 l).

**Distribution:** So far only been found in Goa.


Perennial, more or less branched and woody below; branches often in dense fascicles, intravaginal. Leaves linear, convolute or flat, hard; ligule a fringe of hairs. Racemes silky-villous. Spikelets usually 3-nate, rarely 2-nate, on the more or less fragile rachis of villous spike-like racemes which end the stems and branches (if any) and are supported by or exserted from often spathaceous sheaths, if 3-nate 2 sessile, the sessile different in sex from, but similar in shape to, the pedicellated; rachis nodes bearded all round; joints and pedicels linear, the latter more slender and shorter, opposite the joints if 2 sessile spikelets be present, otherwise approximate, but not contiguous and parallel to one of the sides of the joint; disarticulation at a right angle to the rachis, scar at the tips of the joints suborbicular, smooth, often ciliate. Sessile spikelets, if 2, one on each side of the pedicel with a narrow ring-shaped callus. Florets 2, lower male, upper bisexual, awnless. Glumes unequal; lower longer, subcoriaceous, flat on the back, acuminate, 2-keeled upwards and 2-dentate, densely ciliate, upper boat-shaped, membranous, keeled. Valves hyaline, 3-nerved. Valvules hyaline, 2-nerved. Lodicules 2, cuneate. Stamens 3. Stigmas linear, laterally exserted. Grain oblong, slightly dorsally compressed, embryo half its length. Pedicelled spikelet similar to the sessile, but with an indistinct glabrous callus and with both florets male or more or less reduced.


**Description:** Cke. l. c.

**Locality:** Sind: Karachi (Bhide!); Sehwan to Laki, foot of hills (Sabnis B613!); Umartot, sandy plains (Sabnis B940!).

**Distribution:** Nubia, Egypt, Brit. Somaliland, Arabia, Afghanistan, Baluchistan, Punjab, Sind, Rajputana.


Usually perennial, espistose, aromatic grasses. Blades of leaves flat or folded; ligules very short, membranous. Racemes erect, joints strongly compressed, usually villous, tips oblique, not appended. Spikelets similar, usually awnless, differing in sex, 2-nate, one sessile, the other pedicelled, on the articulate fragile rachis of solitary spike-like racemes, the sessile deciduous with the adjacent joint of the rachis and the pedicel. Florets 2: Lower reduced to an empty valve, upper bisexual in the sessile male, rarely barren, in the pedicelled spikelet. Glumes equal: Lower subcoriaceous to herbaceous, often 9-toothed or 2-fid, rarely awned, dorsally flattened, 2-keeled, usually with fine filiform transparent balsam ducts close to the ciliate or placilicate keels; upper membranous, lanceolate, acute, rarely awned. Valves hyaline, awnless. Valvule obsolete or absent. Lodicules 2, cuneate. Stamens 3. Stigmas laterally exserted. Grain oblong, dorsally compressed; embryo about half the length of the grain.

Species about 15.—Tropical and subtropical regions of both hemispheres.

18. **Rotboellia, Linn. f.** (Stapf in Fl. Trop. Afr. ix, 72)

Annual. Usually coarse grasses, often with stilt-roots from the lowest nodes, more or less branched, particularly upwards. Leaves large, linear-lanceolate, rather wide; ligule membranous, short. Racemes dorsiventral, with the spikelets placed antically and laterally. Spikelets 2-nate on the nodes of the very fragil rachis of stout cylindrical perfectly glabrous spike-like racemes which end the stems and their branches, in the latter case spathe-supported, different in size and usually in size, colour and nervation except those of the uppermost pairs which are barren, homomorphous and upwards increasingly reduced forming a tail-like appendage to the raceme. Joints dorsally flattened below, widely cup-shaped and hollowed out upwards, more or less completely fused with the pedicles along their posticius angles. Sessile spikelets pale, triangular in transverse section; the narrow callus fused with the bases of the adjacent joint and pedicel into a glabrous ring from the centre of which protrudes a knob fitting into the cup-shaped hollow of the next lower joint, the whole plexus falling together. Florets 2, lower male, upper bisexual, awnless. Glumes equal: Lower coriaceous, flat on the back, with very narrow inflexed margins, 2-keeled upwards; upper boat-shaped, keeled upwards, acute. Valves hyaline, 3-nerved. Valvules as long or almost as long as the valves, hyaline, 2-nerved. Lodicules, 2, connate. Stamens 3. Stigmas suberect or shortly laterally everted above the middle of the spikelet. Grain broad-oblong or ellipsoid, dorsally compressed; hilum large, suprabasal; embryo almost as long as the grain. Pedicelled spikelet similar to the sessile, but more compressed, green, striate, with two male florets, or smaller and more or less reduced.

Species 2 or 3.—Tropics of the Old World.


**Description.** Cke. l.c.

**Locality:** Dohe forest, Thana Dist. (Ryan 711!).—**Decau:** Agricultural College Farm (Hcrb. Econ. Bot. Poona!); Poona (Bhide!, Cooke, Woodrow 2!); Purandhar 4,000 ft. (Mc Cann 5591!).—**S. M. Country:** Dharwar, in field (Sedwick 5469!).—**Kanara:** Hattikeri, near Karwar (Hallingberg and Mc Cann A74!).

**Distribution:** India, Andamans, Ceylon, China, Malaya, Australia, Africa. var **robusta**, Hook. f. in F.B.I. vii, 156.

**Description.** Leaf-base more cordately confluent with the sheath. Spikes stouter below, slender above the midle. Spikelets in upper half distichously imbricate, longer than the joints, fertile nearly to the tip. Pales of upper floral glume auricled at the base.

**Locality:** Poona (Woodrow).—We have not seen this plant.

**Distribution:** Malabar, Palamcottta.


Annual (?) or perennial, sometimes very coarse grasses, usually much branch-ed upwards. Leaves linear to lanceolate, short to very long, conduplicate or con-volute in bud, then flat; ligules very short, membranous. Racemes dorsiventral. Spikelets solitary on the nodes of the fragile rachis of slender cylindrical spikes which end the stems and their usually fascicled spathe-supported branches, their pedicelled companions suppressed or rudimentary and very minute and the pedicles completely fused with the joints, both forming together a deeply
hollowed-out cylindrical receptacle; disarticulation of the internodes at a right angle or slightly oblique to the rhachis, their tips hollowed out. Sessile spikelets with a very narrow callus which is fused with the base of the internode into a rim from the centre of which protrudes a small knob fitting into the hollow of the next lower internode, the whole plexus falling together. Florets 2, lower male or neuter, upper bisexual, awnless. Glumes equal: Lower coriaceous, flat or subconvex on the back with very narrow inflexed margins, faintly nerved with a transverse groove at the base, upper boat-shaped, hyaline, obtuse. Valves hyaline, 2-nerved or nerveless. Valvules similar to the valves. Lodicules 2, cuneate. Stamens 3. Stigmas short, laterally exerted. Grain oblong, dorsally slightly compressed; embryo 1/4 the length of the grain.

Species about 4.—From the Sudan through tropical Asia to Australia.

Stapf has described the species Ophiurus megaphyllus which forms part of O. corymbosus, Hook. f. in F.B.I. vii, 160 (not of Gaertn. f. and not of Rothb. corymbosa, Linn. f.). What is left over of Hook. f.’s O. corymbosa after the separation of O. megaphyllus has to go under O. corymbosa, Gaertn.

I. Leaves ensiform, very hairy. Robust, 1.5-1.8 m. 1. O. megaphyllus.
II. Leaves linear, glabrous. Slender, 0.6-1.2 m. ... 2. O. corymbosus.


Description: A large stout grass, 1.5-1.8 m. high, very leafy to the top. Leaves narrowly ensiform, tapering from base to apex, upper 10-18 mm. wide, lower much wider, flat, very hairy as are the sheaths, but more or less glabrescent with age, hairs with small tubercle bases, margins of sheath hisutse. Spikelets 2-4 mm., slightly shorter or longer than the joints, in very numerous peduncled spikes 7.5-10 cm. long, from the leaf-axils. Pedicules 7.5-12.5 cm., sheathed at the base, finally exserted, each solitary on a branch with a villous node, often geniculate at the node. Sessile spikelets: Glumes 4: Lower involucral glume oblong, glabrous, with rounded tip, smooth or with few lines of small pits, not becoming recurved sometimes bearing a small appendage. Upper involucral glume white, becoming inclined forward, quite free from the rhachis when the spikelet opens. Pedicelled spikelets: the lowest are sometimes free at the top and bear a small brown free appendage.

Locality: We have not been able to examine all the specimens which were formerly put under O. corymbosa, Hook. f. and we are, therefore, not in a position, to assign any specimen to O. megaphyllus, Stapf.

Distribution: To make a definite statement all the herbarium material of O. corymbosa, Hook. f. would have to be examined.


Description: Perennial. Stems very numerous, glabrous, erect, slender, 0.6-1.2 m. high, bulbous at the base, the bulbous bases connected into a horizontal rhizome. Leaves linear, glabrous, up to 5 mm. broad, margins minutely tubercled at base, the tubercles bearing cilia when young. Spikes very slender, 5-12.5 cm. long, sometimes ending in a small tail like that of a rattle-snake (Haines), spikelets 2.5 mm. long, equalling the joint. Lower involucral glume of sessile spikelet glabrous, with many longitudinal lines of small pits, narrowly oblong, tip rounded, finally recurved.

Locality: Deccan: Deolali (Blatter and Hallberg 4564!); Nasik Road (Blatter 9624!); Talegaum (McCann!)


Mostly tall, coarse, perennial grasses, much-branched upwards. Racemes with the sessile spikelets which are often imbricate, placed anticously and pedicellated laterally. Spikelets 2-nate on the nodes of the fragile rhachis of slender, more or less compressed conspicuously dorsiventral spike-like racemes which can turn around and their usually fascicled, spatho-supported branches, different or very rarely alike in sex, similar in shape or the pedicelled more or less or very much reduced; joints and pedicels similar or the latter more slender,
linear to cuneate or subclavate, dorsally compressed, glabrous, contiguous or nearly so; disarticulation of the joints at a right angle to the rhachis, their tips more or less hollowed out, with or without an ear-shaped appendage. Sessile spikelet dorsally compressed, the narrow transverse callus fused with the base of the adjacent joint and pedicel into an obscure rim from the centre of which protrudes a knob fitting into the hollow of the next lower joint, the whole plexus falling together. Florets 2, the lower usually reduced to the valve with a small valvule, always neuter, upper bisexual, awnless. Glumes subequal; lower flat or slightly convex on the back, smooth or variously sculptured, with narrow inflexed margins, 2-keeled upwards and more or less winged from the keels, obtuse or emarginate, very faintly nerved; upper chartaceous, keeled, acute, 1-3 nerved. Valves hyaline, of lower floret 2-nerved or nerveless, of upper 3-1-nerved or nerveless. Valvule hyaline, similar to the valve, 2-nerved or nerveless. Lodicules 2. cuneate. Stamens 3. Stigmas shortly laterally exserted. Grain oblong, dorsally compressed; embryo about half the length of the grain. Pedicelled spikelet very varied, similar to the sessile or more or less reduced or rudimentary, male or neuter, very rarely bisexual.

Species about 12. Tropics of both hemispheres.


**Locality:** Kanara : Birchy (Talbot 2820 l, 2072) ; Jugglepet (Talbot 1566 l)

**Distribution:** Chota Nagpur, W. Peninsula.

*(To be continued)*
REVISION OF THE FLORA OF THE BOMBAY PRESIDENCY. Part IV.
By E. Blatter, s.j., ph.d., F.L.S.
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PART IV
GRAMINEÆ

(Continued from page 33 of this volume)

21. IMPERATA, CYRT.

Species 5 or 6, nearly allied. In the warm regions of both hemispheres.


Some authors distinguish varieties and subvarieties which scarcely seem to be justified. Stapf who mentions two varieties (var. Thunbergii, Durand & Schinz, and var. Koenigi, Durand & Schinz) says in a note (I. c. 89): ‘The varieties and the type, although on the whole pretty distinct within their areas, often pass into each other, chiefly along the confines of their areas, or they possibly lose their distinctive characters under particular local conditions, when the separation becomes almost impossible.’ This does not speak in favour or good varieties. Hackel (I. c. 93–95) has 3 varieties and several subvarieties, and Anderson (in Oefvers. K. Vet. Akad. Forh. Stockh. 1885, p. 137) is still more liberal with his subvarieties. Hook. f. makes one variety *latifolia* (F. B. I. l. c.) and remarks about one of Hackel’s varieties: ‘Hackel distinguishes the Indian form as var. Koenigi having villous nodes and broader, less rigid leaves, but some of the Indian specimens appear to me quite like the Western Hackel’s division depends chiefly on such characters as hairiness of the leaf-insertions, width of the leaves and height of the ligule. The height and shape of the ligule, however, seems, according to Hole’s investigations, more or less correlated with the width of the lamina, while the other characters appear to vary with the locality and do not define forms of any constancy. Hole’s treatment of *Imperata arundinacea* (On Some Indian For. Grasses and their Oecology, 1911, p. 93) appeals to us much more. Amongst the material observed at Dehra Dun lie distinguishes 3 forms which are more or less clearly defined:—

(a) The depauperate form common on lawns or areas where the grass is continually cut or grazed, with minute, almost filiform, culms and small leaves. Leaf-insertions usually long-bearded. Glume IV and pale usually glabrous.

(b) The ordinary savannah form which usually attains a height of about 90 cm. with leaves up to 17 mm. wide. Leaf-insertions bearded or glabrous. Pale and glume IV ciliate.

(c) A robust form found in swamps or marshy soil where there is an abundance of available moisture more or less throughout the year. This plant attains a height of 2–3 m. and probably more. Leaves up to 26 mm. wide, leaf-insertions glabrous. Pale and glume IV ciliate. This is identical with var. *latifolia*, Hook. f.

Forms of this kind could be multiplied according to various localities. As we are not going to distinguish any varieties we give a description of the species including all the variations that so far have been observed.
Description:—Culms erect, simple, slender, from 12 cm. in height and almost filiform to 2·8 m. high and 8 mm. diam., 3-4-noded, glabrous, solid, slightly fuscous at base; leaf-insertions tumid, glabrous or densely bearded with erect white hairs. Leaf-sheaths rather loose, glabrous or glabrescent, ciliate or glabrous along the margin towards apex, the lowest at length usually breaking up into fibres, usually longer than proper internode; ligules membranous, rounded, truncate or 2-lobed, ciliate, dorsally silky, attaining a height of 3 mm. Blade of uppermost leaf of flowering culm from mucroniform and 1·25 mm. long to 15 cm. long and 6 mm. wide with greatest width in middle, of lower leaves erect or arculate and attaining a length of 1·2 m. and width of 27 mm., greatest width about the middle, dark green, midrib white, apex acuminate, narrowed towards the base where the midrib occupies almost the entire width of the leaf, smooth, but scabrid on margin and on one or more sub-marginal nerves above, especially towards the apex, white villous above or margins towards the base and behind the ligule. Panicle spike-like, 3-50 cm. long, not exceeding 25 mm. in width, cylindric, very dense; branches and branchlets very numerous, crowded, appressed; pedicels fine with clavate tips, glabrous, scabrous or pubescent, with long fine hairs below. Flowering panicle purple with the exerted stigmas, the callus-hairs being closely appressed to the axis, fruiting panicle silvery white with the wide-spreading callus-hairs. Spikelets not awned. lanceolate, 3 mm long, both spikelets of each pair similar, each 1-flowered and hermaphrodite, and at length falling from the pedicel; callus-hairs soft, white, 2-3 times as long as the spikelets. Lower involucral glume lanceolate, membranous, slightly thickened towards the base, apex hyaline, 3-9-nerved, none of the nerves extending to apex of glume, margins incurved ciliate above, dorsally villous with soft white hairs overtopping the glume by 13 to 3 times the length of the glume. Upper involucral glume similar and subequal to the lower, but sometimes sub-keeled with mid-nerve extending almost to apex. Lower floral glume oblong, hyaline, nerveless, apex acute or subtruncate and laciniate or denticulate, ciliate, 1/4 to 1/2 of the upper involucral glume. Upper floral glume subequal to the lower one, ovate-lanceolate, hyaline, nerveless, apex acuminate, acute or obtuse and laciniate or denticulate, minutely ciliate or glabrous. Pale quadrangular, rectangular or subpentagonal hyaline, nerveless, apex denticulate or unequally laciniate, glabrous or ciliate, 1/4 the size of the upper floral glume sub-keeled to it. Lodicules none or very minute. Anthere 2, 2·5-3·3 mm. long, orange, filaments sometimes connate below. Stigma 3, 3·4 mm. long, purple.

Locality: Sind: (Stocks).—Gujarat: (Graham).—Konkan: Tardeo, Bombay (Hallberg 5308!); Allibag, sandy shore (Ezekiel!); near Thana (McCann!); Banks along railway track between Ghatkoper and Thana, Salsette (McCann!).—S. M. Country: Shiggaon (Sedgwick 2353!); Dwarari (Sedgwick and Bell!); Castle Rock (Bhide!); Londa, common (McCann!).—Kanara; Halyal (Talbot 1886!).

Distribution:—The hotter parts of India, ascending in the Himalayas to at least 6,500 feet, Mediterranean region, Africa, Java, Japan, China, Australia.

Biology and Ecology:—See Hole, l. c. 96.

Uses:—Duthie says of this grass that 'cattle relish it.' 'In Australia,' he says, 'it is called blady grass and the young succulent foliage which springs up after the occurrence of a fire is much relished by stock. I have observed the same effect resulting from periodical fires on certain parts of the Himalaya where this grass is plentiful.' (Duthie, Fadd. Grass. of N. Ind. 23). 'In India,' according to Hole (l. c. 101) 'the succulent white stolons are eaten by pigs and areas which have been well-worked by pigs in their search for the stolons are not infrequently seen in the forest. It is possible that in some cases the eradication of the species might be cheaply accomplished by the aid of pigs.' This grass is also known as a paper-making material: 'The ultimate fibre obtained from this grass is very similar in most respects to Esparto; the yield of bleached fibre being about the same. This is a favourable indication inasmuch as Esparto is one of the best known and most useful sources of supply for the trade. The results obtained from the chemical analysis show that the grass is capable of yielding a good quality of cellulose, suitable in every way for the manufacture of paper.'

The leaves are largely used for thatching (Hole).


The genus as understood by the latest agrostologists comprises also the species which were formerly described under the genus *Erianthus*, Michx. As already remarked by Haines in his Flora of Chota Nagpur the awned upper floral glume of some *Saccharum* breaks down the only distinction between *Saccharum* and *Erianthus*.

Cooke (ii, 948) mentions 3 species of *Saccharum*: *T. spontaneum*, Linn., *S. arundinaceum*, Retz. and *S. officinarum*, Linn. To these we add *S. Munja*, Roxb. and *S. Griffithii*, Munro. The two species of *Erianthus*, observed in the Presidency, viz., *E. Ravenna*, Beauv. and *E. fastigiatus*, Nees, will be transferred to *Saccharum*.

General characters of *Saccharum*: Perennial tall herbs. Leaves various. Panicle large, often silvery-silky and showy; spikelets usually surrounded by long silky hairs from the base, all alike, binate, one sessile, the other pedicelled on the articulate fragile rhachis of panicked racemes, the pedicelled falling from their pedicles, the sessile deciduous together with the contiguous joint of the rhachis and pedicle. Florets 2, the lower reduced to an empty valve, the upper hermaphrodite. Involucral glumes equal, often chartaceous to subcoriaceous towards the base, membranous to subhyaline upwards; the lower glume with infixed margins and in the sessile spikelet usually with an even number of nerves; upper glume 1-, 3-, or 5-nerved. Floral glumes hyaline; upper with a terminal bristle-like usually straight awn, or mucronate, or muticous, or 0. Lodicules 2, cuneate. Stamens 3. Stigmas laterally exerted. Grain oblong to subglobose; embryo short to half the length of the grain or more; hilum basal.

**Key to the species, mainly after Haines.**

A. Awn of upper floral glume not or scarcely exerted from spikelets or 0.

I. Hairs on calyx of sessile spikelet shorter or not much longer than spikelet

1. Culms not leafy above, under 17 mm. diam.
   Leaves under 20 mm. broad. Lower Inv-o-lucral glumes ciliate
   2. Culms densely leafy above, over 25 mm. diam. Leaves over 25 mm. broad. Lower Inv-o-lucral glumes glabrous

II. Hairs on calyx of sessile spikelet shorter or not much longer than spikelet

1. Upper involucral glume of sessile spikelet not villous dorsally
   (a) Foliage not glaucous. Culms densely leafy above. Sessile spikelet shorter than internodes of rhachis
   2. Upper involucral glume of sessile spikelet villous dorsally

II. Panicles thyrsiform. Spikelets 3-4 mm. long.
   Awn 2-5 to almost 6 mm. long

II. Panicles not thyrsiform. Spikelets 4 to almost 5 mm. long. Awn 8 mm. long

In the following treatment of the various species we shall draw largely on R. S. Hole, On some Indian Forest Grasses and their Oecology, in Indian Forest Memoirs, vol. 1, pt. 1 (1911), 50-91.

We have not included the synonyms which Stapf Fl. Trop. Afr. ix, 95, has given under *S. spontaneum var. aegypticum*, Hack. as we are not in a position to judge whether it is a good variety or not. According to Hole the African forms placed under var. *aegypticum* differ from the Indian plants chiefly by their slightly larger spikelets. But he finds that this difference is very slight and that it falls in the case of some African specimens. ‘Considering the great variability of the species in India it seems possible that a more complete knowledge of the African plant will prove *aegypticum* to be merely one of the several oecological forms which are defined by inconstant characters and which are connected by numerous intermediates.’

*Description:*—Stem erect or decumbent at the base, reaching up to 6 m. in height and 15 mm. in diam., solid above, fistular below, terec, indistinctly striate, usually pruinose when young, polished when old, silky below the panicle and minutely silky below the upper leaf-insertions, glabrous or minutely pubescent below the lower leaf-insertions. Leaf-sheath longer than proper internode, often with reddish or purplish blotches, villous at mouth, often minutely pubescent at base, otherwise glabrous or with scattered appressed hairs, sulcate. Blade erect, of uppermost leaf of flowering culm usually long, varying from 3 cm. to 90 cm. in length, of lower leaves up to 1-2 m. and even 2 m., usually very narrow, often not exceeding 1-5 mm. in width and then consisting of a very narrowly margined canaco-convex midrib, but also attaining a width of 16 mm. glaucous, midrib white, margin scabrid, often villous above at base immediately behind the ligule. Ligule ovate or deltoid, base often sub-auricled, membranous, subacute or subtruncate, often fimbriate when old, up to 6 mm. high, minutely silky dorsally and ciliate. Flowering panicle 15-60 cm. long, conical or lanceolate to oblong branches horizontally spreading or slightly ascending, usually reddish or purplish, with the callus hairs closely appressed to the branches of the panicle; primary rhachis sulcate, silky with long white hairs; primary branches subverticillate, simple or compound. Spikelets in pairs, one pedicelled and one sessile on the capillary jointed branches and branchlets, awnless, lanceolate, 2-5 mm. long, sessile and pedicelled similar, each one-flowered and hermaphrodite, pedicelled fruiting spikelet falling from the pedicel, the sessile spikelet falling later with the attached pedicel and joint of axis; joint of axis longer or shorter than sessile spikelet, villous on margins, or on margins and dorsally; pedicel 1-1½ the length of the sessile spikelet, but usually shorter than spikelet, glabrous or ciliate, shorter than proper joint; callus-hairs white, from ½-7 times as long as sessile spikelet. Lower involucral glume lanceolate, the basal third thickened, becoming hard and polished in fruit and more or less brown in colour, the upper two-thirds membranous hyaline, with 2 lateral nerves from which the margin is inflexed; apex entire or minutely bidentate; margin ciliate; dorsally with the upper two-thirds minutely appressed-pubescent. Upper involucral glume broad-lanceolate, similar to the lower, but subtilifivated with one central nerve; apex sometimes mucronate; margin inflexed and long—ciliate. Lower floral glume hyaline, nerveless, shorter than upper involucral glume, ovate-lanceolate, long—ciliate, minutely pubescent above dorsally. Upper floral glume minute, linear, ciliate, hyaline, sometimes 0. Pale minute, ovate, ciliate, often shorter than the lodicules. Lodicules 2, cuneate, glabrous or ciliate at apex. Anthers 3, yellow, turning brown. Stigmas 2, purple.

‘The horizontally spreading callus-hairs of the fruiting spikelet form an efficient parachute which aids its distribution by wind. The hairs of neighbouring spikelets becoming entangled together, characteristic flocculent masses of several spikelets are often soon being carried by the wind or hanging on the adjacent vegetation.’ (Hole).

As good field characters we may mention the narrow leaves and slender culms, the long callus-hairs and the brown coriaceous base of the involucral glumes.

This is a very variable species, and Hole does not think that we are justified in making different sub-species or varieties. He distinguishes 3 ecological forms:

(a) The dry sandy soil-form, a xerophilous type. The culms are slender, erect and tufted, usually less than 5 mm. diam. The leaves exceedingly narrow, sometimes only a little more than 1 mm. wide. The callus-hairs not less than 3½ times the length of the spikelet.

(b) The swamp form, a hygrophilous type, found in marshes and swamps with an abundance of available moisture more or less throughout the year. The culms are stout, 5-15 mm. diam., usually decumbent at base and not tufted. Leaves broad, reaching a width of 17 mm.
The callus-hairs 1½-3½ times as long as the spikelets. The fruiting panicle elongate-elliptic to oblong with its branches usually more persistent than in other forms.

(c) The loam-form, intermediate between (a) and (b). The culms are more or less decumbent at the base and not tufted, but less robust and with longer callus-hairs than in (b).

Locality: Sind: Shikarpur (Woodrow); Mirpur Sakro (Blatter and McCann 1897!);—Gujarat: Baroda (Cooke); Domas near Surat (Dalzell and Gibson).—Khandesh: Dadgann (McCann 9892!); Northern slope of Chanseli (McCann 9893!); Bor, Bori River (Blatter and Hallberg 4422!);—Konkan: Kamana, Mahim (Ryan 2205!); Sakwar, river side (Ryan 2050!); Bassein (Ryan 41!); Karjat (Woodrow), on river bank (McCann 1!); Vibar Lake (McCann 9,894!); Alibag, sandy shore (Ezekiel!).—Deccan: Igtapuri, on banks of bund (McCann 4334!); Poona, river bank (Woodrow).—S. M. Country: Banks of streams, common in the S. Dharwar District (Sedgwick and Bell 3693!).—Haveri (Talbot 2236); Castle Rock (Gammie 15743!, McCann 1!); Belgaum (Ritchie).—Kanara: Suppa, bed of Kala Nuddi (Talbot 2196!); Hullikul (Talbot 1348!).

Distribution of the species, irrespective of the varieties: Africa (Upper Guinea, Nile Land, Mozambique District), Lower Egypt, Arabia, Syria, Afghanistan, India, Ceylon, Burma, China, Java, Philippines, New Guinea, Australia.


Description: Stems up to 6 m. high, many-noded, glabrous or pubescent below the panicle, more or less coated with wax below the nodes. Leaf-sheaths tight, terete, smooth, glabrous except when young; ligules very short, membranous, ciliate; blades linear-lanceolate, up to 1½-5 m. long and over 5 cm. broad green above, glaucous below, more or less scabrid along the margins, midrib very stout, rounded on the back, more or less flat above. Panicles pyramidal, up to 1 m. long, dense, silvery; primary rachis glabrous except on the pubescent nodes, or more or less silky; primary branches verticillate or semi-verticillate, very slender, glabrous or hairy. Racemes up to 10 cm. long, very fragile; joints and pedicels filiform, more or less ciliate or glabrous, the joints variable in length, the pedicels much shorter. Spikelets lanceolate, up to 4²-2 mm. long, surrounded from the callus by a tuft of long silky hairs up to 9 mm. long. Involucral glumes subequal, lanceolate, firm towards the base, otherwise subhyaline the lower acute. 2-nerved to sub-4-nerved, glabrous, the upper very similar 1-3-nerved, glabrous or ciliolate. Lower floral glume oblong, acute or subacute, hyaline, nerveless, ciliate, about 3-3 mm. long, upper floral glume subacute, ciliate, as long as the lower or 0. Pale, if present, very minute, obovate, ciliate. Lodicules broad, cuneate, sparingly ciliolate from the top. Stigmas purplish. 2½ mm. long. Grain oblong, attenuated upwards, subterete, flesh-coloured; embryo ½ the length of the grain.

Locality: Grown throughout the Presidency.

Origin.—There are many indications that S. Asia is the original home of the sugarcane.


Description: A gigantic tufted grass. Culms biennial (or triennial), somewhat with the habit of the sugarcane, branched, often 5 m. high, the flowering culms sometimes nearly 9 m. high and over 18 mm. diam., solid. Stem glabrous, smooth, or slightly rough with very long internodes. Blade reaching 1½ m. in length and 5 cm. in breadth, with rib stout and as broad as the blade at base, keeled below, villous with long silky hairs above, margins
cutting. (According to Hole the midrib in basal leaves occupies at base ¼ or less of the width of the blade). Upper cauline leaves becoming folded and filiform. Leaf-sheaths glabrous. Ligule truncate with a ring or tuft of long silky hairs 6-25 mm. distance from its base. Panicle 60 cm. to 1'2 m. long, pink, white or silvery, diffuse while flowering, with smooth glabrous axis, main branches tufted on the axis, tufts alternate or subverticillate. Spikelets 2-5-3'7 mm. long, much shorter than the internodes of the spike. Pedicel ½ to equal the length of the sessile spikelet. Joint usually longer than sessile spikelet; majority of pedicels shorter than proper joint. Callus-hairs pale, not dense, as long as spikelet (according to Hole shorter than or subequal to spikelet). Hairs of joint overtop the joint by less than to 1'4 times the length of the joint. Sessile spikelet: Lower involucral glume chartaceous, dorsally sparsely villous, villi overtopping the glume by about 1'4 the length of the glume. Upper involucral glume chartaceous, not villous dorsally. Lower floral glume not villous dorsally. Micro of upper floral glume not exserted beyond apex of spikelet. Pale ciliate. Pedicelled spikelet: Involucral glumes dorsally villous, villi overtopping spikelet by 1-1'2 times the length of the spikelet. Spikelet sometimes 2-3-flowered with 1-2 additional paleate glumes inside the floral glumes.

Locality: Cultivated in gardens.

Distribution: Bengal, Assam, Burma, extending into China. It is a native of the evergreen zone of India characterized by a rainfall exceeding 70 in., but is frequently cultivated in gardens throughout India. (Hole).

4. Saccharum munja, Roxb Fl. Ind. i (1832), 246; Hole in Ind. For. Memoirs, i (1911), 62; Haines Bot. Bihar and Orissa 1013.—S. Sara, Roxb. l. c. 244—

For explanation of above synonymy see Hole, l. c. 65-67.

Description: An erect grass, attaining a height of 5-5 m. and 12 mm. diam., pale straw-coloured, smooth, striate, solid. Leaf-sheath shortly silky at extreme base, otherwise quite smooth, striate, pale straw-coloured, villous on margins at apex with long white hairs usually much longer than proper internode, uppermost sheath sometimes extending beyond the base of the panicle. Upper leaf of flowering culm 22-70 cm. long, flat, tapering from the base, long-accumulate, 5-10 mm. broad. Lower leaves up to 2 and 2'4 m. by 25 mm., but usually only 18 mm. broad. In basal leaves the concave midrib occupies ½ or more of width of blade. Colour glaucous, midrib white. Margin scabrid as are one or more intramarginal nerves below, otherwise smooth, but densely white villous at base behind the ligule. Ligule truncate, usually a narrow membranous rim, of upper leaves longer, attaining 3 mm., minutely silky dorsally and ciliate. Lowering panicle 30-50 cm. long, usually lanceolate, pale cream-coloured to dark reddish-purple, branches spreading. Fruiting panicle oblong, branches appressed to the axis, white to greyish-white. Primary rhachis glabrous, sulcate, more or less scabrid on the ridges. Primary branches subverticillate, compound. Ultimate branchlets triquetrous, more or less villous with long white hairs on angles and on two faces. Spikelets in pairs, one pedicelled and one sessile on the capillary jointed branches and branchlets of a terminal panicle, awnless, lanceolate, up to 5 mm. long; sessile and pedicelled similar, each one-flowered and hermaphrodite. Pedicelled fruiting spikelet falling from the pedicel, the sessile spikelet falling later with the attached pedicel and joint of axis. Joint of axis triquetrous, ½ to subequal the sessile spikelet, but usually shorter than the spikelet, villous on two faces and on margins, the villi overtopping the joint by once to twice the length of the joint. Pedicels triquetrous, ½-Ì the length of the sessile spikelet, villous with long white hairs on two faces and on the angles. Most pedicels shorter than proper joint, rarely subequal to the proper joint. Sessile spikelets: Lower involucral glume lanceolate, chartaceous, with two strong lateral nerves and usually 1-4 more or less distinct additional nerves, dorsally long villous on basal half or two-thirds, the hairs overtopping the glume by about the length of the glume, scabrid dorsally on keels, margin inflexed, sparsely ciliate above, apex minutely bidentate to entire. Upper involucral glume subequal to the lower, lanceolate, chartaceous, keeled, with one strong central
nerve and usually 2-4 more or less distinct additional nerves, glabrous dorsally or minutely pubescent towards apex, scabrid dorsally on keel, margins incurved, ciliate above, apex usually shortly mucronate. Lower floral glume oblong-lanceolate, hyaline-membranous or little shorter than the upper involucral glume, 1-3-nerved, margins incurved, ciliate, apex acute or short mucronate. Upper floral glume broad-lanceolate to elliptic, shorter than or subequal to the upper involucral glume, hyaline, 1-3-nerved, mucronate, ciliate, micro short to 1-25 mm. long, but not exserted beyond the apex of the spikelet. Pale ovate, hyaline, ciliate, from 1/2 the length of the upper floral glume. Pedicelled spikelets similar, but both the involucral glumes are dorsally long villous and usually with 3-5 strong nerves and occasionally 2 additional fainter ones. Lodicules 2, cuneate, glabrous, 0-5 mm. long, Anthers 3, pale yellow to purple, 2-2.5 mm. long. Stigmas yellow, often tinted with purple, 1-1.5 mm. long.

To distinguish this species from *Saccharum Ravenna* Hole gives the following field-characters: Glaucous narrow leaves, awnless spikelets, smooth leaf-sheaths.

**Locality:** Sind (Stocks in herb. Boiss. ex Hackel).—Gujarat:— (Sedgwick and Sexton).

**Distribution:** Northern India in the Punjab and Upper Gangetic Plain.

**Uses:** The fibre of the upper leaf-sheaths is used for mats, ropes, etc. It has also been favourably reported on as a paper material (Haines).


**Description:** A cespitose grass. Culms 2 m. high or slightly higher, solid. Blade glaucous, narrow, about 5 mm. wide; midrib at base usually occupies 1/4 or more of width of blade; sheath not hirsute, nodes not bearded. Rachis of racemes fragile. Spikelets 2 at each node of the rachis, one sessile and finally deciduous with the accumbent joint, the other pedicelled finally separating from the pedicel, both 1-flowered, hermaphrodite. Spikelets 4-6 mm. long, muticous; pedicel 1/2-3 the length of the sessile spikelet; joint 1/2 the length of the sessile spikelet. Most pedicels subequal to longer than proper joint; callus-hairs yellow, shorter than to subequal to the spikelet; hairs of joint overtopping the joint by once to twice the length of joint. Sessile spikelet: Lower involucral glume chartaceous, dorsally densely villous in basal 1/2, villi not overtopping the glume, or overtopping by less than 1/2 the length of the glume. Upper involucral glume chartaceous, dorsally villous in basal 1/3 or 1/2, villi not overtopping or overtopping by less than 1/2 the length of the glume. Lower floral glume sometimes sparsely villous dorsally. Upper floral glume with a very short micro, 1-5 mm. long, not exserted beyond apex of spikelet. Pale ciliate. Pedicelled spikelet: Involucral glumes dorsally villous in basal 1/4-1/2, villi not overtopping or overtopping by less than 1/2 the length of the spikelet; no additional glumes inside the floral glumes.

**Locality:** Sind:—Near Hyderabad (Blatter and McKann D698 i); W. of Tatta (Blatter and McKann D699 i); near Karachi (ex Hackel l.c.).

**Distribution:** Afghanistan, Baluchistan, Punjab, Sind.


**Description:** Culms erect, up to 6 m. high and 17 mm. thick, solid, often slightly fistulose just below the panicle, smooth and polished, striate, shortly and finely bearded at the leaf insertions. Leaf-sheath hirsute with bulbous-based hairs, the latter varying in colour from white to yellow or brown, the hairs being more or less deciduous and old sheaths are often rough with the persistent bulbous bases; upper sheaths glabrescent, always longer than the proper internode, long ciliate on margins towards the apex. Blade of uppermost leaf of flowering

[7]
culm from 20 cm. long and 6 mm. wide, linear and tapering from base, to 75 cm. long and 16 mm. wide with greatest width about the middle; lower leaves usually 1'-2'-1.5 m. long and 25 mm. wide, but also attaining a length of 1'8 m. and width of 38 mm., broadest about the middle, sometimes in upper third, dark green, midrib white, apex acuminate, narrowed towards the base. In basal leaves the concave midrib occupies \( \frac{1}{4} \) or more of width of lamina at base, often the entire width of the leaf, densely villous above towards the base with bulbous-based hairs, more or less scabrous along nerves, margins scabrid. Ligule a narrow membranous rim not longer than \( 1.75 \) mm., entire, rounded or deeply 2-lobed, patently hairy dorsally with stiff white hairs, ciliate. Panicle 30-90 cm. long, lanceolate, dense or somewhat lax and lobed, silvery silky, with a tinge of grey and purple, or quite white; primary rhachis sulcate, glabrous, smooth below, scabrid on the ridges; branches slender, solitary from the distant nodes, divided from the base, up to 20 cm. long, branchlets unequal, divided again, glabrous except at the nodes. Racemes sessile or the lower more or less pedunculed, narrow to oblong; joints and pedicels filiform, long ciliate, with thickened tips, the latter shorter than the joints. Callus-hairs shorter than to subequal to length of spikelet, purplish or brownish. Sessile spikelet: Lower involucral glume lanceolate with 2 lateral keels, dorsally flat or depressed between the keels, apex 2-nucirnulate, one or both margins incurved, dorsally scabrid on keels, otherwise glabrous, or more or less villous dorsally, villi not overtopping the glume, or overtopping by less than \( \frac{1}{4} \) the length of the glume, 2-nerved, sometimes with 1-2 additional faint nerves between the keels. Upper involucral glume subequal to the lower, with a central keel, mucronate, margin incurved, ciliate, dorsally scabrid on keel, otherwise glabrous or more or less villous dorsally, villi not overtopping the glume, or overtopping by less than \( \frac{1}{4} \) the length of the glume, 1-nerved and sometimes 1 or 2 partial lateral nerves. Lower floral glume slightly shorter than upper involucral glume, oblong-lanceolate, hyaline, apex mucronate or acute, dorsally glabrous, margin incurved, ciliate above, 1-3-nerved. Upper floral glume usually \( \frac{1}{4} \) the length of the lower, ovate-lanceolate, hyaline, margin incurved, ciliate, long-awned, awn 2'-5.5 mm. long, 3-nerved. Pale about \( \frac{1}{4} \) the length of the upper floral glume, ovate-lanceolate, hyaline, glabrous, nerveless. Lodicules 2, ciliate, glabrous. Anthers 3, yellow streaked with purple. Stigmas yellow. Pecicelled spikelet like the sessile, but involucral glumes often strongly 3-nerved and hairy.

Can easily be distinguished from Saccharum munja by its distinctly awned spikelets, the broader dark green leaves and hairy leaf-sheaths. (Hole).

**Locality:** Sind—Laki (Bhide 1); Khaipur Mirs, sandy plain (Sabnis B226 l); Sehwan (Sabnis B36 l, B664 l); Larkana (Sabnis B44 l, Cooke); Pad-Idan (Sabnis B493 l, B509 l); Sukkar (Sabnis B552 l); Nasarpur, sandy plains (Sabnis B1049 l); Umarkot, sandy plains (Sabnis B1211 l); Sanghar (Sabnis B900 l); Jamesabad (Sabnis B968 l); Phutel Canal, on banks (Sabnis B193 l); Mirva Canal, sandy banks (Sabnis B258 l); Khaipur forests (Sabnis B329 l); Sita Road (Sabnis B367 l); Sehwan to Laki, foot of hills (Sabnis B600, B111 l); Mirpur Sakro (Blatter and McCann D694 l); Chuar Chemali (Blatter and McCann D656 l); Indus Delta (Blatter and McCann D696 l); Karachi (Cook, Woodrow).—Deccan; College Garden, Poona (Garade 1).

**Distribution:** Western Himalaya, Punjab, Upper Gangetic Plain, Sind, extending westwards to the Mediterranean.

**Uses:** The culms are used for making screens, etc. The leaves quickly decay and are therefore useless for thatching.


**Description:** Cke. i. c.

**Locality:** S. M. Country:—Belgium (Ritchie 792).

**Distribution:** Sikkim, Khasia, Assam, Bengal, Chota Nagpur, Orissa, W. Peninsula.


**Description:** Cke ii, 947.

1. Hairs of callus longer than the spikelet...1. *P. crinitum*,

2. Hairs of callus shorter than the spikelet...2. *P. saccharoides*.


**Description**

Cke. ii, 965.

**Locality**: Kanara: Sirsi (Gammie!); Sumpkund, in a cutting (McCann 9347!, Woodrow!); Nilkhund Ghat on steep bank along roadside (Telbot 781!); Gersoppa Falls (Telbot 2671!, McCann, 9339!).

**Distribution**

More or less all over India, Afghanistan, China, Malaya, New Hebrides.


**Description**

A much tufted, branched and very leafy elegant grass, 30–60 cm. high; stem firm or almost woody, slender, polished, from a perennial woodstock; nodes on stem glabrous or bearded. Leaves 2½–6½ cm. long up to 2½ mm. broad, linear, acuminate, bearded at the base and margins of sheaths. Spikes 17 mm. to 5 cm. long, terminating all the branches; rhachis compressed and pedicel bearded; each spikelet with 2 long fine scabrous awns 15–25 mm. long. Sessile spikelet: Lower involucrum glume narrow-oblong, broadest above, faintly 2–4-nerved, tip bearded. Upper involucrum glume the largest, conuplicate, 2½–5 mm. long, 1-nerved, keel produced into a long awn, tip densely ciliate. Lower floral glume sometimes absent. Pale of upper floral glume broadly ovate-oblong, much exceeding the minute ovary. Pedicel spikelet about ⅔ the length of the sessile.

**Locality**: Grown in gardens.

**Distribution**

Hilly parts of India from the Punjab to Bhutan, Burma and China, southwards to Central India and Ceylon, Malaya.


(Formerly under *Pollinia*, Trin.—Cke. ii, 950).

Perennial. Culms simple, erect or ascending. Leaf-blades convolute when young, then flat, usually narrow, gradually passing into the sheath. Racemes often coloured, brown or purplish. Spikelets all alike or nearly so, one sessile, the other pedicelled on the articulate fragile rhachis of 2-nate, digitate or fascicled spike-like racemes, the pedicelled falling from their pedicels, the sessile deciduous together with the contiguous joint of the rhachis and the pedicel. Involucral glumes equal or somewhat unequal, rigidly membranous to coriaceous, the lower distinctly flattened or shallowly concave (never grooved),
more or less 2-keeled with inflexed margins, the upper 1-3-nerg, keeled. Lower floral glume empty, sometimes much reduced, muticus, hyaline; upper floral glume very short, 2-lobed, awned, pale small or 0. Lodiceus small, cuneate. Stamens 3. Stigmas linear, laterally exserted. Grain oblong; embryo almost half the length of the grain or longer; hilum basal, punciform.

Species about 25, in the tropical and subtropical regions of the Old World.

1. Racemes many, 6-12.

2. Racemes few, 2-4.


Description: Cke. ii, 950.

Locality: Khandesh : Tapi Valley, railway line (Bhide!).—Konkan : Ratnagiri (Woodrow); Near Ratnagiri (Herb. Econ. Bot. Poona!); St. Xavier's College compound, Bombay (McCann 4510!); Parsik Hill (McCann 9715!); above Kenery Caves (McCann 9729!); Ghatkoper, Horse-shoe Valley (McCann 9981!); Marine Lines, Bombay (Hallberg 9889!); Bassein (McCann 9745!); Veta (Sabinis 33507!).—Deccan : Lonavla (Bhide!, McCann!, Woodrow, Lisboa); Khandala, very common (McCann 9716!); Lohagad, way up (McCann 9718!); Panchgani (Blatter 5388!); Blatter and Hallberg B. 1213!, McCann!; Maval (Woodrow).—S. M. Country : Dharwar District (Sedgwick 2112!); Dastikop (Sedgwick 2088!); Castle Rock (Bhide!, McCann A. 304!).—Kanara : Suppa Taluka(Talbot 2257!); Juglepet(Talbot 1569!); Yellapore (Talbot 1525!); Halyal (Talbot 2224!); Kumberwada (Talbot 2257!); Dandeli (Talbot 2267!).

Distribution: Throughout India, Ceylon, Malaya, Australia.

2. Eulalia fimbriliata. Blatter and McCann, comb. nova.—Pellinia fimbriliata, Hackel Monogr. Androp. 164; Hook. f. in F. B. i. vii, 112; Cke. ii, 950.

Description: Cke. i. c.

Locality: Konkan : Dahe Forest (Ryan 708!); Uran (McCann, 5123!); Trombay (McCann 305!); Matheran, Monkey Point (D'Almeida A. 254!, A. 255!).—Deccan : Lonavla (Chibber 11!, Woodrow 173); Khandala, common (McCann 5300!).

Distribution: W. Himalaya, W. Peninsula, Pegu.


Annual or perennial, often robust, grasses. Leaf-blades convolute in bud, usually flat, herbaceous, often large. Panicles erect or nodding with verticillate or scattered branches, often large, in the spontaneous species mostly loose, in the cultivated forms frequently variously contracted to compact. Spikelets 2-nate, those of each pair differing in shape and sex, one sessile, the other pedicelled or represented by a pedicel only, on the articulate fragile or (in cultivated forms) tough rachis of panicled few- (sometimes-1 or the other extreme, 6-8-) jointed racemes, the sessile spikelet falling with the contiguous joint and the accompanying pedicelled spikelet or at least its pedicel. Flores 2, lower reduced to an empty valve, upper hermaphrodite in the sessile, male or neuter in the pedicelled spikelets, if present at all. Sessile spikelet: involucral glumes equal, coriaceous, at least when mature, rarely permanently chartaceous, muticus. Lower with a broad flattened or convex back with the margins narrowly inflexed near the tips and elsewhere involute. Upper cymbiform with narrow hyaline, usually upwards ciliature margins. Lower floral glume empty, hyaline, ciliate, 2-nerved or nerveless. Upper oblong to ovate, 1-3-nerg, 2-lobed or dentate, with the lobes free or more or less adnate to a perfect or variously reduced awn or a macro rising from the sinus, rarely entire and mucronate or muticus. Pale hyaline, often minute or 0. Lodiceus 2, ciliate or glabrous. Stamens 3. Stigmas laterally exserted; styles terminal or subterminal. Grain in the wild species mostly obovoid, dorsally compressed, in cultivated forms frequently enlarged, globose or subglobose; embryo as long or slightly longer than half the grain. Pedicelled spikelets, if present, much narrower than the sessile, lanceolate to subulate, male or neuter
sometimes reduced to the glumes or one glume only or quite suppressed. Intravolitional glumes permanently herbaceous, awoless like the hyaline 2-1-nerved ciliate floral glumes.

According to Stapf (Fl. Trop. Afr., ix, 105) there are about 35 wild species in the tropical and subtropical regions of both hemispheres, very few extending into the temperate zones. One group of forms is widely cultivated in the tropics, particularly in Africa.

The classification of the material belonging to the section *En-sorghum* forms a difficult problem, which we are not prepared to tackle at present. The difficulties are well explained by Stapf (i.e.), and we cannot refrain from quoting the passage, though somewhat lengthy, because it may be a help to workers on this genus and induce them, at the same time, to subject the vast material available in the Presidency to a more scientific examination and exact taxonomic treatment, by which Botany as well as Agriculture will profit.

Those species, says Stapf, 'which come under consideration in this work (Flora of Tropical Africa) have with two exceptions (*S. purpureo-sericeum* and *S. versicolor*) been placed by Hackel in one vast species, *Andropogon Sorghum*, the leading idea being that they were all derived from one wild ancestor, the old *Holcus halepensis*, Linn. Piper, however, has recently advanced good reasons why this is extremely improbable. He has pointed out that the Linnean *Holcus halepensis* (*Andropogon Sorghum*, subsp. *halepensis*, var. *genuinus*, Hack.) is a perennial type almost confined to the Mediterranean region (*sensu lato*) and absent from tropical Africa which is the home of most of the spontaneous annual forms and probably also the cradle of most of the cultivated races known collectively as Guinea corn (*Andropogon Sorghum*, subsp. *salivus*, Hack.). To these spontaneous annuals and the cultivated forms he confines the name *Andropogon Sorghum*, and dealing in particular with the former he groups them under 11 subspecies, whilst he abstains from attempting to classify the latter. Most of Piper's subspecies are here recognized as definite units, but with the status of species, a procedure which seems to have the advantage of simplicity and directness, whilst it leaves the door open to any theoretical grouping which may in the future be desirable. The same reasoning has been applied to the cultivated forms. Hence the breaking up of Hackel's *Andropogon Sorghum*, var. *salivus*. Koernicke, who made the first comprehensive attempt to classify them, relied for that purpose exclusively on characters exhibited by mature infructescences, especially their degree of looseness or contraction and the colours of the ripe glumes and grains; but Hackel in his monograph introduced characters taken from the shape of the spikelets. The grain being in most cases the thing aimed at in the evolution of these very numerous races, it is clear that artificially introduced modifications must from the beginning have tended in the grain-state to obscure or repress the phylogenetically important features in so far as they were economically indifferent or undesirable. It seemed therefore, more promising to base the primary grouping on the comparison of the flowering stages, which might be expected to be more or less outside the influence of the artificially moulding forces of man. Within these primary groups, which are treated here as species, nothing more than a purely artificial arrangement can for the present be attempted. An exhaustive treatment of the hundreds of races which have been given distinctive popular names would, even if it were possible, be beyond the scope of a colonial flora. '

If Stapf, with all the facilities of Kew and the British Museum and other European herbaria at his disposal, complains about 'the very rudimentary state of our knowledge and of our collections' nobody can reasonably expect that we should bring order into the chaotic state of the *Sorghum* question in India. Years of intensive study of Indian and African forms are required to bring the intricate problem nearer its solution.

For the present we follow Haines in retaining the old species of *S. halepens* and *S. vulgare*. Of species not known from the Presidency before we add *S. subglabrascens*, Schweinf. & Aschers. and *S. nittidum*, Pers. This, we admit, is not quite satisfactory, but it is all we can offer at the present state of our knowledge and with the material at our disposal in India.

In order to enable Indian botanists to utilize Stapf's and Piper's investigations in the further study of the genus *Sorghum* we shall add, in the way of an appendix, the descriptions of those species which Stapf has described from tropical Africa and which have also been observed in India, whether in the
Presidency or outside it. It is only in this way that we shall be able to co-ordinate the knowledge obtained on so widely spread a genus like *Sorghum* and it would not help botanical science to start the investigations of Indian *Sorghums* on independent lines without constant reference to the work done in other fields. It might be easier and perhaps also more convenient for certain practical purposes, but on the whole certainly less scientific and in the long run more confusing.

A. Wild species
B. Cultivated species


**Vern. Names**: Boru, baru; called Johnson Grass in America.

**Description**: Cke. i. c.

**Locality**: Gujarat: Ahmedabad (Gammie 16389!); Perim Isl., Gulf of Cambay (Blatter 3813!).—Khandesh: Toranmal (McCann 9643!); Khadgaum (McCann 9642!).—Konkan: Bassein Fort (Chibber 1381!); Kase forest, Dham Range (Ryan 1919!); Vetora (Sabnis 33072!); Trombay (McCann A. 269!); Byculla (McCann 9859!).—Decan: Ganeshkhind Botanic Gardens (Herb. Econ. Bot. Poona i); Purandhar (McCann 5001!); Khandala, railway line near Rama's Bed (McCann 9426!); Panchgani (Utatter and Hallberg B. 1302!).—

**S. M. Country**: Kunnur, 2,000 ft., rainfall 35" (Sedgwick and Bell 4984!); near Kilgerry (Telbot 2617!).—Kanara: Halyal Fort (Telbot 2006!).

**Distribution**: Most warm countries.


**Description**: Annual. Culms (Stapf saw only a meagre specimen) slender almost simple, 75 cm. high, about 8-noded, internodes, except the uppermost, shorter than the sheaths. Leaf-sheaths finely pubescent at the nodes: ligules very short, shortly ciliate from the back; blades linear from a broad (middle and upper leaves) or slightly narrowed (lower leaves) base, long-attenuated upwards, up to 20 by 1.7 cm., long, green, flushed with red, quite glabrous. Panicle oblong, erect, 8.5 by almost 2.5 cm., contracted, moderately dense; branches scattered, erect, or 4-noded, and 8.5-10.6 mm. long, dense; joints rather stout, up to 2 mm. long, shortly whitish-ciliate; pedicels very similar, up to 1 mm. long. Sessile spikelet oblong, actue in flowar, broad-ovoid or ellipsoid in fruit, 6.3 by 3.3 mm., at length variegated, awned; callus—beard scanty, 1 mm. long. Involutural glumes equal, gapwing when mature, more or less coriaceous and glossy in the lower third, spongy-subcoriaceous and constricted about the middle, then papery, more or less whitish strigilllose, at length sometimes almost glabrous; lower finely 13-nerved, nerves showing above the coriaceous base, keels rather sharp, scabrid, running into minute teeth, between which the minute hyaline tip protrudes, the coriaceous part rich maroon to almost black, followed by a pale transverse zone, then violet or purple across the middle, the broad triangular somewhat depressed tip straw-colour or reddish upwards; upper glume almost as broad as the lower, 9-nerved, slightly keeled, coloured like the lower. Floral glumes ciliate; lower broad-oblong, up to almost 5.3 mm. long; upper ovate, subtentire, 3.3 mm. long, awn up to 12.7 mm. long, sharply bent, column stout, twisted, equalling the bristle. Grain exposed
upwards between the gaping glumes, equalising or slightly exceeding them, obovoid, 4-2 mm. long, more or less orange; embryo-mark and nerves obscure. Pedicelled spikelet neuter, persistent, linear-lanceolate, acute, 5-3 mm. long and more, reddish, lower involucral glume up to 11-, upper 7-nerved.

**Locality**: Maharatta Country (Young, ex Stapf).

**Distribution**: Abyssinia, tropical Arabia.

*Note*: According to Stapf the specimen from India is a smaller variety of the type just described.


*Description*: Cke. i.c.


**Distribution**: Central Provinces, W. Peninsula, tropical Africa.


*Description*: A tall tufted grass, 1-2'4 m. high, densely villous at the nodes. Leaves 10-75 cm. by 8-20 mm., setaceous acuminate, glabrous or sparsely hairy on both surfaces, hairs often tubercle-based, midrib broad, prominent, white; sheaths terete below, keeled upward, more or less hairy; mouth silky-villous; ligule very short, truncate. Panicle 10-30 cm. long, oblong, lax, subsimple, rhachis glabrous, branches capillary, about equalling the spikes, glabrous or scabrous, whorls distant. Spikes 8-37 mm. long, red-brown; joints and pedicels ½ to ¾ the length of the sessile spikelets, margins shortly villous. Sessile spikelets broadly ellipsoid, calyx rounded (Haines), or acute (Hook. f.). Lower involucral glume coriaceous, broadly oblong or elliptic acute or obtuse, dorsally flattened with incurved margins, brown-hairy and keels hispid, 7-nerved, or about 3-nerved between keels, sometimes nearly black, polished. Upper involucral glume broadly cymbiform with rounded back, lanceolate, acute, 1-nerved, hairy upwards. Lower floral glume as long as or shorter than the upper involucral glume, hyaline, margins inrolled, 2-keeled, ciliate; upper floral glume linear-oblong, 2-lobed, awned or not. Pedicellate spikelets linear-oblong, pale or greenish with brown hairs. Lower involucral glume oblong, rounded or sub-truncate, dorsally depressed and 2-nerved between the keels; upper equal, rather narrower, obtuse margins much inflexed, 3-nerved between keels. Lower floral glume hyaline, linear.

**Locality**: Kanara: Tinai (Talbot 2574!); Sambiani (Talbot 1337!); Sirst to Sidderpur (Hallberg and McCann A 270!).

**Distribution**: India, Ceylon, Nicobars, Asia, tropical Australia.


*Description*: Stout, usually tall annual grasses. Leaves broadly linear with a prominent white midrib. Panicle usually thyrsiform decompound with crowded whorls of erect branches and branchlets, rarely subebove. Rachis of spike tenaceous, joints when forcibly separated leaving a ragged scar at the tip. Pedicellate spikelets usually neuter, pedicels short.

**This is the Great Millet or Jowar, cultivated in most parts of the Presidency.**


After what we have said above we do not consider it advisable to enter into a description of the numerous varieties and forms. But we may mention in this place that a variety common in the Presidency, viz. *S. vulgaris var. Roxburghii*, Hackel in Monogr. Androp. 510 has been described as a species by Stapf under
the name of *S. Roxburghii* in Fl. Trop. Afr., ix, 126. The description will be given in the following appendix to the genus *Sorghum*.

Species of *Sorghum* described from Africa by Stapf which also occur in India. All the information is taken from Stapf, mostly almost verbatim.

A. Mature sessile spikelets deciduous with the adjoining joint of the rachis and its pedicelled companion: spontaneous grasses

1. *S. verticilliflorum*.

B. Mature sessile spikelets persistent: cultivated grasses

I. Mature glumes wholly coriaceous or the lower with a herbaceous triangular tip, its nerves not visible on the back except at the tip, particularly when this is herbaceous

1. Mature panicles more or less loose, usually with arched or drooping branches, never quite compact

(a) Sessile spikelets ovate or elliptic to lanceolate-oblong

* Mature spikelets pale straw-colour, permanently more or less hairy; the grain embraced below by the tightly appressed glumes

** Mature spikelets bright tawny early glabrescent; the grain almost wholly exposed between the involute glumes...

(b) Sessile spikelets broadly obovate in outline

2. Mature panicles very dense to compact, rarely more or less loosened owing to the reduction of the primary axis and the consequent subdigitate arrangement of the branches

II. Mature glumes thinly crustaceous to papery, the tips brittle and breaking irregularly. Back of spikelets longitudinally striate.

1. Sessile spikelets 6-3-8-5 mm. long. Pedicelled spikelets 7-6-10 mm. long

2. Sessile spikelets 5-6-3 mm. long. Pedicelled spikelets up to 6-3 mm. long

5. *S. papryscens*.

6. *S. cernuum*.


Description: An annual. Culms 1-2-2-4 m. high, sometimes slightly pruinose below the nodes. Leaf-sheaths delicately silky-pubescent at the nodes; ligules up to over 2 mm. long, scarios, hairy on the back; blades linear from a broad rounded and often clasping base, long attenuated upwards, up to 45 cm. long, rarely over 25 mm. wide, green, sometimes slightly glaucous or flushed with purple, hairy just behind the ligule, otherwise glabrous. Panicle oblong to ovoid-oblong, often rather contracted and more or less nodding at first, then spreading out and more erect, up to 37 cm. long and ultimately 15-22 cm. wide; branches slender, flexuous, whorled, longest up to 22 cm. long and undivided to up to 5, rarely 7-5 cm. from the base, distantly branched, slightly and shortly hairy to villous at the base, like the branchlets more or less rough, at least upwards. Racemes fragile, up to 5, but mostly 2- or 3-noded, rarely over 18 mm. long; joints slender, 3-3'-4'-2 mm. long, shortly ciliate, cilia dirty white or pale fulvous, often with a tinge of purple; pedicels similar, slightly shorter, their tips subdiscoid. Sessile spikelet ovate to ovo-lanceolate, shortly acuminate to acute, 3-7-4-5 mm. by 1.5-2'2 mm., straw-coloured, greenish towards the tips (at least when young), sometimes tinged with purple, ultimately
often turning bright or blackish-red particularly below; callus-beard less than 1 mm. long. Involutcal glumes equal, coriaceous, slightly glossy below (more so when ripeing), thinner upwards, lower usually slightly bulging below and somewhat depressed towards the tips, 11-13-nerved, with the nerves very obscure near the tips or more or less marked, sharply 2-keeled and scabrid to spinulously ciliolate in the upper half or third, more or less strigillose, often glabrescent, rarely almost glabrous, hairs pale whitish or fulvous, loosely appressed, upper sharply keeled towards the tips with the keel rough, 7-nerved, more or less hairy. Floral glumes conspicuously ciliate, lower lanceolate, 5-3 mm. long, upper ovate, shortly 2-lobed, 2'2 mm. long; awn fine, 1-3-1'7 cm. long. Anthers 3'3 mm. long. Grain obovate-oblung, 3-3 mm. by 0'2 mm., fuscous, paler below; embryo-mark distinct, hardly exceeding the middle of the grain. Pedicelled spikelet male or neuter, early deciduous, subulate-lanceolate to linear, acutely acuminate, 63 mm. long, pale greenish, often tinged with red or purple; lower involucral glume 9-, upper 5-nerved.

**Distribution:** Nileland, Mozambique District, Natal, the Comoros, Seychelles, Madagascar, the Mascarenes. Introduced into India as Tabucki grass, also to Australia, Polynesia, and the West Indies.


**Description:** Annual. Culms stout, tall, often slightly waxy, pruinose below the nodes. Leaf-sheaths softly pubescent at the nodes; ligules, very short, scarioso, hairy from the back; blades linear to linear-lanceolate from a broad clasping base, long-attenuated upwards, up to over 45 cm. long and up to 37 mm. wide, usually hairy to tomentose inside above the liguule and outside at the junction with the sheath, otherwise glabrous. Panicle oblong to ovoid-oblong, rarely subovate or elliptic in outline, erect, contracted and dense (rarely lax) in flower, somewhat to much loosened when mature; branches slender, flexuons, whorled or semiverticillate, the longest undivided for up to 12-25 mm. (rarely much more) from the base, more or less ciliolate towards the base and often villous at the junction with the nodes, otherwise like their divisions glabrous or nearly so, finely scabrid upwards. Racemes tough, up to 4- (rarely 5-7) noded, 8-12 mm. long; joints slender, 2-3'3 mm. long, distinctly and often densely ciliate, cilia white or purplish; pedicels similar but more slender, of about the same length or more often shorter with very slightly thickened tips. Sessile spikelet ovate, acute, with a small fine point, sometimes flattened on the back when young but soon convex, about 5'3 mm. by 2'7-3'3 mm., permanently pale or dull straw-coloured to tawny, at length slightly glossy; callus-beard, white. Involucral glumes equal, coriaceous, lower about 10-13-nerved, finely and often obscurely 2-keeled towards the tips with the keels slightly scabrid, transversely constricted at the base, more or less white-strigillose (to almost tomentose) when young, at length more or less glabrescent on the back, upper 7-9-nerved, finely keeled upwards, tip usually straight. Floral glumes distinctly ciliate, cilia up to 1 mm. long. lower broad-oblong, as long as the glumes, upper broad-ovate. 3'3-4 mm. long, middle nerve much thickened from the middle upwards, running out into a short straight macro, lobes adnate to it almost all along. Anthers 2'7 mm. long. Grains elliptic or ovate-elliptic in outline, 3'8-4'8 mm. by 2'7-3'3 mm., dull white (in the African specimens). Pedicelled spikelet usually neuter, linear or linear-lanceolate, up to 4'2 mm. long, more often much reduced and quite small, persistent; lower involucral glume, if well developed, up to 9-nerved, upper 5-nerved.

Of this species Stapf describes two varieties which also occur in India.


**Description:** Panicles fairly dense, also when mature. Involucral glumes less coriaceous towards the tips and more or less showing the nerves in that portion, permanently more or less strigillose, their margins clasping the grain so that only its top or upper half is exposed.

**Distribution:** Nileland of tropical Africa, Mozambique District, Natal, Madagascar, India.

(b) **Var. hians,** Stapf l. c. 127.—*Holcus Sorghum nitidum,* Wall. Cat. 8777 D.—*Andropogon Sorghum,* var. hians, Stapf in Hook. f. F. B. I., vii. 194.—*A. Sorghum,* [15]

Description: Panicles more or less loose with very flexuous and often drooping branches. Involutural glumes coriaceous to the tips with the nerves quite obscure, subglabrous and somewhat glossy on the back when mature, their margins involute, exposing the whole grain, which is often placed with its back and front parallel to the median line of the spikelet.

Distribution: Mozambique District; also in India.


Description: An annual. Culms stout, up to 4 m. high, many-noded. Leaf-sheaths mostly overlapping, finely pubescent at the nodes; ligules short, ciliate from the back; blades linear to lanceolate-linear from a broad and rounded or slightly narrowed base, up to 50 cm. long and 7-5 cm. broad, pubescent to tomentose inside above the ligules and less or glabrous at the back on the junction with the sheath. Panicles erect, contracted and more or less dense, or loose and oblong or oblong-ellipsoid or obovate to ob lanceolate in outline 7·5-30 cm. by 5-9 cm.; branches erect or obliquely erect, rather rigid, finally sometimes slightly drooping, the longest often more than half the length of the panicle and undivided for 12 mm. to 7-5 cm. from the base, like the branchlets very rough, spinulously ciliolate or ciliate, particularly upwards, slightly hairy, rarely villous at the base. Racemes tough, compact, frequently 3- or 4- (rarely 5-) noded; joints somewhat stout, flattened, 1·6-27 mm. long, shortly whitish or fulvously ciliate; pedicels similar, about 1 mm. long. Sessile spikelet more or less broadly obovate even in flower, with very short broad and depressed tips, 4·8-5·8 mm. by 3·5-4·2 mm., straw-coloured to tawny, finally darker, often with red or brown or purple spots or blotches or turning altogether fuscos, chestnut-brown or quite black, closed when mature or only slightly gaping, usually aawned; callus-beard scanty. Involutural glumes equal, firmly coriaceous except at the papery to membranous tips, unevenly striglillose particularly and mostly persistently on the tips or almost glabrous; lower up to 16-nerved, nerves very faint, keels short, usually obscure, tips very short, broadly triangular with a hyaline point, depressed; upper broad, 9-nerved, obscurely keeled close to the tip, otherwise broadly rounded on the back. Floral glumes ciliate, lower broad-elliptic, about 4·2 mm. long, upper broad-ovate, 3·3 mm. long, 2-lobed, awn about 10·6 mm. long, sometimes much reduced. Anthers up to 4-2 mm. long. Grain tightly enclosed in the glumes or the top slightly exposed, obovate-oblong in outline, 3·3-3·8 mm. by 2·2-4·4 mm., brown; embryo-mark distinct; nerves obliterataed. Pedicelled spikelet neuter, persistent, lanceolate to linear-oblong, acute, about 4·2 mm. long, reddish; lower involucral glume 9-10-, upper about 7-nerved.

Distribution: Lower Guinea. Occasionally cultivated in the Mediterranean region from Madeira to India, also introduced into Australia, the West Indies and Brazil.


Description: An annual. Culms stout, up to 4 m. high and even more, 20-40-noded. Leaf-sheaths finely pubescent at the nodes; ligules very short, shortly ciliate; blades up to 40 cm. by 5 cm., quite glabrous (? always). Panicle usually quite compact, ovoid or ellipsoid, erect or sometimes recurved, 10-15 cm.
by 5–10 cm; branches erect, more or less flexuous, rather slender, rough to spinulose-ciliate, particularly upwards. Ciliature to subvillos at the base, the longest up to one half or one-third the length of the panicle, divided from very low down. Racemes compact, tough, about 8.5 mm. long (in flower), mostly 3- or 4-noded; joints somewhat stout, flattened. 1 to almost 2 mm. long, whitish-ciliate; pedicels similar, but still shorter. Sessile spikelet rhombic-obovoid, subacute (in flower), greenish or straw-coloured with greenish tips, ultimately whitish or variously brown, dark red or black, awned or awnless, callus-beard scanty. Involucral glumes equal, coriaceous up to beyond $\frac{1}{2}$ or $\frac{3}{4}$, then papery, unevenly striigillose, particularly at the tips and sides; lower with a broad triangular greenish strongly nervated, about 12-nerved with 3 or 4 finer nerves interspersed, 2-keeled upwards (keels rough), more or less flattened out and very broad to rotundate when mature with the tips worn off and the back glossy; upper broad, 9-nerved with some additional finer nerves, slightly keeled upwards. Floral glumes ciliate; lower ovate-elliptic, about 4.2 mm. long; upper broad-ovate, 2-toothed, 4.2 mm. long, awn up to 7.5 mm. long, mostly much shorter and then hardly twisted and differentiated into column and bristle or quite suppressed. Anthers over 2 mm. long. Grain subglobose, slightly compressed, with a broad rounded much exposed top, white, yellow or variously reddish, 5.3 by 5.3 mm., nerveless; embryo-mark faint. Pedicelled spikelet neuter (always), persistent; lanceolate to linear-oblong, subacute, up to 6.3 mm. long, greenish or reddish, lower 11–, upper 7-nerved.

**Distribution:** Nileland of Tropical Africa, Arabia, Afghanistan, India.


Only mature panicles were known to Stapf. Culms up to 12 mm. across at the base of the panicle. Panicile erect, oblong to oblanceolate in outline, contracted, dense, up to over 30 cm. by 10–13 cm.; branches more or less whorled, often many to a whorl, erect, the longer slightly arching, rather robust, like the branchlets rough to spinulosely ciliate upwards and softly ciliate or pubescent in addition, villous at the base or 12 mm. above it, following (longest) up to 15 cm. long and undivided for 5–7 cm. from the base. Racemes tough, up to 4-noded and 18 mm. long, dense, much crowded; joints moderately slender, up to over 3.3 mm. long, shortly white-ciliate; pedicels similar, 1–2 mm. long. Sessile spikelet oblong (in flower), at length ovoid or oblong-ovoid, tight or somewhat inflated, closed, up to 9.3 mm. long, permanently pale straw-coloured or reddish; callus-beard very short. Involucral glumes equal, papery and transparent throughout; lower up to 16-nerved with numerous transverse veins, very obscurely keeled upwards or keelless, nerves raised from the base upwards, softly pubescent to almost villous, very imperfectly glabrescent or at length almost glabrous, hairs white; upper broad, about 13-nerved, very obscurely keeled upwards, much less hairy. Floral glumes conspicuously ciliate; lower broad-elliptic, 5.3 mm. long; upper broad-ovate, entire and awnless or shortly 2-lobed, with a micro or an awn up to 6.3 (rarely 10.6) mm. long, usually slightly bent and hardly twisted. Lodicules densely ciliate. Grain completely enclosed by the glumes or partly exposed by their breaking up, oblate to orbicular-oblative in outline, compressed, biconvex, dull white or orange; embryo-mark faint, elliptic, slightly exceeding the middle of the grain. Pedicelled spikelet neuter, reduced to the involucral glumes, persistent, linear or linear-lanceolate, acute, pale straw-coloured or reddish, 6.3–8.5 mm. long, lower 11–13–, upper 9-nerved, shorter.

**Distribution:** Nileland of tropical Africa. Also known from India.


**Description:** An annual. Culms stout. 3–4 m. high and more, 20–30-noded. Leaf-sheaths minutely pubescent at the nodes; ligules very short, densely ciliate from the back; blades linear-lanceolate, over 50 cm. by 6 cm., pale green, pubescent to tomentose inside above the ligule and outside at the junction with the sheath. Panicile erect or recurved, ovoid to oblong, very compact or
somewhat loose, 10-25 cm. by 5-7.5 cm.; branches rather stout below, rigid, spinulently ciliolate, particularly upwards, softly ciliate to villous at the base; branches divided almost from the base, the longest 5-7.5 cm. long. Racemes compact: up to 3- or 4-noded, up to 10.6 (rarely 12.7) mm. long; joints stout, compressed, 1 mm. long, more or less white-silky-villous; pedicels very similar, of about the same length. Sessile spikelet ovate with rather broad tips, 5.3 mm. by 3.3-3.8 mm., pale straw-coloured with greenish tips, whitish when mature, awned. Involucral glumes equal, coriaceous about up to the middle or at the base only, otherwise papery and often partly spongy, white-silky-villous all over or glabrous on the coriaceous portion of the back; lower 12-nerved (with the nerves distinct upwards and sometimes with a few very delicate additional nerves interspersed), sharply 2-keeled upwards with the keels spinulently ciliolate and abruptly ending, forming minute teeth between which the hyaline end of the tip protrudes; upper very broad, about 12-nerved, slightly keeled upwards. Floral glumes very densely ciliate; lower broad-ovate, 2-lobed, 4-2 mm. long; upper broad elliptic-oblong, awn about 8.5 mm. long with the bristle half the length of the long-exserted column or more or less reduced. Anthers 3.3 mm. long. Grain equalling the glumes or more or less exserted, orbicular or orbicular-ovoblate in outline, more or less compressed, 4-2-5.3 mm. by 4-2 mm., white, dull; embryo-mark indistinct. Pedicelled spikelet neuter, linear-lanceolate, 4-2 mm. long, pubescent, lower involucral glume 11-, upper 10-nerved.

Distribution: Upper Guinea, North Central Tropical Africa, N. Africa, the Orient to Turkestan and N. India as far as Manipur.

(To be continued)
REVISION OF THE FLORA OF THE BOMBAY PRESIDENCY.

Part V. By E. Blatter, S.J., Ph.D., F.L.S.
REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY

BY
E. BLATTER, S.J., PH.D., F.L.S.

PART V
GRAMINEÆ

BY
E. BLATTER and C. MCCANN

(Continued from page 298 of this Volume.)


Tall, rather coarse grasses, annual according to Stapf, perennial according to Hook. f. Leaves long, narrow, flat, with stout midribs. Panicles narrow, more or less contracted, greyish or fulvous hairy. Spikelets solitary, all alike, hermaphrodite, pedicelled on the tough rhachis of racemously arranged or panicked racemes, falling entire from the thickened tips of the pedicels. Florets 2, lower reduced to an empty glume, upper hermaphrodite. Involucral glumes equal, very similar, with involute margins, more or less coriaceous, delicately 7-9-nerved, muticous. Floral glumes hyaline, lower 2-nerved, upper 2-dentate or subentire, 3-nerved, with a twisted flexuous awn from the sinus or tip; pale very minute, ciliate. Lodicules 2, broad-cuneate, sparingly ciliate. Stamens 3. Stigmas laterally exserted, plumose. Grain oblong to obvoid-oblong, very obtuse or truncate; embryo half the length of the grain.

Species 3, one in West India and 2 in tropical Africa.

1. CLEISTACHNE STOCKSI, Hook. f. in F. B. i, vii, 163.

Description: Stem tall, stout, simple. Leaves 3½–40 cm. by 12 mm., finely acuminate, softly hairy, midrib stout, margins slightly thickened, ciliolate, sheath terete, ligule oblong, coriaceous. Panicle 15–20 cm. long, long-pediculed, sub-erect; rhachis and branches sparsely ciliate, pedicles of spikelets strigose with bright yellow hairs. Spikelets 3 mm. long, crowded, dark brown, callus short, bearded. Lower involucral glume dark brown, obscurely many-nerved, hisutae, shining, upper like lower, but narrower nearly glabrous. Lower floral glume 2-nerved, margins infolded, tip hispid, upper a twisted awn 16–25 mm. long, dilated at the base into a hyaline, entire, 3-nerved membrane, embracing the minute, ovate, obtuse pale.

Locality: Tungar forest, Bassein (Bhide!).

Distribution: So far only found in Malabar on the Bababoodan Hills.

28. VETIVERIA, Thouars ex Virley in Journ. de Pharm. i. ser., xiii, 499; Stapf in Fl. Trop. Afr. ix, 156.

Coarse, perennial, glabrous grasses; rhizomes stout; culms stout, more or less compressed below. Leaf-blades firm to hard, conduplicate in bud, then flattening out, at least upwards, gradually passing into the sheath; lower sheaths much compressed, flabellate-imbricate. Panicles erect, long, of many-rayed whorls of slender simple or rarely compound racemes, glabrous except for the frequently bearded calli. Spikelets 2-nate, of each pair subsimilar, differing in sex, one sessile, the other pedicelled, on the articulate fragile rhachis of copiously whorled (rarely panicked) peduncled 3-to many-jointed racemes, the sessile spikelets falling with the contiguous joint and the accompanying pedicelled spikelet or at least the accompanying pedicel; joints and pedicels slender, slightly and gradually thickened upwards. Florets 2, lower reduced to an empty glume, upper hermaphrodite in the sessile, male in the pedicelled spikelets. Sessile spikelet laterally slightly compressed, awned or
awless. Involucral glumes equal, lower more or less coriaceous or char-
taceous with a broad rounded back and subinflexed margins, usually muti-
cous, upper boat-shaped, keeled upwards, with broad hyaline ciliate margins, muticous, mucronate or aristiate. Floral glumes hyaline, of lower floret 2-nerved, of upper minutely 2-dentate, muticous or mucronulate or with a per-
fect or imperfect awn from the sinus. Pale minute, hyaline, nerveless. Lod-
cules 2 glabrous. Stigmas laterally exerted; styles subterminal. Grain oblong, slightly oblique at top. Pedicelled spikelet dorsally compressed; in-
volutral glumes much thinner than in the sessile, like the floral glumes usually awless.

Species about 7 in the tropics of the Old World.
1. Leaves 5-13 cm. long. Panicle 15-16 cm. long ... 1. *V. Lawsonii.*
2. Leaves 30-90 cm. long, Panicle up to over 30 cm. long ... ... 2. *V. zizanioides.*


*Description.* Rootstock stout, horizontal. Stem erect, simple, slender, internodes very long. Leaves chiefly subradical, 5-13 cm. by 5 mm., exactly linear, rigid, curved, acute or obtuse, tips serrulate, base not contracted, margi-
s ciliate, nerves 4-8, strong; sheaths compressed, of lower very short, of cauline very long, striate; ligule a ridge of hairs. Panicle 15-18 cm. long, narrow, elongate, branches or peduncles of spikes opposite and fascicled, branchlets sparsely pubescent with a white scurf. Spikes 6-12 mm. long, pale reddish, erect; joints 6-8, very obliquely truncate, tips obscurely ciliate, pedi-
cels nearly equaling the spikelet, slender, compressed. Sessile spikelets 4 mm. long, linear-lanceolate, callus bearded with silky hairs. Lower involucral glume linear, rigid, coriaceous, tip obtuse, bristly, keels muciliate, scab-
rous, minute, margins inflexed, upper involucral glume cymbiform, tip 2-fid, awn longer than the glume, base ciliate, keel pectinately ciliate above the middle. Lower floral glume oblong, ciliate, nerveless, upper arched, linear, obtusely 2-dentate, awn very slender. Pale oblong, ciliate, nerveless. Anthers long. Pedicelled spikelets male, longer and narrower than the sessile, callus naked; lower in-
volutral glume 3-nerved, awned, keels pectinately ciliate, upper acuminate, awned. Floral glumes oblong, obtuse, ciliate.

*Locality:* S. M. Country: Dharwar District, very common (Sedgwick 2170!); Dharwar (McCann A277!).


J. D. Hooker and Cooke and many others have followed Hackel in calling this plant *Andropogon squarrosus,* Linn. f. Stapf (in Kew Bull. 1906, 347) has explained that this name applies to quite a different plant; 'Notice was taken of Schenckner's description or of Petiver's and Du Bois's specimens, and when Linnaeus, about 1770, received the grass from Koenig he described it as something new under the name *Phalaris zizanioides.* Koenig, however, also sent specimens of the grass to Retzius, who published it as *Andropogon muricatus* in 1783. This name, which was suggested by Koenig himself, was subsequently adopted by Roxburgh and most other botanists. More recently, however, it has been replaced by *Andropogon squarrosus,* a name adopted by the younger Linnaeus for a plant, also communicated by Koenig, who found it

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1Linnaeus, Mant. Alt. (1771), 183.
2Retz. Observ. iii (1783), 43.
3Hackel, Andropog. in DC. Monogr. Phaner. vi (1889), 542.
4Linn. f. Suppl. (1781), 433.
"circa Zeylonam natans supra stagna profundiora," and entirely distinct from Andropogon muricatus. The specimen is still in Linnaeus' herbarium and was correctly identified by R. Brown¹ with his Panicum abortivum, that is Chamaeraphis spinosca, a characteristic Banglow grass of the mainland region. Retzijn² himself is responsible for the erroneous reduction of Andropogon squarrosus to Andropogon muricatus, which recently has been revived, although Roxburgh³ long ago drew attention to the confusion. "Zizanioides" being the earliest specific epithet, it will have to be adopted for the "Khas Khas," so that its name under Veliveria must be V. zizanioides.'”

Vern. Names: Vala, Ushir, Valo, Bala, Khas Khas of the Anglo-Indians.

Description: A densely tufted perennial grass. Rootstock branching with spongy aromatic roots. Culms stout, up to over 1.8 m. high, usually sheathed all along. Leaf-sheaths compressed, especially the lower which are sharply keeled and fan-like, imbricate, very smooth, firm; ligulæ reduced to a scariosus rim; blades narrowly linear, acute, 30-60 cm. long, 4-2-10 cm. wide, erect, rigid, firm or somewhat spongy, usually glabrous, rarely more or less hairy downwards on the face, pale green, midrib slender, lateral nerves close, 6 or more on each side, rather stout, slightly prominent, margin spinosly rough. Panicle oblong, up to over 30 cm. long, usually contracted; rhachis stout, smooth; whorls 6-10 with up to 20 rays; branches oblique to suberect, naked for up to 5 cm., filiform, slightly rough. Racemes up to 5 (rarely 7.5) cm. long, very slender; joints about as long as the sessile spikelets or sometimes distinctly exceeding them, smooth or more or less rough, minutely and unequally ciliolate at the slightly oblique tips; pedicels similar, but shorter. Sessile spikelet linear-lanceolate to almost linear, acute or subacute, 4.2-4.8 mm long, yellowish, olive or violet-brown or purplish to almost black; callus obtuse, under 1 mm. long, glabrous. Involucral glumes, acute, coriaceous, lower, smooth all over the back, 5-nerved, lateral nerves close, very fine; upper spinosly ciliolate on the keel. Lower floral glume as long as the involucral glumes, acute, reversedly ciliolate, upper up to 9.3 mm. long, narrow, oblong-lanceolate, mucronulate, ciliate. Lodicules 2, quadrate and conspicuous, though small. Styles and stigmas short. Stigmas purpure. Anthers 2-3.3 mm. long. Pedicelled spikelet sparingly acuminate or almost smooth; upper floral glume entire, acute.

Locality: Gujarāt: Road to Lasandra (Chhiber!); Daman (Bhide!); Ahmedabad, common in damp valleys (Seeligwick!).—Konkan: Ghatkoper, Horse-shoe Valley (McCann 19957!).—N. Kanara: Dandeli (Talbot 2209!).

Cke. l.c. classes this species amongst non-indigenous plants. We are of opinion that it is indigenous in most parts of the Presidency.

Distribution: Practically this species over the whole of India, and eastwards to Burma, Occasionally cultivated. Lower Guinea in tropical Africa. Throughout the Malayan region only cultivated or as an escape. Introduced into the Mascarenes, the West Indies and Brazil.

Early history and economic uses: See Stapf in Kew Bull., l.c.


Perennial (at least in the Old World). Leaf-blades narrow. Panicles usually lax, of whorls of simple or basally divided filiform branches, rarely the branches 2-nate or solitary. Spikelets in threes at the ends of the branchlets of terminal panicles, one sessile, the other 2 pedicelled, the three falling entire from the thickened, nearly always bearded, oblique tips of the peduncles; exceptionally 2-nate in 2-jointed racemes, one sessile, the other pedicelled, each sessile spikelet falling with the contiguous joint and its pedicelled companion, pedicels and joints, if present linear-filiform, never longitudinally grooved or appended. Florets 2, lower reduced to an empty glume, upper hermaphrodite in the sessile, male or neuters in the pedicelled spikelet. Sessile spikelets usually laterally compressed, awned. Involucral glumes subequal; lower coriaceous or chartaceous, involute with a rounded

²Retz., l. c., v (1789), 21.
³Roxburgh Fl. Ind. ed., Carey and Wall. I (1820), 270.
back or complicate and more or less keeled upwards, upper boat-shaped, more or less keeled. Floral glumes hyaline, lower 2-nerved, upper linear, entire or 2-dentate with a usually perfect awn from the sinus. Pale 0 or small, hyaline, nerveless. Lodicules 2, small, glabrous. Stamens 3. Stigmas exerted laterally low down. Grain linear, laterally compressed; embryo half the length of the grain; scutellum linear-oblong. Pedicelled spikelet dorsally compressed, awnless or aristulate.

Species about 18 in the hot parts of the Old World, only a few entering the temperate zone. One in Florida and Cuba.


To these we add 4 species not noted from the Presidency before: Chrysopogon Wightianus, Ness, Ch. asper, Heyne, Ch. polyphillus, Blatter and McCann, and Ch. Gryllus, Trin.

A. Pedicels of the upper spikelets half as long as the sessile spikelets or longer

1. Pedicels of upper spikelets glabrous or nearly so

1. Stems erect. Leaves 15-45 cm. long... 1. C. Gryllus.

2. Stems creeping below. Leaves 2-13 cm. long... 2. C. aciculatus.

II. Pedicels of upper spikelets villous with rusty rarely pale hairs

1. Lower involucral glume of pedicelled spikelets long-awned, upper not or very shortly awned

(a) Callus long villous all round... 3. C. asper.

(b) Callus glabrous in front... 4. C. lancearius.

2. Involucral glumes of pedicelled spikelets both awned... 5. C. Wightianus.

B. Pedicel of upper spikelets not half as long as the sessile spikelets

1. Lower sheaths compressed...

2. Lower sheaths terete

1. Leaves, peduncle and branches of panicle glabrous...

2. Leaves, peduncle and branches of panicle not glabrous...

7. C. polyphillus.

8. C. Aucheri.


Description: Stems simple, forming dense hard tufts, erect, 15 cm. to 1.5 m. high; nodes smooth. Leaves 15-45 by 4-8 mm., linear, acute, glabrous or hisrate, margins serrulate; sheath keeled above, glabrous or pubescent. Panicle large. 12-20 cm., rachis angular, scabrid, axils bearded. branches long, 5-10 cm., capillary, spreading, simple or branched, usually very many in a whorl and bearing 2-4 spikes, tips obliquely truncate and densely bearded. Sessile spikelets 5-8 mm., callus straight, acute. Lower involucral glume coriaceous, 2-toothed, dorsally rounded with 2 muricate or mamillate keels or channels, shining, smooth or scabrous, margins broadly involute, upper chartaceous, hyaline, lanceolate, mucronate or aristulate,awn equaling the spikelet or shorter, keel and sides bristly above the middle. Lower floral glume linear-oblong, obtuse, nerveless, upper linear, minutely 2-toothed, awn minute or 12-35 mm. long. Pale small, oblong, glabrous. Pedicelled spikelets rather longer than the sessile, terete, lanceolate, acuminate; pedicels glabrous or ciliolate. Lower involucral glume acuminate or aristulate, 5-9-nerved keels
ciliate above, upper lanceolate, acuminate, ciliate. Floral glumes narrower, ciliate, awn of upper half the size of the glume.

**Locality:** N. Kanara : Halyal ( Talbot 2058 ).

**Distribution:** Temperate Himalaya from Kashmir to Sikkim, 4,000-9,000 ft. Khasia Hills, 4,000-5,000 ft., westwards to N. Africa and S. Europe, Australia.


**Description:** Cke. l. c.

**Locality:** Konkan : Alibag, sandy shore (Ezekiel!).—*N. Kanara* : Karwar, sea-shore (Sedgwick and Bell 5070); Jog, hills ( Hallberg and McCann A272 ).

**Distribution:** More or less throughout India, Ceylon, Tropical Asia, Australia, Polynesia.

**Uses:** According to Haines the leaves which lie close to the ground escape to a large extent the lips of cattle. The plant is a pest on account of the sharp callus and small awns sticking to the clothes.


**Description:** Stem 30-90 cm., leafy below, very slender above. Leaves distichous, 30-45 cm. by 12-18 mm., broadly linear, acute cordate, coriaceous, flat, smooth, 11-nerved, midrib very slender, spinulose beneath, margins spinulose serrulate, and with a few long tubercole-based cilia towards the broad semi-amplexicaul base; sheaths broad, compressed, laxly hisrate, lower ones 12 mm. broad, keeled, armed with scattered tubercole-based hairs. Panicle 18 cm. long, narrow, of many whorls of short, unequal, simple, smooth, erect branches bearing solitarily rarely 2 erect spikes, tips very shortly bearded. Sessile spikelets 6 mm. long, pale, coriaceous, callus up to 2 mm., long villous all round. Lower involucral glume hispid beneath, the tip strongly compressed above; upper with the keel and sides more or less hispid above the middle, awn as long as the glume or shorter. Lower floral glume shorter than the upper involucral, narrow, obtuse, 2-nerved, ciliate, upper consisting of the linear, hyaline, 3-nerved base of the awn, awn 35-50 mm. long. Pedicelled spikelets 8 mm. long, narrowly lanceolate, 7-nerved, pale, shining, keels ciliate; pedicels very shortly rufous-villous on both margins, excised at the tip in a semi-circle; lower involucral glume thin, tip 2-dentate, nerves strong, sub-equidistant, or the 3 lateral on each side submarginal, margins narrowly incurved, keels ciliolate from base to tip, upper lanceolate, acuminate, 3-nerved, ciliolate. Lower floral glume linear-oblong, 2-nerved, ciliate, upper narrowly lanceolate, 1-nerved.

**Locality:** N. Kanara : Tainy ( Talbot 2564 ).

**Distribution:** Madras : Pulicat Hills.


**Description:** Cke. l. c.

**Locality:** Deccan : Panchgani ( Blatter and Hallberg B 1230 ).—*S. M. Country:* Castle Rock ( Woodrow ). Seems to be very rare in the Presidency.

**Distribution:** Sikkim Himalaya, Behar, Chota Nagpur, Orissa, W. Peninsula.

**Uses:** A good fodder according to Haines.


**Description:** Very variable in habit. Stems short or long, erect or ascending from a short stout creeping stock. Leaves 7-25 cm. long, linear, acute, rigid, from glabrous to pubescent on both surfaces and with sometimes tubercle-
based hairs, spinulose-serrulate; sheaths glabrous, lower ones compressed; ligule very short, villous. Panicle 7-13 cm. long, contracted, lower branches long, few in a whorl, rachis and branches minutely hairy; spikes solitary, green or brownish. Sessile spikelets subcylindric, 4 mm. long, callus long, densely bearded with rusty hairs all down. Lower involucral glume minutely compressed above, minutely truncate, glabrous below, hispid above, obscurely 4-nerved, tip 2-dentate, chartaceous, hispid above on the keel and sides, tip 2-lobed, awn as long as the glume or shorter. Lower floral glume linear-oblong, 2-nerved, ciliate, upper consisting of an awn with a narrowly dilated 2-lobed base, awn 50-65 mm. long, column hispid. Pedicelled spikelets nearly 12 mm. long, lanceolate, pubescent; pedicel truncate, margins shortly villous. Lower involucral glume glabrous or pubescent, 7-nerved, awn longer than the glume, keels ciliate, upper lanceolate, 3-nerved, awn as long as the glume or shorter. Lower floral glume oblong, 2-nerved, ciliate, upper very narrow, ciliate, nerveless.


Distribution: Madras, Nilgiris, Burma, Assam. (Hackel mentions a species gathered in Ceylon but, according to Hooker f., it seems to be a starved specimen of Chrysopogon zeylanicus, Thw.).


This synonymy requires an explanation. Chrysopogon montanus, Trin. as understood in this place comprises Hackel's two species Andropogon monticola Schult. and A. Trinii, Steud., and is identical with Hook. 1's. A. monticola, Schult, with all its varieties.

Hackel has two species and he distinguishes them by the following characters: A. monticola: Upper involucral glume of sessile spikelet keeled, the keel from the base up to $\frac{1}{3}$ of its length densely pectinate ciliate with long, rigid, rufous hairs, shortly white hispid in the upper $\frac{1}{3}$.

A. Trinii: Upper involucral glume of sessile spikelet keeled below the apex only, keel white-ciliate, the lower $\frac{1}{3}$-2 not keeled and glabrous.

Hook. f. in F. B. i. makes of these species two varieties: var monticola proper and var. Trinii, and includes them under A. monticola, Schult., adding a third variety: var. robustus.

At the same time Hooker confesses: 'I am unable to classify the varieties of this common and variable plant in accordance with geographical areas or other considerations. This, if possible, must be effected by field-botanists in India. There is every gradation from the coarsely hisrate keel of monticola, to the perfectly smooth of some states of Trinii; from the awnless to long awned gl. 1 of the pedicelled spikelets, and from the glabrous to the pubescent of the same organ; the colour of which affords no character; nor does its length, or that of the cilia on its keels.'

Cooke (ii, 985) has adopted the name A. monticola, Schult. with Hooker's description and evidently also the latter's varieties. But his opinion does not count in this case as he has not seen any specimens from the Presidency and was therefore 'as he says' himself, 'unable to fix definitely the variety to which the Bombay species belong. They will probably belong to var. Trinii H. f.' What induced Cooke to say that they probably belong to var. Trinii we cannot understand, especially as Hooker came to the conclusion that he was not able to classify the varieties according to geographical areas.

We have examined a great number of specimens from all parts of the Presidency, except Sind, Cutch and Kathiawar and we have been able to separate [6]
many into the two varieties. They exhibit almost the same distribution and
often both are found in the same locality, with this exception that var. Trinii
has not been observed in N. Kanara, Gujarat and the Konkan. But we must
also mention that this is the most important point, that we saw many specimens
all over the country which could not be classed under either variety, and it
would require many new varieties if we wanted to give a name to all the
different variations. And even then they would be forms only and not
varieties.

Haines seems to have felt the same difficulty when he tried to classify the
*montanus* material of Bihar and Orissa. He distinguishes five forms. If we
wanted to follow the same method for our area, we doubt whether double the
number of forms would yield satisfactory results.

Stapf describes the specimens from Tropical Africa under the name of
*C. montanus* var. *tremulus*, Stapf. He calls it one of the several races which
constitute the rather polymorphic species *C. montanus*, Trin., whose area
includes Southern Africa, Madagascar and India. The var. *tremulus* ap-
approaches very closely the var. *elatior*, Stapf, a large-spikeletted parallel to the
var. *cerrulatus*. Stapf (*Chrysopegon serrulatus*, Trin.) and differs from it
apparently only in the almost quite smooth rachis and branchlets (a few sharp-
pointed hairs may be found under a high power) and the pedicels, which are
glabrous almost up to the middle, and not ciliate from the base. It seems
to us (it may look like presumption on our part to criticize our veteran and
highly merited agrostologist) that it is somewhat risky to find new varieties of a protean species on a few specimens only.

According to Hole all the 3 varieties mentioned by Hooker appear to vary
greatly, as regards their habit and vigour of growth, in response to the moisture
conditions of the habitat and also according as whether, or not, the plants
are habitually grazed, cut for fodder, or periodically burnt. The colour of
the cilia of glume II of the sessile spikelet (pale or white in *robustus* and rufous
in *monticola*), accordingly, appears to be the chief difference in the habit, and
these forms appear to have different and fairly defined areas of distribution
(*monticola* occurring chiefly in Central and Southern India, while *robustus* is
mainly found in N. India, in the outer N. W. Himalayas and Sub-Himalayan
tract). Hole who studied the varieties *robustus* and *Trinii* both from
herbarium specimens and in the field has observed that the plant at Dehra Dun
gradually and imperceptibly passes from the typical *robustus* to the typical
*Trinii*. We are justified in stating that a similar transition takes place between
*monticola* and *Trinii* in Western India. (Of Central and Southern India
we have no experience). We have therefore a gradual transition from
*robustus* to *Trinii* at Dehra Dun, and from *Trinii* to *monticola* in W. India
and consequently, we are not allowed to consider Hooker’s varieties as good
varieties.

**Vern. Names:** Sunthia Khad (Dohad), Agiva, Gogar, Ghora, Dand,
Pandhari Kusal (Poona), Kare Hullu (Bijapur).

**Description:** A very variable perennial grass. Stems usually slender, erect
or geniculately ascending, glabrous, sometimes robust, simple or branched,
30 cm. to 1.2 m., but often attaining 2 m., slightly compressed, solid, develop-
ing usually axillary leafy and flowering branches from all the upper nodes except
the one next below the panicle. (The branches growing within the sheaths
push the latter away from the stem which often results in a characteristic fap-
shaped appearance.) Blade of uppermost leaf of flowering stem usually
mucroniform, but attaining 8 cm., of lower leaves up to 43 cm. long and 8 mm.
broad, linear acuminate, tapering from the base, scabrid on margins, sometimes
also scabrid dorsally on midrib, and scabreous above, especially towards the
apex, often ciliate towards the base with tubercle-based hairs, at least when
young; sheath glabrous, compressed, keeled, especially of the lower leaves,
shorter or longer than the proper internode; ligule a minute membranous rim.
Panicle 5-15 cm. long, ovate to subcylindric, yellowish to purplish, of several whorls
of few or many capillary flexuous very unequal branches bearing solitary spikes,
branches of flowering panicle more or less horizontally spreading, of the fruiting
panicle erect and closely appressed to the rachis, which is smooth or scabreous.
Spikelets in clusters of 3, a central sessile hermaphrodite one with 2 lateral pedicelled male ones, the clusters being terminal and solitary on
the capillary branches of the panicle. Sessile spikelets laterally compressed,
4-7 mm. long, tip of peduncle brown-bearded, clavate, callus short, with oval
scar and dense beard. Lower involucral glume laterally compressed, narrow-oblong, embracing the margins of the upper, chartaceous 2- to 4-nerved, hispidly ciliate dorsally on keel towards the apex or almost glabrous, 1- to 2-nerved dorsally or notched, and minutely pubescent with appressed hairs dorsally near margin, apex truncate or 2-dentate. Upper involucral glume laterally compressed, broader than lower, obtusely keeled, subchartaceous, 3-nerved, margins broad, hyaline, membranous, ciliate or not, very variable with regard to its hairiness, sometimes almost glabrous, at other times hispidly ciliate dorsally on keel with long white or rufous hairs more or less from base to apex, sometimes also pubescent, or minutely villous dorsally on keel and lateral nerves, awned, awn 2-5 to 6 mm. long, apex entire or 2-lobed. Lower floral glume ½ the length of to subequal the upper involucral glume, linear, hyaline, ciliate, nerveless or indistinctly 1- to 3- or more-nerved, apex obtuse. Upper floral glume consisting of the narrow 3-nerved base of the awn, basal 2-½ or ½ hyaline, membranous, upper portion chartaceous, awn geniculate, 10-18 mm. long, but also reaching 37 mm. (including the twisted column), margins ciliate or not, apex entire or 2-lobed. Pale sometimes present, very narrow, 1-25 mm. long. Lodicules 2, cuneate, glabrous. Anthers 3, up to 3 mm. long, yellow or purple. Stigmas 2, laterally exserted at base of spikelet, yellow. Pedicilled spikelet dorsally compressed, subequal the sessile spikelet; pedicel less than half the sessile spikelet, usually about ½ the spikelet, densely ciliate on both margins with stiff rufous or white hairs, the upper of which are shorter than to subequal the spikelet. Lower involucral glume lanceolate, membranous, 5- to 7-nerved, minutely pubescent with appressed hairs dorsally, especially towards the apex, or almost glabrous, sometimes ciliate dorsally on midrib and marginal nerves, especially towards the apex acute or shortly awned. Upper involucral glume subequal to the lower, 3-nerved, margins incurved, long ciliate, apex acute or mucronate, glabrous dorsally. Floral glumes linear, hyaline, ciliate, nerveless or indistinctly nerved. Pale sometimes present, as in sessile spikelet, but slightly longer, very narrow.

The flowers are much visited by small bees.

**Locality : Gujarat :** Mahal-Dangs, elevation 800 ft., rainfall 100" (Sedgwick and Bell 5391 !) — Khandesh : Tapti River (Blatter and Hallberg 5426!); Bhusawal (McCann 5224 A !); Nandgaum, Bori River (Blatter and Hallberg 3827!); Bori, Tapti Island (Blatter and Hallberg 5146!); Amalner, Bori River (Blatter and Hallberg 4455!). — Konkan : Sion Creek (Sabnis A 231 !); Matheran (D’Almeida 9688!). — Deccan : Khandala to Karjat (Blatter and Hallberg A 232!); Kikree (Talbot !); Peshan (Gammie !); Mangiri, 8 miles E. of Poona (Gammie !); Katraj (Gammie !); Pasarni Ghat (Blatter and Hallberg B 1209!); S. M. Country : Dumbai (Talbot 2317!); Badami (Talbot 2928!); N.W. of Dharwar (Sedgwick 3141!); Dharwar, dry pasture land, elevation 2,400 ft., rainfall 34" (Sedgwick 1817!); Konankeri, elevation 1,800 ft., rainfall 35" (Sedgwick and Bell 4439!); Haveri (Talbot 2189!). — Kanara : Jog to Siddhapur, open grass land (Hallberg and McCann A 274!). This species forms patches of many individuals, or combines with other individuals to form associations of a few species.

**Distribution :** Throughout India, especially in hilly tracts, from the N.W. Himalaya southwards, ascending to 6,000 ft., extends to Ceylon, Burma, Afghanistan, Tropical and S. Africa, Madagascar.

**Uses :** In Bihar and Orissa this grass is considered to be a valuable fodder, and Hole, writing of the Siwalik Division, calls it one of the most valuable fodder grasses. In and near Abu according to Lisbon, it is reckoned as a good fodder grass and the grain is used as food by the natives. But the same writer, under the name of Andropogon servulatus, Trin. (= Chrysopogon montanus var. Trinii) remarks : ‘ Said to be good fodder, used much in Poona, but reports from other places unfavourable.’ (J. C. Lisboa, List of Bombay Grasses, Bombay (1896), 81).

The last statement might find an explanation by a suggestive note made by Hole (l. c. 111) : ‘ So far as the local (Dehra Dun) plant is concerned specimens with the more hairy glume ] tend to occur in localities where there is a scarcity of available moisture, both on the dry ridges and slopes of the Siwalik Hills and also (rarely) on waterlogged soil, and the writer believes that the characters have been sufficiently well defined to define these varieties vary in response to the factors of the habitat and particularly in response to the available water supply. Provided that the development of the plants has not been interfered
with by grazing, grass-cutting, or other agency, those plants with the more hairy glume are usually less robust and less coarse, or rank, than the others, and they are therefore as a rule most valued for fodder and are distinguished locally by the vernacular name of *dhaula*, whereas the coarser plants with smooth glume are called *gurta*. As this grass affords a valuable fodder and is sometimes cultivated, in consequence, it is important to determine the extent to which its characteristics are constant. If, as suggested above, they depend on the available moisture, it is obvious that cultivation of this grass on good agricultural land, with a large quantity of available moisture, would result in producing an inferior class of rank, coarse fodder.1


*Description:* Stem 60–90 cm. high, as thick as a crow-quip or more, stiff, simple or fastigiatly branched, quite glabrous. Leaves crowded or not, 15–25 cm. by 2–4 mm., narrow, rigid, acuminate, flat, pale glaucous-green, glabrous on both surfaces, coriaceous, midrib and nerves very slender, margins minutely scaberulous; sheaths terete, appressed, hard. Panicle 10–13 cm. long, oblong, subsecund, dense-flowered, very pale, branches 5–12 mm., very unequal, in many closely approximate whorls, smooth, peduncle slender, quite glabrous. Sessile spikelets 4 mm. long drooping, white or pale purplish, calyx long, 13 mm. long, obtuse, bearded at the very base only with long fulvous hairs. Glumes as in *C. montanus*. Lower involucral glume obtuse, glabrous, keel ciliate towards the tip; upper not awned, keel glabrous or ciliate. Upper floral glume with an awn 3–8 mm. long, nearly straight, pale. Pedicelled spikelets narrowly lanceolate, acuminate, glabrous, 7-nerved, eciliate, not awned, rather longer than the sessile; pedicels naked, villous, at the tip only.

Can easily be distinguished from *C. montanus* by the stout naked calyx which is bearded at the base only, and by the naked pedicels which are long-villous only at the base.

It differs from the next species, *C. Aucheri* by its size, the long, glabrous glaucous leaves and the glabrous peduncle and branches of the panicle.

*Locality: Gujarat:* Porbandar (Bhide) ; Dohad (Bhide) ; Watrak River on rocks (Sedgwick 1165!) ; Daman (Bhide).—*Deccan:* Dond, river-bank (Bhide).  

*Distribution:* Central Provinces. W. Peninsula.


*Description:* Cke. i. c.

Stapf thinks that *C. Aucheri* comprises several geographical races and that the one from which the species was first described extends from Arabia through Southern Persia and Baluchistan to Sind. He characterizes it by the lower glume of the pedicelled spikelet being usually awnless or in any case much more shorty awned than the upper, by the glume awns not being ciliate or ciliate only at the base, and by the longer beards of the pedicels.  

*Locality: Sind:* Gizri (Sabinis 6777 !) ; Jemadar ka Landa near Karachi (Stocks).  

*Distribution:* Sind, Baluchistan, Afghanistan, S. Persia, Arabia (not Africa).  


Species about 20, in the tropical and subtropical regions of the Old World.  

We retain the 6 species mentioned by Cke. i. c. His *A. lanceolatus*, Hochst. will be slightly restricted under the name of *A. serrulatus*, Hochst., the name *A. lancifolius*, Hochst., will be substituted for *A. microphillus*, Hochst., and *A. quartinianus*, Nash, will take the place of *A. ciliatis*, Beauv.  

Key as in Cke.


*Description:* Cke. i. c.  

*Locality: Konkan:* Okda Forest, Thana District (Ryan 7181) ; Wada Range, Thana District (Ryan 6921) ; Matheran (Woodrow) ; Marmagao (McCann).  

—*Deccan:* Mahabaleshwar (Sedgwick and Bell 4513), Woodrow ; Purandhar

This species includes all the material of the Nileland of Tropical Africa, of tropical Arabia and the greater part of the Indian specimens which, up to now, were ranged under Arthraxon lanceolatus, Hochst., as understood by most authors.

It has been pointed out by Stapf that Arthraxon lanceolatus, Hochst., was founded on Andropogon lanceolatus, Roxb., a Coromandel plant, which has larger and wider long-awned spikelets with the lower involucral glume very minutely muricate towards the tips only. Neither of these names can, consequently, be mentioned as synonyms of Arthraxon serrulatus.

Description.—A perennial grass; rhizome short, emitting fascicles of closely set culms and innovation shoots, which are more or less thickened below and covered with reddish silky cataphylls. Stems rather slender, up to 90 cm. high, many-noded, usually finely pubescent, sometimes glabrous, with vegetative branches below and usually solitary flowering branches above, the latter subfastigate. Leaf-blades lanceolate to ovate-lanceolate, setaceously acuminate, with a caudate amplexicaul base glaucous or greenish, 2'5-5 cm. long, 12-18 mm. wide, margins cartilaginous, ciliate with the cilia springing from tubercles, smooth, very finely pubescent below or glabrous, primary lateral nerves about 8-11 on each side, fine, slightly raised below; ligule 1-2 mm. long, rounded, membranous; sheaths terete, tight, slightly shorter than the internodes or exceeding them in the leafy shoots, more or less hairy with tubercle-based hairs and often softly pubescent at the nodes, the uppermost frequently glabrous. Racemes 2-5 nate, slender, greenish or suffused with purple or violet, 3-over 5 cm. long on a short common axis, the fascicles borne on a slender peduncle, shortly or far exerted from the supporting bladeless or almost bladeless sheath; rhachis fragile, shortly bearded at the nodes; joints narrowly linear, 3'3-6'3 mm. long, hairy on the back and sides, or the lowest almost glabrous, hairs increasing upwards to more than 2 mm.; pedicels very similar, but much shorter and more slender. Sessile spikelets narrowly lanceolate-linear to linear slightly tapering upwards up to 7'4 mm. long (not including the awn), glabrous; callus very short, puberulous. Glumes 4. Lower involucral glume chartaceous, 6 mm. long, lanceolate, with a minutely truncate hyaline tip, very convex on the back, which is smooth or more often muricate along the 4 indistinct or faintly raised inner, spinulously muricate along the outer nerves, margins hyaline, comparatively wide; upper linear-lanceolate in profile, membranous, 3-nerved, glabrous or nearly so. Lower floral glume linear, acute, up to 4 mm. long, hyaline, nerveless or obscurely 1-nerved at the base; upper membranous at the base, hyaline upwards, narrowly lanceolate-linear in profile, 2-dentate, with the teeth minute, sometimes produced into short capillary bristles, delicately 3-nerved, awned from near the base, awn 8-15 mm. long, very fine, knee about the middle, twisted below. Anthers up to 3 mm. long. Grain baccilliform about 4'2 mm. long. Pedicelled spikelet male, linear-lanceolate, acute, about 5 mm. long. Involutral glumes subequal, lower herbaceous-chartaceous, acute, scaberulous along the outer and slightly so on the 4-5 inner nerves or almost smooth, upper slightly shorter, membranous, otherwise as in the sessile spikelet. Lower floral glume as in the sessile spikelet, upper linear-oblong, obtuse, nerveless, muticous.

Locality: Sind : (Stocks 642).—Gujarat : Mervi, Kathiawar (Woodrow).—Deccan : Lonavia (Woodrow) ; Pashan, tank (Gannie l). Panchgani (Blatter [10].

Journ., Bom. Nat. Hist. Soc., Vol. XXXII, No. 3. [Jan. 15, 1928 (McCann 5592); Khandala (McCann 9950!, 9740!).— S. M. Country : Derikop woods (Sedgwick 1845!) ; Castle Rock (Gannie l 15678!).

Distribution : W. Peninsula, apparently endemic.
and Hallberg B1277).—S. M. Country: S. W. of Dharwar (Sedgwick and Bell 4436); Derikop (Sedwick 2022!); Belgaum, Fort wall (Sedwick 3013).

Distribution: More or less throughout India, Tropical Arabia and Tropical Africa (Nileland).


Locality: Western Ghats: Khandala, in open grassland on a hillside, 600 m. (Meebold 9132); Khandala, common (McCann 9949 i, 9498 !); Lonavla, common (Bhide !, McCann !); Panchgani (Blatter and Hallberg B1238 i, B1225 i), Tableland (Blatter 3904 i); Mahabaleshwar (Sedgwick and Bell 4523).

—N. Kanara: Taini (Talbot 2569 i).

Distribution: W. Peninsula, apparently endemic.


Description: Cke. l.c.

Locality: Gujarat: Smat (Herb. Dehra Dun !, Cooke i).—Konkan: Tungar hill, Thana District (Herb. Econ. Bot. Poona !); Parisel (Herb. Econ. Bot. Poona !); Kulla (Garade !); Salsette (Jacquemont 713).—Deccan: Trinbavak, Nasik District (Herb. S. X. C., Bombay i).—S. M. Country: Belgaum Fort walls (Sedgwick 3012 i); W. of Dharwar, banks of road, in forest (Sedgwick 1851 i); Castle Rock (Bhide i).—Kanara: Karwar (Talbot 1308 !) Yellapore (Talbot 2084 i).

Distribution: More or less throughout India, Ceylon to Tonkin and S. W. China, tropical Africa (Upper Guinea, Nileland).


We wish to substitute *A. quantinianus*, Nash in place of *A. ciliaris*, Beauv. This latter species which was described in 1812 has been emended repeatedly since then, and that to such an extent that it is scarcely possible to recognize the original plant. Hackel made five subspecies: *Langsdorffii*, *subnuttius*, *nudus*, *Quantinianus*, and *Vriesei*, and nine varieties. The subspecies were arranged by him in two leading groups:

1. Joints of rhachis glabrous, or with a few scattered hairs towards the tip (Langsdorffii, subnuttius, nudus).

2. Joints of rhachis, at least the upper, more or less ciliate (Quantinianus, Vriesei).—To these two groups Hooker f. added a third one (F.B.I., vii, 146):—

3. Spikes silky villous, spikelets 5–7 mm. long, lower involucral glume entire or minutely 2 toothed, awn 12 mm. or more. (This is *Arthraxon cuspidatus*, Hochst., conserved by Hackel as a distinct species.

*Arthraxon* quantinianus, Nash, and adopted by Stapf l. c., covers part of the subspecies *Quantinianus* in Hackel's group 2, including var. *Quantinianus*
s. str. and var. coloratus, but excluding var. Hookeri and var. glabrescens. Quartz's specimen No. 14, collected in Abyssinia, and representing a form with large spikelets, has, according to Stapf, to be considered as the basis of the species, whilst Schimper's 1532, the type of Arthraxon coloratus, stands for the other extreme. Arthraxon quartianianus, Nash, includes all the material of the Bombay Presidency that has come under our observation.

The rest of A. ciliaris, Beauv. et auctorum has to be studied separately, but as the material lies outside the Presidency we leave it to other botanists to work out their respective material.

**Description**: Annual. Stems very slender, ascending from a branched, sometimes prostrate and rooting base, from 8-30 cm. high, smooth, glabrous or finely puberulous below the inflorescence, with solitary or 2 to 3-naite branches above, internodes mostly exerted. Leaf-blades ovate-lanceolate to oblong-lanceolate from a cordate amplexicaul base, finely acuminate, 25 to over 50 mm. long by 6-12 mm. broad, flaccid, with scattered tubercle-based hairs on both sides, ciliate towards the base, primary lateral nerves 3-4 on each side, very fine; ligules membranous, ciliolate, short, truncate; sheaths lax, the upper very often more or less inflated and bladeless, more or less hirsute in the upper part with tubercle-based hairs and densely ciliate along the upper margins, nodes shortly bearded. Racemes 1 to about 9, in fascicles, born on filiform, ultimately long exerted peduncles, 2-5-15 cm. long, very slender, flexuous; rhachis fragile; joints 3-3' mm. long, usually shortly ciliate, but the uppermost cilia sometimes up to 1'6 mm. long, sometimes glabrous or nearly so; pedicels reduced to a minute point or subule. Spikelets solitary, sessile, oblong-lanceolate in profile, somewhat oblique, laterally compressed, including the very minute glabrous or minutely puberulous callus, 3'3-4'2 mm. long. Involucral glumes subequal, lower subchartaceous, acute, scabernulous along the very slender 7-9 nerves or almost smooth towards the base, upper obliquely lanceolate to linear-lanceolate in profile, acute or minutely mucronate, 3- (rarely 5) -nerved, eciliate. Lower floral glume oblong, obtuse, hyaline, obscurely 2-nerved, shorter by half than the involucral glumes, upper narrowly linear-lanceolate in profile, 2'-2'7 mm. long, awn from near the base, usually 6'3 mm. long, more rarely down to 4'2 or up to 8'3 mm. long, very delicate, kned and twisted below the middle. Stamens 2.

**Locality**: Gujrát: Chamargaon (Woodrow).—Khandesh: common (McCann!).—Konkan: very common (McCann!).—Deccan, Mahableshwar (Sedgwick and Bell 450!); Panchgani (Blatter and Hallberg B1244!, B1232!, B1257!, B1266!, B1273!, B1290!) Khandala, very common (McCann!).—S. M. Country: S. W. of Dharwar (Sedgwick and Bell 4434!); Dharwar (Sedgwick 3089!); Gadag (Talbot 2394!); Belgam (Ritchie 796A).—Konara: Halyal (Talbot 2161!); Yellapore (Talbot 1057!).

**Distribution**: From Bihar southwards to Ceylon, Tropical Africa (Nileland, Upper and Lower Guinea, Mozambique District), introduced into Jamaica and Guadeloupe.


**Description**: Cke. 1.c.

**Locality**: Konkan: (Law, Stocks).—Deccan: Kori Fort, 12 miles south of Lonavla (Woodrow); Khandala, damp rocks (Hallberg 9788!); Lohagad Fort, top (McCann 9789!).

**Distribution**: W. Peninsula, apparently endemic.


Annual or perennial grasses. Stems slender, simple or branched, sometimes very copiously, often bearded at the nodes. Leaf blade with a rather conspicuous white midrib. Panicles delicate, when much divided the branchlets at length more or less divergent. Spikelets small, 2-nate, one sessile, the other pedicelled, similar in shape but differing in size, in 1-2- (rarely up to 8-) jointed racemes at the ends of the capillary primary and secondary and often tertiary or even quaternary branches of a loose panicle; joints and pedicels finely filiform, longitudinally grooved and hyaline in the groove, disarticulating horizontally; sessile and pedicelled spikelets deciduous, the former with the adjacent joint and pedicel. Florets 2 in the sessile spikelet, lower reduced to

[12]
an empty glume or quite suppressed in the pedicelled spikelets, upper hermaphrodite; one male or neuter, in the pedicelled spikelet. Sessile spikelet dorsally compressed, awned, calyx small, shortly bearded. Involute glumes equal, membranous to subherbaceous; lower 2-keeled, with narrow inflexed margins; upper boat-shaped, 3-nerved, keeled, grooved on both sides along the obtuse keel. Lower floral glume hyaline, nerveless, upper consisting of a hyaline, linear stipe, firmer upwards, passing into a slender awn. Pale 0. Lodicules 2, minute, glabrous. Stamens 3. Stigmas exserted laterally, longer than the styles. Grain oblong-ellipsoid or oblanceolate, dorsally slightly compressed; embryo exceeding $\frac{1}{2}$ of the grain. Pedicelled spikelet awnless, glume, if present, hyaline, nerveless.

Species 6, in tropical and subtropical Asia, Polynesia and Australia, tropical Africa.

Three species, described by Cooke (ii, 981, 982) under Andropogon assimilis, Steud., A. Hugelii, Hack., and A. filiculmis, Hook. f. belong to this genus.

I. Stems more or less suffrutescent below, stiff, erect
1. Nodes of stem glabrous; calyx shortly bearded ... ... 1. C. assimilis.
2. Nodes of stem bearded; calyx densely villous ... ... 2. C. Hugelii.

II. Stems decumbent and interlaced, very weak, filiform ... ... 3. C. filiculmis.


Description: Cke. 1. c.
Locality: Konkan: Above Kenery Caves (McCann 9959 !).—Deccan: in dry forest, between Mahableshwar and Panchgani, at 4,000 ft. (Sedgwick and Bell 4738 !).—Konkan: Juglepet, road side, common (Talbot 1386 !).

Distribution: Temperate Himalaya, Khasia, Behar, N. Bengal, Rajputana, Central India, W. Peninsula, Java, China, Japan.

Locality: Konkan: Toranmal (McCann 9672 !).—Konkan: Mulgaum (McCann 3664 !).—Deccan: Khandala, St. Xavier’s Villa (McCann 9423 !); dry forests between Mahableshwar and Panchgani (Sedgwick 4738 !); Panchgani (Blatter and Hallberg B1321 !, McCann !).—S. M. Country: deciduous forests west of Dharwar (Sedgwick 4498 !).—Konkan: Halyal (Talbot 2082 !); Ecumbi to Mungod (Hallberg and McCann A288 !).

Distribution: Rajputana, Central Provinces, Central India, W. Peninsula.

3. Capillipedium filiculmis, Blatter & McCann, nov. comb.—Andropogon filiculmis, Hook. f. in P. B. I. vii, 181; Cke ii, 982. Description: Cke. 1. c.
Locality: Konkan: Trombay (McCann A286 !).—Deccan: Khandala to Karjat (Blatter and Hallberg A287 !); Igatpuri (Blatter and Hallberg 5117 !); Poona, in rocky places (Jacquemont 310); Donshi, Mawal Districts (Woodrow 26); Burundhar (McCann 5570 !).—S. M. Country: forests near Dharwar (Sedgwick 1854 !).

Distribution: W. Peninsula, apparently endemic.


Perennial grasses. Stems slender, simple or branched, bearded or beardless at the nodes. Panicles mostly subdigitate with a short primary axis, rarely the racemes on branches of the second order; racemes always shortly peduncled.
Spikelets small, 2-nate, one sessile, the other pedicelled, similar in shape or the pedicelled reduced and smaller, the latter always different in sex except sometimes the lowermost pair which may be homogamous (male or neuter), on the fragile rhachis of many-jointed shortly peduncled racemes; joints and pedicels filiform, longitudinally grooved and hyaline in the groove, disarticulating horizontally; sessile and pedicelled (always?) spikelets deciduous, the former with the adjacent joint and pedicel. Florets 2 in the sessile spikelets, lower reduced to an empty glume, upper hermaphrodite, 2 or 1 in the pedicelled spikelet, the lower male or neuter, the upper neuter or usually quite suppressed. Sessile spikelet dorsally compressed, awned; callus small, shortly bearded. Involucral glumes equal, thinly chartaceous to membranous; lower 2-keeled, with narrow sharply inflexed margins; upper boat-shaped, 3-nerved, acutely keeled. Lower floral glume hyaline, nerveless, upper a hyaline linear stipe, firmer upwards, passing into a slender awn. Pales 0 or very minute. Lodicules 2, minute, glabrous. Stamens 3. Stigmas exserted latterly usually low down, longer than the styles. Grain oblong, obtuse, dorsally slightly compressed; embryo about half the length of the grain. Pedicelled spikelet awnless, glumes, if present, hyaline, nerveless.

Species probably over 25, mostly in Tropical Asia.


Key to the species (after Ck.)

A. Racemes digitate or fasciculate, the lower longer than the rhachis of the inflorescence

I. Lower involucral glume of sessile spikelets villous below the middle

1. Lower involucral glume not pitted
   
   (a) Upper involucral glume muronulate ... 1. A. compressa.
   (b) Upper involucral glume obtuse ... 2. A. Woodroffeii.

2. Lower involucral glumes pitted ...
   3. A. pertusus.

II. Lower involucral glume of sessile spikelets glabrous below the middle (sparsely silky in A. excisiflorus)

1. Nodes of stem densely bearded ...
2. Nodes of stem glabrous
   (a) Leaves reaching 12 mm. broad ...
   5. A. excisiflorus.
   (b) Leaves reaching 3 mm. broad ...
   6. A. concanensis.

B. Racemes panicked, the lower branches shorter than the rhachis of the inflorescence

1. Non-aromatic; sheaths terete ...
   7. A. glabra.
2. Aromatic; sheaths compressed ...
   8. A. odorata.

1. Amphilophis compressa, Blatter & McCann, comb. nov. Andropogon compressus, Hook. f. in F.B.I. vii (1896), 172; Ck. ii, 977.
   Description: Ck. i.c.
   Locality: Deccan: Khandala, plain behind the Saddle (Hallberg 9657!), Bhide!; Lonavla (McCann 9433!); Mawal (Woodrow!); Poona (Woodrow).
   Distribution: Western Peninsula, apparently endemic.

   Description: Ck. i.c.
   Locality: Deccan: Khorbasa, Mawal Districts (Woodrow); Pand, 20 miles W. of Poona (Woodrow!).
   Distribution: Western Peninsula, apparently endemic.


*Vern. Names:* Ghanga, marvel (Satara, Sholapur, Poona), payen, palva, palvan.

*Description:* Cke. ii, 978. A very variable plant. We must confess we find it impossible to follow various authors who have described a number of varieties. It would be easy to increase their number on merely morphological grounds, but the results would be highly unsatisfactory. It is only from genetic tests that we can expect to get an insight into the natural variations of this and other species of this genus.

*Locality: Gujarat:* Perim Island, Gulf of Cambay (Blatter 3814).—Konkan: Damman (Bhide!); St. Xavier’s College compound, Bombay (McCann 9630!, 9631!).—Deccan: Nasik (Bourke 11!); Rahuri (Nana A278!); Khandala, Campoli (McCann 9961!); Pashan (Gammie!); Lonavla (Woodrow); Agricultural College, Kirkee (Bhide!); Poona (Cooke); Panchgani (Blatter and Hallberg BI236!), on edge of Tabeeland (Blatter 9962!), on roadside 4,000 ft. (Sedgwick and Bell 4699!); Satara (Lisboa); Sholapur (Lisboa); Joonur (Talbot!).—S.M. Country: W. of Dharwar, elevation 2,000 ft., rainfall 35" (Sedgwick and Bell 4494!); Dharwar, elevation 2,400 ft., rainfall 34" (Sedgwick and Bell 4488!); Kunur, elevation 2,000 ft., rainfall 35" (Sedgwick and Bell 4953!); Badami (Talbot 2744!); Haveri (Talbot 2233!); Gokak (Sheodye!).—Kanara: Halyal (Talbot 2080!, 2106!).

*Distribution:* More or less throughout India, chiefly in the drier parts, Ceylon, Afghanistan, Arabia, tropical Africa (Upper Guinea, Nileland, Mozambique District).


*Description:* Cke. i. c.

*Locality: Konkan:* (Stocks).—Deccan: (Woodrow 153!).—Mawal (Woodrow).

*Distribution:* Bihar, Central Provinces, W. Peninsula.

5. *Amphilophis ensiformis*, Blatter & McCann, comb. nov.—*Andropogon ensiformis*, Hook. f. in F. B. I. vii, 175; Cke. ii, 979.

*Description:* Cke. i. c.

*Locality: Deccan:* Lonavla (Woodrow!).

*Distribution:* W. Peninsula, apparently endemic.


*Description:* Cke. i. c.

*Locality: Konkan:* Matheran (Woodrow!).—Deccan: Venna River, Lingmala, Mahabaleshwar, 4,000 ft. elevation, 200" rainfall (Sedgwick and Bell 1452!); Lingmala, Mahabaleshwar (Blatter and Hallberg BI238!); Khandala, in water courses, common (McCann 9651!); Mannmad, river-bed (Blatter A283!); —Kanara: Kalanadi River, Supa, on rocks, elevation 2,000 ft., rainfall 100" (Sedgwick and Bell 4857!); Halyal (Talbot 2221!); Goond (Talbot 2202!); Gersoppa Falls, on rocks in river bed (Hallberg and McCann A279!).

*Distribution:* W. Peninsula, apparently endemic.


It will be seen from the above synonymy that Stapf considers *Andropogon glaber*, Roxb. as the type of the species. Of *Andropogon intermedius*, R. Br. as
conceived by Hackel he includes only the var. punctatus, subvar. glaber. Haines in his Bot. Bihar and Orissa, 1928, adopts Stapf's name Amphilophis glabra with the following synonyms: Andropogon intermedius, R. Br. inc. A. glaber, Roxb., A. punctatus, Roxb. and A. montanus, Roxb.?

This is evidently not Stapf's Amphilophis glabra. Haines includes Andro-
pogon intermedius, R. Br., whilst Stapf confines his species to var. punctatus, Haines has A. punctatus, Roxb. as a synonym, Stapf excludes it expressly.

Haines' description is much wider than that given by Stapf and includes Hackel's var. genuinus, Hœnkei, punctatus and glaber, and one of his own var. hirta. He says in a foot-note (p. 1029): 'These varieties are after Hackel and were described before I consulted Stapf's Gramineæ in Fl. Trop. Africa, where he reduces Hackel's intermedius to Roxburgh's glaber. The names (e.g. genuinus) in some cases become inapplicable if Roxburgh's glaber is the type. Var. Hœnkei is, I think, a distinct species and easily distinguished in the field. It should be called Amphilophis Hœnkei.'

Haines seems to overlook the fact that Stapf's glabra is restricted to one of Hackel's varieties of Andropogon intermedius, viz., punctatus and that, consequently not all of Hackel's names can be applicable.

In our opinion Haines is not justified in calling his species Amphilophis glabra, Stapf. As it includes practically the whole of Andropogon intermedius, R. Br. taken in Hackel's sense he might have called it Amphilophis intermedius, Haines, if that name had not been preoccupied by Stapf (Fl. Trop. Afr. ix, 174).

We are not arguing the point whether Stapf or Haines is right in the treatment of Andropogon intermedius, R. Br. et auctorum; good reasons can be adduced for both cases. All we wish to say is that Haines' Amphilophis glabra is not A. glabra, Stapf.


We adopt Stapf's conception of A. glabra together with his description. Dr. Stapf was kind enough to name some of our Bombay specimens.

Description: Perennial. Khizome very short, hard, innovations extragavi-
nal, cataphylls ovate to lanceolate, acute, hard, smooth. Stems tufted, erect or shortly ascending, to over 1 m. high, rather stout below, glabrous, 5-noded, rarely branched. Leaf-sheaths terete, glabrous, smooth, the intermediate and upper mostly shorter than the internodes, nodes glabrous or the upper bearded. Blades linear, long-tapering to a setaceous point, hardly broader, not or slightly contracted at the base, up to over 30 cm. by 8-5 mm. (mostly narrower), pale green, often turning reddish or purplish, glabrous, rarely with very fine, long, spreading, white hairs at and above the ligule, smooth except at the margins, midrib rather stout to very stout downwards, lateral nerves 3-4 on each side; ligules truncate, very short, scarious. Panicle narrowly oblong, 10-23 cm. by 25-38 mm., erect, primary axis much longer than the lowest racemes, somewhat stout and (at least when mature) stiff, smooth, shortly bearded at the branch axils, otherwise glabrous and smooth; branches whorled, up to 6 in a whorl or semiverticillate, or 2-nate or solitary from the weaker nodes, straight, 25-75 mm. long, the longer divided from 12 mm. above the base, few to 7-noded, secondary branches simple. Racemes 12-38 mm. long, straight or flexuous, usually purplish, inconspicuously white-villous; joints and pedicels 2-3-5 mm. long, ciliate, uppermost cilia much longer than the rest, up to 1 mm. long. Sessile spikelet pale green or purplish throughout, including the small minutely bearded callus 3'-3-3' mm. long. Involucral glumes equal; lower truncate, slightly concave on the back, chartaceous-membranous, hairy below the middle, more rarely glabrous, keels rigidly ciliolate upwards, intracinal nerves 4-5, very fine, evanescent upwards with or without a pit above the middle; upper lanceolate, acute, 3- nerved, keel scarab, upwards, margins sparingly ciliate. Lower floral glume oblong, 2-7 mm. long, hyaline, nerveless, ciliate, upper an awn 6'-12-17 mm. long, brown below, pale above the bend. Pedicelled spikelet neuter, mostly reduced to the glumes, narrowly linear-oblong to linear, 2-7-3' mm. long.
glabrous, of the same colour as the sessile. Lower involucral glume rigidly and minutely ciliolate, 5-9-nerved, often rolled in, not pitted, upper hyaline, nerveless, often minute.

**Locality:** Konkan: Penn (McCann A282 !).—Deccan: Pimpalagam, on the brink of a stream (Bhide !); Lonavla (Hallberg 9955 !); Khandala, St. Mary's Ravine, on a water course (McCann 9435 !).

**Distribution:** More or less throughout India, Tropical Asia, N.E. Australia, Tropical Africa (Upper and Lower Guinea, Mozambique District, Nileland) Madagascar.


**Description:** Cke. 1.c.

**Locality:** Khandesh (Lisboa).—Konkan: Khardi (Mrs. Lisboa).—Deccan: Igatpuri (McCann A281 !), Lonavla; (Mrs. Lisboa, Bhide !); plain at foot of Lohagad (McCann 9561 !); Pand, 20 miles W. of Poona (Herb. Econ. Bot. Poona !); Mawal, Poona District (Woodrow).

**Distribution:** W. Peninsula, apparently endemic.


Perennial or annual. Stems simple or branched, usually many-noded, bearded or beardless at the nodes. Panicles usually subdigtate with a short or very short primary axis, rarely the latter elongated; racemes always shortly peduncled. Spikelets small, 2-nate, one sessile, the other pedicelled, similar in shape, different in sex, except the lowermost 1 or 2 pairs (sometimes 3 or 4) of each raceme which are (with occasional exceptions in *D. annulatum*) homogamous (male or neuter), in many-jointed, shortly peduncled, subdigitate, rarely subpanicled or racemously arranged, racemes; joints and pedicels filiform, solid, disarticulating subhorizontally except the lowest barren pairs; fertile sessile and pedicelled spikelets deciduous, the former with the adjacent joint and pedicel. Sessile spikelet dorsally compressed, awned except the basal homogamous ones; callus small, shortly bearded. Involutural glumes equal, thinly chartaceous, lower usually very obtuse, 2-keeled, with narrow sharply inflexed margins, upper boat-shaped, 3-nerved, acutely keeled. Lower floral glume hyaline, nerveless, upper reduced to the hyaline base of a slender awn; pale minute or absent. Lodicules 2, minute, glabrous. Stamens 3. Stigmas exerted laterally at or above the middle or near the tips. Grain oblong, obtuse, dorsally compressed; embryo rather more than half the length of the grain. Pedicelled spikelet awnless. Lower involucral glume oblong, many nerved, upper flat with sharply inflexed margins closing over the hyaline lower floral glume if present and the stamens, upper floral glume usually 0, never awned.

Species 10 in the tropical and warm-temperate regions of the Old World.

So far 4 species were known from the Presidency and described by Cooke under *Andropogon armatus*, Hook. f., *A. Cookei*, Stapf, *A. caricosus*, Linn. and *A. annulatus*, Forsk. To these we have added 2 new species: *Dichanthium panchganiense*, Blatter & McCann, and *D. McCannii*, Blatter.

**Key to the species**

A. Racemes digitate (sometimes solitary in *D. caricosus*), 25 mm. long or longer

1. Lower involucral glumes of pedicelled spikelets armed with marginal bulbous-based bristles
   1. Lower involucral glume of pedicelled spikelet always pitted ...
   2. Lower involucral glume of pedicelled spikelet not pitted
      (a) Ligule absent ...
      (b) Ligule present ...

2. *D. panchganiense*.
3. *D. armatum*.
4. *D. McCannii*.
II. Lower involucral glumes of pedicelled spikelets not armed with marginal bristles

1. Nodes of stem glabrous; ligule a short, ciliate membrane ... 4. *D. caricosum*.
2. Nodes of stem bearded; ligule large, membranous ... 5. *D. annulatum*

B. Racemes solitary, less than 25 mm. long ... 6. *D. serratuloides*.


*Locality*: Deccan: Panchgani (McCann !)

*Distribution*: W. Peninsula, apparently endemic.


*Description*: Cke. i. c.

*Locality*: Konkan: Stocks (test Hook. f.).—Deccan: Kalsabai Hills, Nasik District (Patwardhan 1183 !); Gira Hill, Khandala (McCann 9430 ! 9431 !); Lohagad (McCann 3871 !); Panchgani (Blatter and Hallberg B1212 !); Pasarni Ghat (Blatter and Hallberg B1304 !).

*Distribution*: W. Peninsula, apparently endemic.


*Locality*: Deccan: Panchgani (McCann !).

*Distribution*: W. Peninsula, apparently endemic.


Three authors have made the new combination *Dichanthium caricosum*:

(a) *A. Camus*: l. c. (b). Stapf in Ridley Pl. Malay Penins. v (1925), 210. (c) Haines in Bot. Bihar and Orissa (1924), 1039. *A. Camus* has therefore to be adopted as authority for *D. caricosum*.

We are not trying to describe varieties or forms of this very variable species.

*Vern. Names*: Marvel (Mar.), Zinzvo (Guj.).

*Description*: Cke. 1. c.

This species can, according to Burns and others ¹ be distinguished from *D. annulatum*, Stapf by the following characters:—

<table>
<thead>
<tr>
<th>Character</th>
<th><em>Dichanthium caricosum</em></th>
<th><em>Dichanthium annulatum</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Habit</td>
<td>Big and tufted with terminal and axillary in-forescences</td>
<td>Medium size with terminal in-forescences</td>
</tr>
<tr>
<td>Nodal hairs on stem</td>
<td>Short.</td>
<td>Long.</td>
</tr>
<tr>
<td>Colour of in-forescence</td>
<td>Light purplish-green.</td>
<td>Purple.</td>
</tr>
<tr>
<td>Hairs of in-forescence</td>
<td>Short.</td>
<td>Long.</td>
</tr>
</tbody>
</table>

Haines l. c. believes there is no single character by which *D. caricosum* can be distinguished from *D. annulatum*. 'I have,' he says, 'tested all those given in the F. B. i. and found them fail on specimens named by Sir J. D. Hooker himself; the key characters in Bengal plants are also unworkable as applied to the same specimens, many of which have bearded nodes, and the character of spiral or subdistichous spikelets is difficult to apply. Linnæus described *Andropogon caricosus* as with solitary spikes, and Wildenough (sic!) adds 'leaves with sparse hairs and sheaths hirsute at the base' (probably he refers to the nodes).'

In his key-characters Haines says that in *D. caricosum* the callus is glabrous. This seems to be a mistake. Hackel calls the callus *Brevissime barbatus*, Cooke has 'bearded,' Rangachari describes it as 'short and short hairy below.' We have always found it bearded.

N. slope of Chausali (McCann 99681).—Konkan: Parsik, railway tract (McCann 96331).—Deccan: Junnar (Mamladar of Junnar!); Shevygaon (Mamladar of Shevygaon!); Lohagad, half-way up (McCann 96271!); Agricultural College Farm, Poona (Herb. Econ. Bot. Poona!); Khed (Mamladar of Khed!); Purandhar (McCann 55701!); Bairawady, Purandhar (McCann 50751!); Panchgani (Blatter 3803!, Blatter and Hallberg B12231!); between Mahabaleshwar and Panchgani, elevation 4,000 ft. (Sedgwick and Bell 4743!);.—S. M. Country: Dharwar, elevation 2,400 ft., rainfall 34" (Sedgwick 18281!).—Kanara: Halyal (Talbot 2427!).

**Distribution**: India, Burma, Ceylon, Mauritius, China.

**Uses**: A good fodder grass.


**Vern. Names**: Kizcho, handi daroya, daroya (Surat), dhowrow (Broach), zinsema (Charodi), jinjva (Panch-Mahals), marvel (Poona), sheda, sam-payen palvan-hullu, marwalyan-hullu (Dharwar).

**Description**: Cke. i. c.

**Locality**: Sind: Jamesabad (Sabnis B972'); Mirpurkhas (Sabnis B1028!, B1185!); Hyderabad (Sabnis B51'); Pad-Irana (Sabnis B515'); Larkana (Sabnis B462'); Nasarpur (Sabnis B1140!); Tatta, Kullan Kote Lake (Blatter and McCann 18571!); Tatta, tombs (Blatter and McCann 6681!).—Gujarat: Kabirwad (Chhiber!); Nadiad Farm (Herb. Econ. Bot. Poona!).—Khandesh: Amboli, Bori River (Blatter and Hallberg 5148!); Dadganna (McCann 96651!); Toranml (McCann 9670!); Bor, Bori River (Blatter and Hallberg 4428!); Umalla, Tapti Bank (Blatter and Hallberg 5228!).—Konkan: Sion (McCann 3672!); Sewri (McCann 3587!); Parsik, railway line (McCann 96541!); Campoli (McCann 5359!).—Deccan: Kirkee to Poona, railway line (Garade 83!); College Garden, Poona (Garade!); Chattarshinji Hill, Poona (Ezekiel); Trimbak (Chhiber!); Khandala, very common (McCann 5297!); Mannmad Blatter 99/0!); Purandhar, north foot (McCann 9421!).—S. M. Country: Devikop, elevation 1,800 ft., rainfall 40" (Sedgwick 3984!).—Kanara: Halyal (Talbot 2081!); Kulgi (Talbot 2299!).

**Distribution**: Tropical Africa (Nileland, Mozambique District), from Morocco through North Africa, the Orient and India to China and Australia, Pacific Islands.

**Uses**: Considered good fodder.


The systematic position of this species is somewhat doubtful. Cooke already found that it does not agree with Hackel's subgenus *Dichanthium*, but he adds: "It is the only subgenus into which it will fit at all." Cooke and Stapf, when describing the same species under a different name, remark: 'Ob spiculis secundariis intimis saepissime neutras calerum eadem forma ac fertiles si vis ad Dichanthium referendus, sed nulli species arce affinis spiculis maurusculis in racemos spiculis Serrafalci haud dissimiles congestis insignis.' Following this suggestion we have put it under *Dichanthium*.

**Description**: Cke. ii, 986.

**Locality**: Deccan: Lonavla (Bhide!); Khandala, Echo Point (McCann 9403!); Kalanbai Hills (Patwardhan!); Sakar-Pathar near Lonavla (Woodrow!); Mahabaleshwar (McCann!); Panchgani (McCann!, Blatter and Hallberg B1250!).

**Distribution**: W. Peninsula, apparently endemic.


Perennial or annual grasses. Stems slender, simple below, more or less branched above, the branches often gathered in fastigate bundles, each supported by a bladeless sheath and terminated by a solitary raceme. Spikelets small, 2-nate, one sessile, the other pedicelled, similar in shape, different in sex, on the fragile rhachis of many-jointed solitary spathate racemes which are

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frequently gathered in fastigiate bundles, rarely the lowermost 1-3 pairs homogamous; joints and pedicels filiform, compressed, solid or slightly grooved, disarticulating horizontally; spikelets deciduous, the sessile with the adjacent joint and pedicels. Sessile spikelet dorsally compressed, awned; callus small, shortly bearded. Involucral glumes equal, thinly chartaceous to membranous, lower 2-keeled, with narrow inflexed margins, upper boat-shaped, 3-nerved, acutely keeled. Lower floral glume hyaline, nerveless, upper reduced to a hyaline upwards firmer linear stipe passing into a slender awn. Stamens 3. Stigmas exserted laterally near the middle of the spikelet, longer than the styles. Pedicelled spikelets awnless; somewhat similar to the sessile.

Species about 5, in the tropical and warm-temperate parts of the Old World.

Cooke knew one species from the Presidency which he described under the name of *Andropogon foveolatus*, Del. We add *Eremopogon Paranipyeunum*, Blatter and McCann.

1. Lower involucral glume of sessile spikelet 4-nerved ...
2. Lower involucral glume of sessile spikelet faintly 5-7-nerved ...


Description: Cke. I. c.

Locality: Sind: Sehwan to Laki, foot of hills (Sabin B 651).—Gujarat: Road to Lasandra (Chibber !); Bhuj Hill, Cutch (Blatter 3765 !) —Khandesh: Umalla, Tapti Bank (Blatter and Hallberg 5222 !); Bhusawal (McCann 4243!); Bor, Bori River (Blatter and Hallberg 4309!); Naradana (Blatter and Hallberg 5180 !).—Kokkan: Parel, poor specimen (McCann 5373 !).—Deccan: Panchgani, roadside, elevation 4,000 ft., rainfall 60 " (Sedgwick and Bell 4735 !); Yeola (Herb. econ. Bot. Poona !); Arangaon, Ahmednagar (Ryan !); Chattarshini Hill (Ezekiel !); Deolali (Blatter 4550 !); Manmad (Blatter A 261 !); Panchgani (Blatter and Hallberg B1245!).—S. M. Country: Dharwar, elevation 2,400 ft., rainfall 34 " (Sedgwick 1825 !); Haveri (Talbot 2220 !).

Distribution: Tropical Africa (Upper Guinea, Nieland), Canaries, from Egypt and Tropical Arabia to the drier parts of India.


Description: A delicate-looking grass. Stems slender, erect, 30-45 cm. high; upper nodes pubescent; leaves 2-5-7-5 cm. by 2 mm., subcordate at base, long-hairy on both sides, the margins thickened and minutely irregularly repand and spinulose serrulate; sheaths glabrous; ligule a short erose membrane. Racemes solitary, 12-25 mm. long (without the awns), on a very slender peduncle. Sessile spikelets 3 mm. long. Lower involucral glume oblong, obtuse, faintly 5-7-nerved, glabrous, margins narrowly incurved, keels shortly ciliate at the apex, upper just a little longer than the lower, 3-nerved, oblong, apiculate. Lower floral glume shorter than the involucral glumes, hyaline and with ciliate margins, epaleate, upper floral glume consisting of the narrow base of the awn, just a little more than half as long as the lower involucral glume, obscurely margined and 1-nerved with 2 obscure narrow lobes at the apex, and an interposed twisted, scabrid awn about 4 cm. long, bearing a bisexual flower. Pedicelled spikelets about 4 mm. long. Lower involucral glume oblong, obtuse, 7-9-nerved, margins incurved and broadly winged at the keels, wings shortly ciliate towards the apex, upper involucral glume a little shorter than the lower, oblong, acute, 3-nerved, margins ciliate. Lower floral glume shorter than the upper involucral, hyaline, ciliate, faintly 3-5-nerved, epaleate, male. Joints and pedicels compressed, obliquely truncate, ½ as long as the sessile spikelets and ciliate with short white hairs on both sides.

Locality: S. M. Country: Castle Rock (Bhide !).

Distribution: So far endemic.

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Annual or perennial grasses, rarely suffrutescent, never very tall. Stems slender. Leaf-blades folded in bud, usually narrow. False panicles varying from very loose and scanty to densely fascicled; spathes mostly very narrow, scarios, membranous or lower down herbaceous. Spikelets 2-nate, of each pair differing in sex and mostly also more or less in shape and in size one sessile the other pedicelled, on the articulate fragile rachis of many-pointed solitary racemes terminating the culms and their branches, supported by spathes and often collected into a false panicle, the sessile spikelets falling with the contiguos joint and the accompanying pedicelled spikelets; joints and pedicels thickened upwards, often rather stout with a scarios cupuliform and more or less dentate terminal appendage. Sessile spikelets dorsally compressed or sometimes in their lower half almost terete, awned; callus short with a short beard at the very base. Involucral glumes equal or subequal, lower chartaceous to subcoriaceous, more or less convex or flat on the back with at least from the middle upwards, sharply inflexed and mostly narrow margins, 2-keeled, the keels running out into teeth or mucros, upper thinner to membranous, narrowly boat-shaped to dorsally flattened, keeled (at least upwards), 1-3 nerved, the delicate margins ciliolate. Floral glumes, ciliolate, hyaline, lower membranous downwards and often purplish. 2-nerved, upper usually 2-fid or 2-denate, rarely entire, awned, awn from the sinus or continuing the entire valve, Pale 0 or a microscopic hyaline scale. Lodicules 2, minute, glabrous. Stamens 3, rarely 2. Stigmas laterally exerted low down; style terminal. Grain narrowly linear in outline or tapering upwards, subterete; embryo short. Pedicelled spikelet in line to the sessile, but usually relatively broader and flatter, or more or less reduced and then sometimes quite small. Involucral glumes, or more or less membranous, the lower aristulate or muticous. - Floral glumes, if present hyaline, ciliate, muticous.

Species about 50, in the tropics of both hemispheres.


Description: Annual. Stems weak, up to 60 cm. [long, usually ascending from a decumbent base, rarely erect many-noded, branched] rom most of the nodes: branches often 2-4-nate and dividing again, very slender to filiform, geniculate, glabrous, the lower internodes usually much compressed. Leaf-blades linear, constricted at the junction with the sheath, the lower and those of the primary branches obtuse or sub-obtuse or suddenly narrowed to a sharp point, 25-38 mm. long and 2-6 mm. wide, the upper and those of the secondary and tertiary branches much narrower and more acute, often glaucescant, smooth except along the margins and the lower side of the midrib, nerves very fine. Ligules membranous, very short, ciliolate. Sheaths compressed, the lower keeled, somewhat lax, glabrous, smooth, the uppermost spathe-like, leaves like the spathe of the inflorescence ultimately turning reddish. Spathes on subcapillary curved or flexuous branchlets, very narrow, acute, reaching to the base of the racemes or slightly exceeding them; racemes borne on filiform upwards clavate peduncles, slender from less than 12 mm. to slightly over 25 mm. long. 5-11-jointed; joints 2-2-7 mm. long, widening upwards from a slender base, tips 2-dentate glabrous, smooth pedicels as long as the joints, very slender and only slightly thickened upwards. Sessile spikelets linear-lanceolate, acuminate, more or less convex on the back, pale green, about 3-3 mm. long including the minute callus, which is more or less shortly bearded, at least on the sides. Involucral glumes lower than densely chartaceous, 2-dentate, scaberulous among the keels, with very fine intracinal nerves, smooth or very minutely scaberulous on the back; upper boat-shaped, acute 1-nerved, ciliolate. Lower floral glume elliptic, obtuse, hyaline, nevellus, ciliolate, upper 2-fid almost to the base, 1·6 mm. long, segments linear-oblong, sub-

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obtuse, sparingly ciliate, awn 8-5-12.7 mm. long. Anthers 0.5 mm. long, deep red or purple. Grain sublinear, tapering upwards. Pedicelled spikelet reduced to a minute glume, often passing indistinctly into the pedicel and produced into a bristle-like awn, about 4.2 mm. long.

*Locality*: S. M. *Country*: Badami (Talbot 2930!)

*Distribution*: Widely distributed throughout the tropics.


After the restoration of Hackel’s subgenera to the rank of genera, the general characters of *Andropogon* itself must be modified in many ways:

Mostly perennial grasses of various habit. Spikelets 2-nate, the sessile and pedicelled differing from one another in sex and more or less heteromorphous, all pairs similar, or if the lowest sessile spikelet male or imperfect then resembling the others. Spikelets (spiciform racemes) many-jointed, fragile, paired (very rarely solitary) or corymbose (digitate or subdigitate) on terminal peduncles, embraced below by a spathic-like leaf (spatheole), frequently 2 or more pairs with their spathes subtended by a common spathe and so on to more composite branching, the whole forming a false raceme; the sessile spikelets falling with the contiguous joint and the accompanying pedicel; joints and pedicels filiform or thickened upwards and then the tips frequently more or less cupular or auricled. Sessile spikelets dorsally or laterally compressed, nearly always awned; callus short, mostly quite obtuse, shortly bearded. Involucral glumes equal or subequal, subcoriaceous to membranous, lower flat or concave or channelled on the back with at least from the middle upwards sharply inflexed margins, 2-keeled; upper more or less boat-shaped, keeled upwards, 3-1-nerved, sometimes aristulate. Floral glumes ciliate or ciliate, rarely glabrous, lower hyaline, 2-nerved, upper 2-fiid or 2-dentate, hyaline or firmer and sometimes subapitiform below the insertion of the awn. Pale a hyaline nerveless scale or 0. Lodicules 2, minute, glabrous. Stamens 3. Stigmas laterally exerted; styles terminal. Grain narrowly lanceolate to oblong in outline, subterete to planoconvex; embryo about half the length of the grain. Pedicelled spikelets often very different from the sessile in shape and less so in size, always more or less compressed dorsally, never concave or channelled on the back, sometimes reduced and then often small or quite suppressed. Involucral glumes herbaceous-chartaceous to membranous, the lower muticous or very rarely aristulate. Floral glumes, if present, hyaline, ciliate, muticos.

Species about 100, mostly in the tropics of both hemispheres.


*Vern. Names*: Zinzvo (Surat), baerk, gondwal, lalgavat, tambrut, gondal, chiman chara, malakaya.

*Description*: Cke. l.c.

*Locality*: Gujarat: Nadiad farm (Herb. Econ. Bot. Poona!); Surat (Dalzell).—Khandesh: Bhusawal (McCann 5451!); Bor, Bori River (Blatter and Hallberg 5116!); to Nickenig (Blatter and Hallberg 5207!).—Deccan: Pashan (Gammie!); Bairawadi, Purandhar (McCann 5054!); Mannad (Blatter A262!); Shinda (Sabnis A260!); Panchgani (Blatter and Hallberg B1268!; B1274!; B1326!).—S. M. *Country*: Haveri (Talbot 2230!); Dumbal (Talbot 2318!); Harsol (Sedgwick 1083!).—Kanara: Karwar (Lisboa).

*Distribution*: Nepal, Bihar, Rajputana, Central Prov., W. Peninsula.


Perennial, densely tufted and usually aromatic grasses. Leaves often very coarse. Panicles frequently much compound and contracted, spathate. Spikelets 2-nate, those of each pair differing in sex and more or less in shape—except those of lowest pair of the lower or of both racemes which are homogamous (male or neuter)—one sessile, the other pedicelled on the articulate fragile rhachis of many-jointed paired racemes, terminating the culms and their branches; raceme-pairs supported by a spatheole, collected into often decompound or supra-decompound spathate panicle; the fertile spikelets falling with the contiguous joint and the accompanying pedicel; joints and pedicels filiform
or linear with frequently more or less cupular or auricled tips, those of the lowest pair (raceme-base) often conspicuously swollen, oblong or barrel-shaped and hard. Sessile spikelets (above the lowest) female or hermaphro- dite, dorsally, rarely, laterally, compressed, awned (normally); callus very short, obtuse, shortly bearded. Involucral glumes equal or subequal, more or less chartaceous, lower almost flat or slightly depressed or narrowly grooved on the back, with at least from the middle upwards sharply inflexed margins, 2keeled, upper more or less boat-shaped, keeled upwards, usually 1-nerved. Floral glumes ciliate or ciliolate (sometimes obscurely), lower entire, hyaline, 2-nerved, upper 2-fld or 2-lobed, hyaline, rarely firmer and almost stipe-like below the insertion of the awn; column of awn, if any, smooth. Pale 0. Lodicules 2, minute, glabrous. Stamens 3. Stigmas laterally exerted; styles terminal. Grain oblong in outline, suberet to plano-convex in cross-section; embryo about half the length of the grain. Pedicelled spikelets usually slightly different in shape and size from the sessile, but never depressed or grooved on the back. Involucral glumes muticous, lower chartaceous to sub-chartaceous upper thinner. Lower floral glume hyaline, 2-nerved, upper 0, but usually a male flower present.

Species about 36, in the tropical, more rarely in the subtropical regions of the Old World.

Cooke mentions one indigenous (Andropogon Jwarancus, Jones) and one cultivated species (Andropogon Schænanthus, Linn.) belonging to this genus. We add two indigenous species and a cultivated one:

**Key, mainly after Stapf:**

A. Blades long, hard, rough-edged throughout, filiform to linear; lower involucral glume of sessile spikelet flat or concave between the keels

I. Raceme-joints villous all over, hairs long, more or less concealing the sessile spikelets; awn usually a straight, very short bristle

1. Basal leaf-sheaths in dense tufts, tightly clasping, thickened below; blades more or less filiform and flexuous, except when very short; raceme-fascicles more or less simple

2. Basal leaf-sheaths ultimately loosened and curled; blades flat; raceme-fascicles compound

II. Raceme-joints bearded along the sides, but hairs not concealing the sessile spikelets; fertile spikelets awnless

B. Blades flat, 5-30 mm. wide, rounded to subcordate and stem-clasping at the base, of a soft texture, with smooth edges, at least in the lower part; lower involucral glume of sessile spikelet with a narrow groove from the middle downwards corresponding to a keel inside

I. Blades 10-30 mm. wide (rarely under 10 mm.), somewhat fat, rich green, at least above; panicles 10-30 cm. long, turning reddish when mature

4. C. Martini.

II. Blades 2-6 mm. wide, thin, glaucous; panicles 10-20 cm. long, glaucous or straw-colour when mature

5. C. cesius.


For a discussion of the foundation of this species see Stapf in Kew Bull. (1906), 303-305.

Description: Perennial, compactly cespitose, with numerous intravaginal innovations, 15-45 cm. high. Culms erect, slender, few—to 4-noded and simple below the inflorescence, terete, glabrous, very rarely with a few small hairs at the nodes. Leaf-blades semiterete, filiform, wiry, flexuous, very firm and often cincinate upwards, rounded on the back, channelled on the face, or those of the culms somewhat flatter and shorter, up to more than 23 cm. long, 1 mm. in diameter, glabrous, finely scaberulous on the nerves below, though often smooth to the touch, pale, glaucous, evenly 7-9-nerved, the midrib showing only above as a broad, white band. Ligules membranous to scarious, oblong, truncate, ciliate, up to 3-3 mm. long. Sheaths very firm, smooth, glabrous, tight, those of the innovations and base of the culms widened at the base, very tough and long Persistent, straw-coloured, up to 13 cm. long. Spathate panicle narrow, 8-30 cm. long, few—to 7-noded lower internodes 5-7.5 cm. long, upper rapidly decreasing in length, slender, glabrous; lowest primary branch rarely undivided at the base, 3-2-noded and up to 15 cm. long, usually forming up to 4-rayed tiers; lowest subending sheaths with foliaceous blades; rays finely filiform, 2-5-3-7 cm. long, rarely to over 5 cm., glabrous; spathes narrowly lanceolate, subherbaceous, often tinged with pale purple, with a short blade or the upper bladeless and produced into a setaceous point, 3-7-4*3 cm. long, glabrous. Spatholoes very narrow, acute or with a setaceous point, 12-25 mm. long, pale or straw-coloured; peduncles finely filiform, widened upwards 3-3-4*2 mm. long, tips truncate. Racemes 2-nate, more or less divaricate, at length epinastically deflexed, 1-2 mm. long, white-villos, pale or tinged with purple, one subsessile, the other with a bare base, 1-2 mm. long, bases puberulous to pubescent in the fork, ciliate-bearded upwards, with minutely cupular and denticulate tips, that of the subsessile raceme as well as the adjacent pedicel stout, elliptic to elliptic-oblong in outline and convex on the back, ultimately more or less glabrescent and glossy; fertile joints filiform, slightly widened towards the oblique subcupular auricled tips, 2'-7-3.3 mm. long, densely hairy to villous from the back and the angles; adjacent pedicels similar to the joints but more slender. Homogamous pair of spikelets one at the base of the sessile or of both racemes; the sessile spikelet of the lowest but one of the sessile raceme intermediate and imperfectly awned. Fertile spikelets linear-lanceolate, more or less acuminate, acute, including the callus 5'-3'-6.3 or even 7-4 mm. long, glabrous, pale green below, reddish upwards; callus short obtuse, slightly bearded. Involucral glumes equal, chartaceous, lower nerveless and shallowly concave between the acute scaberulous keels, minutely 2-denticulate, upper lanceolate-oblong in profile, acute, slightly curved on the back, 1-nerved, margins broadly hyaline upwards, ciliate. Lower floral glume linear-oblong, nerveless, hyaline, ciliolate, slightly shorter than the involucral glumes, upper very narrow, shortly 2-fid, cuneate-linear and chartaceous below the insertion of the awn, less than 3*3 mm. long, lobes broadly lanceolate, ciliate, awn up to 1 cm. long, very fine, more or less keeled at and slightly twisted below the middle; column smooth. Anthers 2 mm. long. Pedicelled spikelets male, linear-oblong, 4*-2*-6.3 mm. long, glabrous, more reddish than the sessile; involucral glumes subchartaceous, with 5-9 evenly distant intracarinal nerves, the upper thinner, 3-nerved; lower floral glume linear-oblong, sub-2-nerved, ciliolate, 4*2 mm. long; upper floret reduced to a male flower, or its glume present as a microscopic scale.

Locality: Sind: (Stocks 816, Woodrow); Jemadar ka Landa near Karachi (Stocks).

Distribution: From Morocco through N. Africa, Arabia, Persia, Afghan-
istan, Baluchistan, Punjab, Sind.


Vern. Names: Jwarankusa (i.e. fever-restrainer) (Sansk.), khavi (Hindust.).

Description: Usually a tall grass, up to 1'8 m. high, with very aromatic roots, densely tufted, the stems from clusters of firm, persistent, finally loose and open and tortuous leaf-sheaths, more or less widened below. Leaves flat, up to 60 cm. long and 5 mm. broad, narrowly linear, filiform above and ending in a long capillar tip, ligule 0'5 mm. long, membranous. Panicles long, narrow interrupty, with very compressed, short, fascicled branches bearing spathes about 5 cm. long and spatholes 6-18 mm. long. Racemes 1'4-1'8 cm. long, often 5 joined, joints half as long as the uppermost villi. Spikelets 3-4 pairs, green, half hidden by the 5 mm. long villi, on the joints and pedicels. Sessile spikelets 5 mm. long; lower involucral glume flat or concave between the keels, which are neither winged nor margined (omitting of course, the ordinary inflexed margins of the glume common to the genus) or sometimes narrowly margined, scabrid or ciliolate, nerves 2-4 or 0 between the keels. Joints of rhachis and pedicels subclavate, with toothed tips. Pedicelled spikelets equal or rather longer than the sessile, narrowly lanceolate, purplish; lower involucral glume 7-9 nerves.

Note.—This species is nearly related to C. Schoenanthus and the two, as pointed out by Hackel (1. c. p. 600), are not always distinguishable with certainty. ‘At high altitudes,’ says Stapf (1. c. 314), ‘as in Kumaon and Spiti, or in the dryer parts of the Punjab, it (C. Jwarancusa) becomes dwarfed and narrow-leaved and forms a “transition state” to C. Schoenanthus. The latter is a characteristic desert plant, able to exist with a minimum supply of water. On the other hand, C. Jwarancusa is dependent on an, at least temporarily, abundant supply of water, and prefers the neighbourhood of rivers, or actually grows in the beds of torrents. It is not impossible, that the distinguishing characters of C. Jwarancusa as compared with C. Schoenanthus, that is the robust state, the long, flat and relatively broad leaves, and the more composite panicles, are mainly due to eolaphic conditions.’

Locality: Sind: Karachi (Dalzell and Gibson); Bholari (Bhid); Shikarpur (Bhide!); Umerkot, sandy plains (Sabnis B1082!); Gharo (Blatter and McCann D669! D670!); Gholamalla (Blatter and McCann D671!).—Gujarat: Ahmedabad (Dalzell and Gibson).

Distribution: Outer hillzone of the United Provinces, Kumaon, Garhwal (up to 3000 m. or over) and westwards as far as Peshawar, Jodhpur and Jaisalmer States, Sind, Bihar.

Uses: Stapf is of opinion that this grass is very probably used along with C. Schoenanthus. See also Stapf (1. c. 313-314).


For the taxonomic position of this species see Stapf in Kew Bull. (1906), 330-333.

Vern. Names: Oleu cha, hirva cha (Mar.), lili cha (Guj.), vasane-hullu, kavance hullu, majjige hullu (Canarese).

Description: A tall perennial, throwing up dense fascicles of leaves from a short, oblique annulate, sparingly branched rhizome, usually barren, but occasionally giving rise to a stout erect culm up to over 1'8 m. high, 7-8-noded and simple below the panicle. Leaf-blades linear, long-attenuated towards the base and tapering upwards to a long setaceous point, up to over 90 cm. long by 16-18 mm. wide, very firm, glaucous-green, glabrous, smooth or more or less rough upwards and along the margins; midrib somewhat stout below, whitish on the upper side; primary lateral nerves 4-6 on each side, raised particularly near the joints; secondaries and the veins between these and the short, various, rounded or truncate. Sheaths terete, those of the barren shoots much widened at the base, and tightly clasping each other, narrow and separating upwards, with rounded shoulders at the mouth, 10-30 cm. long,
subcoriaceous, quite glabrous and smooth, more or less cinnamon-coloured or russet on the inside; sheath of the culms tight, shorter than the internodes, finely pubescent or velvety at the nodes. Spatheate panicle decomposed to subdodecamous, loose, 30 to over 60 cm. long, nodding; internodes 4 to over 6, the longest up to 20 or 22 cm. long, rapidly, decreasing in length upwards; lowest primary branches undivided at the base, up to over 45 cm. long, and up to 5- or 6-noded, the following forming mixed tiers of very unequal variously compound and simple rays, ultimate tiers up to 4-rayed; rays filiform and glabrous; spathes narrow-lanceolate, acute or acuminate, 2-5-5 cm. long with narrow membranous margins. Spatholes very narrow, linear-lanceolate to almost subulate when inrolled, 14-18 mm. long, acute or finely acuminate, reddish to rich russet. Peduncles 6-10 mm. long, glabrous. Racemes 2-nate, finally spreading at right angles or epinastically deflexed, moderately dense, 14-25 mm. long, pale, variously tinged with dull purple, loosely villous, one subsessile, the other with a slender filiform bare base, almost 2 mm. long and hairy, the pedicel of the homogamous pair also slender, though short; fertile joints filiform, slender, 2-3 mm. long, ciliate on both sides, tips obliquely auriculate and cupular, adjacent pedicels very similar. Homogamous pair of spikelets 1 at the base of the sessile raceme, its sessile member usually slightly differing in shape from the fertile spikelets. Fertile spikelets linear to linear-lanceolate, acutely acuminate, 5-6 mm. long; reddish, glabrous; callus short, obtuse, minutely bearded. Involucral glumes subequal, lower subchartaceous, slightly depressed towards the base, otherwise flat on the back, keels acute, scaberulous above, intracalarial nerves 0 or 1, short or indistinct, upper boat-shaped, slightly curved on the back, acute, keeled upwards. Lower floral glume hyaline, linear-oblong or almost linear, sub-2-nerved, ciliolate above, slightly shorter than the involucral glumes, upper narrowly linear, acute, about 4 mm. long, usually entire and awnless, rarely more or less 2-fid with a small bristle from the sinus. Anthers 2 mm. long. Pedicelled spikelets male or neuter, linear to subulate-lanceolate, as long as the sessile, reddish, glabrous; lower involucral glume 5-9-nerved, upper 3-nerved; lower floral glume shorter to much shorter than the involucral glumes, hyaline, ciliolate, upper very narrowly linear, nervesless if present at all.

Locality: Gardens in Bombay.
Distribution: This grass is only known in the cultivated state. Probably of Indian origin, and now widely distributed over the tropics of both hemispheres.
See Stapf in Kew Bull. (1906), 334.

History and uses of the Lemon-grass: Stapf 1.c. 322-330. 334, 358.


Vern. Names: Geranium grass, Rusa grass; rohisha, rosem (Sansk.) ; rusa, gandh-bel, mirchia gandh, tikhari (Hindust.) ; rohish, roshegavat (Mar.) ; rhonde, rauns (Guj.) ; eunthi hullu, khasi hullu (Kanar.).

Description: A tall, perennial sweet-scented grass, 1·5-2·4 m. high. Stems glabrous, straw-coloured, leafy. Leaves flat, usually broad, rounded or subcordate at the base, more or less glabrous beneath, those below the inflorescence rarely under 23 cm. long by 1 cm. wide at the base, but often 2·5 cm. wide below, tapering from a little above the base or from the middle to a firm tip, glabrous except for the scabrid margins, margin sometimes smooth near the base. Spikes 2-nate, 12-18 mm. long, oblique or divaricate or less often deflexed. Peduncle about half the length of the 18-25 mm. long spatheole, several spatheoles and their peduncles from a spathe of lower order, these arranged in long usually narrowly oblong panicles not more than 3·5-5 cm. wide, but sometimes panicle with many branches and broader. Joints and pedicels slenderly clavate (excluding the much thickened lowest), about half as
long as the sessile spikelets, tips with a lanceolate tooth or 3-toothed, margins long-villosous, 3'5-5 mm. long. Lower involucral glume (above the lowest spikelet) with lanceolate centre becoming ob lanceolate or oblong from the keels being membranously winged above the middle, back with a vertical median depression below the middle corresponding to a ridge inside; upper cymbiform with the dorsal keel winged above, minutely ciliate below.

**Locality:** Gujaral: Champanir (Chhibber!); Ahmedabad, dry hills (Sedgwick 310!); Junagad, Kathiawar (Blatter 3783!); Bhu-Jkhodir-Maha, Cutch (Blatter 3649!); Anjar, Cutch (Blatter 3741!).—**Khandesh:** Road to Chinchpada (Chhibber!); Toranmal (McCann A235!).—**Konkan:** Wada Range (Ryan 488!); Gokhivra, Bassein (Ryan 41!).—Keltan (Ryan 392!); St. Xavier's College compound (McCann 4461!).—**Deccan:** Ganeshkhind Botanic Gardens (Garade 2435!); Purandhar (Bhide!).—**Kathiawar:** (McCann 5010); Kasara, Igatpuri Ghat (McCann 4343A!); Panchgani (Blatter and Hallberg 4432!); Purandhar (McCann 5010!); Kasara, Igatpuri Ghat (McCann 4343A!); Panchgani (Blatter and Hallberg B1248!, B1282!, B1297!, B1324!).—**M. Country:** Haveri (Talbot 2180!); Dharwar (Talbot 2616!); Badami (Talbot 2928!). [According to Malcolmson, 'the Rusa grass in the Deccan affords particularly the trap, more or less avoiding the granite, so much so that he was able to trace the green-stone dykes across the granite by the luxuriance of the grass' (ex Stapf).]

**Distribution:** From the Afghan frontier to the Rajmahal Hills in Bengal and from the subtropical zone of the Himalaya to about 12° N., excluding the desert region of the Punjab and the greater part of the northern Carnatic.

Stapf excludes also the outer slopes of the Western Ghats, but the localities given above show that the grass is well represented in that region. For the history and uses of the Rusa grass oil Oleum Palmarose seu Gerani Indici (Palmarosa oil) see Stapf in Kew Bull. (1906), 338-341, 360.


For foundation of this species see Stapf in Kew Bull. (1906), 344.

**Description:** A perennial, tufted grass, up to 1 m. high, with intra— and extravaginal innovation—shoots from a short rhizome. Culms erect or geniculate—ascending, slender, more or less wiry, frequently branched below, the branches often in fascicles from the knees, often many—noded, terete, glabrous, smooth. Leaf—blades linear from a scarcely narrowed rarely slightly rounded base, tapering to a long setaceous point, those of the culms up to over 1.5 (sometimes almost 30) cm. long, 2–6 (sometimes 10) mm. broad, of the innovations usually much shorter, flat, bluish—glaucescent, glabrous, smooth, midrib slender, primary lateral nerves very fine, 3–4 on each side. Ligules very short, rounded, scarious. Sheaths rather firm, tight, the lowest mostly short, those placed at branching nodes at length thrown aside, inrolling or deciduous, glabrous, smooth, usually much shorter than the internodes. Spathaceous panicle narrow, mostly 7–15 cm. long, rarely much longer, sometimes reduced and small, dense or interrupted; internodes usually 4–6, the lowest rarely exceeding a third of the panicle, the following gradually decreasing; lowest primary branch shortly exserted from its sheath, undivided at the base, or like the following forming mixed or (upwards) simple—rayed tiers; rays of ultimate tiers 5–3, finely filiform. 7–10 cm. long, glabrous; lowest subtending sheaths with foliaceous blades: spathes lanceolate, acuminate—2.5–4 cm. long, subherbaceous, glaucescent, sometimes turning reddish. Spathecoles narrowly lanceolate, acuminate, 14–16 mm. long, subherbaceous to scarious, turning dirty straw—colour or slightly reddish; peduncles filiform 5–6 mm. long, glabrous. Racemes 2–nate, obliqually erect. 12–14 mm. long, greenish, more or less white—villous, one sub sessile, the other with a bare base, over 2 mm. long, finely pubescent on the inner side, ciliate and thickened upwards, base of the sessile raceme swollen, hard, fused with the equally swollen and hard adjacent pedicele; fertile joints filiform, about 2 mm. long, glabrous on the back, densely ciliate on the sides, cilia snow—white, tips often cupular with a crenulate margin or auricle; adjacent pedicels very similar. Homogamous pair 1 at the base of
the sessile raceme. Fertile spikelets oblong, slightly wider above the middle, subobtuse, 4 mm. long, greenish, glabrous; callus very small, obtuse, minutely bearded. Involute glumes equal, subchartaceous, lower minutely truncate, flat on the back with a fine median groove in the lower half, keels narrowly winged from the middle upwards, intracarinal nerves 1 on each side towards the keels, very fine; upper narrow in profile, very acute, very narrowly winged above the middle with 1 delicate nerve on each side near the margin. Lower floral glume delicate, oblong, minutely truncate, ciliolate, nerveless, upper substipitiform, almost 3 mm. long, 2-fid to the middle, segments subulate, ciliolate, awn very fine, 10-14 mm. long, bent at and twisted below the middle. Anthers almost 2 mm. long. Pedicelled spikelets male, linear to lanceolate-oblong, subobtuse, 4 mm. long, green, glabrous; lower involucral glume slightly convex on the back, subherbaceous, about 10-nerved, the inner 6 nerves prominent, upper subhyaline, 3-nerved; floral glume oblong, truncate, sub-2-nerved, almost 4 mm. long.

Locality: Gujarat: On sandy and gravelly hills and banks, Ahmedabad and Prantij.

Distribution: Throughout the Carnatic, Gujarat, Arabia, Somaliland.

For history and uses see Stapf Kew Bull. (1906), 342-345, 361.

(To be continued)
REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY

BY
E. Blatter, S.J., Ph.D., F.L.S.

PART VI
GRAMINEÆ
BY
E. Blatter and C. McCann

(Continued from p. 435 of this Volume)


Perennial or annual grasses, with simple or more often upwards branched culms; branches few to many, mostly flowering and gathered into a spatheate panicle; racemes conspicuously dorsiventral, the bases of the male (or neuter) spikelets subimbricate on the back of the raceme, their upper parts bending forward around the sides, forming a hollow in which the fertile spikelets are enclosed, with their awns exserted antically and often intertwined. Spikelets 2-nate, those of the lower (1 to many) pairs alike in sex and shape, male or neuter, of the upper pairs differing in sex and shape, one of each pair sessile, the other pedicelled on the many-jointed rhachis of solitary racemes, terminating the culms and their upper branches; rhachis, tough or upwards tardily disarticulating and glabrous between the homogamous pairs, readily disarticulating above them; homogamous pairs long-persistent, the spikelets of the heterogamous pairs falling separately, the pedicelled with the pedicel, the sessile with the adjacent joint and the adjacent pedicel or its base. Sessile spikelets subcylindric, awned; calyx long, pungent, densely bearded upwards. Involute glumes equal, the lower coriaceous rarely chartaceous, more or less tightly involute, quite keelless, nerves obscure, often connected by few transverse nerves in the upper part; upper with a deep longitudinal groove on each side, coriaceous, rarely chartaceous, between them, thinner towards the margins, membranous at the tips, 3-nerved. Lower floral glume hyaline, nerveless, upper stipitiform from a hyaline very slender base, cartilaginous upwards and passing into a usually stout geniculate awn. Pale small or absent. Lodicles large or more or less reduced, to very minute. Stamens 3, often rudimentary or absent. Stigmas exserted terminally or laterally. Grain more or less linear in outline, subterete, slightly dorsally compressed; embryo somewhat exceeding the middle of the grain. Pedicelled spikelets male or neuter, dorsally flattened, usually slightly asymmetric, and often somewhat twisted, muticous, imbricate. Lower involucral glume herbaceous, many-nerved, winged upwards from one or both keels; upper membranous, lanceolate-oblong, acute, 3-nerved. Floral glumes hyaline, 1-nerved, well developed or more or less reduced. Stamens 3 or 0.

Species about 6, in the tropical and subtropical regions of the whole world.

Cke. describes four species under Andropogon, viz. A. polystachyum, Roxb., A. triticeus, R. Br., A. Ritchiei, Hook. f., and A. contortus, Linn. We transfer these to Heteropogon and add Heteropogon oliganthus, Blatter & McCann.

A. Not more than 30 cm. high
I. Upper involucral glume of pedicelled spikelet 1-3-nerved...
II. Upper involucral glume of pedicelled spikelet 5-nerved...

1. H. oliganthus.
2. H. polystachyum.

[1]
B. More than 40 cm. high
   I. Lower involucral glume dorsally deeply
grooved
   II. Lower involucral glume not dorsally
grooved
   1. Ligule of several narrow membranous
      segments
   2. Ligule truncate, ciliolate
      3. \( H. \) insignis.
      4. \( H. \) Ritchiei.
      5. \( H. \) confortius.

   \textit{Description}: A dwarf annual. Stems 7–15 cm. high, tufted, slender, sometimes creeping below, geniculate. Leaves 5–7.5 cm. long, quite flat, subnepaliform, acuminate, softly hairy, margins thickened, cartilaginous, sheaths compressed; ligule very short, membranous. Spikelets usually very shortly exserted from the long, narrow, glabrous spathes; peduncle curved, puberulous. Spikes 8–16 mm. long, with 3–6 pairs of glumes, lower spikelets neater. Joints and pedicels about half as long as the sessile spikelet, long-ciliolate. Sessile spikelet 5 mm. long, oblong; callus short, obtuse. Lower involucral glume obtuse, chartaceous, dorsally villous toward the base, not dorsally channelled, shining, faintly nerved, with narrowly involute margins, ciliolate towards the truncate tip, callus bearded, upper involucral glume obtuse, apiculate. Lower floral glume very short, broadly oblong, ciliate, upper with a shining awn 3–4 cm. long, column of own glabrous. Pale very small. Anthers 1 mm. long. Pedicelled spikelet, neater, larger than the sessile, ovate-oblong. Lower involucral glume herbaceous, obovate-oblong, truncate, distinctly 9–13-nerved, submarginate, keels scabrous, margins ciliolate, hardly incurved, upper shorter by \( \frac{1}{2} \), membranous, oblong, obtuse, 1.3-nerved, ciliate. Pale of upper floral glume very small.

Hackel, l.c., is of opinion that this species is intermediate between \textit{ Dichanthium} and \textit{Heteropogon}, but comes nearer the \textit{Heteropogons}, because the sessile spikelets differ from the pedicelled ones in shape, nervation and the dorsal furrow.

\textit{Locality}: \textit{Deccan}: Kalsubai (Patwardhan!); Mahabaleshwar, open edge above the precipices looking from Dhobi’s Waterfall path to Elphinstone Point, elevation 4,500 ft., rainfall 270 inches (Sedgwick \& Bell 4608!); Panchgani (Blatter \& Hallberg B1221!; McCann!).

\textit{Distribution}: Nilgiris.

   \textit{Description}: Cke. i.c.
   \textit{Locality}: \textit{Deccan}: Khandala (Woodrow); Mahabaleshwar, western side of hill (Dalzell \& Gibson). We have not seen this species.

\textit{Distribution}: Peninsular India.

   \textit{Description}: Cke. i.c.
   \textit{Locality}: \textit{Konkan}: Above Kenery Caves (McCann 9634!);—\textit{Deccan}: Around Vital Hills, Poona (Bhide 782!); Chattarshinji Hill, Poona (Ezekiel!); Khandala, very common on open hillside composed of rock fragments (McCann 9425!); Igatpuri (McCann 4335!); Mawal, Poona District (Woodrow).—\textit{S. M. Country}: Manoli (Talbot 3978!).—\textit{Kanara}: Anmod, bare hillsides, elevation 2,000 ft., rainfall 200 inches (Sedgwick 3324!).

\textit{Distribution}: India (Burma, C. Provinces, W. Peninsula), Ceylon, Malaya, Australia.

   \textit{Description}: Cke. l.c. [2]
Locality: Deccan: Katraj Ghat, eleven miles S.E. of Poona (Gammie 1037!); hills near Poona (Woodrow).—S. M. Country: Belgaum (Ritchie test Hook. f.)

Distribution: W. Peninsula, apparently endemic.


Vern. Names:—Sunkhal, Nani Sunkhal (Dohad); Survalu (Charodi); Kursali (Poona); Kusal, Sukhi kursali, Ganjali hulul (Belgaum) (ex Burns). Known to Anglo-Indians as Spear grass.

Description: Cke. l. c.

Locality: Gujarat: Sevalia (Chibber!); road to Lasandra (Chibber!); Sungiri (Gammie 15886!); Junagad Kathiwar (Blatter 3789!).—Khandesh: Bhusawal (Gammie!); Toranmal (McCann 9640!).—Konkan: Dahe forests (Ryan 717!); Osarvira forest, Mokhada range (Ryan 190!); Manbar hill (McCann 3620!); Mulgaum (McCann 4245!); Parsik, railway line (McCann 9655!) above Kenery Caves (McCann 9662!).—Deccan: Katraj Ghat, 11 miles S. E. of Poona (Shevade!); Trimbak (Chibber!); Khandala, very common all over the hills (McCann 9422!); Bairavadi, Purandhar (McCann 5059!); Rahuri (Nana A264!); Chattarshinji Hill, Poona (Ezekiel!); Mannmad, river bed (Blatter A269!); Igatpuri (McCann 4328!); Panchgani (Blatter & Hallberg B1246!, B1296!, B1308!).—S. M. Country: Dharwar, elevation 2,400 ft., rainfall 34 inches (Sedgwick 1820!); Castle Rock (Gammie 15686!); Badami (Talbot 2925!).—Kanara: Yellapole (Talbot 734!).

Distribution: Mediterranean region and tropics and subtropics generally.


Varieties: Hackel (l.c.) distinguishes two varieties and, excluding polystachyus, 5 subvarieties. His first variety genuinus is characterized by the male spikelets being more or less covered on the back or at least above or towards the margins with white, patent tubercale-based bristles. This character together with the degree of ramification of the culms forms the foundation of four subvarieties: typicus, Roxburghii, hispidissimus and secundus.

The second variety glaber has the male spikelets glabrous. Both varieties are represented in India, and all the subvarieties except secundus.

To Hooker f. (l. c.) these varieties and subvarieties appear 'to be too inconstant for definition', and, according to Stapf (l. c.) the inconstancy of those characters 'is so evident that it is not worth while to discriminate between the forms corresponding to them.' Haines, too, has abstained from distinguishing varieties and forms.

Burns and others in the paper quoted above (p. 40) wrote in 1925: 'In our observations at Kalas and elsewhere we noticed variability within the species, and early came to the conclusion that there must be definite varieties of Andropogon contortus. We can say with confidence that there are at least two varieties, differing markedly in size, habit, longevity, and in morphological characters. One is small and annual, the other large and perennial.' Since then Patwardhan and Hedge have published a paper1 in which they describe in detail the morphology, anatomy, physiology and ecology of the two varieties. As the authors themselves identify their perennial variety with Hackel's subvariety typicus, and their annual variety with Hackel's hispidissimus, we shall refer to them in the following under Hackel's names. The description is taken entirely from the paper just mentioned.

Key to the varieties.

I. Lower involucral glume of pedicelled spikelet sparsely hairy with long tubercle-based deciduous hairs on the back, in the upper part and towards the margins; lower part glabrous ...(a) var genuinus, subvar. typicus.

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2. Lower involucral glume of pedicelled spikelet densely hairy with tubercle-based persistent hairs all over the back; hairs in lower part shorter than in upper...

(a) var. genuinus, subv. typicus. Patwardhan and Hedge i.e.; Hack. in Monogr. Androp. 586 (sub Androp.).

Description: Perennial. Stems densely tufted, 45 cm. to 1.2 m., suberect or decumbent, about 3 mm. thick at the base and much flattened, glabrous, simple or subfastigially branched from the nodes of the upper half; internodes not much longer than the leaf-sheaths. Leaves crowded at the base; sheaths smooth, compressed, keeled, shortly auricled at the mouth; ligule short, truncate, ciliate; lamina 5-35 cm. long, acuminate or abruptly so, at first folded inward, afterwards flat, rigid, suberect, ciliate or sparingly hairy on the upper surface, with tubercle-based hairs towards the base, rough to the touch on both surfaces. In semi-dry or dry specimens the leaves may be vinaceous to deep vinaceous in colour. Spike solitary, terminal, 2.5-7.5 cm. long excluding the awn, with closely imbricating pairs of sessile and pedicilled spikelets. Spikelets subsecund, pedicelled ones all male or neuter; of the sessile spikelets the lower 2 to 8 male or neuter awnless, the upper awned, female; the lower awnless spikelets persistent, the upper awned ones deciduous. Sessile spikelet: Lower involucral glume narrow, linear-oblong, truncate or rounded, brownish, many-nerved, hispid with short sparse hairs, margin incurved, tip membranous; upper involucral glume linear, obtuse, coriaceous dark brown, hispidulous, 3-nerved, margins incurved. Lower floral glume oblong, hyaline, thin, nerveless, short, truncate, paleate; upper empty, reduced to an awn about 7-3 cm. long, column slightly hairy, callus long, pointed, with a tuft of reddish brown hairs. Ovary linear, stigmatic branches from 6-8 mm. long, with thick-set hairs, carmine in colour, fading towards the tips. Pedicelled spikelet: Lower involucral glume lanceolate, obliquely twisted, sparsely hairy with long, tubercle-based, deciduous hairs on the back in the upper part and towards the margins, lower part glabrous, margins unequally winged; upper involucral glume oblong-lanceolate, acuminate, 5-nerved, ciliate towards the tip, margins hyaline. Lower floral glume oblong-hyaline, 1-nerved, ciliate, epaleate, containing stamens; upper empty, obovate, lanceolate, hyaline, ciliate, nerveless. Stamens 3, filaments 3 mm. long; anthers oblong-lanceolate, cordate at base, pale yellow when young, light purplish vinaceous; pollen grains round, not sculptured, dull grey. The sessile male spikelets in the lower part are similar to the pedicelled spikelets above. Fruit 5-8 mm. long, thinly hispid, dark brown with 2 deep furrows on the ventral side, armed with a pointed callus below and a long lash-like awn above.

Location: Tevar (ex Burns and others).

Distribution: Tropics and subtropics generally, N. W. Himalaya, Afghanistan (ex Hackel).


Description: Annual. Stems little tufted, 15-60 cm. high, erect or slightly decumbent below, slender and slightly compressed near the base, glabrous, simple or subfastigially branched from the upper 2 or 3 nodes; internodes much longer than the leaf-sheaths. Leaves little crowded at the base; sheaths smooth, slightly keeled, shortly auricled at the mouth; ligule short, truncate and ciliate; lamina 2.5-20 cm. by 2.5-5 mm. wide, linear, acuminate or abruptly so, ciliate or hairy on the upper surface up to nearly half its length from the base with tubercle-based hairs, rough to the touch on both surfaces, in semi-dry or dry specimens straw to very light purple in colour. Spike solitary, terminal, 1-5 cm. long excluding the awns, with closely imbricating pairs of sessile (lower) and pedicelled spikelets. Spikelets subsecund, pedicelled, all male or neuter; of sessile the lower 2-5 male or neuter, awnless, upper 4-12 female, awned. Those which are male or neuter persistent, the upper 4-12 pairs which include both males and females deciduous. Sessile spikelet: Lower involucral glume narrow, linear-oblong, truncate or rounded, brownish,
many-nerved, densely hairy with whitish long hairs, margins incurved, tips membranous; upper involucral glume linear, obute, coriaceous, dark brown, hispid-hairy and uniform; ligule not incurved. Lower floral glume oblong, hyaline, thin, nerveless, short, truncate, epaleate, upper empty, reduced to an awn, 5-1 cm. long, column densely hairy with whitish hairs, callus long, pointed, bearded with light brown hairs. Ovary linear, stigmatic branches 4-5 mm. long with thinly set ox-blood red hairs. Pedicelled spikelet: Lower involucral glume lanceolate, obliquely twisted, densely hairy with tubercle-based, persistent hairs all over the back, hairs on lower part shorter than in upper; upper involucral glume oblong-lanceolate, acuminate, 5-nerved, ciliate, tip hairy, margins hyaline. Lower floral glume oblong, hyaline, 1-nerved, ciliate, upper oblong or obovate-lanceolate, hyaline, nerveless. Stamens 3, filaments 4 mm. long; anthers oblong, sagitate, pale yellow when young, sulphur yellow when mature; pollen grains round, smooth, dull grey. The sessile spikelets in the lower part are similar to the pedicelled spikelets above. Fruit 5-8 mm. long, densely hairy with whitish soft hairs, light brown with two deep furrows on the ventral side, armed with a pointed callus below and a long, lash-like awn above.

Locality: 'Usually found on the very shallow parts of Deccan soils' (ex Burns and others, 1. c.).

Distribution: Malabar, tropical Africa, Madagascar, Java, Philippines.


Cke. has described two species: 1. Wightii, Anders. and 1. laxum, Hack. We add a third one, I. anthephoroides, Hack.

The following key is after Hole:

A. Lower involucral glume of hermaphrodite spikelet dorsally appressed, hairy at base and ciliate on margins in basal 1

  1. I. anthephoroides.

B. Lower involucral glume of hermaphrodite spikelet glabrous dorsally at base and on margins in basal 1.

I. Spathe and upper floral leaf not tubercled on keel

  2. I. laxum.

II. Spathe and upper floral leaf tubercled on keel

  3. I. Wightii.


Description: A much tufted annual grass, very leafy below, with many stems 30-80 cm. high, sometimes pink, nodes glabrous. Leaves mostly short, the longer ones about 15 cm. by 5 mm., subobtuse, ciliate at base and tip of sheaths, cilia with small tubercle-bases, blades with scabrid margins, nerves usually fine and uniform, glume of short fine hairs. Pedicels long, rather strict, but some of the spathes divergent, lower spathes foliaceous, upper with shorter blades, base of blade and top of sheath with very long cilia; spathes often with many tubercles on the margins. Spathes cymbiform, not acuminate, smooth and glabrous or minutely tubercled and scabrous, margins scarious, several spathes from each spathe or leaf-sheath. Peduncle of cluster very short, 2-5 mm. long. Cluster scantily bearded at the base. Involucral spikelets broadly oblong, 4 mm. long, rounded at tip, not or very sparsely ciliate, their pedicles about 1 mm. long and nearly as broad at top, compressed, bearded. Glumes 2 only. Lower involucral glume with narrowly inflexed margins, strongly 2-nerved on the back and almost sulcate on either side of midrib, 2 other partial nerves between the strong ones, upper involucral glume nearly as long, flat, oblong, obtuse, 1-nerved; floral glume absent. Anthers yellow. Seta of spikelet 5-8 mm. long, suddenly tapering part or beak rather longer than the lower broader part. Lower involucral glume 2-cuspidate at tip, 4-nerved between keels, hispid-hairy on the back on the wider portion, the beak scabrid or scabrellous; upper involucral glume as long,
narrowly lanceolate with prominent ciliate keel on lower third, scabrellous above, margin inflexed. Lower floral glume very narrow, 2-nerved, ciliate, upper reduced to the membranous base of the awn, awn 12-14 mm. long, very slender, nearly smooth.

**Locality:** Khandesh: Near Naradana (Blatter & Hallberg 52061).—Deccan: Katraj Ghat (Gammie 929!); Deolali (Blatter & Hallberg A316!); Chattarshinji Hill, Poona (Ezekiel!); Pushan (Gammie!).—S. M. Country: Black soil fields E. of Hubli (Sedgwick & Bell 5295!); Yelvigi (Sedgwick 2085!).

**Distribution:** W. India and Deccan.

**Uses:** A smaller yielder and an inferior fodder plant than *I. laxum*. See W. Burns Bull 78, Dept. Agric. Bombay, p. 11.

2. *Iseilema laxum*, Hack. Monogr. Androp. 682; Hook. f. F.B.I. vii, 218; Cke. ii, 996. For synonyms see Hook. f. i. c

**Description:** Cke. i. c.

**Locality:** Gujarat: Red upland near Talod (Sedgwick!).—Khandesh: Bor, Bori River (Blatter & Hallberg 4429!); Toner, Tapti bank (Blatter & Hallberg 5167!); Dadgaum (McCann A322!).—Konkan: Sion (McCann 3668!); Thana (McCann 8728!); Parsik Hill (McCann A321!); Bhandup, rice field (McCann A323!); Trombay (McCann A324!).—Deccan: Grasslands between Mahableshwar and Panchganli (Sedgwick & Bell 4742!); Nasik (Bourke!); Lohagad, half way up (McCann A320!); Poona (Jacquemont 439).—S. M. Country: Dastikop (Sedgwick 2059!); Dharwar (Sedgwick 1826!); Belgam (Ritchie 799).—Kanara: Halyal (Telbot 2087!); Sirdi (Kulkarni!).

**Distribution:** Upper Gangetic Plain, Orissa, Deccan, W. Peninsula.

**Uses:** Considered to be the best fodder grass in Central and S. India.


**Vern. Names:** Mabid (Dohad), Moshi (Surat), Gandhi (Charodi), Gandhefi (Panch Mahals), Sona, Tambrut, Tambit, Gondval, Gamsi, Mussau (ex Burns).

**Description:** Cke. i. c.

**Locality:** Gujarat: Kharaghodata (Saxton 503C!); in a very marshy valley between Wastrapur and Thaliti(Sedgwick 322!); Morvi, Kathiawar (Woodrow).—Khandesh: Antroi, Bori River (Blatter & Hallberg 5150!).—Deccan: Panchganli (Blatter & Hallberg B1294!); Poona (Woodrow).—S. M. Country: Kunnur (Sedgwick & Bell 4922!); Rhanibenpur (Bhide!); Haveri (Telbot 2254!); Dharwar (Nana A325!); Belgam (Woodrow).—Kanara: Halyal (Telbot 2143!).

**Distribution:** Throughout India.

**Uses:** A fair fodder.


**Species** about 16, in the tropical and subtropical regions of the Old World, chiefly Indo-Malayan.


I. **Involucral spikelets** truly verticillate

1. Involucral spikelets glabrous or more or less irregularly beset with tubercle-based hairs ... 1. *T. triandra*.

2. Involucral spikelets always with a row of stiff bristles along the flexures near the tips, the bristles arising from coarse pale tubercles ... 2. *T. quadrivalvis*.

II. **Involucral spikelets in closely superposed pairs**

1. Inflorescence a decompound thyrsiform panicle. Lower involucral glume of bisexual spikelets not channelled ... 3. *T. cymbaria*. [6]
2. Inflorescence a racemiform panicule. Lower involucral glume of bisexual spikelets deeply channelled ... 4. T. tremula.


Hooker f. who deals with this species under Anthistiria, Linn., says in a preliminary remark (F.B.I., vii, 211): 'The species of this genus are most difficult of discrimination, of which the best proof is the irreconcilable conclusions of two excellent botanists, both experts in the order of Gramineae, Anderson (in Nov. Act. Upsali, ii, 1856) and Hackel (Monogr. Androp.).'

He then criticizes Hackel for having restored Forskål's name of Themeda because of having four years of priority, and of Linnæus' description of Anthistiria being very inaccurate. He admits the claim of priority, but as to the other reason he rightly adds that if inaccurate description has to be considered, a host of the genera of old authors would have to be invalidated. Hooker finally decides in favour of Anthistiria because this genus 'had for upwards of a century been adopted by all botanical writers.' This reason, however, does not hold good in view of the present rules of nomenclature. Hackel restored Themeda in 1889 and since then most systematists have followed his example. It was easy to settle this point, but the real difficulty comes in when we have to define and give a name to all the material gathered by Hackel (i.e. 659-664) under his Themeda Forskali, and by Hooker f. under Anthistiria imberbis, Retz. (F.B.I., vii, 211).

A glance at Hackel's synonymy and localities shows that he has included all the forms of this highly variable grass which are found in the tropical, sub-tropical and sometimes in the temperate regions of the Old World. The same applies to Hooker's A. imberbis, except that he separated Hackel's var. dubia laxa and restored it to its former specific rank of A. laxa, Anders. But this is of minor importance in this connection. It does not change the fact that both Hackel and Hooker describe the same material and of the same area though under different names.

Hackel justifies the adoption of the specific name Themeda Forskali in this way: 'Themeda triandra, Forsk. Fl. Aeg.-arab. p. 178, Anthist. Forskali Kunth Revis. Gram. 1, p. 162, generis typus, a Forskalio prope Bulgoso in
Arabia felici lecta, probabiliter etiam varietas est Th. Forskalii meae; sed descripturn rem dubiam relinquuit, specimina authentica desideratnr. Nec hucusque ullam hujus generis speciem in Arabia felici lectam vidit, et si probabile est, Th. Forskalii ibidem habuit in Syriae meridionali, et Arab. invenerit. Itaque nomen specificum "triandra" tamquam dubium et rem indi-cans quae in hoc et plerisque Granairearum generibus nullius est momenti, sepouii, "Forskali" a Kunthio datum non minus quidem dubium, sed generis autem omnino commoratmos recepto.

Hooker does not agree with Hackel, 'The earliest names of this plant are Themedia triandra, Forsk., and Anthistiria imberbis, Retz. Hackel has abandoned both, substituting first Anthistiria vulgaris, and then Themeda Forskalii, on the ground that A. imberbis was perhaps not Forskalii's T. triandra (why then call it Forskalii?) of which no type specimen exists, and because triandra indicates a character of no individual value in grasses. In so doing he overlooked Gmelin's name of T. polygama (Syst. 149). Having regard to the wide range of A. imberbis, from Australia to Africa, its presence in Arabia might well be anticipated; and that it is a native of that country is now proved by Schweinfurth's finding Hackel's var. glauca in that country. This makes the var. (which is local, and not Indian) the type of the species, and if Forskalii's name of Themeda is to be retained, necessitates a re-arrangement of the varieties. To me it appears most expedient to retain Retz.'s name which applies to the prevalent form over the area of distribution as the specific one.'

Hooker's reasons against Hackel's view are certainly valid, but his own Anthistiria imberbis does not rest on a firmer foundation. The fact that the var. is local and not Indian should not prevent us from making it the type of the species, and the other circumstance that a re-arrangement of the varieties will become necessary if the name Themeda is retained, can only be a reason of expediency.

So far we come to the conclusion that Hackel and Hooker deal with the same material, but that neither name is satisfactory.

We come now to the latest publication affecting our question. Stapf l.c. has adopted the name Themeda triandra, Forsk. (1775) instead of T. Forskalii (1889), 'as there is no doubt that the type of Forskal's species, which apparently has been lost, was one of the forms covered by the description given by Stapf' (see Schweinfurth in Bull. Herb. Boiss. ii, App. II, 16).

But here Stapf creates a new difficulty. His description applies only to the 'African share of Hackel's T. Forskalii'. In order not to be open to misstate-ments we quote the whole passage in which Stapf explains his position: 'The species, as defined here, is, however, taken in a sense somewhat narrower than Hackel's; this restriction requires a short explanation. Hackel in his mono-graph of the Andropogoneae distinguishes eleven varieties and as many sub-varieties or forms within his T. Forskalii, whilst other authors have at various times described more than a dozen species, all of which come within the com-plex. The question then is not so much as to the close affinity of these forms and the question of their status is mainly one of expediency. A careful examination of the large amount of material at Kew and the British Museum has led to the conclusion that for the present it will be most useful to detach, firstly, those forms that are fairly uniform, and at the same time exclusive, over a large area; and secondly, those that, though of a limited range, stand out from the remain-der by some character or characters. This leaves a residuum much less homo-geneous than any of the segregates just referred to. It consists apparently of more or less fixed races, mutants, hybrids and edaphic forms which from her-barium material are the less separable because they are to a high degree inde-pendent of geographical areas. At the same time, however, they are all African with an extension into Arabia, Syria and the south-eastern corner of Asia Minor, and, taken as a whole, represent practically the African share of Hackel's T. Forskalii. It is to this aggregate that the description and synonymy given above apply.'

From the above it is evident that Stapf's T. triandra, Forsk. is not identical with Hackel's T. Forskalii and Hooker's A. imberbis, Retz., as it comprises only the African element including 'an extension into Arabia, Syria, and the south-eastern corner of Asia Minor.' Stapf's synonymy leads to the same conclusion, except for the inclusion of T. imberbis, T. Cooke (Fl. Bombay ii, 993). The Australian element Anthistiria australis, R. Br. has been separated by the same author as Themeda australis, Stapf. It seems to us that Stapf's treatment
of *T. triandra* is somewhat arbitrary. We quite agree that the name should remain and that it is the only correct name, but we cannot agree to its being restricted to the African element only, and it is difficult to understand why the Indian specimen should not go by the same name. If we could distinguish groups of varieties or forms that are confined to more or less definable geographical areas, it would be admissible to speak, e.g. of an African group and call it *T. triandra*, because Arabia exhibits one of those African forms, or of an Indian or Australian group, and name them accordingly. But experience shows that with regard to the material under review there are no such geographical areas which contain a group of varieties or forms that are peculiar to one area exclusively. A glance at the localities given by Hackel under the different varieties and sub-varieties will confirm our statement.

We are, therefore, of opinion that the name *Themeda triandra*, Forsk. should embrace all the material that was described by Hackel under *T. Forskalii*, by Hooker under *A. imberbis*, and by Cooke under *T. imberbis*.

Haines describes the material from Bihar and Orissa under the name of *T. imberbis*, T. Cooke, and adds in brackets 'partly'. His species, therefore, is not Cooke's *T. imberbis*, but must be given some other specific name as long as Cooke's name stands. But if botanists adopt our *T. triandra*, Forsk. Haines' name will be merged in it, and his material may be treated as a form or group of forms under that species.

**Description**: See Hackel, Hook. f. and Cooke 11. cc.

**Locality**: **Gujarat**: Ahmedabad (Gammie 16391 !).—**Khandesh**: Toranmal (McCann 9813 !).—**Konkan**: Mokhada range (Ryan 28264 !); Mahaluxmi (Sabnis A2971 !); Bhandup (McCann 98101 !); Bassein (McCann 41751 !).—**Deccan**: Ganeshkhind Botanic Gardens (Garade !); Panchgani (Blatter 3806 !, Blatter & Hallberg B1326 !); Khandala, common (McCann A291 !); Bairrawadi, Purandhar (McCann 5069 !); Ikatpuri (McCann 4322 !); Poondra (Balbot 4307 !).—**S. M. Country**: Devaranji, elevation 1,800 ft., rainfall 90 inches, (Sedgwick & Bell 4427 !); Castle Rock (Gammie 15728 !); Dudsagar Falls (McCann A298 !); Dhwarar (Nana A29 !).

**Distribution**: Africa, Indo-Malaya, Australia.


**Vern. Names**: Bongrut (Sholapur); Bhatu (Surat); Bhati, Zini bathi, Mothi bathi (Dohad); Bhatharu (Broach) (ex Burns).

**Description**: Cke. i.c.

**Locality**: **Gujarat**: Ahmedabad (Gammie 16391 !).—**Khandesh**: Toranmal (McCann 9817 !).—**Konkan**: Parsik, railway line (McCann 9808 !); Allibag, water-works (Ezekiel !); S. Konkan (Stocks teste Cooke, Law); Salsette (Jacquement 717 teste Cooke).—**Deccan**: Pashan, near Poona (Gammie !); road, Mahabaleshwar to Pratagbad (Bhide 1170 !); Purandhar (McCann 5571 !), Bairrwdi, Purandhar (McCann 507A !); Panchgani (Blatter & Hallberg B1311 !, B1325 !).—**S. M. Country**: Konkerni, elevation 2,000 ft., rainfall 40 inches (Sedgwick & Bell 4943 !); Dhwarar. elevation 2,400 ft., rainfall 34 inches (Sedgwick & Bell 4886 !); Dastikop elevation 2,500 ft., rainfall 35 inches (Sedgwick & Bell 2060 !); Castle Rock (Gammie 15729 !); Belgaum (Ritchie 886 teste Cooke).—**Kanara**: Halyal (Balbot 2115 !).

**Distribution**: N. W. India, Bengal, C. Provinces, W. Peninsula, Tenasserim. Introduced in tropical and S. Africa.


**Description**: Cke. i. c.

Description: Cke. i. c.

Locality: Konkan: Trombay (McCann A293 !); Ghatkoper, Horse-shoe Valley (McCann A327 !).—Deccan: Khandala (McCann 5359 !); Igatpuri (Blatter & Hall 5844 !); Purandhar, northern foot (McCann 5041 !); Poona (Woodrow teste Cooke).—S. M. Country: Devaranji, elevation 1,800 ft., rainfall 90 inches (Sedgwick & Bell 4428 !); Castle Rock (Gammie 15687 !).—Konkan: Devimani Ghat (Kulkarni !); Jugglepet (Talbot 1568 !); Tinali Ghat (Sedgwick & Bell 3195 !); Sirsi to Siddhapur (Hallberg & McCann A294!).

Distribution: From the Central Provinces and the Konkan southwards, Ceylon.

41. Pseudanthistiria, Hook. f.; Cke. ii, 992.

Species 4.—Indian.

Cooke has described one species: *P. hispida*, Hook. f. We add two others: *P. umbellata*, Hook. f. and *P. heteroclitata*, Hook. f.

1. Ligule exauriculate
   1. Ligule a truncate glabrous membrane, much divided to the base, the tips minutely ciliolate. Sessile spikelets glabrous
   2. Ligule short, membranous. Sessile spikelets
   1. *P. hispida*.
   2. *P. heteroclitata*.
   3. *P. umbellata*.


Description: Cke. i. c.

Locality: Gujarat: Surat (Garade i).—Konkan: Dahe Forest (Ryan 705 !); Matheran (D’Almeida A329 !); Ghatkoper, Horse-shoe Valley (McCann A326 !); Sion (McCann 5247 !); St. Xavier’s College compound, Bombay (McCann 4524 !); Kalyan (Woodrow).—Deccan: Lonavla (Gammie !); Purandhar Fort (Gammie 1010 !); Igatpuri Ghts (McCann 4343 !); Khandala, common, railway line (McCann A331 !); Panchgani (Woodrow).—S. M. Country: Castle Rock (Gammie 15634, McCann A328 !); Derikop (Sedgwick 2061 !); Londa (Gammie 15863 !, Woodrow).—Konkan: Birchy (Talbot 2096 !); Yellapure (Talbot 1522 !); Devimani Ghat (Kulkarni !).

Distribution: C. Provinces, W. Peninsula.


Description: Stems 30–80 cm. high, geniculate, slender, terete, smooth, sub-simple or branched. Leaves linear, 15–30 cm. long, 3–5 mm. broad, glabrous or more or less ciliate on both surfaces, nerves distinct, margins with long, tubercle-based hairs or nearly glabrous; sheaths much shorter than the internodes, quite glabrous; ligule short, membranous, exauriculate. Panicles 20–30 cm. long, leafy, compound, with many shortly peduncled fascicles, fascicles of spikes about 12 mm. broad, proper spathes 7–10 mm. long, hardly longer than the spikes, towards the margin with long, tubercle-based bristles; spike 6–8 mm. long. Sessile spikelets 3–4 mm. long, linear-oblong, hispidulous all over. Lower involucral glume furrowed. Upper floral glume awned, awn 18–24 mm. long, thin. Pedicelled spikelets lanceolate, with a few long, tubercle-based bristles, keel ciliate.

Locality: Konkan (Law ex Hook. f.).

Distribution: Bengal, Konkan, S. Kanara.

Description: A very slender, glabrous plant with filiform, prostrate, creeping branched stems, rooting at the nodes, stems 30-60 cm. long, compressed. Blade 2-5 cm. long, distant, linear-oblong, acute, rounded at base, sessile or short-petioled, nerves distinct, very slender, with a few scattered cilia on both surfaces, nearly smooth; sheaths shorter than the blade, often with tubercle-based hairs above, rarely glabrous; ligule passing at the sides into 2 short, herbaceous, fimbriate auricles of the sheath. Panicle leafy, very lax, interrupted, 12-20 cm. long; fascicles of spikelets few, axillary, 6-12 mm. broad, glabrous or with a few tubercle-based cilia on simple, rarely branched capillary peduncles shorter than the leaves; lower peduncles sometimes elongate, 2-5-7.5 cm. long and bearing several fascicles; outer spathes 8-25 mm. long; spikes 3-6 in a fascicle, proper spathe 10-12 mm. long, rather longer than the spikes, glabrous or towards the margin with a few bulbous-based hairs. Sessile spikelets 3-4.5 mm. long, linear, scabridulous. Lower involucral glume dorsally concave; awn of upper floral glumes 12-14 mm. long, very thin. Pedicelled spikelets linear-lanceolate, naked, awn 12-15 mm. long.

Locality: S. M. Country: Londa (Gammie 15869).—Karana: Birchy (Talbot 2073!).

Distribution: Deccan and W. Peninsula, Ceylon.

42. Digitaria, Hall. Hist. Strp. ii (1768), 244; Stapf in Prain Fl. Trop. Afr. ix, 422.

Species more than 100, in the warm parts of the whole world, but chiefly in the Old World.

Cke. (ii, 940-942) describes 6 species. All are retained in this place, but the name of Digitaria sanguinalis will be replaced by D. marginata.

Key as in Cke.


Description: Cke. i. c. Occasionally long fine hairs are found on the peduncles.


Distribution: India (Khasia Hills, Burma, W. Peninsula), Yunnan, tropical and S. Africa.


Description: Annual, 30 cm. to 1 m. high. Stems tufted, usually ascending from a geniculate or prostrate base, simple or branched from the lower nodes, glabrous, few to many-noded. Leaves 5-15 cm. by 4-8 mm., linear or linear-lanceolate from a slightly contracted and rounded base, acute, flat, flaccid, glabrous or sparingly hairy particularly towards the mouth, margins finely cartilaginous, rough and often crisp, midrib very slender, whitish; sheaths thin, subherbaceous, loose, glabrous, or more or less beset with spreading tubercle-based hairs often forming a loose beard at the base; ligules truncate, membranous, up to over 1 mm. long; Spikes mostly 4-9, sessile, subdigtigate, solitary or 2-5-nate on a short, scabridulous common axis, erect or spreading, rather slender, strict or slightly flexuous 5-15 cm. long, often finely pubescent at the base; rachis almost straight, triquetrous, lateral angles winged, herbaceous, scabrid, internodes up to more than 2 mm. long. Pedicels 2-nate, one very short, the other up to 1.5 mm. long, angular, scabrid. Spikelets appressed, lanceolate, acutely acuminate, 2-4 mm. long, pale greenish, rarely tinged with purple, variously hairy, rarely quite glabrous. Lower involucral glume an ovate, obtuse to subacute membranous scale, usually not over 0.3 mm. long, sometimes obsolete or quite suppressed; upper ovate-lanceolate, acute, equaling or considerably exceeding half of the upper floral glume, rarely distinctly shorter, 3-nerved, with fine lines of hairs between the nerves and along the margins, rarely quite glabrous. Lower floral glume corresponding in outline and size to the spikelet, firmly membranous, 7-nerved, rarely quite glabrous, usually with fine lines of hairs between the inner side-
nerves (of each half) and along the margins; upper floral glume oblong-lanceolate, acutely acuminate, almost as long as the spikelet, thinly chartaceous, pale or slightly purplish, brownish when ripe. Grain oblong, plano-convex, whitish, scutellum less than half the length of the grain.

This species is not identical with *Paspalum sanguinale*, Lamk. of the F. B. I. or with *Digitaria sanguinalis*, Scop. in Cooke's *Flora* or in Haines' *Bot. of Bihar & Orissa*. *D. sanguinalis*, Scop. (sensu stricto) is a plant of S. Europe and has not been found either in India or tropical Africa, as was pointed out by Pilger (in Engl. Jahrb. xxx, 118) and Stapf. Most of the numerous synonyms given by Hook. f. in the F. B. I. would have to be mentioned under the different varieties. Here we have to deal only with one variety which was described by Cooke as var. *ciliaris*, Prain and which was called var. *fimbriata* by Stapf.


**Description**: Upper involucral glume usually much exceeding the middle of the fertile floret and frequently equaling ½ of its length. Indumentum of spikelets uniform or more often more or less varied in the same inflorescence; hairs of the upper involucral glume and lower floret partly in fine lines, all of one kind, very fine, thin-walled, obtuse-tipped, partly more thick-walled with slightly clavate tips, and up to 1 mm. long, spreading out at maturity and forming a rigid double fringe on each side of the spikelet, the inner fringe often mixed with a varying number of tubercle-based acute yellow bristles which ultimately also spread out at right angles.

It is well to remember what Stapf says in a note, l. c. 441: 'The peculiar indumentum of the spikelets, which in the mature state leads to the formation of spreading fringes, may extend to all spikelets alike or it may be, at least in its perfect development, confined to the long-pedicelled member of each pair of spikelets or only to some of them, in which case the indumentum of the fringeless spikelets approaches more or less that of var. *Linkii*. Var. *Linkii*, Stapf is Hooker f.'s var. *commutatum* of *Paspalum sanguinale* in F. B. I. vii. 15.

**Vern. Names**: Tara (Surat); Shikarol or Arotaro (Dohad); Chansarien (Broach); Taru, Modhan (Sind); Fakri, Fakria, Kurad, Suka, Revga, Dinohi, Shikar koli, Kalam hulul (Bijapur); Shimipigay hulul (Belgaum) (ex Burns).

**Locality**: *Sind*: Sanghar (Sabhis 8903!); Mirpurkhas, in cultivated fields (Sabhis B1290!); Bughar, Indus River (Blatter & McCann D686!); Ghulamalla, garden (Blatter & McCann D687!); *Gujarat*: Cutch (Blatter 8742!); Ahmedabad (Herb. Econ. Bot. Poona!).—*Khanedesh*: N. slope of Chanseli (McCann 9535!); Bor, Tapti Island, on sand and mud (Blatter & Hallberg 5403!); Muravat, Tapti Bank (Blatter & Hallberg 8390!); Umballa (Blatter & Hallberg 5178!); Amalner (Blatter & Hallberg 4431!); Sumit (Blatter & Hallberg 5188!); Bor, Bori River (Blatter & Hallberg 5213!); Dadgaum (McCann 9531!); *Konkan*: Victoria Gardens, Bombay (McCann 9831!); Versova, Salsette (McCann 4308!); Malabar Hill (McCann 4300!); very common through the Islands of Bombay and Salsette (McCann!); Parsik, railway line (McCann 9530!); Bassein (McCann 4485!); Alibag, sandy shore (Ezekiel!);—*Deccan*: Khandala (McCann 3650!); Igatpur (McCann 9833!); Purandhar (McCann 5606!); Chattarshinji (Ezekiel!); Pashan (Gammie!); Deolali (Blatter & Hallberg 4556!); Gangapur (Blatter & Hallberg 4581!); Panchgani, Maratha Well (Blatter & Hallberg B1233!);—*S. Country*: Haveri, dry ground, compound of P. W. D. (Telbot 2228!); Dharwar (Sedg-
wick!); Belgaum (Herb. Bot. Gard. Cal. !).—Karana: Karwar (Talbot 1294!); Halyat (Talbot 2153!); Kulgi (Talbot 2279!).

**Distribution:** Tropics of both hemispheres, rarely found beyond the tropics.


**Description:** Cke. i. c.

**Locality:** Sind: Karachi (Stocks *lente* Hook. f.); Jemadar ka Landa, near Karachi (Stocks); Tatta, Kulan Kote (Blatter & McCann D684!); Tatta (Blatter & McCann D683!).—*Gujarat:* Porbandar (Bhide!); Morvi, Kathiawar (Woodrow).


**Description:** Cke. i. c.

**Locality:** Konkan: Thana (McCann 8725!); Sion (Herb. S. X. C. !); Mulgaum (McCann 3663!).—*Decauv:* Chattrashinji Hill, Poona (Ezekiel!).—*S. M. Country:* Hubli, elevation 2,000 ft., rainfall 30 inches (Sedgwick & Bell 4229!).

**Distribution:** Throughout India.


**florum,* Gmel. Syst. 158.—*P. parvulum,* Trin. Pan. Gen. 117.—*P. argyro-


*Digitaria tenuiflora,* P. Beauv., given as a synonym by Cke, seems to be a different species. It is apparently a perennial of erect habit and with long narrow leaves.

**Description:** Cke.i. c.

**Locality:** *Deccau:* Deolali (Blatter & Hallberg 9835!).—*S. M. Country:* Dry uplands, Dharwar, elevation 2,400 ft., rainfall 34 inches (Sedgwick 2653!); Belgaum (Herb. Bot. Gard. Cal.).—*Karana:* Halyat (Talbot 2310!); Londa (Bhide!).

**Distribution:** Throughout India, Ceylon, tropical and S. Africa, Madagascar, Mascarenes, Malaya.


**Description:** Cke. i. c.

**Locality:** Konkan: St. Xavier's College compound (McCann 4533!); Mulgaum, Salsette (McCann 9523!).—*Deccau:* Khandala (McCann 3651!).—*Lonavla:* (Herb. Econ. Bot. Poona!); Purandhar Fort (Bhide!); Lina Hill, Nasik District (Blatter & Hallberg 4542!); Lohagad, way up (McCann 9512!); Katraj Ghat, 11 miles S.E. of Poona (Bhide!); Panchgani, slopes below Third Tableland (Blatter & Hallberg B1229!); Panchgani, Maratha Well (Blatter & Hallberg B1224!, B1281!); Mahabaleswar, in a garden, elevation 4,500 ft., rainfall 270 inches (Sedgwick & Bell 4584!); Suvasni Ghat (Woodrow).—*S. M. Country:* Dharwar, elevation 1,600 ft., rainfall 34 inches (Sedgwick 2843!); Belgaum (Herb. Bot. Gard. Cal.).—*Karana:* (Talbot!)

**Distribution:** Hilly districts throughout India, Ceylon; apparently not in tropical Africa.

Stapf (l. c. 483) explains why he adopts *Allotroposis*, Presl, as emended by Hitchcock.  ’As Hitchcock (Contrib. U. S. Nat. Herb. xii, 210) has pointed out, Presl’s description and analyses of *Allotroposis* are based on a composition of a Panicoid and an Andropogonoid grass, whilst the original in Presl’s herbarium is undoubtedly the plant described here as *A. semialata*, and so is also the habit figure (l) in Presl’s plate. The genus is therefore accepted here with Hitchcock’s emendation.’

‘Another member of this genus, *A. cimicina*, was included by Palisot de Beauvois (Agrost. 12) in his genus *Axonopus* under its earliest synonym *Milium cimicinum* and as ‘*A. cimicinum?*’ on p. 154, and this led J. D. Hooker (Fl. Brit. Ind. vii, 64) to use the name *Axonopus* in preference to *Allotroposis*, a view which was adopted by myself in *Fl. Cap. vii*, 418. From P. Beauvois’ diagnosis however, and from the fact that he quotes in the first place *Milium compressum* as example for *Axonopus*, there can be no doubt that he had primarily *Milium compressum* in view when establishing his genus *Axonopus*, and it is in that sense that the genus is understood in this work. *A. cimicina* also forms the basis of another genus, *Coridochloa*, Nees in Edinb.-New Phil. Journ. xv, 381. A. Chase (in Proc. Biol. Soc. Washington, xxiv, 157) maintains this genus as distinct from *Allotroposis*, and I followed her when drawing up the key of the genera of Tropical African grasses (p. 13); but I have since come to the conclusion that the species referable to these two groups are so similar in the peculiar structure of their spikelets that they are better merged into one genus for which *Allotroposis* has priority over *Coridochloa*.’

We have, therefore, to add the characteristics of the genus as given by Stapf:—

Perennial or annual. Leaf-blades flat or more or less convolute; ligules membranous, ciliate or ciliolate, short or reduced to a mere rim. Racemes sessile or peduncled, often more or less compound towards the base, digitate or subdigitate on a more or less elongated common axis. Spikelets ovate or lanceolate-oblong; acute or acuminate, mostly awned, slightly or conspicuously compressed from the back, falling entire from the pedicels, 2-nate or fascicled, subsecund and abaxial on the triquetrous rhachis of more or less spiciform racemes. Lower floret usually male, upper hermaphroditic. Involutural glumes unequal, lower smaller, membranous to hyaline, 3-1-nerved, very acute, often mucronulate, upper equal or subequal to the spikelet, membranous to chartaceous, 5-nerved, with the outer nerves submarginal, densely ciliate along them. Lower floral glume resembling the upper involucral glume, but ciliate, pale short, deeply 2-fid with conspicuously auricled flaps, upper floral glume chartaceous, glabrous, delicately ciliate upwards, 5-nerved, produced into a straight awn or mucronate, pale equal to the glume, 2-keeled, with broadly auricled flaps. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct, stigmas laterally exserted. Grain enclosed by the glume and pale, elliptic-oblong, dorsally much compressed; scutellum about half the length of the grain; hilum basal, punctiform.

Species about 5.—In the tropics and the warm temperate zone of the Old World, 2 in India.

In the Bombay Presidency there is only one species:


*Description*: Cke. i. c.

*Locality*: Konkan: Sewri (McCann 3586 !); Mulgaum (McCann 3654 !).—

*Deccan*: Sinhagad forests (Bhide !); Lina Hill, Nasik District (Blatter &
Hallberg 4583); Panchgani (Hallberg!).—S. M. Country: Dharwar (Sedgwick 2032!; Woodrow); Gokak (Shevade!); Badami (Woodrow).—Kanara: Halyal (Talbot 2294!); Kulgi (Talbot 2434!).

Distribution: Tropical Africa, Madagascar, throughout India to Java.


Species about 25.—In the warm parts of the whole world.

Cook describes one species: *E. polystachya*, H. B. & K. which name has to cede to *E. ramosa*, O. Kuntze.


Note.—Masaja Honda in his Revisio Graminum Japoniae (Bot. Mag. Tokyo 37 (1923), 113-124) is of opinion that *Eriochloa ramosa*, O. Kuntze, has to be partly emended and changed to the new species *Eriochloa Hackelii*. Details are wanting to form an opinion on this point.

Description: Cke. i. c.

Locality: Sind: Umerkot, in a garden (Sabnis B718!); Jamesabad, on banks of a watercourse (Sabnis B967!); Bughar, Indus River (Blatter & McCann D691!); Tatta, Kullan Kote Lake (Blatter & McCann D692!); Tatta (Blatter & McCann D683!).—Gujarat: Ahmedabad (Gammie 16408!).—Konkan: Bassein (Bhide!); Antop Hill (McCann 3613!); Aliabag, rice field (Ezekiel!); Bandra, on walls and in ditches (McCann!); Bombay (Hallberg A141!); Bombay, near Mahim (Woodrow, Lisboa); Bhandup, in an old distillery compound, in a ditch (Hallberg A191!).—S. M. Country: Shiggaon, elevation 2,000 ft., rainfall 34 inches (Sedgwick 2356!); Kunnur, elevation 2,000 ft., rainfall 35 inches (Sedgwick & Bell 4937!); Ranibener (Bhide!); Dharwar (Sedgwick!).—Kanara: Halyal (Talbot!).

Distribution: Tropics of the Old World, introduced into Ascension Island, St. Helena, Cuba.


Perennial or annual. Leaf-blades linear to lanceolate, usually flat; ligules reduced to a narrow ciliate or ciliolate rim. Racemes usually sessile and solitary on a common axis, sometimes bare at the base owing to the arrest of spikelets, rarely truly peduncled and panicked, simple or compound near the base, rarely to or beyond the middle; rachis filiform, triquetrous or more or less flattened and herbaceous with a wavy or zig-zag midrib, which forms the keel as a mostly acute keel on the face, pedicels solitary or in pairs, alternately to the right and the left of the facial angle or the midrib, if solitary all short or very short, if paired, the primary slightly to very much longer; spikelets closely appressed, always biserrate in the plane, but frequently becoming 1-seriate by the dovetailing of the alternate spikelets of the closely approximate ranks, more or less contiguous with their sides or imbricate, forming dense, spike-like racemes, or distant by almost their own length or more, glabrous or hairy. Spikelets more or less elliptic or oblong, more or less flattened or slightly depressed, convex on the base, falling entire from the pedicels, 1-2-, rarely more-nate, secund and adaxial (with lower involucral glume towards the axis and the convex side of the upper floral glume away from the axis), closely appressed to and 2-seriate on the triquetrous or flat rachis of spiciform racemes; lemma: forel male or bursa with a usually well-developed pale, very
rarely the latter suppressed. Involucral glumes dissimilar and mostly very unequal in length. Lower involucral glume shortest; upper resembling and more or less equalling the lower floral glume, 5-7-(rarely 9-) nerved. Lower floral glume 5-, rarely 7-nerved, the lateral nerves placed towards the margins and distant from the middle nerve; pale usually only slightly shorter than the valve with well-developed inflexed flaps, or the latter vanishing above the middle; upper floral glume oblong to elliptic in outline, emucronate, though sometimes contracted into an apiculus, crustaceous or subcrustaceous with firm involute margins, faintly 5-nerved; pale almost as long as the glume, 2-keeled, its sides tightly embraced by the valve. Lodicules 2, small, broadly cuneate. Stamens 3. Styles distinct; stigmas plume, laterally exerted from the upper part of the spikelet. Grain tightly enclosed by the glume and pale, or more or less flattened on both faces; hilum subbasal, punctiform; embryo half to over 1/2 the length of the grain.

Species about 80. In the warm parts of the whole world, but chiefly in Africa.

Cooke mentions 3 species which belong to this genus: *Panicum Isachine, P. ramosum* and *P. muticum*. To these we add *Brachiaria distachya (Panicum distachyum)*.

A. Spikelets 0·5 mm. long or slightly more
   1. B. Isachine

B. Spikelets 2·5-4 mm. long
   I. 90 cm. to 1·8 m. high
      ... 2. B. mutica.
   II. Less than 80 cm. high
      1. Spikes 5-many ...
         ... 3. B. ramosa.
      2. Spikes 2-4 ...
         ... 4. B. distachya.


Description: Cke. ii, 931.

Locality: Sind: (Herb. Econ. Bot. Poona!).—Gujarat: Surat (Chibber!, Dalzell testâ Cooke).—Khandesh: Sungrî (Gammie 16552!); Dhulâ Farm (Chibber!); Chanseli (McCann A92!); Nimb, Tapti Bank (Blatter & Hallberg 9571!); Dadgaum (McCann 9562!); Tapti, Bhusawal (Blatter & Hallberg 5156!); Umâla village (Blatter & Hallberg 5159!); Bor, Bori River (Blatter & Hallberg 4424!).—Konkan: Clerk Rd., Bombay, along brackish water (Sabnis 9565!); very common in Bombay and Salsette Islands (McCann!).

—Deccan: Yeola (Herb. Econ. Bot. Poona!); Mangiri, 8 miles E. of Poona (Gammie!); Sholapur (D'Almeida A91!); Deolali (Blatter 9570!, 9569!); Khandala, common (McCann 9566!); Purandhar, N. foot (McCann 9568!); Panchgani, below Sidney Point (Blatter & Hallberg 1271!).—S. M. Country: Nelogi, elevation 1,800 ft., rainfall 30 inches (Sedgwick 2134!); Haveri (Talbot 2150!).—Kanara: Halyal (Talbot 2150!).

Distribution: Throughout the Indian sub-continent in demand places, Ceylon, westwards to Italy and tropical and S. Africa.


In adopting Forskal's name 'muticum' for this species Stapf, according to his own words, has relied on Ascherson's identification (Asch. & Schweinf. Ill. Fl. Egypt 160) of the type with the Algerian *P. numidium*.
Popular Names: Water Grass, Mauritius Grass, Para Grass, Scotch Grass, Buffalo Grass.

Description: Perennial 1-2·5 m. high. Stems ascending from a sometimes prostrate and copiously rooting base, stout, terete, usually many-noded and sheathed high up, simple or sparingly branched, glabrous, often waxy, pruinose below the nodes. Leaf-blades linear, up to 30 cm. long, 6-10 mm. broad glabrous or rarely more or less hisrate, margins scabrid. Panicle oblong to ovoid-oblong in outline subsecund or almost quaquaversal, 6-20 cm. long; common rhachis terete to seritate, more or less deeply channelled or triquetrous upwards, scabrid along the angles, glabrous. Racemes numerous, solitary or irregularly approximate, sometimes paired or in false whorls, shortly peduncled or subsessile, obliquely spreading, 7 (rarely 12) to 2·5 cm. long, mostly compound, glabrous, greenish or tinged with purple; rhachis flat, with a slender, raised midrib up to 1 mm. wide, villosulous at the base, otherwise glabrous; secondary racemes usually very short, and 6-3-spiculate; pedicels solitary or paired, very short, or if paired then the longer up to 1 mm. long, frequently with a few setules. Spikelets laterally contiguous or discontinuous, those of the secondary racemes often imbricate, oblong or lanceolate-oblong, acute, 3-3·5 mm. long, glabrous. Involucral glumes dissimilar, lower broad-ovate, acute to subacute, from less than $\frac{1}{2}$ to not quite $\frac{1}{2}$ the length of the spikelet, faintly 3-5-nerved, often tinged with purple; upper corresponding in outline and size to the spikelet, 5-7-nerved. Lower floral glume as long as the upper involucral glume and similar to it; pale narrowly oblong, subacute, almost as long as the glume, with narrow flaps; anthers 2 mm. long; upper floral glume slightly shorter than the spikelet, mostly 3 mm. long, oblong, subacute or minutely apiculate, pale yellowish, glume and pale cistaceous, very finely transversely wrinkled or almost smooth. Stigmas blackish-purple, very conspicuous.

Locality: Cultivated at Kirkee and Surat (Woodrow) and very likely in other places.


Description: Cke. ii, 932.—Stapf points out that this species occurs in a glabrous and a pubescent state, and that the original specimen in Linnaeus' herbarium represents the former. 'The pubescence, he says, 'if present, extends generally to the culms, the leaves, the axes of the inflorescence and the spikelets, the upper glume [upper involucral glume] and lower valve [lower floral glume]. On the blades it may be scanty and disappear with age. It does not seem to be correlated with any other character, and the area of the glabrous and pubescent states overlap completely, in fact both have been taken in the same collecting.'

He mentions another curious modification in which the lower floral glume is more firmly membranous to crustaceous and faintly transversely rugose and thus more or less resembles the upper floral glume (not the upper involucral glume as is normally the case). It has been collected in India and W. Africa.

Locality: Sind: Chachra (Mamlatdar of Chachra!); Shahabander (Karachi P.O.C. of Shahabander!); Sangarh (Sabnis B901!, B887!); Nasapur, clayey soil (Sabnis B1057!).—Gujarat: Ahmedabad (Herb. S.X.C. 2165!); Mausari (Mamlatdar of Mausari!); Sumrasar, Cutch (Blatter 376)!.—Khandesh: Tamer, Tapti river (Blatter & Hallberg 5172!); Antroli, Bori river (Blatter & Hallberg 5149!); Toranmal (McCann A142!).—Konkan: Malabar Hill (McCann!); Versova (McCann 9588!); Byculla (McCann 9586!); Sion (McCann 8689!); Bandra Hill, in fallow fields (Vakil A115!).—Deccan: Khandala (Sedgwick 2631!); Poona (Woodrow!); Lina Hill, Nasik District [17]

Description: A slender, creeping grass, glabrous or panicle sparingly hairy. Stems 30–60 cm. high. Leaves linear or lanceolate or linear-lanceolate, acuminate, 5–15 cm. by 3–6 mm., widest at the rounded or ampliaceous base, flat; sheaths ciliate or not on the margins, mouth hairy. Spikes 2–4, distant, 2 5–6.5 cm. long, rarely more than 10 cm., erect, at last spreading; rhachis slender, glabrous. Spikelets variable in size, pale green, 3–4 mm. long, solitary, subsesile, spikately arranged in 2 (–1) series, ellipsoid, glabrous. Lower involucral glume embracing the spikelet and margins overlapping below, ½ to nearly ½ the spikelet, 5–7-nerved, obtuse or subacute; upper involucral glume ovate, acute, 7-nerved, paleate or not, pale if present, narrow, neuter. Lower floral glume 5-nerved, upper ellipsoid, obtuse or rounded, 2 mm. long, brown and minutely transversely lineolate or obscurely rugulose when ripe.

Locality: Gujarat: Ahmedabad, banks and margins of fields around Ahmedabad (Sedgwick 239!).—S. M. Country: Dharwar (Sedgwick 2840!).

Distribution: India, Ceylon, China, Malaya, Australia.

46. Paspalum, Linn. Syst. Nat. ed. x, 855; Cke. ii, 943.

Species over 200, chiefly in tropical America, only a few in the Old World.

Cooke describes 3 species: P. scrobiculatum, Linn., P. compactum, Roth., and P. distichum, Linn., to which we add Paspalum dilatatum, Poir. P. distichum has to be replaced by P. vaginatum, Sw., for reasons detailed below.

I. Leaves over 14 cm. long
1. Plant 60–90 cm. high...
   2. Plant 1–1.5 m. high...

II. Leaves less than 11 cm. long
1. Leaves 2.5–7.5 cm. long, 8–12 mm. broad...
   2. Leaves 5–10 cm. long, 1–2.4 mm. broad...

1. Paspalum scrobiculatum, Linn. Mantiss. (1767), 29; Hook. f. in F. B. i. vii 10; Cke. ii, 943; Haines in Bot. Bihar & Orissa 1000.—P. scrobiculatum, Linn. var. Commersonii, Stapf in Prain Fl. Trop. Afr. ix, 573.—P. scrobiculatum, Linn. var. frumentaceum, Stapf i. c. 575.—P. scrobiculatum, Linn. var. polystachyum, Stapf i. c. 576.—For further synonyms see Hook. f. and Stapf. II. cc. Hook f. gives P. orbiculare, Forst. Prodr. 7 as a synonym, but Stapf considers it as a distinct species of the Polynesian and Indo-Malayan regions with an extension into New Zealand and Australia. Of Hook. f. syn. in the F. B. I. we wish to enclose only those which apply to spontaneous forms of the Old World.

As can be seen from the above synonymy we are not following Stapf in distinguishing several varieties or rather forms. He takes the cultivated forms of India to be the original P. scrobiculatum of Linnæus and calls it P. scrobiculatum var. frumentaceum. All the spontaneous forms of P. scrobiculatum as understood by most post-Linnaean authors are put by Stapf under P. scrobiculatum, Linn. var. Commersonii, the type for this combination being P. Commersonii, Lam. Ill. i, 175, t. 43, fig. 1. The third form var. polystachyum does not seem to occur in India.

Description: Cke. I. c.

Locality: Sind: Jamesabad, in bed of watercourse (Sabnis B979!); Bohara (Blatter & McCann D689!).—Konkan: Victoria Gardens, Bombay (McCann 4297!); Mulgaum, Salsette (McCann 3607!); Parsik, between stones of railway track (McCann 3816!); Vihar Lake, Salsette (McCann 9517!).—Deccan: [18]
Khandala, in watercourse, on sandy soil (McCann 9824! ).—S. M. Country: Konankeri, Dhawar District, elevation 1,800 ft., rainfall 40 inches (Sedgewick & Bell 4542!); F. W. I. of Dhawar, elevation 2,000 ft. rainfall 60 inches (Sedgewick & Bell 4452!); Dastikop, elevation 2,500 ft., rainfall 35 inches (Sedgewick 2109!); Dhawar (Garade!); Belgaum (Herb. Bot. Gard. Cal! ).—Konanara: Halyal (Talbot 2297!); Karwar (Herb. Econ. Bot. Poona 2297 !, 618! ); Castle Rock (Gammie !).

Distribution: Tropics of the Old World.


Description: A tall, erect grass, about 1-1.5 m. high. Culm developing from a thick rootstock with 3-3 leaves; leaf at base of culm often about 30 cm. long, 8-12 mm. broad, smooth on both sides, rugose along the margins. Racemes 12-30 cm. long, having 5-10 somewhat spreading spikes, which are 7 cm. or more in length, 2-5 cm. apart, upper ones gradually shorter. Spikelets closely arranged in 4 rows, two on each side of the narrow and nearly straight axis, in alternate pairs, 1.5-2 mm. wide, and 3-4 mm. long, ovate, acutely pointed, crowded and overlapping each other, compressed, margins clothed in silky hairs. Involucral glumes ovate, acute, 5-nerved, nearly smooth except the fringe of white hairs on the margin. Floral glumes thick, hard, and firm, very minutely punctate. Pale fitting inside the flowering glume and enclosing the stigmas and styles. Anthers linear. Styles 2; stigmas blackish-purple, plumose.

Locality: Cultivated. See Mann, l. c.

Distribution: Virginia, Mississippi, Louisiana, Texas, S. America, especially Brazil.

Uses: One of the best fodder grasses in N. America and is extensively cultivated there. For a full account see Kew Bull. (1902), 1-4.


Description: Cke. l.c.

Locality: Konkan: Tiwari-Pada, Bassein (Herb. Econ. Bot. Poona 1609!); Matheran, to Louisa Point (D’Almeida A243! ). —Deccan: Khandala, growing in gravelly soil, very common (McCann 9823!); Igatpuri, very common (McCann 4587!); Panagchani, First Tableland (McCann B1300!, B1265!); Second Tableland (McCann B1242!, B1292!); Mahabaleshwar (Cooke, Woodrow).—S. M. Country: Londa (Bhide!); Belgaum (Hole 15!).—Konanara: Yellapole (Talbot 6571!); Tinai (Talbot 2566!); Castle Rock, elevation 1,900 ft., rainfall 250 inches (Sedgewick 2752!); Karwar, Bingy Ghat (a very villious form, McCann (Talbot 1529!)); Devimani, elevation 1,300 ft. (McCann A17!).

Distribution: W. Peninsula of India.


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\(^1\) We have to thank Mr. K. Biswas, the Curator of the Herbarium of the Sibpur Botanic Garden, for most of the information contained under this species.

[19]

To explain the change of name from *P. distichum*, Linn. to *P. vaginatum*, Sw., and to elucidate certain points of the above synonymy taken from Stapf, it will suffice to quote the short explanation given in the Fl. Trop. Afr. p. 572: ‘Frequently confused with *Paspalum distichum*, Linn. (*Herb. Linn.*) which has broader and flatter leaves, mostly sessile or subsessile lateral spikes and spikelets with firmer sides and a more convex upper glume, which is appressed and silky pubescent.’

**Description**: Cke. ii, 943.

**Locality**: Gujar. : Marshy edge of the Bokh, Prantij (*Herb. Econ. Bot. Poona*).—Konkan : Marine Lines, Bombay (*Hallberg 9514*); sea-shore, Bombay (Woodrow); Malabar Hill, Bombay (McCann 3690); St. Xavier’s College compound (McCann 9830); Alibag, sandy shore (*Ezekiel*); Malwan (Woodrow).

**Distribution**: Tropics of the whole world, mostly on the sea-shore; introduced into Galicia (Spain) and the Western and Central Pyrenees.


(LECT.) *Paspaloideae* in F. B. I. *partim*.

Perennial, semiaquatic or terrestrial. Leaves linear, flat or involute. Ligule a ciliolate rim. Racemes sessile or sub-sessile and secund on the alternate notches of a triquetrous common axis of a false compound spike, more or less appressed to the more or less hollowed-out flanges of the latter. Rhachis ending in a subulate point. Spikelets mostly conspicuously 2-seriate, nearly always quite glabrous, ovate ovate-oblung or ovate-lanceolate (when seen in front view), awnless, falling entire from the pedicels, solitary, secund and abaxial on the rhachis. Involucral glumes mostly dissimilar and very unequal in length; lower reduced to a small scale or to, rarely over, half the length of the spikelet, upper mostly almost equalling the spikelet, 5-7-nerved with the nerves evenly distributed, rarely both glumes much reduced. Lower floral glume similar to the upper involucral glume with the inner side-nerves more distant, pale if present only slightly shorter than its glume with well developed inflexed flaps; upper floral glume oblong to elliptic in outline, acute to apiculate; emunconate, crassaccous with firm involute margins, faintly 5-nerved, pale almost as long as its glume, 2-keeled, its sides tightly embraced by the glume all along. Lodicules 2, small, broadly cuneate. Stamens 3. Styles distinct; stigmas plumose, laterally exserted from the upper part of the spikelet. Grain tightly enclosed by the more or less hardened glume and pale.

Species about 12.—In the warm countries of the whole world. Six are confined to Australia and New Caledonia.

Cooke (ii, 929) describes 3 species belonging to this genus: *Panicum flavidum*, Retz., *P. punctatum*, Burm., and *P. fluitans*, Retz. We retain all, but substitute the older name *geminatum* for *fluitans*.

I. Lower spikes shorter than the internodes. Upper involucral glume shorter than the upper-floral glume ...

II. Lower spikes as long as or longer than the internodes. Upper involucral glume about $\frac{1}{3}$ the upper floral glume ...

III. Lower spikes as long as or shorter than the internodes. Upper involucral glume mostly as long as the upper floral glume ...


Description: Cke. ii, 929.

Locality: Sind: Sanghar (Sabnis B762!).—Gujarat: Near Surat (Dalzell & Gibson teste Cooke); Morvi, Kathiarwar (Woodrow teste Cooke); Porbandar, Kathiarwar (Woodrow teste Cooke).—Konkan: Mulgaum (McCann 3579!); Thana (McCann 8726!); N. & S. Konkan (Laws teste Cooke).—Deccan: Poona (Bhide !); Mr. Gammie’s compound, Kirkee (Bhide 894!); Khandala (Woodrow teste Cooke!).—S. M. Country: Konankeri, in a small tank, elevation 1,800 ft., rainfall 40 inches (Sedgwick & Bell 4954!); Belgaum (Herb. Econ. Bot. Poona!).—Kanara: Yellapore (Talbot!); Halyal (Talbot 2095!).

Distribution: Plains of India, Ceylon, tropical Asia (not in tropical Africa as reported by Hook. f. and Cooke).


Description: Cke. i.c.

Locality: Deccan: Poona (Woodrow, Lisboa); Ahmednagar (Woodrow).

Distribution: Throughout India in marshes, Ceylon, Malay (not in tropical Africa).


Description: Cke. ii, 929.

Locality: Sind: Munchar Lake (Stocks teste Cooke); Tatta (Blatter & McCann D611 l., D612 l.).—Gujarat: Porbandar (Bhide!); Lesundra (Chibber!); Ahmedabad, canal banks (Sedgwick!); Cutch, Anjar, tank (Blatter 3745 l!).—Khandesh: Dhulia (Chibber!); Borod, growing in water, partly submerged (McCann A97 l!).—Konkan: Mahaluxmi (Sabnis 5449!); opposite Kantwadi, sandy shore, Bandra (Vakil A99!); Victoria Gardens (McCann A100!); common in Bombay Isl. (McCann!).—Deccan: Bund Gardens, Poona (Garade 343!); sides of stream Dangar Guy, Ahmednagar (T. Cooke 6 l!); Mannmad, river bed (Blatter A94!); Sholapur Tank, in water (D’Almeida A95!); Pashan (Gammie!); Igatpuri (Blatter & Hallberg 5432!)—S. M. Country: Dharwar (Sedgwick 3602!); Shiggao (Sedgwick 2081!).—Kanara: Halyal (Talbot 2149!).

Distribution: More or less throughout India, Ceylon, Afghanistan, Arabia, tropical Africa and America.


Perennial or annual. Leaves linear to lanceolate, flat; ligules a ciliate rim. Racemes sessile or subsessile on a common axis, simple or nearly so; rachis more or less triquetrous with a low almost straight or zigzag facial angle or keel, [21]
rarely strap-shaped; pedicels solitary or in pairs, alternately to the right and the left of the facial angle, usually reduced to short disc-tipped stamps, or if binate the primary slightly longer. Spikelets close, contiguous or slightly dis-contiguous, 2 or irregularly pluri-seriate, glabrous or hairy, broad-ovate to elliptic or lanceolate-oblong, awnless, usually more or less flattened or slightly depressed abaxially, convex on the back, falling entire from the pedicels, solitary or binate or in fascicles of 3-4, secund and abaxial on the rachis, involucral glumes similar and subequal or more often dissimilar and very unequal in length, the over being the shorter, upper resembling and more or less equaling the lower floral glume, 5-11 (mostly 7-) nerves. Lower floral glume 5-7-, rarely more-nerved the inner lateral nerves somewhat distant from the midnerves, pale subequal to the glume, with well-developed inflexed flaps and sharp sometimes marginate keels; upper floral glume elliptic to rotundate-elliptic in outline, very obtuse, with usually scabrid or barbellate macro, narrowly involute, 5-7-nerved, pale almost as long as the glume, 2-leaved, the sides tightly embraced by the valve all along. Lodicules 2, small, broadly cuneate. Stamens 3; styles distinct; stigma plumose, laterally exerted upwards. Grain tightly enclosed by the glume and pale, broadly to rotundate-elliptic, dorsally compressed.

"Very similar to Brechiaria, but with the orientation of the spikelets inverted and a short fine macro from the very obtuse apex of the fertile valve. Although very similar in general appearance, none of the species of Urochloa can be said to approach closely members of the genus Brachiaria. Their affinities are clearly inter se, suggesting a distinct line of evolution. The occurrence of parallel states, one with glabrous, the other with pubescent spikelets, but otherwise indistinguishable, runs almost through the whole genus. To this may be added the presence of a submarginal fringe in the lower floret, almost normal in some and very rare in other species, and apparently in no case correlated with other characters." (Stapf I.c.)

Species about 18.—Hol part is of the Old World, one in America, but perhaps introduced.

Cooke describes 3 species of Panicum which belong here: Panicum prostratum, Lamk., P. setigerum, Retz., and P. Javanicum, Poir., to which we add Urochloa marathensis, Henrard.


A. Spikelets up to 2 mm. long ...
1. U. repans.
B. Spikelets 2.5-5 mm. long

I. Spikelets lanceolate, acuminate
1. U. setigera.
II. Spikelets ovate to elliptic-oblong

1. Leaves about 3 cm. long. Racemes 2 cm. long ...
2. Leaves 3.5-15 cm. long. Racemes 2.5-5 cm. long ...


Description: Cke. ii, 932, under Panicum prostratum.

Locality: Gujarat: Ahmedabad, famine grass plot, Bedar (Herb. Gujarat College!); Ghad, on black soil (Sedgwick 1124!).—Khandesh: Nandurbar, (Mamlatdar of Nandurbar!); Umalla, Tapiti bank (Blatter & Hallberg 5229!); Bor, Tapiti (Blatter & Hallberg 4417!).—Kornkan: Vaseo da Gama (Bhide!); Matunga, salt pans (Sambis 95721!); Byculla (McCann 85771!).—Deccan: Kirke
Revision of the Flora of the Bombay Presidency


Description: Cke. ii, 933, under Panicum setigerum.


Distribution: India, Ceylon, Mauritius, tropical and S. Africa.

Note: We do not think there is any good reason for retaining Hook. f.'s var. tomentosa which was also mentioned by Cke. i. c. We refer to the note given above after the general characteristics of the genus and add what Stapf says with regard to this species in particular: 'The African specimens have glabrous spikelets. In India, however, the pubescent form appears to be prevalent.'


Distribution: Annual, dwarf and robust, glaucous, branching from the lower geniculations. Stems low, stricate, quite glabrous, few-noded, nodes pubescent. Leaf-sheaths terete or slightly compressed, stricate, lower ones gaping, upper ones tight, shorter than the internodes, hisrate with bulbous-based hairs. Ligule very short, covered with long hairs. Blade cordate at the base, linear-lanceolate, gradually acute, more or less 3 cm. long, 5-7 mm. broad, flat, on both sides but especially on the upper sparingly covered with spreading bulbous-based hairs, margin thickened, distinctly undulate, fimbriate with long tubercular hairs. Racemes 2-3, distant from each other more or less 1 cm., 2 cm. long, stout, erect-patulous or finally reflexed; rachis subtrigcns, pilose at the base, more than twice as narrow as the spikelets slightly undulate, the angles scaberulous, otherwise glabrous, giving off solitary pedicels. Spikelets biseriate, broadly elliptic, very acute, 4 mm. long, anteriorly almost flat, posteriorly very convex, green, glabrous. Involucral glumes very unequal. Lower almost ⅛ of the spikelet, subobtuse, 5-nerved, upper as long as the spikelet, very acute, distinctly 7-9-nerved. Lower floral glume equal in shape to the upper involucral glume, flat, 5-nerved, glabrous on the back tubercular-echinulate near the margin, except near the tip and base, paleate. Upper floral glume shorter than the preceding glumes, elliptic with a rounded tip, rigid, opaque, brown-straw-coloured, rugulose, long caudate, 5-nerved, bullate below.

Locality: S. M. Country and N. Kanara (A. P. Young ex Henrard). We have not seen the specimen.

Distribution: So far endemic.

Note: Henrard has a variety from the same localities: var. Velutina, which differs from the type by the densely pubescent spikelets. What we said in a note under the previous species can be applied here.


This is the species which was described by Hook. f. and many others, amongst them by Cooke, under the name of Panicum javanicum, Poir. According to Stapf P. javanicum, frequently confused with U. Helopus, is U. panicoides, Beauv., a distinct species. A number of synonyms and references have, according to the same authority, to be excluded from the F.B.I. under Panicum javanicum: Bentham’s Flora of Australia (vii, 476) mentions Panicum Helopus, but it is partly Brachiaria notochlona, Stapf (Panicum notochthlonum, Domin) and partly Brachiaria ramosa, Stapf. T. 7 in Duthie’s Fodd. Grass. does not represent Panicum Helopus, but Brachiaria ramosa, Stapf. Urochloa panicoides, Beauv. is a synonym of Panicum javanicum, Poir. P. trichopus, Hochst. is Urochloa trichopus, Stapf.

As a number of foreign elements have crept into the usual descriptions of our species we give Stapf’s description of P. Helopus.

Annual. Stems tufted, 30–60 cm. high, erect or geniculately ascending from a short sometimes rooting base, frequently sparingly branched from the lower nodes, 4–10-noded, intermediate internodes like the uppermost (peduncle) very sparingly pubescent or almost glabrous. Leaf-blades lanceolate to linear-lanceolate from a wider and semi-amplexicaul base, 3.5–15 cm. by 8–12 mm rarely up to 25 cm. and then linear and narrowed towards the base, soft, flat, pale or yellowish-green, loosely and often finely hisrate with tubercle-based hairs, rarely almost glabrous, margins usually crisped or wavy and more or less ciliate. Sheaths somewhat loose, pale, striate, densely ciliate upwards, more or less shortly hisrate with the hairs tubercle-based, nodes pubescent to subvillose. Ligules a densely ciliate rim. Inflorescence of mostly 4–7 erect or at length more or less spreading stiff or slightly flexuous sessile or subsessile spiciform secund racemes; common axis 1.2–5 (rarely 7.5 cm.) long, subsemierete below, much flattened upwards, pubescent. Racemes moderately dense, 2-seriate, simple, 25–5 cm. 10–2, solitary or here and there approximate and then unevenly distributed; rachis straight or slightly wavy, flat on the back, about 1 mm. wide, villous at the base, glabrous upwards, rarely sparingly hairy, angles scabrid; internodes up to 1 mm. long; pedicels solitary, reduced to short stout stumps with discoid tips, frequently bearing some long spreading hairs. Spikelets laterally contiguous or subcontiguous ovate to elliptic-oblong, very acute, 4–5 mm. long, greenish, glabrous or pubescent. Involutal glumes dissimilar; lower broad-ovate, subobtuse to acute, clasping at the base, 1.5–2 mm. long, glabrous or sparingly and minutely pubescent, 5-nerved upper one corresponding in size and outline to the spikelet, prominently 7–11–(mostly 9)–nerved, glabrous or pubescent. Lower floral glume very similar to the upper involucral glume, but flat or slightly depressed, 5–7-nerved with the inner siders-nerves distant, glabrous or pubescent, pale oblong, acute, slightly shorter than its glume, usually 2 mm. long. Upper floral glume rotundate-elliptic, greenish to pale brown, 2.5–3 mm. long, pale finely transversely rugose or granular, mucro up to 1 mm. long, sparingly barbellate. Grain rotundate-elliptic on outline, much compressed, about 2 mm. long, yellowish or greenish.

Locality: Gujarat: Baroda (Cooke teste Cooke).—Deccan: Katakā Ghat, 11 miles S. E. of Poona (Shevade!); Poona (Woodrow!); Deolali (Blatter A110!); Ganeshkhind Bot. Gardens (Patwardhan!); Chattarshini (Bhide!); Mangiri, near Poona (Gammie 15344!); Akola (Mamlatdar of Akola!); Dapuri near Poona (Jacquemont 4921!).—S. M. Country: Bharwar, elevation 2,500 ft., rainfall 35 inches (Sedgwick 21571!); Kilgerry (Taibot 2419!); Havari (Taibot 2284!); Bijapur (Mebebld 11201!); Badami (Woodrow teste Cooke).—Kanara: Kulgi, elevation 2,000 ft. (Taibot 2283!); Nundgod (Mamratar of Nundgod).

Distribution: Plains of India, Ceylon, tropical and S. Africa, Mauritius.

49. Echinocloa, Beauv. Agrost. 53, t. 11, fig. 2; Stapf in Prain Fl. Trop. Afr. ix, 604.

Annual or perennial. Leaf-blades from a slightly constricted or equally wide rarely much attenuated base. Ligules 0 or represented by a transverse fringe of hairs. Panicles of crowded or loosely arranged secund speciform branches
mostly bearing spikelets from the base or near it. Spikelets ovate to elliptic- or lanceolate-oblong, usually cupulate or awned, very convex on the back, flat or slightly depressed in front, falling entire from the peduncles, 2-nerved or clustered, 2 or 3-nerved, acute, cupululate or cupulate, rarely produced into a short awn. Lower floret equalling the upper glume (excluding cusps or awns); lower floral glume very similar to the upper involucral glume, but flat or depressed on the back and often with a more pronounced cusp or an awn; pale equal to the body of the valve, or in barren florets more or less reduced, hyaline, finely 2-keeled. Upper floral glume ovate to elliptic-oblong, apiculate or obtuse, very convex on the back, suboriceous or crustaceous, polished, faintly 5-nerved, margins firm, involute up to near the tip, then flat, not embrazing the tip of the pale, pale sub-equal to the glume and similar in substance, with rounded keels and flaps which thin out towards the flat slightly recurved tips. Lodicules 2, cuneate, fleshy. Stamens 3. Styles distinct; stigmas plumose, exserted from near the tips. Grain broad-elliptic dorsally flat, ventrally convex; hilum punctiform, subbasal.

Species about 20-25.—The warm regions of both hemispheres.

Note: It will be useful to remember what Stapf says regarding this genus l.c. 605: 'The segregation of the numerous forms which make up the genus Echinochloa and their reduction to more or less well definable species is still unsatisfactory, mainly owing to their apparently endless variability and the difficulty, if not impossibility, of discriminating between stable and unstable modifications and the effects of hybridization. Here, as in other cases, observation in the field and experiment will have to decide.'

Cook describes under Panicum 2 species which have to be referred to Echinochloa: P. colonum and P. stagninum. We add E. Crus-Galli which Cooke thought did not occur anywhere in the Bombay Presidency.


Description: Cke. ii, 931.
Locality: Sind: Karachi (Nankan!); Mirpurkhas (Bhide!; Sabnis B1176!); Sindh (Blatter!); Larkana, barren plains (Sabnis B989!; B85!; B457!); Sanghar (Sabnis B899!; B894!); Masepur, clayey soil (Sabnis B1048!); Mirva Canal, Khairpur Mirs (Sabnis B263!); Khairpur Mirs (Sabnis B337!); Schwan to
Laki (Sabnis B63!); Hyderabad (Sabnis B49!); Pad-Idan (Sabnis B516!); Chuar Ch. (Blatter & McCann D616!, D621!); Baghar (Blatter & McCann D617!); Mirpur Sakro (Blatter & McCann D618!, D620!); Gulamalla (Blatter & McCann D619!); Shikarpur (Woodrow).— Gujarat: Lasundra (Chibber!); Anjor (Cutch), brackish water (Blatter 3743!); Ahmedabad (Cowper!).— Morvi, Kathiawar (Woodrow).— Khandesh: Muravad, Tapti bank (Blatter & Hallberg 4435!); Bor, Tapti Island (Blatter & Hallberg 4439!); Dadgaum (McCann A104!); N. slope of Chansarri (McCann A105!);— Konkan; Bombay, salt swamps (Woodrow!); Vetaora (Sabnis 33589!).— Charni Road, Bombay (Sabnis 4329!); Bombay, very common (McCann!).— Alibag, rice fields (Ezekiel!).— Deccan: Purandhar Fort (Bhide!, McCann 5520!); Nira Canal, Poona District (Chibber!); Khandala, very common (McCann A101!); Sholapur (D’Almeida A102!); Igatpuri (Blatter & Hallberg 5487!; McCann 4331!); Deolali (Blatter A103!); Poona, canal (Ezekiel!).— S. M. Country: Dharwar (Sedgwick 2655)!; Castle Rock (McCann A106!); Londa (Woodrow).— Kamara: Dongi Nallah (Talbot!); Karwar (Talbot 634!).

Distribution: Throughout the plains of India, Ceylon, all over the tropics and the warm-temperate regions of the world. Probably of African and Indian origin according to Stapf.

The same author is of opinion that Panicum frumentaceum, Roxb. which is grown in India as a grain crop, is evidently descended from Echinochloa colona. Roxburgh’s species may therefore, be treated as a variety: var. frumentaceus, Blatter & McCann.— Echinochloa frumentacea, Link. Hort. Berol. i, 204; Aitchis. Cat. Panjab Pl. 161.— Panicum frumentaceum, Roxb. Fl. Ind. i, 304; Schult. Maut ii, 230; Trin. Sp. Gram. i. t. 104; Duthie Grass. N. W. Ind. 4, Field & Gard. Crops. 5. t. 24, Podd. Grass. N. Ind. 8.— P. Crus-Galli, var. frumentaceum, Trin. Cat. Ceyl. Pl. (1855), 104.— Echinochloa Crus-Galli, var. frumentacea, Haines in Bot. Bihar & Orissa 998.— Panicum stagninum, Retz. var. frumentacea, Cooke in Cke. ii, 931.— Oplismenus frumentaceus, Kunth Rev. Gram. i, 45, Enum. Pl. i, 146; Dalz. & Gibs. Bomb. Fl. Suppl. 98.

Description: Tall, robust. Stems erect, from 60 to 120 cm. high. Panicle often nodding. Spikes second, incurred, crowded. Spikelets mostly 3-nate, unequally pedicelled, one at least sessile, varying from hispidulous to almost glabrous, and from acute to cuspidulate or rarely distinctly cuspitate.

Locality: Cultivated in and near the Ghat districts.


Description: Annual, up to 1 m. high. Stems geniculately ascending, branched below, compressed towards the base, glabrous and smooth, internodes enclosed or exserted. Leaf-blades linear, base scarcely narrowed, narrowed to an acute point, 7-25 cm. by 6-12 mm. flat, subflaccid, glabrous, more or less dull greyish-green, smooth or scaberulous below, particularly towards the tip, margins finely cartilaginose, scabrid to almost smooth. Sheaths somewhat loose, the lower often compressed, whitish and [26]
thin, the upper subherbaceous, all smooth, glabrous and striate except the basal which are pubescent above their insertion. Ligules 0, junction of blade and sheath glabrous inside marked by a brown line. Panicles erect, strict or flexuous, at length exserted, 7.5-20 cm. long; axes triquetrose, setose; branches few to about 15, solitary or 2-nate, suberect or spreading, distant except the uppermost or all more or less approximate forming a 'lobed' panicle, the lower 2.5-6 cm. long, forming rather stout dense mostly many-ranked simple or subcomposite subsecond sessile false spikes; rhachis triquetrose, scabrid, rarely distinctly, particularly near the nodes; pedicles fascicled or 2-nate, very short, up to 1 mm. long; scabrid, bristly at the base, tips subdiscoid. Spikelets crowded, ovate-elliptic in outline, acute, cuspidate or awned 2.5-3 mm. long, greenish or tinged with purple. Lower involucral glume membranous, very broadly ovate, clasping at the base, obtuse to subcuspidate, 1 mm. long, 5-nerved scaberulous; upper herbageous-membranous, very broadly ovate-oblong, concave, acute, cuspidate, as long as the spikelet, 5- or (near the tip) 7-nerved, rigidly pubescent between the scabrid and spinulose nerves. Lower floral glume similar to the upper involucral glume, but flat or depressed on the back, cuspidate or produced into a scabrid often long flexuosus awn, 7-nerved (at least at the tip), pale elliptic, shorter by \( \frac{1}{2} \) than its glume, keels scaberulous upwards; upper floret hermaphrodite, elliptic in outline, cuspidate, over 2 mm. long, whitish or yellowish, polished, glume and pale subcoriaceous. Anthers oblong. Grain broad-elliptic in outline, 1.5 mm. long.

**Locality:** Sind: Mirpurkhas (Bhide!); Ghulamalla (Blatter & McCann D613!); Keti (Blatter & McCann D614!);-Gujarat: Stream near Prantji (Sedgwick!); the Bokh, Prantji Taluka (Sedgwick 1144!).—Deccan: Poona (Woodrow!).—S. M. Country: Aluara, elevation 2,000 ft., rainfall 28 inches (Sedgwick 3066!); Bidi, elevation 2,500 ft., rainfall 50 inches (Sedgwick 3076!).

**Distribution:** Common through the greater part of India and Malaya; as a weed throughout the warm temperate countries of the northern hemisphere, rather rare in the tropics of Africa and the New World and south of the Tropic of Capricorn (Stapf).


**Description:** Cke. ii, 930, under Panicum stagninum.

**Locality:** Sind: Ghulamalla (Blatter & McCann D615!).—Konkan: Virar, on bank of a tank (McCann 9588!, 9584!).—Deccan: Igapturi (Blatter & Hallberg 5473!); Khandala, in water in the smaller village tank (McCann 27441!); Panchgani (Blatter & Hallberg B1241!).—S. M. Country: Hubkop, elevation 2,000 ft., rainfall 50 inches (Sedgwick 3175!); Chikkerur, Taluka Kod, water hole by road (Sedgwick 1969!); Bomigatti tank (Sedgwick 3930!); common in the Carnatic (Sedgwick).—Kanara: Pardhani (Talbot 3136!).

**Distribution:** Common or local throughout India, Ceylon, tropical and South Africa.

**Uses:** Considering tropical African conditions Stapf observes (l. c. 619): ‘This grass deserves every attention on account of its locally abundant supply
and high sugar-content. Chevalier states that it is the most useful of all the plants growing in a wild state in the neighbourhood of Timbuctu. Every part of it is utilized. It yields excellent fodder, material for thatching and caulking, is burned to produce a salt used in the manufacture of soap and indigo, the grains are eaten and the canes are gathered for extracting sugar or preparing vinaigre or a beverage resembling cider. Sir John Kirk also describes it as one of the richest of fodder grasses. Although typically a perennial with long rhizomes creeping in the mud of swamps, lakes and rivers, it seems on temporarily flooded land to flower frequently the first year and then to behave as an annual.

(To be continued)
REVOLUTION OF THE FLORA OF THE BOMBAY PRESIDENCY.
Part VII. By E. Blatter, S.J., Ph.D., F.L.S.

1928

Pseudocimolaena

Reumannum
REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY

BY
E. BLATTER, S.J., PH.D., F.L.S.

PART VII

GRAMINEÆ

BY
E. BLATTER and C. McCANN

(Continued from p. 649 of Volume XXXII)

Annual. Culms very slender with a prostrate rooting base. Leaf-blades lanceolate, soft. Spikelets very irregularly armed or quite unarmed, obliquely ovoid, laterally compressed and mostly conspicuously gaping, falling entire from the pedicels, binate or more often subsolitary or solitary, secund on the flat or subtriquetrous slender rhachis of spiciform racemosely arranged racemes. Involutral glumes herbaceous, of about the same length and almost as long as the spikelet, or the lower distinctly shorter, heteromorphous. Lower more or less flat, 3-nerved, smooth or almost so; upper boat-shaped, gibbous downwards, 7-nerved, with longitudinal rows of more or less transparent spots between the nerves and with or without shorter or longer, stout, hooked hairs or bristles from the centre of the spots. Lower floret male or barren, as long as the spikelet; glume oblong-lanceolate with a minutely truncate tip, laterally compressed, but rounded on the back, chartaceous, with membranous margins and a delicate hyaline area at the base, smooth, pale almost as long as the glume, more or less convolute, faintly 2-nerved. Upper floret hermaphrodite, shorter than the lower; glume broad-lanceolate to oblong, subacute, very convex on the back, chartaceous, faintly 5-nerved pale similar to the valve in texture, tightly clasped by it when mature. Lodicules 2, cuneate. Stamens 3. Styles free at the base, capillary; stigmas plumose, subterminally exerted.
Grain oblong in face-view, semi-ovobate in profile, back very convex; scutellum elliptic, almost half the length of the grain; hilum subbasal, punctiform.
Species 1.—Tropics of the whole world.
The only species of this genus was originally described under Echinolæna. This genus, however, is exclusively American which, according to Stapf, differs from Pseudechinolæna in many ways, 'as in its densely packed spikes, the many-nerved lower glume, the “eglandular” always unarmed upper glume, the uniformly papery 5-nerved lower valve [lower floral glume] which is accompanied by a sharply 2-keeled flat valvule [pale], the basally appendaged fertile valve [upper floral glume] and the acutely auricled or toothed flaps of its valvule [pale], and finally the flatter grain which is marked with a panduriform line on the face extending through its full length and possesses a slender linear hilum.'


Species about fifteen, in the warmer parts of the world, but mostly tropical. We retain the two species mentioned by Cooke ii, 926, 927.


Description: Cke. l.c. A very variable plant.

Locality: Khandesh: Toranmal (McCann 9593!). — Konkan: At the foot of the Ghats under the shade of trees (Dalzell & Gibson); Bassen (Chhiber 164!); Kenery Caves (McCann 9445!); Sion, woods (Blatter 9591!); Matheran, to Louisa Point (D’Almeida A2441, Woodrow); Thana (Lisboa). — Deccan: Igatpuri (McCann 4342!); Khandala, common in forests (McCann 5335!); Lonavla (Lisboa 666); Lungaunli, Tiger path (Blatter & Hallberg B1253!). — S. M. Country: Bidi, shade of trees (Sedgwick & Bell 2962!); forests W. of Dharwar (Sedgwick & Bell 1853!); Castle Rock (Bhide f., McCann!); Londa (Woodrow!). — Kanara: Yellapare (Telbot 7361!); Karwar (Telbot 1322!); Goond (Telbot 2204!); Amshi Ghat (Telbot 2192!); Kadgal (Woodrow).

Distribution: Throughout India, Ceylon, tropical and subtropical Asia. Australia and Polynesia.

Locality: Gujarat: Surat, shady places (Sedgwick 314!);—Konkan; Versova (McCann 4313!); Alibag, sandy shore, on the roots of coconut tree (Ezekiel!); Bombay Isl. (McCann!); Parse (Herb. Dehra Dun!; Woodrow).—Deccan: Chakan (Gammie !); Khandala, very common, forming carpets under trees (McCann 3892!); Lonavla (McCann 3898!); Igatpuri (McCann!); Panchgani (Woodrow).—S.M. Country: S. W. of Dharwar (Sedgwick & Bell 4348!); Dharwar, shade of trees (Sedgwick 1837!); Londa (Gammie 15826!); Castle Rock (Gammie 15696!).—Kanara: Halyal (Talbot 2085!); Karwar (Talbot 1295!).

Distribution: Widely distributed throughout the tropics of both hemispheres.


Annual or perennial grasses, rarely suffrutescant, of various habit and size. Leaves mostly linear to linear-lanceolate, but also ovate or filiform to subulate. Ligules usually reduced to a ciliate rim or a fringe of hairs, rarely a distinct membrane or 0. Panicles usually much divided and at least temporarily open. Spikelets usually loosely scattered, glabrous or hairy, lanceolate to oblong, elliptic or orbicular in outline, symmetrical in profile, rarely somewhat obovate, falling entire or almost so from the often elongated pedicles of a compound or decompound panicle, without a definite orientation towards the axis. Involucral glumes more or less herbaceous-membranous, lower usually shorter than the upper, often very much so, rarely equaling it, usually with 1 or more nerves, or if very small, nerveless; upper as long as the spikelet, rounded on the back, 5-9-nerved. Lower floral glume very similar to the upper involucral glume and equally rounded and curved on the back, 5-9-, rarely 3- or 11-nerved, male or neuter, pale thinly membranous to subhyaline, subequal to the lower floral glume or more or less reduced, rarely suppressed. Upper floral glume subcoriaceous to coriaceous with firm margins, obstone to subacute, emucronate, faintly nerved, hermaphrodite, pale subequal to the glume and of similar substance, tightly embraced by the more or less involute margins of the glume. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exerted near the tip of the floret. Grain tightly enclosed by the hardened valve and valvule, dorsally compressed, biconvex to almost plano-convex; scutellum elliptic to ovate-elliptic, about half as long as the grain: hilum subbasal, punctiform.

Species about 400. In the tropical and subtropical regions of both hemispheres, few in the warm-temperate regions.

Cooke mentions 20 indigenous and 4 cultivated species.

Of the 24 species we have put Panicum flavidum, Retz., P. punctatum, Burm., and P. fluviatilis under Panpidium.

Panicum stagninum, Retz. and P. colonum, Linn. have been transferred to Echinochloa.

Panicum Isachne, Roth, P. ramosum, Linn. and P. muticum. Forsk. belong to Brachiastra.

Panicum prostratum, Lamk., P. setigerum, Retz. and P. javanicum, Poir. have been described under Urochloa.

Panicum interruptum, Wild. and P. myosuroides will be dealt with under Saccoilepis.

Panicum patens, Linn. will be transferred to Cyrtococcum.

New to the Presidency are P. psilopodium, Trin. and P. auritum, Presl.

A. Lower involucral glume as long as the lower floral glume or nearly so ... ... 1. P. turgidum.

B. Lower involucral glume shorter than the lower floral glume

I. Annuals

1. Leaves less than 12 mm. broad
   a. Panicle about 35 cm. long ... ... 2. P. obscurans.
   b. Panicle not more than 25 cm. long
      aa. Spikelets gaping ... ... 3. P. trypheron.
      bb. Spikelets not gaping ... ... 4. P. psilopodium.
2. Leaves more than 12 mm. broad
   a. Spikelets 4'-5-5 mm. long ... 5. P. miliaceum.
   b. Spikelets 2-3;2 mm. long ... 6. P. miliare.

II. Perennials
1. Lower involucral glumes very minute, one
   or rarely both often obsolete ... 7. P. subeglume.
2. Lower involucral glumes distinctly evident
   a. Culms up to 3 m. high ... 8. P. maximum.
   b. Culms less than 1'7 m. high
      aa. Culms not more than 90 cm. high...
      bb. Culms more than 90 cm. high
         + Spikelets laxly clustered on the
         branches...
         ++ Spikelets solitary ... 10. P. antidotale.
         +++ Spikelets fascicled, subsecond, sessile or
         shortly pedicelled ... 12. P. auritum.

   19, t. 9, fig. 2; Trin. Diss. Gram. Pan. 189, Gram. Icon. & Descr ii 227, Pan.
   Gen. 221, and in Méan. Acad. Pétersb. sér. vi, iii, 307. Kunth Enum. i, 97;
   Steud. Syst. Pl. Glum. i, 88; Boiss. Fl. Or. v, 441; Duthie Fod. Grass N. Ind.
   214; Meschler. Man. Fl. Egypt i, 57; Cke. ii, 935; Stapf in Prain Fl. Trop.
   Afr. ix, 706.—*P. nubicum*, Fig. & De Not. in Mem. Ac. Torin. ser. 2, xiv, t.
   21, fig. 1-12.
   **Description**: Cke. l.c.
   **Locality**: Sind: (Duthie teste Cooke); Sehwan, sand hills (Bhide!).—
   **Gujarat**: Rajkot, Kathiawar (Woodrow teste Cooke).
   **Distribution**: Tropical Africa, Egypt, Cyprus, S. Palestine, Arabia, Socotra,
   S. Persia, Baluchistan, Sind, Gujarat.
   **Uses**: An excellent fodder for camels.

   Cke. ii, 935.— *Isachne obscurans*, Woodr. in Gard. Chron. 23, ser. 3 (1898),
   161.
   **Description**: Cke. l.c.
   According to Woodrow the whole inflorescence breaks off and is driven about
   by the wind.

   Stapf says that the tropical African *Panicum hippothrix*, K. Schum. is very
   similar and perhaps identical with *P. obscurans*, but he adds that the blades of
   the latter are much wider, measuring up to 14 mm. and that the panicle 'is
   perhaps on the whole more open with slightly larger spikelets.' (In Prain Fl.
   Trop. Afr. ix, 693.) These are scarcely differences to justify specific distinction,
   but as we have not seen the African plant, we do not venture to decide the
   point. If the identity between the two species should be established, Woodrow's
   specific name, being of a later date by four years, will have to cede to
   *P. hippothrix*.
   **Locality**: Deccan: Mangiri Farm (Herb. Econ. Bot. Poona!); Jeur near
   Sholapur (Woodrow).
   **Distribution**: Endemic.

3. *Panicum trypheron*, Schult. Mantiss. ii (1824), 244; Hook. f. in F.B.I. vii, 47;
   Prain Beng. Pl. 1176; Cke. ii, 936; Haines in Bot. Bihar & Orissa 995.—
   **P. Roxburghii**, Spreng. Syst. i, 320; Kunth Enum. Pl. i, 126; Stend. l.c. 98.—
   **P. tenellum**, Roxb. Fl. Ind. i, 306; Duthie Grass. N. W. Ind. 7.

   from *P. trypheron*, Schult. as understood by Hook. f. in F.B.I. l.c., and with it
   all the material covered by the following synonyms: *P. confine*, Hochst. ex
   (non Jacc.).—**P. trypheron**, therefore, does not occur in tropical Africa.
   **Description**: Cke. l.c.
   **Locality**: Gujarat: On the Idar Frontier, Prantij Taluka, sandy waste
   (Sedgwick !).—**Konkan**: Malabar Hill (Lisboa teste Cooke).—**Deccan**: Poona

[4]
(Woodrow testae Cooke); Jeur (Woodrow testae Cooke); Malhargad (Woodrow testae Cooke).—S. M. Country: Dharwar (Garade!); Dharwar, on pastures and dry hills (Sedgwick 6144).

Distribution: Punjab, Bengal, W. Peninsula, Ceylon, China, Borneo.


Description: An annual, tufted grass. Culms erect or quickly ascending, 30-60 cm. high, rather slender, simple or branched, usually leafy up to the panicle. Leaves rather broadly linear, acute or somewhat acuminate, 7-30 cm. by 4-8 mm. glabrous or with few short spreading hairs towards the base, rarely thinly hairy all over. Sheaths often with spreading hairs which leave minute raised dots after falling, more usually glabrous, loose, striate. Ligule a narrow row of hairs. Panicle spreading, 5-20 cm. long, with very capillary branches and slender pedicels which are often 10 mm. long. Spikelets 2-3 mm. long, geminate, narrowly elliptic, with abruptly acute tip. Lower involucral glume very broadly ovate-acute, about ½ the spikelet, base amplexicaul but not overlapping itself in front, 5-nerved. Upper involucral glume oblong-ovate, as long as spikelet, minutely cuspitate; 9-11-nerved. Lower floral glume similar, with delicate, oblong, margined pale. Upper narrow-ellipsoid, acute, very smooth and polished as is its pale.

Locality: Gujarat: Ahmedabad and elsewhere in shady wet places in the monsoon (Saxton & Sedgwick).

Distribution: India, Burma, Malacca, Ceylon.


Vern. Names: Common Millet; cheno (Guj.); vari (Decc.); gajro (Panch Mahals); sava (Mar.); chinee (Sind).

Description: A tufted annual, 0-6-1-2 m. high. Stems erect or geniculately ascending, terete, stout or slender, 4-5-noded, simple or sparingly branched, more or less softly hirsute below the nodes, the uppermost internode usually quite glabrous. Leaf-blades linear from an equally wide or slightly contracted and rounded base, long-tapering to a slender point, 15 to over 30 cm. by 6-20 mm., flat, flexuous, usually glabrous except for the often ciliate lower margins and hispidulous dorsal midrib, rarely sparsely hairy all over, hairs long and fine, midrib somewhat stout and prominent below in large leaves, primary lateral nerves 3-6 on each side, very slender. Sheaths terete, somewhat loose or the upper tight, closely striate, spreadingly hirsute with tubercle-based hairs, pubescent or loosely bearded at the nodes, longer or slightly shorter than the internodes. Ligule a narrow ciliate rim. Panicles contracted and rather dense or open, narrowly oblong, nodding, often with their base permanently enclosed in the uppermost sheath or only shortly exserted, up to 30 cm. long in spontaneous specimens usually scantier, looser and at length more open, divided up to the fourth or in cultivated specimens the fifth degree, all the divisions filiform, angular and scabrid; primary axis slender or somewhat stout below, subterete, striate or grooved and smooth towards the base; primary branches more or less approximate below, more distant upwards, often much divided from low down; branchlets relatively long, the lower divided again in the same manner or like the remainder from much higher tip with spikelets in small loose racemes of 2 (rarely 3) towards the summit; pedicels hardly thickened upwards, with truncate tips, the lateral from less than 1-6 mm. long. Spikelets usually ovate-lanceolate, applicate-acuminate, turgid, 4-5-5 mm. long, glabrous, green or brownish green. Involucral glumes persistent, unequal, strongly and prominently nerved; lower broad-ovate, acute,
from \(\frac{1}{4}\) the length of the lower floret, 5-nerved, upper corresponding in size and outline to the spikelet, broadly rounded on the back, 11-nerved, tip contracted, apiculate to shortly rostrate. Lower floral glume barren, very like the lower involucral glume, pale ovate to ovate-oblong, truncate or emarginate, up to about \(\frac{1}{2}\) the length of the glume. Upper floret hermaphrodite, elliptic-oblong in outline, subacute, very convex on the back, up to over 3 by 2 mm., variously coloured (white, yellow, red, brown or black), very smooth and polished, glume and pale crustaceous. Grain white.

**Locality:** Cultivated in many parts of the Presidency, chiefly in Gujarat and on the Ghats.

**Distribution:** Supposed to have originated in India. But see De Candolle, Origin of Cultivated Plants, p. 376, London 1909.

**Uses:** Cultivated for its grain and as a good fodder.


**Description:** An annual grass. Culms 30-90 cm. high, rather slender, erect or base geniculate, simple or branched, usually leafy up to the panicle. Leaves linear, 15-60 cm. by 12-25 mm., gradually tapering from a broad base, glabrous or finely hairy, sheaths glabrous, rarely hisutse with tubercle-based hairs. Panicles very compound, contracted or thyrsiform, and often nodding, 10-25 cm. long (without the subsidiary axillary panicles which are often developed). Spikelets glabrous, rather flattened, suddenly acute or slightly cuspidate, 2-3 2 mm. long, mostly paired on unequal pedicels, but often solitary at the ends of the branchlets, lanceolate in flower, elliptic or broadly elliptic in fruit. Lower involucral glume very broadly ovate, subtruncate, then suddenly acute, or scarcely acute, about \(\frac{1}{2}\) the spikelet, white, membranous, 3-5-nerved, nerves arching and anastomosing. Upper involucral glume herbaceous, ovate-lanceolate, 11-13-nerved. Lower floral glume 9-nerved, neater, pale as long as its glume. Upper floral glume narrow-elliptic or elliptic-oblong to broadly ovate, acute, shining, white or pale brown, or dark brown, often 3-5-streaked dorsally.

**Locality:** Cultivated occasionally in some parts of the Presidency.

**Note.**—*P. miliare* is in all probability a cultivated form of *P. psilopodium*. It is not always easy to distinguish between the two. Hooker already felt this difficulty. 'If I remember aright,' he says, '*P. miliare* was conjectured by Munro to be a cultivated form of *P. psilopodium*; and except in the greater size, more contracted panicle, rather larger spikelets and usually shorter, pedicels of *P. miliare* I failed to find characters whereby to separate them, and these are not very reliable. In its common state the grain of *miliare* is broader than in any form of *psilopodium* and much darker coloured.' (F.B.I. vii, 46). Duthie was unable to distinguish *P. miliare* from *P. psilopodium* (Fodd Grass, N. Ind. 10). Stapf, however, is inclined to think that they are separable. In his opinion the true *P. psilopodium* has nearly always glabrous leaves, smaller spikelets and a shorter lower involucral glume. Grain in his Bengali Plants gives as the characters of *P. miliare*: 'Leaves hairy; cultivated', and of *P. psilopodium*: 'Leaves glabrous; wild.' But he has nevertheless, as Haines points out 'named most of the glabrous-leaved forms in the Calcutta Herb, as *miliare*, and I have myself noticed whole crops with glabrous leaves, whereas I have collected *psilopodium* with hairy leaves.'

The same author, after discussing the various statements, sums up his own observations: 'Although absolutely the leaves of *miliare* are often broader than in *psilopodium*, yet they are relatively narrower and much more alternate. Moreover the cultivated *miliare* and its ferial forms always appear to have more or less contracted panicles in contrast to the shorter, always quickly effuse, panicle of *psilopodium*. The grain of *miliare* is, as would be expected, rather larger, being '08-1 In. long as compared with '07 In. long in *psilopodium*.'


Description: Cke. i.c.
Locality: S. M. Country: Badami (Woodrow teste Cooke; Bhide i.).


Vern. Name: Guinea Grass.

Description: A perennial, densely tufted grass, up to 3 m. high. Culms erect or geniculate-suberect, usually stout, 3-4 noded, simple or sparingly branched with the branches erect, terete or compressed below, usually quite glabrous and smooth, more rarely more or less hirsute and rough from the tubercular hair-bases. Leaves glabrous or more or less softly hairy or coarsely hirsute with tubercle-based hairs. Sheaths rather firm, the lower compressed, the others terete and tight, often bearded at the mouth and usually so at the nodes, rarely the nodes quite glabrous. Ligule membranous, very short, ciliate usually with dense hairs from behind it. Blades linear from an equally wide or very gradually narrowed and shortly contracted base, long-tapering to a fine point, 10-60 cm. by 4-18 or even 25 mm., flat, margins scabrous to sparsely scabrid, midrib prominent below, whitish and shallow channelled above, primary nerves up to 9 on each side. Panicle erect or nodding, contracted or open, from 10 to over 45 cm. long, glabrous or more often villous at the lower nodes and motile branch bases, divided to the 4th or 5th degree, all the divisions filiform to capillary, often more of less wavy, angular and scabrid or the larger smooth downwards; primary axis comparatively slender, smooth, terete and often fluted below, scaberulous upwards; lower primary branches whorled, suberect or spreading, up to 30 cm. long, mostly remotely divided from 2.5-7.5 cm. above the base, their lower branchlets often up to 7-5 cm. long, flexuous and remotely divided or like the rest rather short and contracted; penultimate divisions usually closely 2-3-spiculate with the lateral pedicels shorter than the clustered spikelets, more rarely long to very loose with the pedicels several times longer, all the pedicels very fine with small subcapular tips. Spikelets oblong, subobtuse to acute, somewhat turgid, broadly rounded on the back, 3-4.5 or sometimes 4 mm. long, light green or tinged with purple, glabrous or rarely more or less densely pubescent. Involutural glumes dissimilar, faintly nerved. Lower rounded or shortly acute or minutely apiculate, about $\frac{1}{2}$ to $\frac{3}{4}$ the length of the spikelet, hyaline, 3-1-nerved or almost nerved. Upper corresponding in shape and size to the spikelet, membranous, 5-nerved. Lower floral glume male, like the upper involucral glume, 7-nerved, pale slightly shorter, oblong, obtuse. Upper floret hermaphrodite, oblong, shortly acute up to almost 3 mm. long, whitish, glume and pale thinly crustaceous, finely transversely rugose except on the flexures. Anthers 1-1.5 mm. long. Grain over 1 mm. long.

Locality: Widely cultivated, chiefly in Gujarat and Sind.

Distribution: Indigenous in tropical and S. Africa, Madagascar, the Mascarenes and in Yemen. Introduced into India and America.

Uses: An excellent fodder grass.

var. paludosum, Cooke in Fl. Bomb. ii, 937 (non Stapf).—P. proliferum
Haines in Bot. Bihar & Orissa 995 (non Lam.).—P. proliferum, Prain in
Beng. Plants 1176 (non Lam.).—P. decompositum var. paludosum, Trim. Cat.
Ceyl. Pl. 105.

The explanation for the above synonym is contained in a note given by
Stapf (in Prain Fl. Trop. Afr. ix, 719) to justify his new specific Panicum longi-
jugulatum. Stapf of tropical Africa which, on a previous occasion, he had described
as var. longijugulatum of P. proliferum (in Dyer Fl. Cap. vii, 406).

The P. proliferum of authors covers a number of allied yet clearly distinct
species. The name is Lamark's, but since Hitchcock (in Contrib. U. S. Nat.
Herb. xii, 147) has shown that his plant so named is identical with P. miliare,
Lam., P. proliferum becomes a synonym unconnected with any of the forms
so far referred to it. Of these, one, namely Hooker's P. proliferum (Fl. Brit.
Ind. vii. 59), is identical with Roxburgh's P. paludosum (Roxb. Fl., Ind. ed.
Carey, i. 307), another, a native of America, is P. dichotomiflorum, Michx.
(Fl. Bor. Am. i. 48). Both appear to me sufficiently distinct from the African
plant described above; P. paludosum mainly by its conspicuously larger and
more finely acuminate spikelets; P. dichotomiflorum by its pronounced
branching habit and the smaller number of nerves of the upper glume (mostly 7)
and lower valve (5-7, mostly 5).

Description: Cke. l.c.
Locality: Konkan: Byculla (McCann A140!); Sewri (McCann 3641!);
Salsette (Lisboa teste Cooke).—Decan: Khandala (McCann 5310!); Poona
(Lisboa teste Cooke); Lonavla (Lisboa teste Cooke).—S. M. Country: Devarayi
(Sedgwick 4118!);—Kanara: Gersoppa Falls, on rocks in river bed, common
(Hallberg & McCann A139!); Karwar (Hallberg & McCann A124!).

Distribution: India, Ceylon. (It certainly does not occur in tropical and
S. Africa, but whether it extends eastwards beyond India we are not able to
say).

10. Panicum antidotale, Retz. Obs. fasc. 4 (1786), 17; Hook f. in F.B.I. vii,
52; Cke. ii, 937; Blatter Fl. Aden 372.—For other references and synonyms see
Hook f. l.c.

Description: Cke. l.c.
Locality: Sind: (Stocks 659 teste Cooke); Karachi to Landi (Burns!); Laki
(Bhide!); Sukkur (Woodrow teste Cooke); Clifton, near Karachi (Sabnis
B797!); Umerkot, sand dunes (Sabnis B1080!); Mirpurkhas (Bhide!);
Mirpurkhas, in fallow fields (Sabnis B1208!); Jamesabad, in fields (Sabnis
B1154!); Sanghar (Sabnis B1369!); Gharo (Blatter & McCann D506 I, D608!).

Gujarat: Bhuj, Rhodi Maka, Cutch (Blatter 3751!);—Sumrasar, Cutch
(Blatter 37501);—Kathiawar (Woodrow teste Cooke).—S. M. Country: Dharwar
(Garade!); Looda (Woodrow teste Cooke).

Distribution: Arabia, Afghanistan, Punjab, Upper Gangetic Plain, W. Pen-
insular, Ceylon, Australia.

11. Panicum montanum, Roxb. Fl. Ind. i (1832), 313 (excl. descr. gluma sup.
floralis); Kunth Enum. Pl. 126; Benth. Fl. Hongk. 412; Hook f. F. B. I. vii,
53; Cke. ii, 938; Haines Bot. Bihar & Orissa, 996.—P. courttallense, Nees &
Arn. ex Wight Cat. no. 2342; Stend. Syn. Gram. 83.—P. euchroum, Steud.
l.c. 98.

Description: Cke. l.c.
Locality: Konkan: Pen, hills (Bhide!); Kenery Caves (McCann A134 !,
A136 !).—Decan: Lohagad, half way up (McCann A137!); Khandala
(McCann A136 !); Lonavla (Garade!).—S. M. Country: Castle Rock, on hill
behind station (Bhide!).—Kanara: Dandeli (Talbot 2243 !); Kala Kundie
(Herb. Econ. Bot. Poona!); Karwar, hillside in shade of trees (Hallberg &
McCann A135 I, Talbot !); Sumpkhund (Hallberg & McCann 9335 !).

Distribution: Hotter hilly parts of India, Ceylon, Penang, Malaya, China,
Philippines.

12. Panicum auritum, Presl ex Nees Agrost. Bras. 176; Rel. Haenk. i, 305;
Fl. Maurit. 437; Miq. Fl. Ind. Bat. iii, 455; Hook f. F.B.I. vii, 40; Haines
Bot. Bihar & Orissa 995.—P. insuliscola, Steud. l. c. 78.—P. javanum, Nees

\textbf{Description:} A perennial, tall, erect grass. Culm 0·9-1·6 m. high, soft. Leaves linear-lanceolate, broadly cordate at base, 20-35 cm. by 24-30 mm. glabrous or sparsely hairy beneath. Sheath glabrous or sparsely hairy with villous mouth. Ligule very short. Panicle long contracted or more or less effuse, 20-45 cm. long, fastigiately branched, branches erect, 5-12 cm. long, branchlets and fascicles of spikelets subsecund. Spikelets green, glabrous, 1-7-2·5 mm., sessile or shortly pedicelled, strongly nerved, subacute. Lower involucral glume broadly ovate, \( \frac{2}{3} - \frac{3}{4} \) the length of the lower floral, obtuse or acute, nerves 3-5 arching, upper involucral and lower floral subequal, ovate-oblong, acute or acuminate, 3-nerved, pale of lower floral glume small, neuter. Upper floral glume as long as the lower, lanceolate-acuminate, smooth, white, thinly coriaceous.

\textbf{Locality:} S. M. Country: Castle Rock (Gammie 15717 i). 
\textbf{Distribution:} India, Ceylon, Malay Peninsula, Malaya, China.


Rather stout grasses. Leaves broadly linear. Panicles thyrsoid, branches erect, appressed with spiciform branchlets and very numerous crowded narrowly lanceolate acuminate second spikelets, articulate on their minute pedicels. Lower involucral glume cuspidate, keeled, membranous, shortest, upper with sheathing amplexicaul base on the long internode of the rachilla between it and the lower floral glume, prominently 3-nerved, cuspidate or awned. Lower floral glume longest, lanceolate-acuminate, passing gradually into the awn, with three strong nerves meeting in the base of the awn and two lateral weaker ones, empty; upper longer than upper involucral glume, oblong, membranous in flower scarcely hardened in fruit, smooth, faintly 2-nerved, embracing the pale except at the tip, pale similar and as long. Lodicules minute. Stamens 3. Styles free.

This genus is not represented in Cooke. The following species is described in the F.B.I. under \textit{Panicum nyurus}, H.B. & K.


\textbf{Description:} Culm stout, tall, 0·6-1·8 m. high, spongy below, rooting at the nodes of the prostrate base, erect, leafy. Leaves 20-50 cm. by 18-25 mm. flat, tapering from a broad cordate base to a fine point, margin serrulate; sheath smooth, glabrous or ciliate; ligule very short, rounded, hyaline. Panicle very dense, narrow, very compound with closely appressed branches, 15-30 cm. long, rarely 25 mm. diam., often interrupted, sometimes quite cylindric. Spikelets variously grouped, shortly and unequally pedicelled, second on the erect branches of the panicle, 4·6 mm. long, narrowly lanceolate, pale green. Lower involucral glume \( \frac{1}{4} \) of the lower floral glume, narrow from an amplexicaul base, aristulate, hispidulous on keel and cusp; upper narrowly lanceolate, subaristate, hispidulous, 3-nerved. Lower floral glume much longer than upper involucral glume, narrowly lanceolate, gradually tapering into the awn as long as spikelet, strongly 3-nerved, hispidulous on nerves, pale imperfect or 0; upper small, thin, narrow, finely acuminate, almost embraced by the lower, shorter than the upper involucral glume, enclosing its pale on the edges.

\textbf{Styles distinct.} 
\textbf{Locality:} S. M. Country: Tadas, tanks, elevation 2,000 ft., rainfall 35 inches (Sedgwick & Bell 4917 l). 
\textbf{Distribution:} Tropical Asia, Australia and America.

Perennial. Culms weak, rising from a decumbent or creeping and rooting base. Leaf-blades flat, linear-lanceolate or almost linear. Ligules membranous, short. Spikelets on long to very long and capillary or short pedicels, widely scattered or approximate, obliquely obovate to semi-obovate, laterally much compressed, falling entire from the pedicels of very loose and open or contracted and dense panicles. Involute glume thinly membranous, unequal to subequal, 3-5 nerved. Lower floret barren with or without a pale, glume similar to the upper involucral glume, pale, if present, narrow, 2-nerved. Upper floret about as long as or almost as long as lower, hermaphrodite, glume narrowly boat-shaped, papery to subbracteaceous with firm very narrowly involute margins, obliquely 5-nerved; pale subequal to the glume, with a narrow convex back, of the same substance as the valve, with fine keels and thin flaps. Lodicules two, minute, broadly cuneate. Stamens three. Styles distinct; stigmas sublaterally exserted high up. Grain not known.

Species 6 or 7. Tropical Africa, Indo-Malaya.

None of the species here described were mentioned by Cooke. Hook. f. in F.B. 1. has them under *Panicum*, sect. *Gibbosa*.

I. Spikelets shortly pedicelled

1. Leaves 2'-5-5 cm. long ... 1. *C. trigonum*.
2. Leaves 5'-15 cm. long ... 2. *C. pilipes*.

II. Spikelets on capillary pedicels which are much longer than the spikelets ... 3. *C. patens*.


*Description*: Perennial. Culms decumbent, branching, interlaced below; branches erect. Leaves 2'-5-5 cm. long, linear-lanceolate, glabrous or laxly hairy. Sheath glabrous or margin ciliate. Ligule rounded. Panicle 25-35 mm long, contracted, rhachis and short, suberect branches glabrous. Spikelets 1'-5 mm. long, very shortly pedicelled, hispidulous. Lower involucral glume about 1/4 the length of the lower floral glume, obtuse or acute, 3-nerved, pale brown; upper pale brown. Lower floral glume 5-nerved, pale brown; upper naked or bearded at the tip.

*Locality*: **Konkan**: Matheran, Harrison’s Springs and Monkey Point (D’Almeida A251!, A252!).

*Distribution*: India, Ceylon, Java.


*Description*: Perennial. Culms 30-60 cm. high, geniculately ascending from a slender, creeping, branching base, lower nodes rooting, upper subpubescent. Leaves 5'-15 cm. long, 8'-35 mm. broad, glabrous or sparsely hairy above, puberulous beneath, finely acuminate, base narrow. Sheath glabrous or ciliate, mouth hairy. Ligule rounded. Panicle 7'-13 cm. long, contracted, branches short, rather remote, erect or spreading with short fastigiate branchlets, often slender hairs on the pedicels. Spikelets 1'-5 mm. long, brown, very shortly pedicelled, glabrous. Lower involucral glume about 1/4 the length of the lower floral glume, obtuse, 3-nerved. Lower floral glume 5-nerved; very white, its pale narrow, patent, hard.

*Locality*: **Konkan**: Above Kenery Caves (McCann A133!); Matheran (D’Almeida A132!, Woodrow!).— **Deccan**: Mahabaleshwar, in forests, elevation 4,500 ft., rainfall 270 inches (Sedgwick & Bell 4801!); Pratapagad Fort (Bhide 1207!).— **S. M. Country**: Castle Rock, in shade of trees (McCann A131!, Bhide!); Belgaum (Herb. Pot. Gard. Cal. !).— **Kanara**: Coastal forests, Karwar (Sedgwick & Bell 5113!); deciduous forests, Klrwaltti (Sedgwick 3130!); Halyal (Talbot!); Supe, elevation 2,000 ft. (Talbot 2091!); Yellapore (Talbot 907!); Devimani Ghat (Hallberg & McCann A128!);
Gersoppa Falls (Hallberg & McCann A125!); Annmol, forests (Sedgwick 3232!); Kulgi, elevation 2,000 ft. (Talbot).

Distribution: Mascarene Islands, Madagascar, India, Malay Peninsula, Pacific Islands.


Description: Culms 30-90 cm. high, creeping and rooting and branched below, leafy, nodes glabrous. Leaves 5-15 cm. by 6-8 mm., ovate to linear-lanceolate, finely acuminate, thin, glabrous or ciliate below with tubercle-based hairs. Sheath with the margins and mouth ciliolate. Ligule rounded. Panicle 5-13 cm. long, contracted or effuse, usually inclined with spreading glabrous or puberulous branches naked below, and very long distant spreading branchlets, finely branched and pedicels capillary. Spikelets 1.5 mm. long. Lower involucral glume 3-½ the length of the lower floral glume, ovate, obtuse, 3-nerved. Upper involucral and lower floral glumes glabrous or with ciliate tips.—A very variable plant.

Locality: Konkan: Vasco da Gama (Bhide!); Vetora (Sabinii 33440!).—S. M. Country: Tadas, in shade of trees, elevation 2,000 ft., rainfall 35 in. (Sedgwick 2102!); Castle Rock (Gammie 15579!), very large specimen (McCann A144!).—Kanara: Nagargalli, forests, very abundant (Sedgwick 2392!); Gersoppa Falls (Hallberg & McCann A126!); Chibber!; Malamani, elevation 1,900 ft. (Talbot 2576!); Kulgi (Talbot 2280!); Buddhalli, Karwar (Hallberg & McCann A127!).

Distribution: Tropical Asia, Malay Peninsula, Pacific Islands.


Annual or often perennial grasses. Leaf-blades linear and flat or filiform-coarctulata, or filiform-subulate. False spikes often very dense, dark or variegated. Spikelets mostly very small, oblong or ovate-oblong or elliptic or lanceolate, suberete or laterally compressed, usually somewhat turgid, falling entire from the short finely filiform pedicels of a spiciform, very rarely open panicle. Involucral glumes similar in structure but unequal. Lower much shorter, softly or rigidly membranous, with a narrow hyaline margin or hyaline tip, stiffened by the hardening of the prominent and often rib-like nerves, or more or less dissimilar owing to the reduction of the lower glume to a small hyaline scale, or its differentiation into a narrow, hardened obscurely nerve back and broad hyaline margins. Upper with a curved or basally gibbous or saccate back, always much concave, mostly 7- or 9-, rarely 5- or up to 13-nerved. Lower floral glume male or barren, very dissimilar to the upper involucral glume and of the same or almost the same length, but with a straighter back; pale narrow, hyaline, finely 2-kneed, shorter than the glume, sometimes reduced or quite rudimentary. Upper floral glume hermaphrodite, oblong in outline seen from the back, very convex, chartaceous, ultimately subcrustaceous, with firm narrowly involute margins, obscurely 5-nerved; pale almost the length of the glume, tightly embraced by it all along and of the same texture, 2-nerved, hardly keeled. Lodicules two, small, broadly cuneate. Stamens three. Styles distinct; stigmas long, loosely plumeous, exserted terminally or subterminally. Grain tightly enclosed by the glume and pale, elliptic in outline, dorsally compressed, with an almost flat back and convex face; hilum punctiform.

Species over 30.—Tropics of the whole world.

I. Lower involucral glume 3-nerved

1. Spikes 1-5 cm. long. Spikelets lanceolate-ovoid, hispid, 2-5 mm. ... 1. S. indica.

2. Spikes 5-23 cm. long. Spikelets ovoid, 1-3-2½ mm. long ... 2. S. nyosuroides.

II. Lower involucral glume 5-nerved ... 3. S. interrupta.

[11]

Description: A slender grass, 15–60 cm. high. Leaves linear-acuminate, 5–13 cm. long, up to 4 mm. wide, glabrous or hirsute, base narrow; sheath not arried. Panicle spiciform, oblong or cylindrical, dense-flowered, green or slightly purplish, 1–5 cm. long by about 4 mm. diam., branches very short. Spikelets longer than their pedicels, 2–2.5 mm. long, crowded, ovoid, acute or acuminate, straight or curved, shortly or hispidely hairy, or glabrous. Lower involucral glume ovate, ¾–½ of the lower floral glume, lanceolate from a broad base, acute, 3-nerved; upper usually subcymiform, curved, obtuse, 7–11-nerved, 2–5 mm. long. Lower floral glume as long as the upper involucral glume, broadly ovate, obtuse, 9-nerved, pale minute; upper narrowly elliptoid, very acute, white, smooth, polished, sides overlapping the margins of the similar pale, base obtuse, mucronulate with remains of the rachilla.

Note.—Stapf has separated Panicum angustum, Trin. Sp. Gram. lc. t. 334 from Panicum indicum, Linn. as conceived by Hook. f., and named it Sacciolepis angustis. In his opinion the various varieties given in the F.B.I. are mostly referable to S. angusta, Stapf.

S. indica is not a well-defined species. It appears to pass insensibly into S. myosuroides and S. interrupta. According to Hook. f., the former differs in its cumbiform spike and more minute rounded spikelets, the latter in its stouter habit.

Haines thinks it is better to confine S. indica to those specimens with hairy spikelets. We have not followed him in this.

Locality: S. M. Country: Khanapur, elevation 2,500 ft., rainfall 70 inches (Sedgwick 3080!); Castle Rock (Bhide!).—Kanara: Tank near Yellapore (Talbot!); Kulgi (Talbot 2391!); Siddhapur to Sirsi (Hallberg & McCann A118!); Karwar (Talbot 1297!, Hallberg & McCann A116!).

Distribution: Tropical Asia and Australia.


Description: Cke. ic.

Locality: Konkan: Savantvadi (Woodrow); Alibag (Lisboa).—We have not seen any specimen.

Distribution: India, Ceylon, Malay Peninsula, China, Australia.


Description: Cke. ic.

Very variable in size and shape, especially the panicle which varies a good deal as to colour.

Locality: Sind: (Woodrow teste Cooke).—Konkan: Bassin, tank (Barns!); Wada, tank (Ryan 453!); Nagotna (Gammie 16074!); Borivli-kanary, in water (McCann A120!); Bhivandil (Chibber!); Vihar (Sabnis!); Gokura Creek, Bassin (Garade 1708!); Virar, on bank of a tank (McCann 9583!); Panvel (Woodrow); Vengurla (Woodrow); margins of tanks throughout the Konkan (Dahell & Gibson).—Decan: Tingerwadi, Igatpuri (Blatter & Hallberg 3825!).—S. M. Country: Tadas, tanks (Sedgwick & Bell 4916!); Londa, in water (Gammie 15854!); Hulpok (Sedgwick & Bell 3174!); Belgaum (Herb. [12]
Econ. Bot. Poona !).—*Kunara*: Sirsi-Siddhapur (Hallberg & McCann A117!); Tinali Ghat (Gammie 15791!).

Usually inhabiting marshy and swampy places such as rice fields and the banks of tanks.

It is doubtless as to whether Woodrow's plant from Sind was correctly named as this grass is one of moist regions.

**Distribution**: Tropical and S. Africa, India, Ceylon, Malaya.


(In 1897 F. Lamson Scribner (in U. S. Dept. Agr. Div. Agrost. Bull. iv, 38) proposed the name *Chetochloa* for the grasses generally known as *Setaria*. Stapf has given convincing reasons why the old name should be retained. See Kew Bull (1920), 124-127.

Species about 100.—Warm regions of the World, a few species common as weeds in the more temperate parts. Cooke has 5 indigenous and 1 cultivated species. We retain them all.

**Key**:
A. Leaves more of less plicate
   I. Perennial, Culm reaching 2'-4 m. ... 1. *S. plicata*.
   II. Annual, Culm reaching 0'-6 m. ... 2. *S. rhachitricha*.
B. Leaves flat, not plicate
   AA. Bristles not retrorsally barbellate
      I. Upper floral glume smooth ... 6. *S. italica*.
      II. Upper floral glume rugose
         1. Panicle spiciform, continuous; bristles 6 or more.... 3. *S. glauca*.
         2. Panicle interrupted or subpyramidal; bristle 1 on pedicel and usually 3-4 below pedicel ... 4. *S. intermedia*.
      BB. Bristles retrorsally barbellate ... 5. *S. verticillata*.


**Description**: Cke. ii, 919.

**Locality**: Konkan: Victoria Gardens, Bombay (McCann 5376!); Parel (Lisbon); western side of the Ghat (Dalzell & Gibson). —*Deccan*: Lingmala, Mahabaleshwar, forest (Sedgwick & Bell 4642!); Panchgani, (Blatter & Hallberg B1234!; B1235!; McCann!). —*S. M. Country*: Belgaum Fort, common all over Belgaum in compounds (Sedgwick 3066!). —*Kunara*: Kulgi (Talbot 2278!); Halyal (Talbot 2408!).

**Distribution**: India, Ceylon, Malay Peninsula and Islands, China.

**Uses**: Sometimes cultivated as an ornamental grass.


We doubt the occurrence of this species in the Presidency. Neither Cooke nor we have seen any specimens. There are none in Herb. Kew, neither do the herbaria of the Presidency contain any. Besides, the distribution of the species is not in favour of its presence in Bombay.

**Distribution**: India (subtropical Himalaya, Chota Nagpur, Calcutta), tropical Africa.

Mr. C. E. Hubbard of the Kew Herbarium informs us that he changed Setaria glauca, Auct. into S. lutescens on account of the synonym Panicum lutescens, Weigel Obs. (1772), 20. Dr. Stapf thinks that this name change is unnecessary and we quite agree with him after reading his MS. on this question which he kindly allowed Mr. Hubbard to put at our disposal. As Dr. Stapf is now about to publish his MS. we refrain from giving his arguments in this place.

Description: Cee. ii, 920.

Locality: Gujarat: Nadiad (Chibber!); Ahmedabad (Saxton 1063!); Baroda (Cooke).—Khandesh: Topanmal (McCann A149!, A150!); N. slope of Chanseli (McCann A151!).—Konkan: Bhandup (McCann 3606!); Mulgaum (McCann A147!); Bassein (McCann 9607!); Sion (McCann 3573!); Thana (Lisboa).—Deccan: Shivner Fort, Junnar (Paranjpe); Mahabaleshwar, common (Woodrow !, Dalzell & Gibson, Cooke); Panchgani, behind Maratha well (Blatter 3824!); Chattharshinji Hill, Poona (Ezekiel!); Shewapur, near Poona (Bhide 981!); Khandala, very common (McCann 8106!); Purandhar, foot (McCann 5603!); Lohagad, top (McCann 9501!); Nasik (Lisboa).—S. M. Country: Dharwar Dist. (Sedgwick 2173!); Dumbai, under trees (Taibot 2390!).—Kanara: Dandeli (Bell 4224!); Halyal (Taibot 2144!); Onore (Taibot 1063!).

Distribution: All warm, temperate and tropical regions.


Description: Cee. ii, 920.

Locality: Gujarat: Doongri (Chibber!); Ahmedabad (Gammie 16351!); Nadiad (Chibber!).—Khandesh: Toranmal (McCann A152!); Umalla village (Blatter & Hallberg 594!).—Konkan: Dadar, very common in Bombay Isl. (McCann A153!); common in Salsette (McCann!).—Deccan: Purandhar Fort (Bhide !, McCann 5595!, 5022!); Chattharshinji, Poona (Bhide!); in cultivated fields about Poona (Jacquemont 355!); Igatpuri, common (McCann 4320!).—Khandala, common (Blatter 4410!, McCann!); Lonavla (McCann 4466!); Panchgani (Blatter & Hallberg B1227!, B1272!).—S. M. Country: Dharwar (Sedgwick 1839!); Belgam (Ritchie 839).—Kanara: Yellapore (Taibot 1520!); Halyal (Taibot 2296!).

Distribution: Temperate and tropical regions.


Description: Cee. ii, 921.

Locality: Sind: Umerkot (Sabnis B748!); Sanghar (Sabnis B758!); Mirpurkhas, cultivated fields (Sabnis B701!); Bughar, Indus River (Blatter & McCann D640!); Ghulamalla, garden (Blatter & McCann D641!); Mirpur Sakro (Blatter & McCann D642!).—Gujarat: Ahmedabad (Sedgwick!).—Cutch (Blatter 3744!); Baroda (Woodrow).—Konkan: Sion (Herb. S. X. C. 526!); Juveni (Herb. S. X. C. 4237!); Malabar Hill (McCann 3626!).—Lycium (McCann!).—S. M. Country: In a village, Dharwar Dist. (Sedgwick 3100!).

Distribution: India, Ceylon, temperate and tropical regions.

**Vern. Names**: Italian millet, foxtail millet, rala.

**Description**: Annual. Calms erect, tufted, 0-6 to 1-5 m. high. Leaves linear or lanceolate-linear, acuminate, 7-10 mm. broad or broader. Sphinct densely ciliate on margin and mouth. PANicle 7-13 cm. long, 10 mm. wide or more, dense, inclined or nodding, simple, cylindrical or lobed or compound; rhachis very hairy. Spikelets oval, 2-2.5 mm. long, in small clusters on the abbreviated branchlets of the panicle, with 2-3 bristles below each pedicel, bristles nearly smooth or microscopically barbulate, 5-8 mm. long, barbs suberect or spreading. Lower involucral glume oblong or subglobose, hyaline, smooth; upper ovate, obtuse or rounded, about 3 cm. the length of the upper floral glume, 5-nerved. Lower floral glume hyaline, delicately 4-5-nerved, as long as and same shape as the upper floral glume, but not concave. Upper floral glume oval or elliptic or subglobose, concave, hardening, variable in length, not rugose but smooth and microscopically cancellate.

**Locality**: Konkan: Bombay, cultivated in compound of the Training College (McCann 4286 !); Bassein, Botanic Garden (Jo-hi !); Chowpatti, Bombay (Herb. S. X. G. 1290).—Deccan: Ganeshkhind Botanic Gardens (Patwardhan !).—S. M. Country: Dharwar, cultivated (Telbot 2014 !).

Extensively cultivated throughout as a food-grain.

**Distribution**: Most warm, temperate and tropical countries.

**Origin**: See DeCandolle, Origin of cultivated plants, p. 378.

57. **Spinifex**, Linn. Mant. ii, (1771), 163; Cje. ii, 913.

Species 4.—1 in India, 3 in Australia.

1. **Spinifex squarrosum**, Linn. Mant. (1771), 300; Lam. Ill. t. 540; Duthie Grass. N. W. Ind. 11; Benth. Fl. Hongk. 415; Miq. Fl. Ind. Bat. iii, 474; Hook. f. F. B. I. vii, 63; Grab. Cat. 240; Trim. l. Ceyl. v. 5; Prain Beng. Pl. 1168; Cje. ii, 913; Haines Bot. Bihar & Orissa 1010.—*Stipa littorea*, Burm. f. Fl. Ind. 29.—*Stipa spinifex*, Linn. Mant. i, 84; Rheede Hort. Malab. xii, t. 75.

**Description**: Cje. l.c.

**Locality**: Gujarat: Near Domas (Cooke).—Konkan: Vengurla (Chibber !); Juveem (McCann 4283 !); Versova (McCann 8927 !); Bandra (Blatter !); sandy shores near Bandra (Graham); Shrivardhan (Woodrow) —*Kanara*: Sandy sea shore, Karwar (Sedgwick & Bell 5057 !, 5056 !); Kumpata (Chibber !, Woodrow); Honavar, very common (McCann !, Chibber !); Onore (Telbot 1073 !).

**Distribution**: India, Ceylon, Java, China.

**Uses**: A valuable sand-binding plant.


Species 10-12.—Chiefly African. The following 2 in the Bombay Presidency.


**Description**: Cje. l.c.

**Locality**: Sind: Laki (Bhide !); Thano-Bulro-Khan (Woodrow).

**Distribution**: Punjab, W. Peninsula; westward to Sicily and N. Africa.


**Description**: Cje. l.c.

**Locality**: Konkan: Commonly cultivated in gardens in Bombay (McCann !); Sewri, probably an escape (Hallberg 3592 !).—Deccan: Diva Ghat (McCann [15])
Species about 40.—In most warm countries.
Cooke has 6 indigenous and 1 cultivated species. We add another cultivated species: *P. purpureum*, Schum. & Thonn. The name *P. cenchrifolius*, Rich. has to cede to *P. ciliare*, Link., and *P. typhoidenum*, Rich. to *P. spicatum*, Roem. & Schult.

A. Anther-cells not bearded at the tips

1. Bristles of involucre free to the base
   1. Inner bristles of involucre scaberulous, not ciliate
      (a) Leaves 30–45 cm. long
      (b) Leaves 7–15 cm. long

2. Inner bristles of involucre ciliate below the middle, but naked at the base.
   Involucre striitate

3. Inner bristles of involucre densely villous or ciliate below the middle, not naked at the base. Involucre sessile
   (a) Inner bristles of involucre densely villous
   (b) Inner bristles of involucre laxly ciliate, 10 long silky hairs, not villous

II. Inner bristles of involucre dilated below, their bases confluent in a coriaceous disk

B. Anther-cells more or less bearded at the tips
   Styles connate

I. Culms less than 2 m. high. Pale of upper floral glume truncate

II. Culms more than 2 m. high. Pale of upper floral glume minutely 2-toothed


Description: Cke. i.c.

Locality: Sind: (Dalzell).—Gujarat: N. Sonasam, on dry sandy bank (Sedgwick !).—Khandesh: Toranal, very common around lake (McCann 9862!).—Deccan: Poona (Woodrow!; Lisboa, Jaquemont 407); near Poona (Gammie 15314!); Nasik (Bourke!; Blatter & Hallberg 9863!, Lisboa); Parandhar, N. foot (McCann 5045!); Lohagad, plain (McCann 9502!).—Panchganji (Blatter 3602!, Blatter & Hallberg 1292!, McCann!); Lonavla (Lisboa).—S. M. Country: Dharwar (Sedgwick 3718!); Lanka (Gammie 15827!).—Belgaum (Woodrow).—Kanara: Halyl (Talbot 2090!).

Commonly found in clumps on sandy soil near streams and lakes. It is extremely tough and occupies sometimes large patches of land excluding almost everything else. *Dichanthium caricosum* is commonly found growing together with this grass.

Distribution: Rajputana, C. India, W. Peninsula.
Uses: 'In Poona brooms are said to be made of it, and at Mt. Abu it is employed in the manufacture of cordage.' (Lisboa).


**Description:** Cke. ii, 915.

**Locality:** Sind: Hyderabad (Woodrow!); Mirpurkhas (Mankhad!). — Konkan: Victoria Gardens, Bombay (McCann 4885!).

**Distribution:** W. Himalaya, Punjab, W. Peninsula, Persia, Syria, Cilicia, Sinai, Egypt, Algeria.


**Description:** Cke. ii, 916.

**Locality:** Gujarat: (Lisboa); Rajkot (Woodrow).— Khandesh: Toranal in watercourse (McCann 9868!).— Decowan: College Farm, Poona (Garade!).

**Distribution:** Bihar, Rajputana, W. Peninsula, tropical Africa.


**Description:** Cke. ii, 916.—Our specimens from Khandesh have the bristles quite free from hairs.

**Locality:** Sind: Hyderabad (Woodrow).— Gujarat: Ahmedabad, No. 6 grass plot Bharad (Sedgwick!).— Khandesh: To Toranal (McCann 9669!); Chanseli Hill, S. slope (McCann 9667!).

**Distribution:** India (W. Bengal, Bihar, Upper Gangetic Plain, W. Peninsula), tropical Africa and America.


**Vern. Names:** Jiral, Anjan, Dhaman (Sind), Vaghnoru (Gujarat).

**Description:** Cke. ii, 916.

**Locality:** Sind: (Burns!); Mirpurkhas (Mankad! Sabnis B1043!); Jacobabad (Deputy Commissioner!); Sanghar (Sabnis B1032!); Clifton, near Karachi (Sabnis B1065!); Jamadar ka Landa, near Karachi (Stocks); Sehwan to Laki (Sabnis B620!); Nasarpur (Sabnis B1051!); Umerkot, sand dunes (Sabnis B1079!); Tatta, Kulan Kote Lake (Blatter & McCann D630!, D631!, D633!), Tatta (Blatter & McCann D632!, D634!, D635!); Indus Delta (Blatter & McCann D636!). — Gujarat: Nadiad (Chhibber!); Vohad, (Chhibber!); Daman (Bhide!); Surat (Gammie!); Ahmedabad (Sedgwick!); near Madalpur, [17]
Ahmedabad (Saxton 1065!); Bhuj Hill, Cutch (Blatter 3767!); Rajkot, Kathiawar (Woodrow).—Khandesh: Tapti bank, Muravad (Blatter & Hallberg 51651!); Umalla, Tapti bank (Blatter & Hallberg 5206!).—Deccan: (Lisboa!).—S.M. Country: Gokak (Shevade!).

Distribution: India (Kashmir, Upper Gangetic Plain, W. Peninsula, Deccan), throughout Africa, Sicily, Canaries.


In order to explain the above synonymy and the final adoption of the specific name *P. spicatum* we reproduce a MS. note kindly sent to us by Mr. Hubbard:

*Pennisetum typhoidenum* L. Rich. in Pers. Syn. i. 72 (1805) has been changed to *Pennisetum americanum* by K. Schum. in Engl. Pflanzenw. Ost.—Afr. B. 51 (1895), based on *Panicum americanum* L. Sp. Pl. ed. i. 56, (1753) *Panicum americanum* L. in turn, is based on *Panicum americanum* Clusius Hist., ccxv (1601). Hitchcock in Contr. U. S. Nat. Herb. xxii, 218 (1921) suggests that the figure (in Clusius) is that of the 'common millet' (*Setaria italica*) and that the description is based on more than one species. I do not think the figure is that of the 'common millet', it is however similar to a form of 'pearl millet' cultivated in Spain; in addition Clusius says that his *Panicum americanum* grows as tall as a man and has stouter, thicker stems than the common millet which he calls *Panicum vulgare* and figures on the same page. In the second edition of the Species Plantarum, 1484 (1793), Linnaeus quotes *Panicum americanum* in synonymy under *Holcus spicatus* L. (first published in Syst. Nat. ed. x. ii. 1305 (1759)); this is the basis of *Pennisetum spicatum* Roem. et Schult. Syst. Veg. ii. 480 (1817). It appears advisable to use this name in preference to *Pennisetum americanum* K. Schum., owing to the uncertainty as to what *Panicum americanum* Clusius really is and also the name 'americanum' is misleading.

Vern Names: Bajri, bulrush millet, cat-tail millet, pearl millet.

Description: Annual. Culms tall, erect, stout, terete, 0.9—1.8 m. high, rooting at the lower nodes, sometimes woolly, pubescent below the inflorescence. Leaves 30—90 cm. by 6—50 mm., linear to linear-lanceolate from a rounded base, acute, flat, more or less rough, glabrous, rarely hisurate; sheath terete, rather inflated, glabrous except the bearded nodes and the often villous junction with the blade, rarely hisurate, usually slightly rough, rather shorter than the internodes, ligule a narrow, long and densely ciliate rim. Panicle spike-like, cylindric, very dense, 10—20 cm. long, often purplish; rachis stout, villous; branchlets reduced to a peduncled involucrate cluster of 1—8 spikelets; peduncles villous, straight, 2.5—5 cm. long, often horizontally spreading or partly deflexed; involucral of very numerous ciliate often purplish bristles about as long as the spikelets. Spikelets sessile or shortly pedicelled within the involucre, readily deciduous when ripe, oblong, 5—6 mm. long, pale or purplish upwards. Lower involucral glume minute or 0, half-ornicular or subquadrate, 1—3-nerved; upper variable in length, sometimes absent, usually the length of the upper floral glume, subquadrate, truncate, obtuse or retuse, 3-nerved, very rarely as long as the upper floral glume and coriaceous. Lower floral glume ovate-oblong, obtuse or truncate and apiculate, 5-nerved, eperaleate or paleate, male or neuter, rarely bisexual; upper coriaceous or herbaceous, ovate, acute, 5—7-nerved, pale very broad, truncate, ciliate at the tip and dorsally, nerves 2, approximate, excurrent. Lodices 0. Anthers linear, 2.5—3 mm. long, tips bearded. Styles connate. Grain oblong, obovoid, or pyriform, smooth, broad, free, top exposed.

Locality: Cultivated throughout the Presidency.


Popular Name: Elephant Grass.

Description: Perennial. Rhizome creeping. Culms erect, in tufts of up to 20, 2-3 m. or occasionally up to 7 m. high by 1-2-2.5 cm. diam. at the base; branches obliquely erect, terete, glabrous, smooth, excepting the upper part of the uppermost internode which is more or less hairy to tomentose, exserted parts sometimes covered with a glaucous bloom; nodes mostly exserted from the sheaths, all glabrous or most of them or only the uppermost with a ring of stiff, long, appressed hairs. Leaf-blade linear, inserted on the sheath with a very marked hinge-fold, tapering upwards to a fine point, 30-60, rarely to 90 cm. long by 2.5 cm. diam., with a strong midrib, rounded or the back with a shallow channel above towards the base, and in the larger leaves with 6 or 7 slightly prominent primary nerves on each side, dull green, sometimes slightly glaucous or tinged with purple, more or less rough on both sides, glaucous beneath, usually more or less hairy above, especially towards the base which sometimes becomes fringed, hairs fine, mostly rather stiff and long and often springing from small tubercles; margins sparsely scabrid. Sheaths terete, clasping the stem, striate, glabrous and smooth or pubescent to hissute with tubercle-based hairs near the top. Ligule a narrow rim bearing a dense fringe of white hairs 2 or 3 mm. long. Inflorescence a dense, cylindric, erect spike, 8-20 and even 30 cm. long and 1.5-3 cm. diam., yellow or tinged with brown, purple or quite blackish-purple. Spikelets borne up of deciduous spikelets or fascicles of spikelets, each spikelet or fascicle surrounded by an involucre of numerous bristles of unequal length, most of them 5-8 mm. long, one usually very much longer (1-2-2 or exceptionally to 4 cm. long), scabrid, one or several of the innermost and longest sparingly plumose towards the base, rarely all naked, often dark yellow, brownish or purplish towards the tips or blackish-purple from the base. Spikelets sessile or if in fascicles of 2-4, the lateral pedicelled, all lanceolate, more or less acuminate, 5-7 mm. long, glabrous, straw-coloured or tinged with brown or purple towards the tips of the florets, rarely blackish-purple all over, hermaphrodite or, if fascicled, the lateral male, rarely neuter or all hermaphrodite. Lower involucral glume suppressed or quite rudimentary, upper ovate to ovate-lanceolate, acute, 0.5-1, rarely to 2 mm. long, subhyaline, 1-nerved or nervless. Lower floral glume male or more often barren, lanceolate, acute or acuminate, half as long to almost as long as the upper glume, 3-nerved, rarely 1- or 5-, or even 7-nerved, pale linear-lanceolate, 2-nerved, shorter than the glume or in the barren florets reduced or suppressed; upper hermaphrodite or in the lateral spikelets male, lanceolate, acuminate or rostrate-acuminate, scaberulous upwards, usually 5-nerved, pale narrow, linear-lanceolate, slightly shorter than the glume, tips minutely 2-toothed. Lodicules 0. Anthers 2-5-3 mm. long, tips very minutely penicillate. Styles united throughout; stigmas very slender, up to 4 mm. long, exserted from the top of the floret. Mature grain unknown.

A most variable plant as can be seen from Stapf's description given above. He refrains from subdividing the species.

Popular Name: Elephant Grass, Napier's Fodder.

Locality: Imported into Bombay in 1915. Has been grown at several centres in W. India: Agricultural College Farm, Poona, the Governor's Dairy Farm, Ganeshkhand, the Sewage Effluent Farm at Hadapsar in the Deccan, the Chharodi Cattle Farm in N. Gujarat, and the Willingdon Cattle Farm near Karachi.

Distribution: Indigenous in tropical Africa between 10° N. Lat. and 20° S. Lat.


(To be continued)
REVISION OF THE FLORA OF THE BOMBAY PRESIDENCY.
Part VIII. By E. Blatter, S.J., Ph.D., F.L.S.

Cencers to Aristide
REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY

BY
E. BLATTER, S.I., PH.D., F.I.S.

PART VIII
GRAMINEÆ

BY
E. BLATTER and C. McCANN

(Continued from page 25 of this Volume.)

60. CENCHRUS, Linn.; Hitchcock and Chase in

Annual or perennial herbs. The inflorescences are spike-like racemes, con-
sisting of involucellate clusters of shortly pedicellate spikelets joined on a
simple rachis. Involutel consisting of hardened spike-like bristles, connate at
the base into a short, coriaceous cup, which is surrounded by erect or squarrose
bristles. Spikelets 1-3 in each involuex, mostly glabrous or nearly so, persist-
ent, 1-2-flowered, with 3-4 glumes. Lower involucral glume 1-nerved, usually
narrow, sometimes wanting; upper involucral glume and lower floral glume
subequal, 5-7-nerved. Lower floral glume longer than the upper involucral,
with or without male flower, paleate. Upper floral glume coriaceous, with a
hermaphrodite or female flower. Lodicules 2. Stamines 3. Styles 2, stigmas
plumose. Grain broad, oblong, dorsally compressed, with a pinnatifid hilum,
free within the glume and pale.

Species about 25.—Tropical and subtropical.

1. Base of involuex rounded ... ... 1. C. biflorus.
2. Base of involuex turbinate ... ... 2. C. catharticus.

1. Cenchrus biflorus, Roxb. Fl. Ind. i (1832), 233; Cke. ii, 917; Achariyar
S. Ind. Grass. (1921), 121—For synonymy see Hook. f. in F.B.I. vii, 89.

Description: Cke. i.c.
Locality: Sind: Karachi (Woodrow); Jamadar ka Landa, near Karachi
(Stocks); Jamesabad, in fields (Sabnis B11011); Umerkot, sandy plains
(Sabnis B1081); Nasarpur, clayey soil (Sabnis B1051); Mirpur Sakro
(Blatter and McCann D627); Tatta (Blatter and McCann D628).—Gujarat:
Kharaghoda, under trees (Saxton 1064); Ahmedabad (Sedgwick l, Cooke);
Morvi (Woodrow).—Khandesh: Bhusaval, Tapti (McCann 5154); Umalla,
Tapti Bank (Blatter and Hallberg 5158); Kaperkheda, Bori River (Blatter and
Hallberg 4393).

Distribution: Punjab, Rajputana, Gangetic Plain, W. Peninsula, Balu-
chistan, Arabia, Africa.

2. Cenchrus catharticus, Del. Cat. Hort. Monsp. (1838); Schlecht. Linnæa
xiii (1839) Litt. p. 103; Cke. ii, 918; Hitchcock and Chase in Contrib. U.S.
Nat. Herb. xx (1920), 53, fig. 8; Achariyar S. Ind. Grass. (1921), 122.—For
synonyms see Hook. f. in F.B.I. vii, 90.

Description: Cke. ii, 918.
Locality: Sind: Karachi (Burns!); Gharo (Blatter and McCann D629).—
Gujarat: Ahmedabad, sandy ground (Sedgwick l); Sumrasar, Cutch (Blatter
3762!); Perim Island, at the mouth of the Narbada River (Raoji).—Khandesh:
Bor, Bori River (Blatter and Hallberg 5115!).

Distribution: Punjab, Gangetic Plain, W. Peninsula, Bellary, Nellore,
Arabia, tropical Africa.

[1]

Key in Cke. ii, 922.

1. Isachne Liebne, Hook. f. in F.B.I. vii (1896), 22; Cke. ii, 922.
   **Description**: Cke. l.c. — We have found specimens reaching the following dimensions: Stem 90 cm.; leaves 25 by 1 cm., or broader, sparingly hairy or almost villous; panicle 25 by 15 or more cm.
   **Locality**: Konkan: Pen, in inundated land (Dalzell). — **Deccan**: Margins of rivulets in the Deccan (Dalzell and Gibson); Mahableshwar, elevation 4,000 ft., rainfall 270 inches (Sedgwick and Bell 4553!); Panchgani, Tableland, forming, large patches (Blatter 5080!); Sinhagad forest (Bhide!); Nasapur to Purandhar (Bhide 1001!); Purandhar, N. foot (McCann 5048!); Lohagad Fort, top (McCann 9500!); Khandala, behind hotel (McCann 8555!); Lonavla (Woodrow 175); Ganeshkhind Gardens (Herb. Econ. Bot. Poona!); between Poona and Karli (Jacquemont 556). — **S.M. Country**: Dharwar, rice fields, elevation 2,500 ft. (Sedgwick 1829!). — **Kanara**: Halyal, rice fields (Talbot 2305!). — Usually forming large mats in damp soft soil, and then not growing very tall.
   **Distribution**: So far endemic.

   **Description**: Cke. l.c. — We have found specimens reaching the following dimensions: Stem 90 cm.; leaves 25 by 1 cm., or broader, sparingly hairy or almost villous; panicle 25 by 15 or more cm.
   **Locality**: Konkan: Pen, in inundated land (Dalzell). — **Deccan**: Margins of rivulets in the Deccan (Dalzell and Gibson); Mahableshwar, elevation 4,000 ft., rainfall 270 inches (Sedgwick and Bell 4553!); Panchgani, Tableland, forming, large patches (Blatter 5080!); Sinhagad forest (Bhide!); Nasapur to Purandhar (Bhide 1001!); Purandhar, N. foot (McCann 5048!); Lohagad Fort, top (McCann 9500!); Khandala, behind hotel (McCann 8555!); Lonavla (Woodrow 175); Ganeshkhind Gardens (Herb. Econ. Bot. Poona!); between Poona and Karli (Jacquemont 556). — **S.M. Country**: Dharwar, rice fields, elevation 2,500 ft. (Sedgwick 1829!). — **Kanara**: Halyal, rice fields (Talbot 2305!). — Usually forming large mats in damp soft soil, and then not growing very tall.
   **Distribution**: So far endemic.

3. Isachne australis, R. Br. Prodr. (1810), 196; Cke. ii, 923.—For synonyms see Hook. f. in F.B.I. vii, 923.
   **Description**: Cke. l.c. — We have found specimens reaching the following dimensions: Stem 90 cm.; leaves 25 by 1 cm., or broader, sparingly hairy or almost villous; panicle 25 by 15 or more cm.
   **Locality**: Konkan: Pen, in inundated land (Dalzell). — **Deccan**: Margins of rivulets in the Deccan (Dalzell and Gibson); Mahableshwar, elevation 4,000 ft., rainfall 270 inches (Sedgwick and Bell 4553!); Panchgani, Tableland, forming, large patches (Blatter 5080!); Sinhagad forest (Bhide!); Nasapur to Purandhar (Bhide 1001!); Purandhar, N. foot (McCann 5048!); Lohagad Fort, top (McCann 9500!); Khandala, behind hotel (McCann 8555!); Lonavla (Woodrow 175); Ganeshkhind Gardens (Herb. Econ. Bot. Poona!); between Poona and Karli (Jacquemont 556). — **S.M. Country**: Dharwar, rice fields, elevation 2,500 ft. (Sedgwick 1829!). — **Kanara**: Halyal, rice fields (Talbot 2305!). — Usually forming large mats in damp soft soil, and then not growing very tall.
   **Distribution**: So far endemic.

   **Description**: Cke. l.c. — We have found specimens reaching the following dimensions: Stem 90 cm.; leaves 25 by 1 cm., or broader, sparingly hairy or almost villous; panicle 25 by 15 or more cm.
   **Locality**: Konkan: (Woodrow). — **Deccan**: Lonavla (Woodrow); Mahableshwar, in forests, fairly common in one spot (McCann!). — **Kanara**: Sulgeri, 500 ft., rainfall 200 inches (Sedgwick and Bell 4248!); Yellapore (Talbot 1522!); Gersoppa Falls, Mysore side (McCann & Hallberg A231!).
   **Distribution**: More or less throughout India, Ceylon, China, Malay and Pacific Islands, S. America.

**62. Arundinella, Raddi Agrost. Brasil. (1823), 37; Cke. ii, 999.**

Species about 55.—In the tropics.

Cooke describes 12 species from the Bombay Presidency. We retain them all except that we change *A. agrostoides*, Trin. into *A. ciliata*, Nees, and *A.*
brasiliensis into *A. hispida*, O. Ktze. To the 12 species we add another: *A. villosa*, Wight & Arn.

**Key after Cke. ii, 999.**

**A.** Upper floral glume with 3 awns.

1. Leaves less than 10 cm. long **Annuals**
   a. A straggling grass. Leaves glabrous or sparsely hairy...
      ... ... ... 1. *A. avenacea*.
   b. An erect grass. Leaves hispid with bulbous-based hairs
      ... ... ... 2. *A. tuberculata*.

2. Leaves 15–30 cm. long. **Perennials** ... 3. *A. setosa*.

**B.** Upper floral glume with 1 awn.

1. Spikelets 1.5–2 mm. long ... ... ... 4. *A. tenella*.

2. Spikelets 2–3.5 mm.
   a. Stem scarcely 15 cm. high. Leaves 2–5–4 cm. long ... ... ... 5. *A. pygmaea*.
   b. Stem exceeding 15 cm.
      a. Stem reaching 45 cm. Leaves 2–5–10 cm. long; and the sheaths clothed with long soft hairs ... ... ... 6. *A. ciliata*.
      b. Stem reaching 90 cm. Leaves 10–15 cm. long; and the sheaths glabrous or nearly so ... ... ... 7. *A. Metzii*.
   c. Stem reaching 4 ft. Leaves 20–30 cm. long, sparsely hairy; sheaths glabrous or nearly so ... ... ... 8. *A. Lawii*.

**III.** Spikelets 4–6 mm. long.

1. Panicle branched
   a. Rootstock hard, creeping, not tuberous. Rhachis of panicle angular, glabrous ... ... ... 9. *A. hispida*.
   b. Rootstock tuberous. Rhachis of panicle filiform, scabreous ... ... ... 10. *A. capillaris*.

2. Panicle spicate
   a. Leaves 2–5–4 cm. long ... ... ... 11. *A. spicata*.
   b. Leaves 10–20–30 cm. long ... ... ... 12. *A. villosa*.

**C.** Upper floral glume without awn ... ... ... 13. *A. gigantea*.


**Description:** Cke. ii, 1000.—This grass in its young state resembles *A. spicata* so much, that it can easily be mistaken for that species.

**Locality:** *Konkan:* Ratnagiri (Wodrow).—*Deccan:* Mahableshwar, very common, 4,500 ft., rainfall 270 inches (Sedgwick & Bell 4510!), Lisboa; Panchgani (Blatter 9383!), Tiger's Path (Blatter & Hallberg B1255!); Khandala, very common (McCann 9604!); Tiger Leap near Lonavala (Wodrow).—*S. M. Country:* Ram Ghat (Ritchie 890);—*Kanara:* Castle Rock (McCann 9854!, Woodrow, Bhide!), Ammod, 1,800 ft., rainfall 200 inches (Sedgwick 3253!); Tinar Ghat, 1,869 ft., rainfall 250 inches (Sedgwick 3269!); Yellapore (Telbot 1035!); Supa (Telbot 2487!); Kumberwada (Telbot 2255!); Karwar (Telbot 1302!); Katgal (Hallberg & McCann 1665!); Devimane (McCann 9936!).

**Distribution:** Khasia, Burma, W Peninsula, Ceylon.


**Description:** Cke. i.e.

**Locality:** *Konkan:* Vasco da Gama (Bhide!).—*Deccan:* Panchgani, slopes below Third Tableland (Blatter & Hallberg 1232!); Pasarni Ghat (Blatter & Hallberg 1306!); Poona (Wodrow).—*S. M. Country:* Dry hills between Yelvig and Savanur, 1,900 ft., rainfall 25–30 inches (Sedgwick 1959!).—

[3]

**Description:** Cke. l.c.

**Locality:** Konkan : Near Bombay (Ritchie).—**Kanara:** Dandeli (Dalzell 2266 !); Gersoppa Falls, on rocks in river bed (McCann A166 !, A162 !).

**Distribution:** W. Himalaya, Khasia Hills, Bihar, Central India, Nilgiris, Ceylon, Tonkln, China, Philippines.


**Description:** Cke. ii, 1001.

**Locality:** Khandesh : Toranmal (McCann 9594 !).—**Konkan:** Pen (McCann 5502 !); Bombay (Lambert).—*Deccan:* Mahableshwar, 4,500 ft., rainfall 200 inches (Sedgwick & Bell 4537 !); common under the shade of trees (Dalzell, Cooke, Woodrow, Lisboa); Panchgani (Blatter 3789 !), Maratha Well (Blatter & Hallberg B1222 !); Karlri and Khandala (Jacquemont 631); Khandala, very common (McCann 5354 !); Lonavla (Gammie !, Woodrow); Purandhar (McCann 5013 !); Igatpuri (McCann 5354).—**Kanara:** Yellapore, 2,000 ft., rainfall 100 inches (Sedgwick 3125 !); Halyal (Dalzell 2553 !); Dandeli (Dalzell 2268 !); Tinai (Dalzell 2576 !).—A very ornamental grass, found commonly throughout the hilly parts of the Presidency.

**Distribution:** W. Himalaya, Khasia Hills, Bihar, Central India, W. Peninsula, Abyssinia.


**Description:** Cke. l.c.

**Locality:** Konkan : Crest of W. Ghats (Woodrow).—*Deccan:* In public garden, Mahableshwar, 4,500 ft., rainfall 270 inches (Sedgwick & Bell 4619 !); Khandala (McCann 5318 !); Igatpuri (Blatter & Hallberg 3143 !).—**Kanara:** N. Kanara (Lisboa).

**Distribution:** Endemic.


**Description:** Cke. ii, 1002.

**Locality:** Konkan : (Wight).—We have not seen any specimens.

**Distribution:** India, Philippines.


**Description:** Cke. ii, 1003.

**Locality:** Deccan : Lonavla (Woodrow).—*S. M. Country:* Devarayi, 1,800 ft., rainfall 90 inches (Sedgwick & Bell 4474 !).—**Kanara:** Yellapore, 2,000 ft., rainfall 90 inches (Sedgwick 3469 !); Sunksal, rocky bank of a stream in evergreen forest 500 ft., rainfall 150 inches (Sedgwick & Bell 5040 !); Birchy (Dalzell 2105 !, 2116 !, 2488 !); Dandeli (Dalzell 2268 !).

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[4]
Distribution: W. Peninsula.

Description: Cke. i.c.
Locality: Konkan: (Woodrow 35!); N. & S. Konkan (Law).
Distribution: W. Peninsula, Ceylon.

Description: Cke. ii, 1003.— A most variable plant. See Hook. f. in F.B.I. vii, 74.
Locality: Deccan: Mahabaleshwar, 4,500 ft., rainfall 270 inches (Dalzell & Gibson, Lisboa), in a stream (Sedgwick & Bell 4543!); Panchgani (Woodrow); Khandala (Saxton 1205!, Lisboa); Lonavla (Hallberg 9660!, Garade!, Lisboa).— Kanara: Castle Rock, on banks of Duoki River, 1,900 ft. (McCann 4855!); Karanudi to Supa, 1,800 ft., rainfall 100 inches (Sedgwick & Bell 4872!); Yellapore, in a gravelly stream bed, 2,000 ft., rainfall 100 inches (Sedgwick 3126!); Sumpkhund, in river bed (Hallberg & McCann A153!); Dandeli (Talbot 2241!).
Distribution: Throughout the hilly parts of India, China, Malay, Australia tropical America.

Description: Cke. i.c.
Locality: Konkan: Parel, Bombay Island (Woodrow).— N. Kanara: Karanudi (Woodrow).
We doubt the occurrence of this species in the Bombay Presidency. Woodrow gives two localities, but neither Cooke nor we have seen his specimens. Lisboa (Journ. Bom. Nat. Hist. Soc. v (1891), 8) calls this plant common all over Bombay. If it is really common it is strange that we should never have met it.
Distribution: W. Peninsula.

Description: Cke. i.c.
Locality: Deccan: Mahabaleshwar, common in open localities, 4,500 ft., rainfall 270 inches (Sedgwick & Bell 4503!), common on the Mahabaleshwar Hills (Dalzell & Gibson, Woodrow, Cooke); Panchgani, very common on the Tablelands (Blatter 3797!, McCann!).
Distribution: W. Peninsula; so far endemic.

Description: Stem 30–40 cm. high, tufted, slender, stiff, leafy at the villous base, villous below the panicles. Leaves 10–20 cm. by 2–2.5 mm., strict, rather rigid, glabrous, tomentose or villous. Ligules of long hairs. Panicle very narrow, 5–10 cm. long, spiciform, rhachis villous; branches 12–18 mm. long.
brown. Spikelets subdistichously crowded, spreading or erect, 5-6 mm. long, setosely hirsute. Lower involucral glume 2 of upper, long-pointed, 3-5 nerved, upper involucral glume subaristately long-pointed, 5-nerved. Lower floral glume sharp-pointed, 5-nerved, neater or male; upper oblong-lanceolate, very minutely scaberulous, rounded at the tip, sometimes 2-dentate, awn not twice as long as the spikelet, column of awn included, twisted.

The leaves vary a good deal as to their size. In addition to the measurements given above, the following have been observed: 30 cm. by 8 mm. and 5-15 cm. by 6-8 mm.

Locality: Deccan: Khandala (McCann 9602A!, 9002B!).

Distribution: E. Himalaya, Khasia Hills, Central India, Deccan Peninsula, Ceylon.


Description: Cke. i.c.

Locality: Konkan: (Stocks); Kineshvar below the Ghats (Dalzell and Gibson).—S. M. Country: Londa (Bhide!).—Devarayi (Sedgwicx 4747!).—Kanara: Castle Rock, in shade (McCann 9853!); Gammie 18668!); Dudsagar Falls (McCann A174!); Nagergali, forests, 1,800 ft., rainfall 80 inches (Sedgwick 4292!); Birchy (Telbot 2250!); Dandeli (Telbot 2593!); Tinali Ghat (Telbot 2626!); Juggllepet (Telbot 1837!); Supa (Telbot 2493!); Karwar (Hallberg and McCann A161!); Gerossappa Falls, on rocks in river bed (Hallberg and McCann A160!); Yellapore (Sedgwicx 3469!, Talbot 1).

Distribution: W. Peninsula; so far endemic.

63. Tristachya, Nees.


Description: Cke. l.c.

Locality: Sind: (Stocks 1217, 648 ex Cooke).

Distribution: Arabia, Nubia.


Cooke has one species: Thysanolaena Agrostis, Nees. We change it into T. procera, Mez.


Description: Cke. ii, 1006.

Locality: Gujrat: In bed of nalla (Sedgewick and Bell 5393!); Bandi, Surat District (Woodrow).—Khandas: (Lisboa); Chanseli to Dadgaun, in a dry nalla (McCann 9589!); Dangs (Woodrow).—Konkan: Victoria Gardens, Bombay (McCann 9846!); Thana (Lisboa).—Deccan: Ganeshkhind Botanic Gardens (McCann 9847!); Nasik (Lisboa).

Distribution: Throughout India, Penang, eastwards to New Guinea.


Annual or perennial herbs, low or moderately tall. Panicles narrow or open, usually rather few-flowered of usually large spikelets. Spikelets 2-several-
flowered; rachilla bearded, disarticulating above the involucral glumes and between the flowering glumes. Involucral glumes about equal, membranous or papery, several-nerved, longer than the lower floret, usually exceeding the upper floret. Floral glumes inurate, except toward the summit, 5-9-nerved, bidentate at the apex, bearing a dorsal bent and twisted awn, which is straight and reduced in *Avena sativa*.

The genus as just described does not include *Trisetum*, Pers. as is the case in Hook. f.'s *Avena* in F.B.I. vii, 274.

Species about 55. Chiefly temperate regions. One species cultivated in the Presidency.


An annual grass. Stems erect, tufted, smooth, 1-2 m. high. Blades flat, up to 30 c.m. high and 12 mm wide, scabrous, especially on the margins; ligule membranaceous, truncate, 1-3 mm. long, toothed or serrate, decurrent along the margin of the sheath; sheaths smooth, striate, the lower rather papery. Panicle open or more or less contracted, erect or nodding, sometimes 1-sided, the pedicels thickened at the apex. Spikelets large, drooping, variable in size, but usually about 20-25 mm. long; involucral glumes strongly several-nerved, membranaceous, acuminate, scabrous, containing usually 2 florets; floral glumes smooth or slightly hairy at the base, teeth acute but not awned, the dorsal awn absent or, if present, usually straight and not much longer than the involucral glumes, often present only on the lower floret, pale enclosed by the inrolled margin of the glume, densely short-ciliate on the 2 keels.—The florets do not easily disarticulate, which condition is probably due to cultivation.

**Locality**: Very little cultivated in the Presidency. Has been grown at Hyderabad (Sind), also at military grass farms for military horses at Ahmednagar and elsewhere.

Grows best in the cold weather and always under irrigation.

For a useful introduction to the study of oats see: Herbert Hunter. Oats, their varieties and characteristics. London, 1924.


A small, leafy, variable marsh grass. Leaves short, flat or convolute. Spikelets 2-flowered (both flowers perfect or upper imperfect) in open or contracted or scirpiform panicles, not articulate on the pedicels, not awned. Rachilla jointed at the base, produced between the lower and upper floral glume but not beyond the upper. Lower involucral glume suborbiculate, concave, obtuse and delicately several-nerved; upper smaller, more oblong, both persistent. Lower floral glume much longer, subsessile, coriaceous, glabrous except the shortly bearded callus, pale as long, coriaceous; upper much smaller and pale more or less hairy. Stamens 3; anthers long, narrow. Ovary ovoid; stigmas free. Grain free within the glume and pale.

Tropical Asia, Australia, Madagascar.


**Description**: Stems 15-45 cm. high, flaccid, decumbent or ascending, slender or rather stout, leafy up to the panicle. Leaves uniform throughout the stem, 1-2.5 cm. long, lanceolate, subulate, acuminate, distant or subequally sheathing, ecostate, minutely scaberulous above, nerves striate; ligule a few hairs. Panicle very various. Spikelets 1-2.5 mm. long, sessile or pedicilled, globose or ovoid. Lower involucral glumes suborbicular or hemispheric, many-nerved, membranous or herbaceous. Lower floral glume hermaphroditic, coriaceous, dorsally rounded, nerves 0 or very obscure, pale, coriaceous; margins incurved; upper much the smallest, often imperfect, neuter or female.

**Locality**: Deccan: Mahableshwar, by the lake, 4,500 ft., rainfall 270 inches (Sedgwick & Bell 4851 !).—S. M. Country: Roadside near Khanapur, 2,500 ft., rainfall 60 inches (Sedgwick 2960 !).—Kanara: Kumbmoada (Talbot 2273 !); Karwar, in wet fields (McCann !); Sirsi to Siddapur, in fields (Hallberg & McCann A47 !); Castle Rock, in a marsh (Bhide!, McCann !).

**Distribution**: Of the genus.
67. Danthonia, Lam. & DC. Fl. Franc. 3 (1805), 32; Hitchcock Genera of Grass. of Unit. St. in Bull 772 Unit. St. Dept. Agric. (1920), 118.

Annual or perennial grasses, tufted, low or moderately tall. Panicle few-flowered, open or spike-like of rather large spikelets. Spikelets 3-many-flowered, with the uppermost florets reduced, erect, not jointed on their pedicels. Rhachilla hairy, readily disarticulating above the involucral glumes and between the flowering glumes, produced beyond the uppermost glume. Lower involucral glumes empty, subequal, as long as the whole spikelet, persistent, keeled, acute or acuminate, 3-9- (rarely 1-) nerved. Flowering glumes dorsally rounded. Ciliate, 7-9-nerved, 2-fid, lobes acute, usually extending into slender awns, a stout awn arising in the sinus; awn flat, tightly twisted below, geniculate, exserted, including 3 nerves of the glume; pale broad. Lodicules 2, fleshy. Stamens 3. Styles free. Grain free within the membranous or hardened glume and pale.

Species about 100.—In the temperate regions of both hemispheres, especially abundant in S. Africa.

1. Danthonia Gammiei, Bhide in Journ. & Proc. As. Soc. Beng. new series, vii (1911), 513. Description: Stem 10–60 cm. high, nodes glabrous. Leaves linear, glabrous below, sparsely long-ciliate above, 2·5–7·5 cm. by 2·5–3 mm., base rounded; ligule a very narrow, truncate, fimbriate membrane; sheaths glabrous; upper leaves very much reduced in size. Peduncle and rhachis hairy; panicle lax, racemose, 2·5–5 cm. by 12–16 mm. Spikelets few, short-pedicelled, about 18 mm. long excluding the awns. Involutcal glumes empty, lanceolate, acuminate, lower one strongly 5-nerved, dorsally rounded glabrous, subscariosous, margins membranous; upper one by ¾ shorter than the lower, membranous, 3-nerved. Lower floral glume without the awns much smaller than the involucral glumes, terete. convolute, 7–9-nerved, dorsally villous all over, 2 dentate with a stout broad median awn; column of awn golden yellow, twisted and shining, tail minutely scabrid, dorsally narrowly 2-channelled; teeth produced into small slender awns reaching as far as the column of the median awn, with a fringe of long white hairs at the junction of the lateral awns with the glume; rhachilla produced and terminating in a minute, ciliate, awned or awnless barren glume (upper floral glume); lodicules membranous, half as long as the anthers, oblong, marginsate. Stamens 3. Styles 2, distinct. Anthers and plumose stigmas protruding from the top of flowering glume.

Locality: Kanara: Castle Rock (Gammie!); Jog to Siddhapur, open grass land on rocky soil (McCann A50!, A51!); Mirjan, laterite flats (Hallberg A49!). Distribution: So far endemic.

68. Phragmites, Adans. Fam. Pl. ii (1763), 34, 559; Cke. ii, 1006 (Phragmites, Trin.).

Some European authors have taken up Tironchoos, Roth. Archiv. Bot. Roemer i, pt. 3 (1798), 37 as antedating Phragmites, Trin. Fund. Agrost. (1820), 134. The latter name, however, dates from Adanson (1763) and should be retained. Cf. M. L. Fernald. The Genera name Phragmites in Rhodora 24 (1922), 55–56. Also: Hitchcock. Genera of Grass. Unit. St. in Bull. 772 Unit. St. Dept. Agric. (1920), 64. Species 3. One in tropical Asia, one in S. America and one cosmopolitan.

1. Phragmites Karka, Trin. ex Steud. Nom. ed. 2, pt. ii (1841), 324; Cke. ii, 1007.—For synonyms see Hook. f. vii, 304. Description. Cke. i.e. Localitiy: Sind: Ketí (Blatter & McCann D652!, D653!); Tatta, Kullan Kote Lake (Blatter & McCann D654!). Gujrat: Mahals-Dang, by a stream, 800 ft., rainfall 100 inches (Sedgwick & Bell 5390!); Anjar, Cutch (Blatter 3740!). Khandesh: Bhusawal, N. E. Tapti River (Blatter & Hallberg 4436!); Chanseli Hill, N. slope, watercourse (McCann A44!, A45!); Deccan: Dhond (Woodrow). S. M. Country: Banks of Warda River, Bangalore Road, 1,860 ft., rainfall 33 inches (Sedgwick 2092!); Haveri (Talbot 2178!, 2188!). Kanara: Supa, 2.100 ft. (Talbot 2185!). [8]
Distribution: More or less throughout India, tropical Asia, Afghanistan, Japan, Australia, Africa.


Tall, stout, perennial grasses with broad linear blades and large plume-like terminal panicles. Spikelets 2-7-flowered, laterally compressed, in large decompound panicles; flowers mostly bisexual; rachilla disarticulating above the involuclar glumes and between the flowering glumes, joints short, glabrous. Involuclar glumes equal, broadly lanceolate, shortly acuminate, keeled, membranous, 3-5-nerved. Floral glumes more or less equaling the involuclar glumes ovate to lanceolate-ovate, acuminate, finely bifid or entire, long-hairy below, 5-9-nerved, 3 nerves more or less percurrent or excurrent, the rest short, the middle nerve often produced into a short, fine bristle; callus short, shortly bearded. Pales slightly exceeding ¼ the length of the floral glume. 2-keeled. Lodicules 2, obovate, nervet, glabrous. Stamens 3. Ovary glabrous; styles distinct, almost as long as the laterally exserted plumose stigmas. Grain obovoid-oblong, broad, loosely enclosed in the glume flume and pale; hilarum basal, punciform; embryo occupying almost wholly one side of the grain.

*1. Arundo Donax, Linn. Sp. Pl. (1753), 81.—For synonyms see Hook. f. in F. B. I. vii, 303.

Description: Stem creeping below, erect, 1-3 m. high, smooth, hollow, very many-noded, simple or scantily branched, internodes slightly exceeded by the sheaths, these very tight, firm, smooth. Blades linear-lanceolate to a broad base, long-tapering to a very fine point, more or less drooping, 30-60 cm. long, 2-5 cm. broad, smooth. Panicles erect, 30-60 cm. long; branches scabrous, erect or drooping; spikelets 8-10 mm. long, light brown. Involuclar glumes glabrous; floral ones 6-10 mm. long; hairs 5-6 mm. long. Anthers 3 mm. long. Grain 2.5 mm. by almost 1 mm.

Locality: Often grown in gardens.


70. Polypogon, Desf. Pl. Atlant. i (1798), 66 ; Hook. f. in F. B. I. vii, 245

Annual or perennial, usually decumbent grasses, with flat blades. Spikelets 1-flowered, minute, jointed (but persistent) on the pedicels, laterally compressed, keeled, densely crowded on the short branches of a spiciform or lobed panicle; rachilla not produced beyond the lower floral glume. Glumes 3. Involuclar glumes equal, concave, keeled, bifid, notched or entire, with a slender awn below the tip or in the sinus. Lower floral glume much smaller, hyaline, sessile, truncate, toothed, awned or not; pale small, 2-nerved. Lodicules 2, falcate. Stamens 1-3; anthers small. Ovary glabrous; styles free. Grain obovoid, free within the glume and pale.

Species about 10.—Temperate regions of the world, chiefly in the Eastern Hemisphere.

1. Polypogon Mandselianus, Desf. Pl. Atlant. i (1798), 66.—For synonyms see Hook. f. in F. B. I. vii, 245.

Description: Stems tufted, 10-60 cm. high, stout or slender, leafy, base geniculate. Leaves 7-15 by 3-6 mm., green, ligule oblong. Panicle 1-15 cm. by 6-10 mm. broad, pale yellowish green, silky, sometimes lobulate from the projecting branches. Spikelets 1-2 mm. long, minutely pubescent. very shortly pedicelled. Involuclar glumes very variable in breadth, obovate-oblong, sides scabrous, keels scabrid, margins ciliate, tip entire, notched or very shortly 2-fid; awns from the length of the glume to 8 mm. long, excessively delicate. Lower floral glume very small, oblong, glabrous, 2-fid, awned or not; pale oblong, tip notched. Anthers very minute, short. Ovary ovoid.

Locality: Sind: Sukkur (Bhide !). Shikarpur (Bhide !)

Distribution: Tropical and temperate regions.


Species about 7.—Mediterranean-oriental.

1. Panicles less than 2.5 cm. long ... ... 1. H. schenoides.
2. Panicles reaching 8 cm. ... ... ... 2. H. dura.

1. Heleochara schoenoides, Host. Gram. Austr. i (1801), 23, t. 30; Cke. ii, 1011.—For synonyms see Hook. f. in F. B. i. vii, 235.
Description: Cke. i. c.
Locality: Sind: Bhubak (Cooke !).
Distribution: Punjab, W. Himalaya, Kashmir, Bundelkhand, westwards to the Atlantic.

2. Heleochara dara, Boiss. Fl. Or. v (1881), 477; Cke. ii, 1011.—For synonyms see Hook. f. in F. B. i. vii, 236.
Description: Cke. i. c.
Locality: Sind: Salt-water creeks (Stocks 455); Gholam in Indus Delta (Blatter and McCann D689!).
Distribution: Arabia.

72. Garnottia, Brogn.; Cke. ii, 1012.

1. 5-20 cm. high, growing on trees. Leaves 2:5-5 cm. long ... ... ... 1. G. arborum
2. 30-60 cm. high. Leaves 7-20 cm. long ... ... 2. G. stricta.

Description: Cke. i. c.
Locality: Igatpuri (McCann 4598 !); Lonavla (Gammie 15501 !); on trees at Nandgaon on the crest of the Ghat's 10 miles S. of Lonavla (Woodrow 30); Kalsubai Hill, under a steep rock (Patwardhan 1189 !).
Distribution: Apparently endemic.

Description: Cke. i. c.
Locality: Konkan : Pen (McCann 5501 !); Kalyan (Talbot !); between Neral and Karjat (Woodrow).—Deccan : Khandala, St. Mary's Villa, on root (McCann A298 !); Igatpuri (McCann 4589 !); Panchgani (Blatter and Hallberg B1283 !; B1305 !).—Kanara : Top of Guddhelli (Hallberg & McCann A303 !); Gersoppa Falls (Hallberg & McCann A300 !).
Distribution: Himalayas, Khasia Hills, Bighar, W. Peninsula, Sandwich Islands.

73. Aristida, Linn. Sp. Pl. (1753), 82; Cke. 1007.
Species about 150. In the warmer regions of the world.
We shall have to refer repeatedly to the splendid monograph by J. Th. Hennrad : A Critical Revision of the Genus Aristida in Mededeelingen van s' Rijks Herbarium, Leiden, No. 54 (1926) and No. 54A (1927). So far 2 vols. have appeared.
Cooke describes 7 species. We retain them and add Aristida mutabilis, Trin. & Rupr., and A. pogonoptila, Boiss.

A. Awns without column
I. Involucral glumes not awned ... ... ... 1. A. Adscensionis.
II. Involucral glumes awned
1. Spikelets 17 mm. long ... ... ... 2. A. setacea.
2. Spikelets 10 mm. long ... ... ... 3. A. Hystrix.
3. Spikelets 6 mm. long ... ... ... 4. A. mutabilis.

B. Awns with a column
I. Column of awn articulate on the floral glume
1. Awn plumose
a. Glumes glabrous. Central awn without a naked tip ... ... ... 5. A. pogonoptila.
b. Glumes not glabrous. Central awn with a naked tip ... ... ... 6. A. hirtigluma.
2. Awn not plumose
a. Stems less than 15 cm. high. Lower
[10]
involucral glume 5 mm. long ... 7. A. hystrica.

b. Stems reaching 2 ft. high. Lower involucral glume 22 mm. long ...

II. Column of awn not truly articulate on the floral glume, though readily separating


The above is a list or synonyms which have been included by Henrard under A. Adscensionis, Linn. either as representing the typical plant or as subspecies and varieties.

The following is a list of synonyms which Hook. f. in the F.B.I. (vii, 224, 225) had cited under A. Adscensionis, but which have to be excluded according to Henrard's recent investigations.

Aristida ceruleascens, Desf. Fl. Atl. i (1798), 109, t. 21, f. 2, treated as a distinct species by Henrard i, 99.—A. chelatophylla, Steud. Syn. Pl. Glum. (1855), 420, no. 1086.—A. depressa, Retz. Obs. iv (1786), 22 (ex Henrard i, 136).—A. eliator, Cav. l.c. vi (1799), 65, t. 581, fig. 1 (non Doell), put by Henrard (p. 161) under A. ceruleascens, Desf.—A. gigantea, Linn. f. Suppl. (1781), 113, Henrard (i, 190) is doubtful about the identity of this species, as he has not seen the type.—A. Jacquiniana, Tausch in Flora ii (1836), 508, considered by Henrard (ii, 268) as a distinct species —A. paniculata, Forskal in Fl. Aegeyt.—Arab. (1775), 25. Hook. f. considers it to be identical with A. Adscensionis 'ex descript.' Trinius, however, observes that Forskal's diagnosis agrees with nearly all the Aristidas with naked awns. Before we can find Forskal's type it will be impossible to place his plant with anything like certainty. (See Henrard ii, 418).—A. mutabilis var. aquilonga, Trin. & Rupr. l.c. (1842), 150. Henrard l.c. ii (1827), 366 retains A. mutabilis as a distinct species and considers the specimen mentioned under the variety aquilonga as the type-specimen of A. mutabilis.—Chetaria ceruleascens, P. Beauv. Roem. & Schult. Syst. ii, 294, identical with A. ceruleascens, Desf.—C. depressa, P. Beauv. Agrost. 30.—C. eliator, P. Beauv. Agrost. 30.—C. gigantea, P. Beauv. Agrost., doubtful.

Description : Cke. ii, 1008.

Note: Cooke includes under A. Adscensionis the plant called A. depressa, Retz. Obs. iv (1786), 22 by Dalz. & Gibs. in their Flora of Bombay, and stated by them to occur 'on dry hills'. Neither Cooke nor we have seen the specimen and so we cannot know whether it is the real Aristida depressa of Retz or
whether it belongs to *A. Adscensionis*. If it is Retz.'s species we would have to add *A. depressa*, Retz. to the Bombay Flora, as it is considered to be a species distinct from *A. Adscensionis*.

For the benefit of botanists who wish to clear up this point we quote from Henrard, p. 137, where he points out the difference between the two species. 'Well-developed plants (of *A. depressa*) have sterile innovation-shoots but the root-system is rather faint and much resembles that of annual grasses. The blades are thin and setaceously convolute and the panicles are very loose and open. The spikelets differ from those of *A. Adscensionis* in the very unequal length of the glumes, the lower glume is about $\frac{3}{4}$ as long as the upper and both are moreover very acute, the lower distinctly awned, the upper without a bifid apex and slightly pointed.'

**Locality:** Sind : Laki (Bhide!); Sehwan to Laki, foot of hills (Sabnis B612!); Umerkot, sand dunes (Sabnis B1075!); Tatta (Blatter & McCann D6261); Kullan Kote Lake (Blatter & McCann D6251).—*Gujarat*: Ahmedabad (Saxton 1066!); Bhuj Hill, Cutch (Blatter 3769!); road to Lasandra (Chibber !); Sevalia (Chibber !); road to Gogka (Chibber !); Jetalsar, Kathiawar (Woodrow 43).—*Khandesh*: Bor, Tapti River (Blatter & Hallberg 5412!); Toranmal (McCann A230!).—*Deccan*: Pashan (Gammie !); Manmad (Blatter 9973!); Happy Valley, Ahmednagar District (Chibber !); Panchgani (Blatter & Hallberg B1315!); Poona (Cooke, Woodrow); Bowdahan Hill near Poona (Woodrow 38).—*S. M. Country*: Dharwar, 2,400 ft., rainfall 34 inches (Sedgwick & Bell 4346!); Haveri (Malhotra 2181!); Ranibennur (Jouvhkat !); Gokak Hills (Bhide !).

**Distribution:** Most warm countries.


We are not in a position to say how far Hook. f.'s synonymy is correct.

**Description:** Cke. l.c.

**Locality:** *Gujarat*: Rajkot, Kathiawar (Woodrow).—*Khandesh*: Dadgaum (McCann 9764!).—*Konkan*: Vetora (Sabnis 33677!); Vengurla, sea coast (Chibber !); Salsette (Graham).—*Deccan*: Manmad (Blatter 229!).—*Khandesh*: Kameshkhind Botanic Gardens (Patwardhan!).—*S. M. Country*: Kappatgudd Hills, 2,600 ft., rainfall 30 inches (Sedgwick & Bell 5217!); Dharwar, 2,500 ft., rainfall 34 inches (Sedgwick 1822!); dry hills and fields N. of Dharwar. (Sabnis 9777!); Byadgi (Malhotra 1753!).—*Kavara*: Karwar, common (Sedgwick & Bell 5065!); Halyal (Malhotra 2161!).

**Distribution:** Bihar, W. Peninsula, Mas. arene Islands.

3. *Aristida Hystrix*, Linn f. Suppl. (1781), 113 (non Thunbg.); Roxb. Fl. Ind. i, 350; Graham 335; Dalz. & Gibs. 295; Hook. f. in F.B.I. vii, 225; Cke. ii, 1009.

**Description:** Cke. l.c.—Hooker f.'s statement (l.c.) that the callus is naked is not correct. Cke. (l.c.), however, is right when saying that it is shortly villous.

**Locality:** *Gujarat*: Daman, on sand hills (Bhide !).—*S. M. Country*: Tadas, dry hillsides, 2,000 ft., rainfall 35 inches (Sedgwick 3823!); Dharwar (McCann 1, Sedgwick !); Haveri (Malhotra 2182!); Badami (Bhide!; Cooke, Woodrow).

**Distribution:** Central Provinces, W. Peninsula.


The following synonyms given by Hook. f. l.c. must be excluded : *Aristida Kunthiana*, Trin. & Rupr. in Mem. Acad. Petersb. ser. vi (1842), 151, a distinct species.—*Aristida meccana*, Hochst. *ap.* Trin. & Rupr. l.c. 152, a distinct species.
Description: An annual grass. Stems 15–30 cm. high, many ascending from the root, simple or proliferously branched, slender. Leaves 2.5–7.5 cm. long, very slender, curved, convolute, rigid, smooth. Panicle 7–15 cm. long, very narrow, subcyindrical; branches very short, crowded or sometimes with a few remote lower down on the stem, ascending from a naked base and bearing a dense oblong fascicle of spikelets; rhachis smooth, branches scaberulous. Spikelets (excl. awns) 6 mm. long, very short-pedicelled, pale green or straw-coloured. Lower involucral glume 5 mm. long, shortly awned, keel scaberulous: upper 6 mm. long, tip 2 toothed below the awn. Floral glume scaberulous, callus shortly bearded, awn obscurely articulate with the glume, column nearly as long as the glume, slender, smooth, branches capillary, rather short, central one about 12 mm. long.

Locality: Sind: Sehwan to Laki, foot of hills (Sabnis B235!)

Distribution: Punjab, Sind, Rajputana, Khandesh, S. India, Arabia, tropical Africa.

5. Aristida pogonopila, Boiss. Fl. Or. v (1884), 496; Henrard l.c. ii (1927), 456.—Arthatherum pogonopilum, Jaub. and Spach III. Fl. Or. iv (1850–53), 56, t. 337.

Description: A perennial grass. Rhizome short, oblique, branching. Stems 15–45 cm. high, strict or geniculate, erect, simple or sparsely branching, slender; terete, glabrous, smooth, obsolescent and finely striate, few-noded, leafy at the base and covered with imbricate sheaths. Uppermost internode at flowering time scarcely longer than the sheath; lower internodes longer than the sheaths. Nodes quite glabrous, mostly rufescent. Leaves glaucous, thin, more or less flexuose or rarely rigid, keelless; on the back finely papillose, articulate on the sheath. Lower leaves 7–25 cm. long, the uppermost very often short (2.5–5 cm.). Lowest sheaths aphyllous, chartaceous, straw-coloured, persistent, subcomplicate, striate, ovate or oblong-lanceolate, mostly acuminate. Proliferous sheaths rotund-truncate, keelless, nervet, densely ciliate with long, white hairs at the apex, densely bearded at the mouth with a ring of short bristles, otherwise glabrous, the upper ones herbaceous, tubular-involute. No ligule. Panicle 7.5–15 cm. long, oblong, somewhat lax, simple and made up of many spikelets. Rachis filiform, continuous, semiterete, scabrous, strict. Branchlets capillary, flexuose, scabrous, alternate, distichous; the spikelets arranged in racemes, pedicelled, mostly 3–5, unequal, getting shorter upwards; pedicels capillary, scabrous, thickened at the apex, most of them longer than the glume. Glumes 3. Involutical glumes awnless, of unequal length, subneculari, 3-nerved, glabrous or with scattered hairs on the back and the margins. Lower one shorter, usually fimbriolate at the apex; upper one inserted slightly higher up, narrower than the lower one and about 2 mm. longer, slightly narrowed at the base, emarginate at the apex. Floral glume (including the stalk and awn) about 5 cm. long. Stalk stout, turbinated, densely setulose, bearded-hirsute at the apex. Inner pale tubular-involute, thinly 3-nerved, chartaceous, keelless, oblong, glabrous, cinereous or black-violet, long awned, on the back papillose-scabrous, especially from the middle to the apex, obtusely emarginate after the awn has fallen. Awn deciduous, setaceous-subulate, far below the middle geniculate and trifurcate; the undivided part almost as long as the glume, contorted, erect, canaliculate, filiform, papillose-scabrous, near the apex conspicuously bearded-hirsute, otherwise naked, or laxly hairy; lateral awns capillary, naked, scabrous, more or less diverging, strict, about \( \frac{1}{2} \) the length of the central one and much thinner; central awn strict, long-plumose, at the base setaceous-filiform, upwards capillary. Inner pale minute, membranous, hyaline, nerveless, involute, keelless, glabrous, cuneate-ovovate, truncate or rotundate at the apex, obsolescent crenulate. Lodicules 2, subnecranous, glabrous, finely striate, obliquely ovate, obtuse. Stamens 3. Filaments capillary. Anthers yellowish, glabrous, linear, elongate, emarginate at apex and base. Ovary obovate; quite glabrous. Styles 2, terminal, elongate, filiform, densely plumose, laterally exserted.

Hook. f. in F.B.I. vii, 228 included this species under A. hirtigluma, Steud. but, according to Henrard, it 'differs in the glabrous glumes, in the shorter column, more hairy and barbate at the point of insertion of the 3 awns and in the more loosely and longer plumose central awn, without a naked tip.'
Locality: Sind (ex Boiss.).

Distribution: Punjab, Sind, Baluchistan.


The following synonyms cited by Hook. f. in F. B. I. vii, 228 have to be excluded:


Description: Cke. l.c.

Locality: Sind: Bholari (Bhide!); Sehwan, sand hills (Bhide!); Laki (Bhide!); hills near Bullo Khan (Woodrow!); Sehwan to Laki, foot of hills (Sabnis B614!).

Distribution: Tunis, Upper Egypt, Sinai, Syria, Nubia, Abyssinia, Eritrea, Highlands of Somaliland, Arabia, Sind, Punjab.


Description: Cke. l.c.—Henrard l.c. ii (1927), 251, points out that ‘the most striking character, a character neglected by all the authors who studied the species, is the densely hairy bifid callus.’ Hooker l.c., therefore, when saying that the callus is ‘minute, glabrous’ is not correct. Cooke does not describe the callus.—Apparently no Indian species has a naked callus.

Locality: Sind: Laki (Bhide!); Bholari (Bhide!); Hydrahabad (Bhide!); Jamdarak at Landa near Karachi (Stocks 1187).


Description: Cke. ii. 1010.

Locality: Sind: Mirpurkhas (Sabnis B1038!); Gharo (Blatter & McCann D622!); Tatta, tombs (Blatter & McCann D623!); Ghulamalla (Blatter & McCann D624!); Jam village (Woodrow 19).—Gujarat: Red earth upland N., of Taloda (Sedgwick!); dry waste land, Ahmedabad (Sedgwick!); Bhuj, Bhdor Maka, Cutch (Blatter 3728!).—Khandesh: Bor, Tapti River (Blatter & Hallberg 4416!).—Amalner, Bori River (Blatter & Hallberg 5108!).—Decan: Poona ( Lisboa); Dapuri near Poona (Jacquement 489!); Pashan near Poona (Gamjnje!); Kirkree to Poona, railway line (Garade 816!).—Katraj Ghat (Bhide 1041!).—Panchgani (Blatter & Hallberg B1310!); Satara (Lisboa); Sholapur (Lisboa); Wai (Talbot 4483!).—Nasik (Bourke!); Bairawadi, Purandhar (McCann 5062!); Rahuri (Nana A227!).—S. M. Country: Dry fields Velvigi 1,800 ft., rainfall 28 inches, (Sedgwick & Bell 4989!); Belgau (Woodrow); near Belgau (Woodrow!); Badami (Bhide!).

Distribution: Punjab, Rajputana, W. Peninsula, Baluchistan, Arabia, tropical Africa.


Description: Cke. l.c.
Locality: Konkan: Trombay, common on the hillside (McCann A212 !, A213 !); Kankeshwar hill, Alibag (Bhide !).—Deccan: Lonavla (Woodrow); Junnar, Poona District (Woodrow); Wai (Talbot 4484); Lohagad, plain (McCann 9503 !); Bairawadi below Purandhar (McCann 5063 !); Pashan (Gammie !); Panchgani (Blatter & Hallberg B1275 !)—S. M. Country: Hubli, barren hillside, 2,200 ft., rainfall 28 inches (Sedgwick & Bell 4929 !); Yelvigi, dry fields, 2,000 ft., rainfall 28 inches (Sedgwick & Bell 4897 !); Dharwar, 2,400 ft., rainfall 34 inches (Sedgwick & Bell 4891 ! Talbot 2910); Haveri (Talbot 2216 !).—Kanara: (Law).—This species commonly grows on open hill sides among other plants by which it is supported as it is very weak and bends over.

Distribution: Central India, Nagpur, W. Bengal, W. Peninsula, S. Persia.

(To be continued)
REVISION OF THE FLORA OF THE BOMBAY PRESIDENCY.
Part IX. By E. Blatter, S.J., Ph.D., F.L.S.
REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY

BY

E. BLATTER, S.J., PH.D., F.L.S.

PART IX

GRAMINEÆ

BY

E. BLATTER AND C. MCCANN

(Continued from page 243 of this Volume)

TRIBE IX. ZOYSIEÆ

74. Trachys, Pers.; Cke. ii, 1013.


Description: Cke. ii, 1014.

Locality: S. M. Country: Badami (Bhide!, Cooke, Woodrow); Gokak (Talbot!); Dharwar (Woodrow).

Distribution: W. Peninsula, Ceylon.


(Tragus, Haller Stirp. Helv. ii (1768), 203; Cke. ii, 1014). The type species is Cenchrus racemosus, Linn. and the genus Nazia, Adans. is based on this species. As to Tragus, Haller, this author, according to Hitchcock, cites pre-Linnaean writers who connect Tragus with Cenchrus racemosus, Linn.

Species 3.—Tropical regions of both hemispheres.


Description: Cke. ii, 1014.
Locality: Sind: Tatta, Tombs (Blatter & McCann D6791).—Gujarat: Ahmedabad, waste ground (Sedgwick!); Domas, near Surat (Graham); Rajkot, Kathiawar (Woodrow).—Khandesh: Bor, Tapti bank (Blatter & Hallberg 54671).—Konkan: Salsette (Graham).—Deccan: Poona (Woodrow!; Jacquemont 386); Chattarshihji Hill, Poona (Bhide!); Bijapur (Cooke, Woodrow).—S. M. Country: Dharwar (Sedgwick & Bell 4145!); Mallapur Hill, Bagalkot (Paranjpe!); Gokak (Shevade!); Badami (Woodrow!).

Distribution: Most warm countries.

76. LATIPES, Kunth.


Description: Cke. ii, 1015.

Locality: Sind: (Woodrow!); Karachi (Burns!); 20 miles N. of Karachi (Woodrow); Jamadar ka Landa, near Karachi (Stocks 1186).

Distribution: Baluchistan, Arabia, Abyssinia, Senegal.

77. PEROTIS, Ait.; Cke. ii, 1016.

Species 2 or 3.—Tropics of the Old World and subtropical Australia.


Description: Cke. ii, 1016.

Locality: Gujarat: Baroda (Cooke); Surat (Lisboa); Domas near Surat (Dalzell & Gibson); Daman, on sand hill (Bhide!); Ahmedabad (Saxton 1052t!); Balsar (Herb. S. X. C. t.)—Konkan: Juven (McCann 4312t!); Versova (McCann 4204!); Alibag, sandy shore (Ezekiel!); Bassein (Bhide!), Malwan (Woodrow).—S. M. Country: Mallapur Hill, Bagalkot (Paranjpe!); Gokak (Shevade!); Badami (Bhide!; Cooke, Woodrow); Lona (Bhiva!); Gokak Falls (Sedgwick!).—Kanara: Kulanudi (Sedgwick & Bell 4287t!); Karwar (Telbot 1068!, McCann!); Honore (Telbot 1068t!)

Usually growing on sandy shores. It is easily recognized by its purplish squirrel-tail-like inflorescence.

Distribution: More or less throughout India, Ceylon, S. Africa.


(izonsia, Wild. (1801); Cke. ii, 1016).

Species about 10, tropical Asia to Australia and New Zealand, Mauritius; in Japan alone there are 7 species (See: Honda Masaji Revisio Gram. Japonice i, in Bot. Mag. Tokyo 37 (1923), 113-124.


Description: Cke. ii, 1016.

Locality: Gujarat: Daman, on sand hills (Herb. Econ. Bot. i, Lisboa).—Konkan: Alibag, sandy shore (Ezekiel!); Juven (McCann 4314t!); Bombay, Walkeshwar, seashore, rocks (Sabinis!); Marine Lines (Hallberg 1873!); Versova, marsh (McCann 8975!);—Kanara: Karwar (Telbot 1531!, McCann!)

Distribution: Tropical Asia.

[2]
TRIBE X. SPOROBOLEAE

Species about 95.—Warm regions of both hemispheres, most abundant in 
America. 
Cooke describes 10 species. We retain all of them and add 3 others: 
S. virginicus, Kunth, S. scabrifolius, Bhide, and S. tremulus, Kunth.

A. Involucral glumes both shorter than the floral
   glume
   I. Stamens 2
      1. Culms 30-90 cm. high; panicle reaching 
         25 cm. ... ... 1. S. diander.
      2. Culms scarcely 15 cm. high; panicle 
         reaching 20-25 cm. ... ... 2. S. sindicus.
   II. Stamens 3
      1. Panicle narrow, 12-20 mm. broad. Spike- 
         lets reaching 2-5 mm. long ... 3. S. indicus.
      2. Panicle reaching 7-5 cm. broad 
         a. Panicle 30-45 cm. long. Spikelets 
            1 mm. long ... ... 4. S. minutiflorus.
         b. Panicle 10-15 cm. long. Spikelets 
            2 mm. long ... ... 5. S. ioclados

B. Lower involucral glume as long as the floral 
   glume or nearly so. Panicle interrupted
   I. Spikelets 2-5 mm. long. Leaves very 
      pale ... ... ... ... ... 6. S. virginicus.
   II. Spikelets 1-5 mm. long. Leaves glaucous. 
      7. S. glaucifolius.

C. Lower involucral glume much shorter than 
   either of the two others
   I. Panicle contracted
      1. Perennials
         a. Margins of leaves smooth ... ... 8. S. tremulus.
         b. Margins of leaves serrulate... ... 9. S. orientalis.
          2. Annual... ... ... ... ... 10. S. piliferus.
   II. Panicle effuse
      1. Spikelets 2-5 mm. long ... ... 11. S. arabicus.
      2. Spikelets 1-1.5 mm. long 
         a. Floral glume ovate, acute ... ... 12. S. scabrilolius.
         b. Floral glume-ovate-lanceolate, acumi- 
            nate ... ... 13. S. coromandelianus.

1. SPOROBOLUS DIANDER, Beauv. Agrostr. (1812), 26; Jacq. Eclog. Gram. t. 28; 
   iii, 46. Ic. Pl. Asiat. t. 139, f. 85; Dalz. & Gibs. Bomb. Fl. 296; Aitchis. 
   Cat. Panjab Pl. 165; Duthie Grass. N. W. Ind. 29; Fodd. Grass. N. Ind. 40, t. 63; 
   Miq. Fl. Ind. Bat. iii, 375; Hook. f. in F.B.I. vii, 247; Cke. ii, 1017.—Arostis 
   diandra, Retz. Obs. v, 19; Roxb. Fl. Ind. i, 317.—Villa erosa, Trin. in Mem. 
   Acad Petersb. ser. vi, Sc. Nat. ii (1840), 86.—V. Retzii, Steud. Nom. ed. ii, 
   ii, 768, Syn. Gram. 162.

   Description: Cke. ii, 1017.

   Locality: Sind: Jamesabad, fields (Sabnis B927 !).—Gujarat: Ahmedabad 
   (Sedgwick !).—Konkan: Bombay (Blatter 5267 !).—Deccan: Deolali (Blatter 
   540 !); Khandala (McCauf 540 !); Chattarshinji Hill, Poona (Ezekiel !, 
   Jacqueumont 352); Katraj Ghat (Shevade !); Panchgani (Blatter & Hallberg 
   B1319 !).—S. M. Country: Gharwar (Sedgwick 2658 !); Londa (Bhide !).— 
   Kanara: Dandeli, 1,800 ft., rainfall 100 inches (Sedgwick & Bell 4221 !).

   Distribution: India, Ceylon, Asia, tropical Australia.

2. SPOROBOLUS SINDICUS, Stapf in Cooke Fl. Bomb. ii, 1018.

   Description: Cke. i.c.

   Locality: Sind: 20 miles from Karachi (Woodrow).—We have not seen this 
   species.

   Distribution: So far endemic.

Description: Cke. ii, 1018.
Locality: Deccan: Chattarshinji Hill, Poona (Ezekiel!); Lina Hill, Nasik Dist. (Blatter A59!); Kolhapur (Woodrow).—Kanara: Castle Rock, 1,600 ft., rainfall 250 inches (Sedgwick 2851!).
Distribution: Most warm countries.


Description: Cke. ii, 1019.
Locality: Konkan: Bombay Island, very common (McCann 4296!), 3635!, Parel (Woodrow); Mulgaum (McCann 3660!).—Kanara: Dandeli, 2000 ft., rainfall 100 inches (Sedgwick and Bell 4220!); Kumpta (Chipher!).
Distribution: W. Peninsula.


Description: Cke. l.c.
Locality: Sind (Stocks).
Distribution: S. Africa.


Description: Perennial. Stems erect or ascending from a decumbent woody creeping base, branched, hard and often tortuous at the base, 15–30 cm. high. Leaves strict, close-set, distichous, erecto-patent, 2½–7½ cm. long or more, narrow and almost terete for the involute margins, pungent, very pale, glabrous or scaberulous above, striate; sheaths terete, short or long; ligule of long soft hairs. Panicle 2½–10 cm. long, elongate, narrow, subspiciform, interrupted, very pale; branches very short. Spikelets 2½–5 mm. long, very shortly pedicelled, crowded. Glumes 3, all 1-nerved, keels glabrous or obscurely scabrid towards the tip. Involucral glumes oblong-lanceolate, acute, the lower shorter than the upper. Pale oblong, narrowly truncate. Grain broadly obovoid, with a pericarp loosened if moistened.

Locality: Gujarat: Porbandar (Chipher!). Chipher was the first to find this species on the shores of continental India.
Distribution: India, Ceylon, westward to Africa and America, eastward to Australia.


**Description**: A small grass, 2·5-30 cm. high, erect or prostrate, wiry, strict, often tufted, from a hard, knotted, stoloniferous stock; stolons 15-45 cm. long, stout or slender, leafy, flexuous. Leaves short, 1-5 cm. long, rigid, subulate or filiform, flat or convolute, pungent, narrowed from the usually hairy base to the tip, margins smooth. Ligule a few hairs. Panicle narrow, 2·5-10 cm. long, subspiciform sometimes longer, flexuous and interrupted, with erect branches, rarely a few spreading. Spikelets crowded, 1-5 mm. long, articulate on very short pedicels half their own length or less, very pale; rachilla readily disarticulate above the lowest glumes and these also separately falling. Glumes all 1-nerved. Lower involucral glume about \( \frac{3}{4} \) of the floral glume, lanceolate; upper involucral glume and floral glume subequal. Pale as long as its glume. Stamens 3. Grain oblong.

**Locality**: *Gujarat*: Sides of the Chandola Tank which are submerged in the monsoon (Sedgwick !).—*S. M. Country*: Kunnur, margins of tanks, 2,000 ft., rainfall 35 inches (Sedgwick & Bell 4936 !); Marikkop, margins of tanks, W. of Dharwar, 1,800 ft., rainfall 35 inches (Sedgwick & Bell 4495 !); Ranibennur, grassy plains near water (Bhide !).

**Distribution**: India, Ceylon, Burma, Tonkin, Cambodia.


**Description**: Cke. ii, 1020.

**Locality**: *Gujarat*: Prantij Taluka, low grounds liable to inundation (Sedgwick !); Karie Roa, Cutch (Blatter 3771 !); Umrat, on salt laud (Woodrow !).—*Konkan*: Bassein (McCann 4481 !).—*Kanara*: Karwar, borders of rice fields (Talbot 1531 !).

**Distribution**: Punjab, W. Peninsula, Ceylon.


**Description**: Cke. ii, 1020.

**Locality**: *Deccan*: Panchgani, Tableland, 4,300 ft., rainfall 60 inches (Sedgwick & Bell 4693 !, Blatter & Hallberg B1319 !, B1320 !, McCann !).—*S. M. Country*: Dharwar (Bhide !); Belgaum (Ritchie 836).

**Distribution**: W. Himalaya, Khasia Hills, Nilgiris, W. Peninsula, Malacca.

Hook f. calls the synonymy of this plant a perplexing one, 'owing to the double use of the specific name pallidus, and to the fact of Villa being now regarded as a synonym of Sporobolus. This name (pallidus) was applied by Nees in 1840 to the Arabian plant described above, under Villa; and by Lindley in 1848 to a very different Australian one, under Sporobolus. Bentham (Fl. Austral. vii, 623) assuming that Nees had referred his plant to Sporobolus, renamed Lindley's S. Lindleyi. Lastly, Boissier, when he founded his S. arabicus, was not aware that it was Trinius's Villa pallida, which he erroneously cites in Fl. Orient., under Sporobolus pallidus, Trin. In this case the proper course appears to me to be to retain the name Sp. pallidus, Lindl., for the Australian plant, and Sp. arabicus, Boiss., for the Arabian and Indian.' Personally we are inclined to call this species S. pallidus, Boiss., as Villa pallida, Nees is the oldest name for the Indo-Arabian species.

Description: Cke. ii, 1020.

Locality: Sind: (Burns!); Laki (Bhide!); Mirpur Sakro (Blatter & McCan D672 !, D671 !, D678 !); Gharo (Blatter & McCan D673 !, D676 !); Tatta (Blatter & McCan D674 !, D675 !); Jamadar ka Landa near Karachi (Stocks 663); Karachi (Woodrow); between Karachi and Mugar Peer (Wykeham Perry).


Description: Stems erect, 20-75 cm. high. Nodes glabrous. Leaves 2.5—12 cm. long, 3-9 mm. broad, lanceolate, rounded or subacute at the base, hairy on both surfaces with bulbous based hairs, margins slightly thickened and spinulose serrulate; sheaths glabrous; ligule a fringe of hairs. Panicle 7.5-17.5 cm. long, 2.5-9 cm. diam. ; branches whorled or fascicled, a few solitary ones or twins intervening. Spikelets about 1 mm. long. Glumes 3, involucral ones empty, ovate, acute, membranous, 1-nerved, the lower one § the size of the upper; flowering glume just a little shorter than the upper involucral, ovate, acute, membranous, 1-nerved, paleate, bisexual; pale shorter than the glume. Stamens 3; styles 2; stigmas plumose. Grain rounded, slightly beaked at the extremities; lodicules minute.

Locality: S.M. Country: Ranibennur (Bhide!); Haveri (Talbot 2176!).

Distribution: So far endemic.


Description: Cke. ii, 1021.

Locality: Sind: Jamadar ka Landa near Karachi (Stocks).—Gujarat: Shady places at Dhansura Madasa-Petha (Sedgwick!).—Khandesh: Bor, Bori River (Blatter & Hallberg 4426!).—Konkan: Kennedy Seiface, Bombay
(Sabnis 4295 !); Bombay (Law).—

**Deccan**: Poona, College Farm (Khomne!); Gungapur (Blatter A56 !).—S. M. Country : Dharwar, 2,400 ft., rainfall 34 inches (Sedgwick 2832 !).

**Distribution**: Punjab, Orissa, Burma, W. Peninsula, Ceylon, Afghanistan, Africa.

**TRIBE XI. ERAGROSTEÆ**

80. DESMOSTACHYA, Stapf. in Haines Bot. Bihar and Orissa (1924), 962.

( **Eragrostis**, Beauv., partim)

This genus agrees with Eragrostis, Beauv., except in the following points: Spikelets very closely packed, imbricate, laterally very much compressed, secund, sessile and articulate on the very short densely crowded branchlets of a tall narrow racemiform panicle, acute and deciduous; rachilla subarticulate.

Species 1.—India to Syria and N. Africa.


**Description**: Cke. ii, 1028 (under Eragrostis).

**Locality**: Sind: Jacobabad (Bhide !); Hyderabad (Bhide!, Woodrow); Sukkur (Sabnis B550!, Bhide!); Miami forest, Hyderabad (Bhide!); Larkana (Sabnis B100!); Sehwan to Laki, foot of hills (Sabnis B66!); Sehwan, sand dunes (Sabnis B674!); Sita Road (Sabnis B360!); Kairpur Mires, forest (Sabnis B328!); Phuleli Canal, on banks, at Hyderabad (Sabnis B181!); Sanghar (Sabnis B895!); Pad-Idan (Sabnis B517!); Ghulamalla, fields (Blatter and McCann D643!); Mirpur Sakro (Blatter and McCann D644!, D646!, D647!); Gharo (Blatter and McCann D645!, D648!).— **Cutch**: (Blatter!).— **Gujarat**: Surat (Gammie!); Nadiad Farm (Supt. of Farm!); road to Lasundra (Chibber!); Charodi (Gammie 16526 !); Mandvi, Kathiawar (Woodrow).— **Konkan**: Palghar, Mahim (Ryan 2189); Bassein (Patwardhan!); Dahana, Thana Dist. (Burns!).— **Deccan**: Nasik (Lisboa).

**Distribution**: India, Syria, Egypt, Nubia.


f. 11; Cke. ii, 1021.

1 Hitchcock ascribes the genus to Host because Host was the first to describe a species of Eragrostis (Gram. Austr. 4 (1809), 14, pl. 24). Host, however, did not give a diagnosis of the genus and so we retain Beauvois who first diagnosed the genus, i.e.

Species more than 100.—Tropical and temperate regions.

Cooke describes 15 species Of these Eragrostis cyanosuroides, Beauv. has been put under Desmostachya above. The other species are being retained, with the exception that E. tenella, var. viscosa, Stapf is considered as a distinct species ( **E. viscosa**). Of two species the names had to be changed viz. **E. annabilis** is here called **E. unioloides**, and **E. maior** goes under the name of **E. Eragrostis. E. papposa** and **E. brachyphylla** are new to the Presidency.

Key, after Cooke.

[7]
A. Spikelets panicled.

AA. Rhachilla of spikelets more or less jointed and breaking up from above downwards

I. Panicle spikeform, compact, 5-7.5 cm. by 8 mm.; rhachis bearded at the nodes; margins of flowering glumes ciliate ...

II. Panicle open or more or less contracted; margins of flowering glumes not ciliate

1. Spikelets 5 mm. long; panicle large, lax, thyrsiform, 20-50 by 10-15 cm. ...

2. Spikelets 2.5 mm. long; panicle short, compact, cylindric, 12-40 mm. long.

3. Spikelets 2.5-4 mm. long; panicles 5-20 cm. long

a. Grain ovoid. Stamens 3 ...

aa. Not sweet-scented ...

bb. Sweet-scented ...

b. Grain obovoid. Stamens 2 ...

BB. Rhachilla of spikelets tough, persistent; flowering glumes falling away from its base upwards

I. Spikelets flat, ovate-elliptic or oblong; lateral nerves of flowering glumes very prominent, straight, almost percurrent; pales deciduous with their glumes ...

II. Spikelets less compressed, linear or linear-oblong; lateral nerves less prominent. When spikelet compressed or lateral nerves prominent, then with persistent pales

1. Spikelets more or less fascicled on the primary or secondary branches or shortly pedicellate in narrow racemes

aa. Leaves glaucous; grain oblong.

bb. Leaves not glaucous; grain globose or nearly so ...

2. Spikelets not fascicled; long pedicellate, more or less divaricate when ripe

a. Leaf-margins glandular

aa. Lower involucral glume 1-3-nerved; upper 3-nerved ...

bb. Both involucral glumes 1-nerved ...

b. Leaf-margins eglandular; involucral glumes 1-nerved

aa. Spikelets versatile, 2.5 cm. long or longer, narrowly linear; branches of panicle solitary...

bb. Spikelets small, 4 mm. long or less

§ Mouth of leaf-sheath naked.

§§ Mouth of leaf-sheath bearded

† Perennial. Grain obovoid.

1. Eragrostis cilifera.

2. E. aspera.

3. E. ciliaris.

4. E. lenella.

5. E. viscosa.

6. E. interrupta.

7. E. unioloides.

8. E. gangetica.


10. E. Eragrostis.

11. E. minor.

12. E. tremula.

13. E. tenuifolia.


15. E. pilosa.

B. Spikelets distichously spreading; secund, in a long, simple terminal spike

1. Keels of pale distinctly winged ...

2. Keels of pale not winged ...

16. E. bifaria.

17. E. brachyphylla.


In our opinion the many intermediate forms make it practically impossible to keep up this varietal distinction. The above synonymy and the following description are such as to include both varieties.

Description: Annual. Stem 15-60 cm. high, procumbent below and generally ascending, slender, glabrous, smooth. Leaves very narrow, flat, tapering to a fine point; sheaths strigate, usually bearded at the mouth with long hairs; ligule a fringe of short hairs. Panicle 1-15 cm. long, spiciform, more or less lobed or interrupted, or short, compact and cylindric, appearing hairy from the long cilia of the pales; branches very short, divided from the base, glabrous; nodes of glabrous rhachis naked; pedicels very short, glabrous. Spikelets 2-5 mm. long and broad, crowded, 6-12 flowered, strongly compressed, very pale; rachilla breaking up. Inflorescence glumes subequal, ovate-lanceolate, acute, 1.5-5 mm. long. Floral glumes about 1 mm. long, oblong, subtruncate mucronulate, spreading, lateral nerves submarginal. Pales equal to their glumes and falling with them, the keels with long rigid cilia. Stamens 3; anthers very short. Grain elongate-ovoid, about 0.5-5 mm. long.

Locality: Sind: Karachi (Burns!); Jamadar ka Landa, near Karachi (Stocks); Mirpurkhas (Sabnis B1175!); Mirpurkhas Farm, Mankad (Herb. Econ. Bot. !); Jamesabad, in fields (Sabnis B1109!); Nasarpur, clayey soil (Sabnis B1035!); Sanghar (Sabnis B757!); Tatta (Blatter & McCann D649!).—Cutch: Bhuji Hilla (Blatter!).—Gujarat: Baroda (Woodrow); Donas, near Surat (Bhide!); Porbandar (Bhide!); Naifad (Chhiber!); Broach (Woodrow!); Singiri (Gammie 16553!).—Perim Isl., Gulf of Cambay (Blatter!).—Khandesh: Taner, Tapiti bank (Blatter & Hallberg 5166!).—Nim, Tapiti bed (Blatter & Hallberg 5400!).—Tapiti Isl. near Bor, on sand and mud (Blatter & Hallberg 4394!); Bor, Bori River (Blatter & Hallberg 4423!); Amalner, Bori River (Blatter & Hallberg 5114!).—Kankan: St. Xavier's College, compound (McCann 4527! 4596!).—Alibag, sandy shore Ezekiel!.—Deccan: Trimbak, Nasik Dist. (Chhiber!).—Kanara: Honavar (McCann!).

Distribution: India, Arabia, tropical Africa and America.

Camus in Lecomte's Flore Général de l'Indo-Chine has adopted the name Eragrostis amabilis for this species. Mr. Hubbard of Kew has informed us that, according to the Vienna Rules of nomenclature (Art. 46) this does not seem to be correct. Poa amabilis, Linn. is the same as Poa tenella, Linn., and Eragrostis tenella, P. Beauv. ex Roem. & Schult. is based on Poa tenella, Linn. Apparently Stapf (in Hook. f. F. B. i. vii, 315) was the first to unite the two species; as the name first used when the species were united takes precedence over the other, we have to retain the name E. tenella, P. Beauv.

Description: Usually a small, very elegant and slender annual grass, very variable. rarely 45 cm. high. Stems many, slender, densely tufted. Leaves slender, narrow, acuminate, attaining 12 cm. by 5 mm., usually much less; sheaths long-ciliolate near the mouth. Panicles decompound, excessively branched 2-8 in. long, contracted or spreading, pale green or purplish, oblong-ovate or cylindrical, never with the long interrupted rhachis and pseudo-verticillate branches of E. interrumpita. Spikelets innumerable, minute to small on capillary branchlets and pedicles, 1-4 mm. by 1 mm. or less, not strongly compressed, 3-9-flowered. Involucral glumes subequal or unequal. Flowering glumes oblique, not mucronate, lateral nerves remote from the margins; keels of pale usually obscurely ciliate. Stamens 3. Grain broadly ovoid, pale brown, polished.


Description: Stems tufted, sometimes reaching 40 cm. high and more, and as well as the panicle eglandular. Panicle delicate, open, often flexuous; branches capillary, rhachis bearded at the nodes; pedicles distinct, often long. Spikelets 1-2-4 mm. long, 3-9-flowered, rhachilla subarticulate. Involucral glumes unequal, the lower distinctly shorter than the upper. Floral glumes less than 1 mm. long. Keels of the pale pectinately ciliate with long hairs. Anthers minute. Grain ovoid, less than 0.5 mm. long.

Locality: Sind: Mirpurkhas, on banks of dry watercourse (Sabnis B1023).—Gujarat: Surat (Bhide !, Woodrow),—Khandesh: Bor, Tapti Island, sandy mud (Blatter & Hallberg 4385!); Umalla, Tapti bank (Blatter & Hallberg 5230 !); Chanseli (McCann 9978!).—Konkan: Common (Lisboa); Byculla, common in Bombay Island (McCann A1; Uran (Hallberg & McCann 5131, 5124!).—Decan: Sholapur (D'Almeida 9977 !); Poona (Cook, Woodrow).—S. M. Country: Dharwar, 2,400 ft., rainfall 34 inches (Sedgwick 2830 !); Yelvigi, 1,800 ft., rainfall 30 inches (Sedgwick 2035 !); Badami (Bhide !); Gokak (Shevade !).—Kanara: Halyal (Telbop 2383 !).

Distribution: Throughout India and Ceylon.

Var. riparia, Stapf in Hook. f. F.B.I. vii, 315; Cke. i, 1024.

Cooko included this variety on the authority of Graham (Cat. Bomb. Pl. p. 236, under Poa tenella). Graham does not give any locality; Cooke has not seen any specimen from the Presidency and we have not found it anywhere in our area. We, therefore, drop this variety.


Description: A tufted, sweet-scented-grass, 15-40 cm high, the panicles occupying the greater part of the plant. Stem and rhachis of panicle, pedicles and glumes with scattered microscopic glands. Leaves mostly convolute,
erecto-patent, 2.5-3.5 cm. long with rigid tips, base and mouth of sheath with very long cilia. Panicles dense, cylindrical or oblong, 7-13 cm. long and up to 2.5 cm. broad. Branches very numerous, more or less spreading, equal, sometimes opposite or 2-nate, but never in interrupted whorls as in *E. interrupta*; rhachis usually glabrous, rarely obscurely bearded at the nodes. Spikelets 5-20-flowered, often purplish, usually about 3 mm. long; rhachillae readily breaking up. Involucral glumes nearly equal or the lower very slightly shorter than the upper. Floral glumes broadly elliptoid, obtuse or rounded, with the keel minutely scaberulous. Pale nearly as long as the glume, rigidly ciliate on the keels. Grain pale brown, polished, about 0.5 mm. long.

**Locality:** *Gujarat*: Junagad, Kathiawar (Blatter 3282 l., 3791 !).—*Khandesh*: Bor, Bori River (Blatter & Hallberg 4430 !); Amalner, Bori River (Blatter & Hallberg 51131); Nim, Tapti bank (Blatter & Hallberg 3829 !); Dadgaum (McCann All !).—*Konkan*: Malabar Hill, Bambay.—*Deccan*. Khandala; Panchgani (Blatter & Hallberg B1280 l!).—*S. M. Cuntry*: Dastlikop fields, 2,500 ft. rainfall 35 inches (Sedgwick & Bell 1898 !).—*Kanara*: Sulgeri, 500 ft., rainfall 200 inches (Sedgwick & Bell 4250 l !); Birchy (Talbot 2102 !).

**Distribution:** From the Gangetic Plain southward, Ceylon, tropical and S. Africa.


We have examined a great number of specimens from all parts of the Presidency. Most of them cannot be classed under any of the 4 varieties mentioned by Stapf. If we wanted to classify them we would have to greatly multiply the number of varieties which could not be satisfactory neither from a theoretical nor practical point of view. Cooke puts the Bombay material under *E. interrupta*, var. *Koenigi*, Stapf. But then he has seen only one specimen from Surat. We have dropped all the varieties as can be seen from the above synonymy. The following description comprises them all.

**Description:** A very variable slender grass from 5-90 cm., annual or perennial. Stems smooth and polished, tufted, geniculate and ascending from the base, branched or not, nodes glabrous. Leaves slender, up to about 25 cm. long, narrow, flat, glabrous; sheaths glabrous, close; ligule a fimbriate membrane. Panicle exceedingly variable, up to 60 cm. long, either contracted with appressed branches or interrupted with many tiers of rather short
spreading subwhorled branches (either long narrow with short dense suberect or erecto-patent pseudo-whorls or long effuse or contracted with solitary or 2-3-nate branches, simple or if branched the whorl rarely overtopped by 1 or 2 branches, ultimate branches not divaricate or long loose narrow, usually stiff, branches pseudo-whorled, spreading, ramified from the base, branchlets and pedicels divaricate or long linear-oblong, branches up to 5 cm. long, hardly whorled, simple at the base, etc.). Spikelets usually very minute, from 1-6 mm. long, ovate to linear, few- to many-flowered. Flowering glumes obtuse, narrow, slender, green or pale brown, rarely coloured, keels of pale scaberulous or smooth. Stamens 2. Grain obvoid.

Locality: Sind: Pad-Idan (Sabitis B5131); Mirpurkhas, fallow fields (Sabitis B11751); Jamesabad (Sabitis B11641); Janja Hill, near Hyderabad (Sabitis B9961); Bhagar, Indus River (Blatter & McCann D6501).—

Gujarat: In water holes (Dalzell & Gibson); Dangs, 800 ft., rainfall 100 inches (Sedgwick & Bell 53921); Surat (Gammie 164361, Woodrow, Cooke); Kabirwad, Broach Dist. (Chibber!); Nadiad (Chibber!); road to Lasandra (Chibber!).—Khandesh: Tapti, Bhusawal, N.E. (Blatter & Hallberg 44371); Bor, Tapti Isl., sand and mud (Blatter & Hallberg 54751); Nim, Tapti, left bank (Blatter & Hallberg 52211); Amaner, Bori River (Blatter & Hallberg 44331); Muravat, Tapti bank (Blatter & Hallberg 51511, 52051); Bor (Blatter & Hallberg 54581); Chanseli Hill, northern slope (McCann 99861); Umalla, Tapti bank (Blatter & Hallberg 52141); Torannal (McCann 99761, 99851).—Kakori, Faizabad: Talwada (McCann 99541); Vihar Lake (McCann 99661); Pen (McCann 85561); Kase Dohan, thana Dist. (Ryan 19201); Ghatkoper. Horse-shoe Valley (McCann 99041); Parel (McCann 54171); Sion (McCann 52461); Bassein (Lisboa); Thana (Lisboa); Aliabag, rocky river bed (Ezekiel!).—Decan: Bhowdan, near Poona (Woodrow); Bahuli, 14 miles N.W. of Poona (Woodrow); Ganeshkhind Botanic Gardens (Gammie!); Trimbak (Chibber!); Dhonid, along river (Bhide 13491); Baris River (Gammie 157661); Khandala, very common in fields (McCann 99861); Khandala to Karjat (Blatter & Hallberg 53221); Igatpuri (Blatter & Hallberg 51931); Bairawadi, Purandhar (McCann 50561); Tangawadi, Igatpuri (Blatter & Hallberg 538341); Lohagad (McCann 98671); Vaslang, Sholapur (D’Almeida 99081).—S. M. Country: Margin of tanks, Yelvigi, 1,800 ft., rainfall 28 inches (Sedgwick & Bell 36121); Dharwar, 2,400 ft., rainfall 34 inches (Sedgwick & Bell 49751); Dastikop, 2,500 ft., rainfall 35 inches (Sedgwick 21351).—Kanara: Halyal, 1,800 ft. (Telbot 21001); Kincholi (Telbot 5441); Castle Rock, on banks of a tank (McCann 99931).

Distribution: India, Ceylon, tropical Asia and Africa.


Mr. Hubbard of Kew has helped us with regard to the synonymy of this species. He says in a letter: "The combination E. amabilis, Wight & Arn. is based on Poa amabilis, Linn. but the majority of the species, the description and the specimens refer to a different plant which has for a long time been known under this name. It cannot, however, be called E. amabilis, Wight & Arn. and the next name for it is Eragrostis unioloides, Nees (Poa unioloides, Retz.). The fact that the name E. amabilis has been applied to a different species might be used as additional justification for rejecting it."

Description: Cke. ii, 1025.

Locality: Sindh: Mirpur Sakro (Blatter & McCann D6511).—Konkan: Penn (Bhide I, McCann 1); very common in the Bombay and Salsette Islands.
(McCann l); Alibag (Ezekiel l); Uran (Hallberg & McCann 5130 l); Parel, Bombay Island (Woodrow); Bassein (Woodrow).—Deccan: Igapuri (Blatter & Hallberg 5192 l, McCann l); Bairawari, Purandhar (McCann 8739 l); Lohagad, way up (McCann 9504 l); Khandala, very common (Blatter 4375 l; 5440 l, McCann l); Lonavla (Woodrow 165); Poona (Woodrow); Katraj Ghat (Bhide l); Panchgani (Blatter 5387 l; Blatter & Hallberg B1243 l); Mahableshwar (Telbot 4511 l).—S. M. Country: Marshes N. of Belgaum (Ritchie 846 l); Dharwar (Sedgwick 2114 l).—Kanara: Karwar, sandy fields by the sea (Sedgwick & Bell 5086 l); Castle Rock (Gammie 15723 l); Dudsagar Falls (McCann 9985 l).

Distribution: India, Ceylon, tropical Asia.


Description: Cke. ii, 1025.

Very similar to E. stenophylla in the character of the panicle and the slaty-blue spikelets, but the longer striolate grain is correlated in all the specimens with the longer usually more acuminate glumes and slightly stouter pedicels than occur in stenophylla.' Haines.

Locality: Konkan: Vihar Lake (McCann 5096 l); Campoli (McCann 9469 l).—Deccan: Igapuri (Blatter & Hallberg 5193 l); Khandala (McCann A10 l); Khandala to Karjat (Blatter & Hallberg A3 l); Poona, Canal (Ezekiel l); Borkas, Mawal, Poona Dist. (Woodrow); Panchgani (Blatter & Hallberg B1218 l, B1276 l); Lingmala, Mahableshwar, 4,000 ft., rainfall 200 inches (Sedgwick & Bell 4654 l).—S. M. Country: Hirdridhal, on the margin of a tank, 2,000 ft., rainfall 50 inches (Sedgwick 3901 l); Havasbarhi, edge of a tank, 2,000 ft., rainfall 35 inches (Sedgwick 2110 l); Tadas, tank, 2,500 ft., rainfall 37 inches (Sedgwick 1910 l); Dharwar, rice field (Telbot 2637 l); Londa (Bhide l).—Kanara: Karwar (Telbot l); Halyal (Telbot 2381 l); Tinal Ghat (Gammie 15808 l).

Distribution: India, Ceylon.


Description: Cke. ii, 1026.

Locality: Khandesh: Tapti Island, near Bor, on sand and mud (Blatter & Hallberg 5470 l); Umallia, Tapti, on sand (Blatter & Hallberg 5180 l).—Konkan: Uran (Hallberg & McCann 5134 l); Maiwan (Woodrow).—Deccan: Khandala (McCann 5319 l); Igapuri (Blatter & Hallberg 5142 l); Pashan, near Poona (Gammie l); Purandhar (McCann 501 l); Panchgani (Blatter & Hallberg B1316 l); Barkas, Mawal, Poona Dist. (Woodrow).—S. M. Country: Hirbudhal, on the margin of a tank (Sedgwick 2081 l).—Kanara: Halyal (Telbot 2165 l); Kulgi (Telbot l).

Distribution: India, Ceylon, tropical Asia and Africa.


Description: Cke. ii, 1026.

Locality: Sind: Sanghar (Sabnis B897! B753!); Mirpurkhas, on bank of dry watercourse (Sabnis B1024).—Gujarat: Kabiwad, Broach (Gammie!); Morvi, Kathiawar (Woodrow).—Khandesh: Chauselli, N. slope (McCann A14!); Nim, Tapti bank (Blatter & Hallberg 5109!); Umalla, Tapti sand (Blatter & Hallberg 5177!); Bor, Tapti sand (Blatter & Hallberg 5187!).—Konkan: Mahalaxmi, Clerk Road, along brackish water (Sabnis A13!).—Deccan: Kannala, Sholapur Dist. (Mamladhar of Kannala!); Purandhar (McCann 5039!); Khandala, road (Blatter 5445!); Kirkee (Gammie 896!); Poona (Jacquement 349, Woodrow), Agricultural College Farm (Ezekiel!).—S. M. Country: Dharwar, 2,400 ft., rainfall 34 inches (Sedgwick 2834!); Badami (Woodrow).—Kanara: Halyal (Talbot 2159!).

Distribution: India, Ceylon, westwards to the Mediterranean, tropical and subtropical Asia.


Description: Cke. ii, 1027.—Stapf l.c. considers the glands on the leaf-margins as 'a very constant character'. It would be better to say that the margins are usually glanular.

Locality: Sind: Jamesabad, in fields (Sabnis B1111!); Pad-Idan (Sabnis B510!); Larkana (Sabnis B476!); Sanghar (Sabnis B751!, B752!).—Gujarat: Godra (Woodrow); Panch Mahals (Woodrow—Khandesh; Umalla, Tapti sand (Blatter & Hallberg 5180!); Tapti Island near Bor, on sand and mud (Blatter & Hallberg 4440!, 5470!); Manmad, Redmond's garden (Blatter A12!); Tapti Bhusawal, N. E. (Hallberg 512!).—Konkan: Farel (McCann 376!, Bombay).—Deccan: Tangawadi, Ipatipuri (Blatter & Hallberg 5835!).—Purandhar (McCann 5060!); Bhimthadi, Poona Dist. (Mamladhar of Bhimthadi!); Man, Satara Dist. (Mamladhar of Man!); Poona (Jacquement 350), Chatter-shinji Hill (Ezekiel!); Nasik (Lisboa).—S. M. Country: Dharwar, 2,400 ft., rainfall 34 inches (Sedgwick & Bell 4487!); Gokak hills (Shevade!).

Distribution: India, Afghanistan, tropical Africa.


Description: Cke. ii, 1027.

Locality: Cutch: Sumrasar (Blatter!).—Gujarat: Sevalia (Chibber!); Perim Island, Gulf of Cambay (Blatter!); Gogo, Kathiawar (Dalz. & Gibson, Woodrow).—Deccan: Lonavia (Lisboa)—S. M. Country: Londa, on a rock in the river bed (Bhide!); Gadag (Bhide!).

Distribution: India, Afghanistan, tropical Africa.


Description: Cke. ii, 1027.
Locality: Deccan: Panchgani (Blatter & Hallberg B1313!, B1317!). — S.M. Country: Belgam (Ritchie). — Kanara: Dandeli, 1,800 ft., rainfall 100 inches (Sedgwick & Bell 4206!).

Distribution: W. Peninsula, tropical Africa.


Description: An elegant perennial. Stems 30–50 cm. high, very slender, simple. Leaves short, strict, very narrow, convolute; mouth of sheath bearded with long silky hairs. Panicle 10–20 cm. long, ovoid, very delicate, lax, open, sparingly branched; rachis filiform, glabrous; branches solitary, alternate, rarely binate, spreading, almost capillary, naked below, loosely branched beyond the middle of the capillary, spreading, stiff branchlets; pedicles long, capillary. Spikelets 4–8 mm. long, linear, 7–23-flowered, very pale yellow or dark or pale olive-grey; rachilla tough. Involucral bracts subequal or lower shorter, hyaline; lower involucral glume 1 mm. long, usually less, nerveless, upper slightly longer, faintly 1-nerved. Flowering glumes broadly ovate, margins above hyaline, about 1.5 mm. long; pale rather shorter, obtuse, denticulate, persistent, keels scabrid. Stamens 3, anthers ½ mm. long. Grain obovoid, about ½ mm. long, dorsally grooved.

Locality: Sind (ex Agharkar).

Distribution: Punjab; Trans-Indus districts, westward to Arabia, N. Africa, Spain.


Description: Cke. ii, 1028.

Locality: Sind: Sanghar (Sabinis B902!). — Konkan: Byculla, common in Bombay Isl. (McCann A8!); Karjat (Halberg 3602!); Kalyan (Garade!). — Deccan: Lina Hill, Nasik Dist. (Blatter & Hallberg 9975!); Khandala (McCann A7!); Nasik (Lisboa); Deolali (Blatter & Hallberg 4559!); Igpauri (McCann 4390!); Gangapur (Blatter & Hallberg 4578!); Waghotti, Mawal, Poona Dist. (Woodrow); Poona (Cooke); Chatrashniji (Ezekiel!); Ganeshkhind Botanic Gardens (Supt. of the Gardens!); Bairamwali, Purandhar (McCann 5068!). — S. M. Country: Dharwar (Sedgwick 2672!, Woodrow).

Distribution: Most warm countries.


Description: Cke. ii, 1029.

Locality: Konkan: Bassein (Chibber!); Matheran (Gammie 16649!); Parsik, hill (Ryan 1147!); Wada range, Thana Dist. (Ryan 687!). — Deccan: Sinaghad, forests (Bhide!); Kirkee (Garade 470!); Chatrashniji Hill, Poona (Ezekiel!); Khandala (Woodrow). — S. M. Country: between Yelvigi and Savanur, dry hill side, 1,800 ft. (Sedgwick 2019!). — Hubli, dry hill sides, 2,000 ft., [15]
rainfall 28 inches (Sedgwick & Bell 4915 l); Badami (Talbot 2927 l); Haveri (Talbot 2179 l); Belgam (Ritchie).

**Distribution:** W. Peninsula, tropical Africa.


**Description:** Perennial. Stem erect, slender, 25-45 cm. high, from a tuft of old fibrous leaf-sheaths. Leaves nearly all radical, 5-10 cm. long, 2.5 mm. broad, coriaceous, linear, flat or conuplicate, obtuse or subacute, glabrous above. Spikes 7-20 cm. long, slender. Spikelets 6-18 mm. long, close-set, linear or linear-oblong, 2nd order, 2-seriate, slightly compressed, olive-green, about 20-flowered, lenticular in section. Glumes closely imbricate, involucral ones subequal, up to 2 mm. long, lower one acute, acutely keeled, upper obtuse, dorsally rounded. Flowering glumes up to 2.5 mm. long, rather turgidly broadly ovate (when unfolded) with rounded tip or obtuse, lateral nerves very weak, midrib microscopically scabrid. Pale as large, somewhat obovate, concave towards rachilla, keels scabrid, narrow. Grain very small, shortly ellipsoid, obscurely trigonous, epicarp coarsely reticulate.

**Locality:** Gujarat: Sevalla (Chhibber l).—S. M. **Country:** Badami Port (Bhide l).

**Distribution:** Bihar, Central Provinces, W. Peninsula.

82. *Halopyrum*, Stapf; Cke. ii, 1029.

Species 1.—Coasts of India and Ceylon, Arabia, tropical Africa.


**Description:** Cke. ii, 1029.

**Locality:** Sind: Clifton, near Karachi (Sabnis B796 l); Manora Island, Karachi Harbour (Sabnis B832 l).—Gujarat: Porbandar (Bhide ! Bhiva).


Species about 20.—Warm regions.—Only 1 species in the Presidency.


**Description:** Cke. ii, 1030.

**Locality:** Sind: Tatta, Kullan Kote Lake (Blatter & McCann D639 l).—Konkan: Parisk, side of railway line (McCann A24 l); Bassein (Bhide !); Sion (McCann 5238 l); Alibag, rice fields near salt marshes (Ezekiel l); Lower Parel (Blatter 4283 l); Antop Hill (McCann 3614 l); Mahim to Matunga (McCann 5139 l); Matunga, near Bombay, in rice fields (Woodrow 10).—Kunara: Near Karwar, maritime marsh (Sedgwick & Bell 5095 l).

**Distribution:** Upper Gangetic Plain, Bengal, Orissa, W. Peninsula, Ceylon, Egypt, tropical Asia, Africa, and Australia.

84. *Leptochloa, P. Beauv.*

Annual grasses. Leaves flat or involute. Spikelets very minute, compressed, 1-many-flowered, sessile or shortly pedicelled, alternate and unilaterally 2-seriate on the very slender spikeform branches of a lax panicle, sessile or minutely pedicelled, not jointed at the base; rachilla jointed at the base and beneath each glume, produced between each glume and often beyond the terminal. Glumes usually 2 (sometimes 1-) many-flowering, membranous.
Involucral glumes subequal or unequal, oblong, lanceolate, or almost linear-lanceolate, 1-nerved; lower and other flowering glumes ovate when unfolded, subacute or obtuse, 3-nerved, 1 nerve in the keel and usually 1 near each margin, nerves usually hairy; pale shorter, 2-nerved. Lodicules 2, cuneate, Anthers 3, short. Styles free. Grain subglobose, oblong, obovoid or 3-gonous closely invested by the glume or pale.

Species probably 20, in the warmer regions.

This genus is not represented in Cooke’s Flora.

Key:

1. Spikes 1-7.5, rarely 10 cm. long, Spikelets 2-3-flowered, under 2.5 mm. long
   1. L. filiformis.

2. Spikes 5-10 cm. long, Spikelets 4-6-flowered, 2-3 mm. long
   2. L. chinensis.


Description: A very slender grass, 30-70 cm. high. Stems tufted and geniculately ascending. Leaves flat, flaccid, 10-25 cm. long, finely acuminate, sometimes sparsely hairy on the nerves and on the sheaths; ligule short, erose or setosely lacerate. Panicle 10-20 cm. long, contracted or diffuse. Spikes 1-7.5 or up to 10 or even 12.5 cm. long, exceedingly filiform with 2-nerved rachis. Spikelets about 1 mm. long, 2-3-flowered, distant nearly their own length on the rachis on very short pedicels. Involucral glumes linear-or oblong-lanceolate. Flowering glumes 2-3, broadly ovate, rather shorter than the upper involucral glume, with median nerve and sub-marginal nerves microscopically hairy; pale rather shorter, reduplicate. Grain fusiform-oblong, pericarp adherent, but slightly produced each end.

Locality: Gujarat: Surat, near Athwa Farm (Bhide!); Ahmedabad in garden (Sedgwick!).—Konkan: Parel, Bombay Island (Talbot!); Victoria Gardens, Bombay Island (McCann 5351!, 5568!); Byculla, Bombay Island (McCann A401).

Distribution: Throughout India and Burma, Ceylon, tropical Asia, Africa and America.


Description: Stem tall, about, 60-120 cm. high, erect or geniculately ascending. Leaves 15-45 cm. long, flat or convolute, scaberulous; sheaths loose; ligule short, lacerate. Panicle 15-25 cm. long. Branches numerous, slender, simple, opposite or alternate, suberect or spreading, 5-10 cm. long. Spikelets 4-6-flowered, about 2.5 mm. long, alternate, short-pedicelled, distant or approximated, or sometimes loosely attached. Involucral glumes somewhat unequal, lanceolate, acute or subulate. Flowering glumes broader, lower apiculate with pilose nerves; nerves of pale pilose. Grain loose, obtusely trigonous, subrugose.

Locality: Gujarat: (ex Lisboa).—Konkan: Parel, Bombay Island (ex Lisboa.—S. M. Country: Kilgerry Tank (Talbot!).

Distribution: Throughout India and Burma, Ceylon, Malaya, China, Japan, Australia.

Note: Haines thinks that the two species are scarcely more than varieties. We can’t say how far this view is correct as we have seen only a few specimens.
REVISON OF THE FLORA OF THE BOMBAY PRESIDENCY. Part X.
By REV. E. BLATTER, S.J., Ph.D., F.L.S.

1929

Chlorideae

Bamboo
REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY

BY
E. Blatter, S.J., Ph.D., F.L.S.

PART X
GRAMINEÆ

BY
E. Blatter and C. McCann

(Continued from page 496 of this Volume)

TRIBE XII. CHLORIDÆ


Species 6.—India, Ceylon, Algeria, S. Africa.


Description : Cke. ii, 1045.

Locality : Konkan : Trombay, on rocks (McCann A32!); Antop Hill (McCann 3611!, 2449!).—Deccan : Gungapur (Blatter A33 !, 584!); Poona (Woodrow); Junnar near Poona (Woodrow).—S. M. Country : Dharwar Dist., dry uplands, 2,400 ft., rainfall 34 inches (Sedgwick 2656!); Badami, Fort (Bhide !, Talbot 2923!); Ranibennur (Chibber!).

Distribution : Throughout the plains of India, Ceylon.

86. Microchloa, R. Br.; Cke. ii, 1031.

Species 7. One distributed throughout the tropics, 3 in Africa, 3 in Australia.


Description : Cke. ii, 1031.

Locality : S. M. Country : Dharwar (Woodrow), on dry hill sides, 2,400 ft., rainfall 34 inches (Sedgwick 2908!); Dumbal (Talbot 2949!).—Kanara. Halyal (Talbot 2387!).—Usually growing on old walls.

Distribution : Tropics of the Old and New World.


Hitchcock (U. S. Dept. Agric. Bull. No. 792 (1920), 178) considers Panicum dactylium, Linn. as the type species. He justifies the change of Cynodon into Capriola in these words: "Capriola Adans., Fam. Pl. 2; 31, 532, 1763. The genera are indicated and distinguished by Adanson in a much abbreviated and often unsatisfactory manner. The tabular arrangement of the genera of Phalarides, his first section of the grass family or Gramina, includes Capriola
with the following diagnosis, interpreting the table: Summit of leaf sheath hairy; flowers in digitate spikes; glumes laterally compressed, lemma awnless. In the index there is given as a synonym under *Capriola*, 'Gramen dactylon Offic.' The last phrase appears in the first edition of the Species Plantarum in the synonymy under *Panicum dactylon* as 'Gramen dactylon, *vadicre repente s. officinarum*, Scheuch. gram. 104,' thus connecting *Capriola* Adams. with *Panicum dactylon*.


In spite of this we have to retain *Cynodon*. Mr. Hubbard of the Kew Herbarium informs us that *Cynodon* is on the list of *nomina conservanda* and according to International Rules must be used, although it is antedated by *Capriola*, Adams. (1763).

Species 3.—India, of which one is cosmopolitan.—Only one in the Bombay Presidency.


*Description*: Cke. ii, 1032.

*Locality*: Sindh: Sita Road (Sabnis B361!); Jamesabad, fields (Sabnis B907!, B1108!); Sanghar (Sabnis B896!); near Phuleli Canal, cultivated fields (Sabnis B135!); Mirva Canal, sandy banks (Sabnis B265!); Sehwan to Laki, foot of hills (Sabnis B300!); Mirpurkhas, fallow fields (Sabnis B1901!); Gizri, near Karachi (Sabnis B783!); Larkana (Sabnis B458!, B477!); Baghar (Blatter & McCann D690!).—*Gujarat*: Junagadh, Kathiawar (Blatter 3785!).—Cutch (Blatter 8533!).—Dakore (Chibber!).—*Khandesh*: Ankai Hill (Blatter!); Bor. Bori River (Blatter & Hallberg 5482!).—*Konkan*: Very common in Bombay and Salsette Islands (McCann!); Parsik, railway line (McCann A181!); Vihir Lake (McCann 182!).—*Deccan*: Igatpuri (Blatter & Hallberg 5486!, McCann!); Devlali (Blatter & Hallberg 4570!).—Khandala, very common (McCann 5439!, 5301!); Purandhar, N. foot and top (McCann 5042!, 5604! bis); Wai (Mamlatdar of Wai!); Panchgani (Blatter & Hallberg B264!, B1270!, B1329!).—*S. M. Country*: Devarayi forests. 1,800 ft. (Sedgwick & Bell 4201!); Dharwar (Sedgwick!); Haveri (Talbot!).—*Kanara*: (McCann!).

*Distribution*: Cosmopolitan.


Species 2.—India and Africa.


*Description*: Cke. ii, 1031.

*Locality*: Gujarat: Daman (Bhide!); Bhuj Hill, Cutch (Blatter 3764!).—*Khandesh*: Toranmal, rocks (McCann A54!); Amalner, Bori River (Blatter and Hallberg 4451!); Tapti, Bhusawal (Blatter and Hallberg 5433!); To Naradana (Blatter and Hallberg 5212!).—*Konkan*: Bandra (Ryan 1432!).—Parsik (Ryan 1215!); Trombay (McCann A52!); Worli Hill, common along sea shore (McCann 5516!); Antop Hill (McCann 3612!).—*Deccan*: Panchgani (Blatter & Hallberg B1278!); Katraj (Bhide!); Sinhagad forest (Bhide!).—Near Poona (Jacquemont 383); Poona (Woodrow!); Pashan, near Poona (Gammie!); Chattarshinji Hill, Poona (Ezekiel!); Kirkee (Gammie!); Khandala to Campoli (McCann A57!); Deolali (Blatter A53!, 4545!).—*S. M. Country*: Dharwar Dist. 2,000 ft., rainfall 35 inches (Sedgwick 2278!); Yelvigi, dry hill sides, 1,800 ft., rainfall 28 inches (Sedgwick & Bell 4902!); Dharwar (Talbot 2008!); Belgum (Stocks, Ritchie 831).—*Kanara*: Yellapore (Talbot!); Karwar (McCann!).

*Distribution*: Bihar, Rajputana, W. Peninsula, Socotra, Nubia.

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1 L. Sp. Pl. 58, 1753.

Description: Clusters of spikelets larger, 1-2 cm. long including the awns.

Locality: Jemadar ka Landa near Karachi (Stocks 646).

89. Enteropogon, Nees; Hook. f. in F. B. I. vii, 284.

Tall, slender, perennial grasses. Leaves long, very narrow. Spikelets very narrow, 1-2-flowered (lower flower perfect, upper if present male or neuter) unilaterally in a solitary terminal slender spike, not jointed at the base; rhachilla jointed at the base. Glumes 3 or 4. Lower involucral glumes unequal, narrow, hyaline, 1-nerved, persistent; lower floral glume much larger, linear, rigid, scabrid, dorsally rounded, 3-nerved, tip entire, or acutely bifid with a short erect awn in the cleft; callus bearded. Pale lanceolate, 2-toothed, keels scabrid. Lodicles 2. Anthers very long. Styles distinct. Grain narrow, free within the hardened glumes.

Species 3.—India, Africa.


Description: Stem 60-75 cm., slender, erect, glabrous. Leaves narrow, 10-18 cm. by 3-6 mm., tapering to a fine acumination, glabrous; sheath glabrous, finely long-ciliate at the mouth and sides; ligule a short membrane with a fine fringe of hairs. Spike solitary, terminal, 15 cm. long. Spikelets 2-seriate and secund on a flattened, trigonous, slightly scabrid rhachis, subsessile or very shortly pedicelled. Involucral glumes persistent, empty, scarios, 1-nerved, glabrous or very minutely puberulous, the lower less than half of the upper, more or less unequal-sided and sometimes slightly lobed on one side, ovate, subacute and erose at the apex; upper shortly unequally 2-dentate at the apex with a short micro before. Lower floral glume slightly longer than upper involucral, 2-dentate at the apex, 3-nerved with a dorsal stiff awn about as long as the glume, scabrid at the back and sides, ventrally grooved, the groove corresponding with the dorsal ridge which is continuous with the awn. Callus bearded with short white silky hairs. Pale a little longer than the glume, scabrid at the back and on the keels, 2-nerved, apex slightly bifid and erose, with a bisexual flower. Grain oblong, flattened, as long as the pale. Upper floral glume like lower, but smaller and also bisexual; rhachilla produced beyond the upper floral glume and bearing a sterile awned glume which is much smaller than the upper floral glume.

Locality: S. M. Country: Badami (Bhide ! Talbot 2924 !).

Distribution: So far endemic.


Species about 75.—Tropical and subtropical regions of the Old and New World.

Cooke has 4 species. We add 5 more: C. pallida, C. quinquesetica, C. virgata, C. montana and C. gayana.

A. Rhachilla not at all produced beyond the lower flowering glume ...

B. Rhachilla produced beyond the lower flowering glume

I. Rhachilla produced beyond the flowering glume and bearing 1 awn ...

II. Rhachilla produced beyond the flowering glume and bearing 1-4 reduced empty glumes

1. Spikelets 1-3. Lower flowering glume broadly cuneiform ...

2. Spikelets 1-3. Lower flowering glume ovoid, hirsute all over ...

3. C. tenella

4. C. villosa
3. Spikes 2-10. Lower flowering glume bearded at the base and on the margins above the middle
   a. Rhachilla bearing 1-2-awned, tubular or inflated glumes
      * Upper involucral glume awned. 5. C. virgata.
      ** Upper involucral glume awnless...
   b. Rhachilla bearing 3-4 empty glumes.
   Spikelets 4-awned altogether ...
   7. C. montana.
   4. Spikes 5-18
   a. Spikes 2.5-5 cm. long ...
   b. Spikes 6-10 cm. long ...
   8. C. quinquesegetica.
   9. C. gayana.

   Description: A slender tufted annual, 25-45 cm. high; stems simple or branched, almost filiform. Leaves 10-20 cm. long, linear, very narrow, flaccid, tips capillary, sparsely hairy inside towards the base; ligule of a few hairs. Spikelets 1-3, erect, digitate, golden-yellow, 7-13 cm. long, up to 5 mm. broad, closely pectinate with the two rows of erecto-patent long-awned spikelets. Spikelets narrow, tapering, about 2 mm. long without the awns subsessile. Involucral glumes ovate-lanceolate, subaristately acuminate, 1-nerved, keels ciliate, lower 4 shorter than the upper. Lower floral glume rather longer than the lower involucral, sessile, ovate, 1-nerved, hairy, base bearded, tip minutely notched, awn 15-25 mm. long, capillary, curved. Pale narrow, keels ciliate, tip 2-dentate. Grain linear, very slender, acute, pericarp loose. Rhachilla not produced beyond the lower floral glume. No rudimentary upper floral glume.
   Locality: Gujarat: Sevalia (Chibber!); Lasundra (Chibber!); Kharagoda, dry salt ground (G.C.H. 537!); —Deccan: Lonavla (Gammie!); Charodi (Gammie 16531!)
   Distribution: Bundelkhand, Bihar, Central India, W. Peninsula.

   Description: Cke. ii, 1034.
   Locality: Gujarat: Bulsar, in the shade of trees (Sedgwick 1114!). —Khandesh: To Toranmal, in a stoney watercourse (McCann 9773! 9774!). —Konkan: Thana (Lisboa). —Deccan: Nasik (Lisboa). —S. M. Country. Deciduous forests W. of Dharwar, 2,000 ft., rainfall 40 inches (Sedgwick & Bell 4499!). —Kanara: N. Kanara (Woodrow); Goond (Telbot 2203!). —Halyal (Telbot 2382!, 2220!).
   Distribution: Throughout the plains of India, Ceylon, China, Afghanistan.

Syst. i, 274.—*Tetrapogon triangulares*, Hochst. Pl. Arab. Schweinf. No. 967 (ex Hook. f.).

**Description** : Cke. ii, 1033.

**Locality : Sind** : Jamadar ka Landa near Karachi (Stocks).—*Gujarat* : Surat, on the city walls (Dalzell).—*Khandesh* : W. Khandesh (Blatter!).—*Deccan* : Bijapur (Woodrow).—*S. M. Country* : Badami Fort (Bhide!).

**Distribution** : Rajputana, W. Peninsula, S. India, Arabia, Abyssinia.


**Description** : Cke. ii, 1034.

**Locality : Sind** : Gharo (Blatter & McCann D655!).—*Gujarat* : Ahmedabad (Sedgwick!).—*S. M. Country* : Suravvar, on dry bunds, 2,000 ft., rainfall 35 inches (Sedgwick 39951); Yelvigi, 2,000 ft., rainfall 30 inches (Sedgwick 1923!)

**Distribution** : Punjab, Rajputana, W. Peninsula, westwards to the Canaries.


**Vern. Names** : Kharrut (Sind), Sikaliu, Gadihu (Surat), Fulkalu (Dohad), Falu (Broach), Khariu (Charodi), Gonde gavat (Deccan), Ganji hullu (Karnatak).

**Description** : A tufted leafy annual grass, 30-60 cm. high. Stems somewhat flattened, erect, leafy at the base, occasionally with creeping stems rooting at the lower nodes. Leaf-blades rather narrow, linear flat, acute, glabrous when old, with scattered long hairs in the leaves of young branches, 5-25 and even 40 cm. long, 3 mm. or less broad. Sheaths glabrous, compressed, upper ones somewhat inflated, margins thin and membranous, mouth of sheath bearded with long hairs in the leaves of young branches, quite glabrous when old and in flower-bearing branches. Ligule a thin, narrow, membranous ridge. Spikes 6-15, erect, crowded at the end of the peduncle, 2.5-6 cm. long, rhachis fine, angular, scaberulous on the edges. Spikelets about 2.5 mm. long excluding the awns, 2-awned, short-stalked, consisting of 4 glumes. Lower involucral glume slender, subulate, glabrous, with the keel glabrous, 1-nerved, about half the upper, upper involucral glume oblong-lanceolate, 2-fid at the apex, glabrous except the scaberulous keel, nerve produced between the lobes into a scaberulous awn. Lower floral glume oblong-ovate, cymbiform and rather deep, bifid at the apex and awned in the sinus, margins slightly ciliate up to about the middle and then closely ciliate with long hairs almost to but not to the tip, awn about 6 mm. long, bearded at base, on each side of the dorsal nerve there is a shallow groove with short scattered appressed hairs. Pale much narrower and rather shorter, often reduplicate, toothed or notched. Rachilla somewhat adnate to lower floral glume, shortly produced, bearing a curious semitubular or beccifirm truncate glume with 2 minute auricles at tip and an awn 8 mm. long. Grain fusiform, sometimes slightly curved, pericarp loose.

**Locality : Gujarat** : Sungiri (Gammie 165851); Perim Island, Gulf of Cambay (Blatter 38161 38201).—*Khandesh* : Bor, Bori River (Blatter &

Description: Cke. ii, 1035. Locality: Sind: Mirpur Sakro (Blatter & McCann D656!); Tatta (Blatter & McCann D657!).—Khandesh: Nim, Tapti bank (Blatter & Hallberg 5399!); to Naradana (Blatter & Hallberg 5163!, 5182!); Uamalla, Tapti bank (Blatter & Hallberg A188!).—Konkan: Parel, very common in Bombay Island (McCann 5381!); Sion (McCann 5220!, 5245!).—Decan: Chattarshinji Hill, Poona (Bakshi!); Jeur, Ahmednagar Dist. (Woodward!).—S.M. Country: Dharwar Dist., 2,000 ft., rainfall 35 inches (Sedgwick 1962!).—Haveri (Talbot 2215!).—Kanara: Kulgi (Talbot 2311!); Yeallapure (Talbot 1524!).

Distribution: Tropics generally.


Description: Perennial. Stems erect, tufted geniculately ascending from a creeping base, rooting at the nodes, quite glabrous, 10 cm. to 1-2 m. high. Leaf-blades narrow-linear, finely acuminate, rounded at the base, glabrous, folded flat inwards, 10-20 cm. long, 1-5-3 mm. broad; sheaths shorter than the internodes, flat, compressed, glabrous, with a few hairs or none at the mouth and with membranous margins, uppermost sheath spathiform, enclosing the florescence when young; ligule a thin ridge of short hairs densely arranged. Nodules glabrous, dark-ringed. Spikes 2-6, very rarely up to 9, 2.5-7.5 cm. long, connate at the base, erect and never spreading. Peduncle slender, long, glabrous, but copiously pubescent just below the base of the connate spikes; rhachis angular, slender, scabrid. Spikelets about 3 mm. long excluding the awns, short-pedicelled, unilaterial, biseriate, thin, slender, 1-flowered, pale or purple tinged, disarticulating above the 2 lower empty glumes which persist on the rhachis, generally 4-, rarely 3- or 5-awned, awns pale or purple, 3-5 mm. long; pedicel short, angular, scaberulous with a few pilose hairs; rhachilla produced, but is shorter than the flowering glume. Glumes usually 6, very rarely 5 or 7. Lower involucral glume hyaline, awnless, white or lightly purplish, about 1.5 mm. long, lanceolate, finely acuminate, 1-awned, and with a scabrid keel; upper twice as long as the lower, hyaline, oblong-lanceolate, finely acuminate or obtuse and shortly awned, 1-awned. Lower floral glume broadly oblong, chartaceous, 3-awned, bearded with long hairs along the margins from a little above the base and with a tuft of hairs at the base, awned at the apex; upper floral glume much smaller, cuneate, conduplicate, awned from...

Description: A glabrous, perennial grass, creeping and rooting at the lower nodes and there forming small tufts of leaves and an erect flowering stem 60 cm. high; nodes glabrous. Leaves 2-15 cm. long and 3-5 mm. broad, sparsely, delicately long-ciliate when young, ultimately glabrous, lanceolate, acuminate, truncate at the base, margins minutely scabrid; ligule a narrow frimbriate membrane. Spikelets 5-18, 2'5-5 cm. long, crowded in a very short racemose fascicle the branches of which are often decurrent into the peduncle for a short distance and form ridges on it which are also studded with stray spikelets. Peduncle below the spikes and the rachises hairy. Spikelets 8 mm. long including the awns. Glumes 7: i and ii empty, iii flowering, awned, paleate, iv-vii barren, epaleate, gradually smaller and rounder, all awned. Lower involucral glume 1'5 mm. long, elliptic-lanceolate, membranous, strongly 1-nerved, slightly oblique: upper 1½ times as long as the lower, elliptic-oblong, membranous, shortly mucronate, strongly 1-nerved. Lower floral glume without the awn as long as the upper involucral, elliptic-obovate, cuneate, coriaceous, 3-nerved, and with a dorsoterminal awn 5 mm. long, lateral nerves densely bearded with long white hairs nearly from the base. Pale as long as the glume but narrower, slightly hairy at the back, very shortly 2-fid at the apex, 2-keeled, keels minutely ciliate. Stamens 3, styles 2, stigmas plumose. Grain plano-convex or trigonous. Lodicles minute.

Locality: Sind: Jamesabad, in fields (Sabnis B116!).—Gujarat: Bhuj, Bhandir Maka Cutch (Blatter 3748!).—Rann of Cutch (Blatter 3732!).—Konkan: Versova (McCann A185!); Papadi, Bassein, growing on the banks of rice fields, in semi-salt land (Bhide!).—Colaba, near a swamp, on rocks, very common (McCann A1981, A199!, A200!).—Kanara: Karwar, on red mud near the shore (Hallberg & McCann A197!).

Distribution: So far endemic.


Popular Name: Rhodes Grass.

Description: Perennial or annual, 0'6-1'2 m. high; culms erect or geniculately ascending, or prostrate at the base, simple or branched, often emitting fascicles of barren shoots or short runners from the lower nodes, often robust, 3-9-noded, compressed below, glabrous, smooth, upper internodes usually exserted; sheaths glabrous or sparingly hairy near the mouth, smooth, the lower strongly compressed, keeled, keels sometimes scabrid, the uppermost sometimes tumid; ligules membranous, very short, long-hairy; blades linear, long-tapering to a fine point, 15-10 more than 30 cm. by 6-8 mm. when expanded, flat or folded, glabrous or hisurse near the base, green, smooth below, rough above on the margins. Spikelets 6-15, umbelked, sessile, suberect, rarely spreading, 6-10 cm. long, greenish or brownish; rachis scabrid; spikelets 3 mm. long, 3-4-flowered, shortly 2-awned, glumes very unequal, the lower involucral ovate-lanceolate, acute, subhyaline, 1'-1'5 mm. long, the upper oblong, obtuse, mucronate, 2-3 mm. long, firmer, scaberulous; lower floral glume oblong, sub-oblanceolate, minutely 2-toothed, ciliolate along the marginal nerves and slightly bearded below the tips or only finely bearded or almost glabrous, with a (sometimes minutely hairy) groove on each face;awn as long or slightly
longer than the glume, straight; callus minutely bearded, pale glabrous, keels scabrid. Anthers 1'5 mm. long; second floral glume with a male flower, like the preceding, but glabrous, 2 mm. long, awn 2 mm. long or less; vth and with glume rudimentary, cuneate in profile, empty, awnless.

Locality: Deccan: Poona (Burns!).—See also Mann in Bull. 77, p. 72 of Dept. Agric. Bombay.

Distribution: S. and tropical Africa.


Annual or perennial; leaves flat, subfiaccid; spikes in umbels of 2-6, erect or stellately spreading; tips of the rachis barren, mucroniform, usually curved. Spikelets 3-5-flowered, laterally compressed, densely imbricate, biserrate, sessile, unilateral on a flattened rachis, the uppermost reduced; rachilla tardily disarticulating above the empty glumes, tough between the flowering glumes. Flowers bisexual, the uppermost rudimentary. Involutcal glumes 2, unequal, strongly keeled, the lower ovate, acute, thin, persistent, the upper elliptic-oblong in profile, obtuse, mucronate or awned, firm, deciduous. Flowering glumes ovate, subacuminate, 3-nerved, mucronate or awned, deciduous with the grains. Pales about as long as the flowering glumes, 2-keeled, subpersistent. Lodicules 2, cuneate, minute. Stamens 3. Ovary glabrous; styles distinct, very long, subterminally exerted. Grain subglobose, slightly laterally compressed, not grooved or hollowed, rugose or punctate; pericarp very delicate, irregularly breaking away; embryo scarcely equaling ½ the length of the grain; bilum basal, punctiform.

1. Annual; grain subglobose
2. Perennial; grain ovoid


Vern. Names: Gandhi (Sind); Anchi, Manchi (Kaira); Tagar sammi (Dharwar); Hakki kalim hulu (Karnatak).

Description: Cke. ii, 1038 (under Elesine aegyptiaca).

Locality: Sind: Ghulamalla, garden (Blatter & McCann D599!); Tatta (Blatter & McCann D600!); Indus Delta (Blatter & McCann D601!); Karachi (Bhide!); Mirpurkhas (Bhide, Sabinis B170!); Umerkot (Sabinis B1001!); Hyderabad, cultivated fields (Sabinis B50!); Sukkar, cultivated fields (Sabinis B540!); Nasarpur (Sabinis B1138, B1089!); Sanghar (Sabinis B888!).—Gujarat: Sumarasar, Cutch (Blatter 3759!); Perim Island, Gulf of Cambay (Blatter 3818!); Bhuj Hill, Cutch (Blatter 8851!).—Khandesh: Muravad, Tapti bank (Blatter & Hallberg 3164!); Bor, Bori River (Blatter & [8]
Hallberg 54831).—Konkan: Wada Range, Thana Dist. (Ryan 685 !), Juven (McCann 4264 !); Vutora (Sabnis 3352 !); Mulgaum (McCann A208 !); Versova (McCann A205 !); Uran (Hallberg & McCann 5135 !); Marine Lines, Bombay Isl. (Hallberg A2061 !); very common in Bombay Isl. (McCann !); Ratnagiri (Woodrow 41).—Descriz: Poona (Jacquemont 388, 486), Agricultural College garden (Garade 665 !); Bopodi, near Poona (Gammie 15310 !); Manmad, riverbed (Blatter A211 !); Khandala to Campoli (McCann A209 !); Khandala (Gammie 15395 !, McCann !); Igatpuri (Blatter & Hallberg 5185 !, McCann !); Shanapur, near Nasik (Woodrow).—S. M. Country: Yelvigi, 1,800 ft., rainfall 25–30 inches (Sedgwick 2002 !); Gokak (Shevade !); Badami (Woodrow 12).—Kanara: Dundeli, 1,800 ft., rainfall 100 inches (Sedgwick & Bell 4215 !); Hyalal (Talbot 2306 !); Karwar, sea shore and near sea (Talbot 1298 !).

**Distribution**: Spread throughout tropical and subtropical regions.


**Description**: Cke. ii, 1039 (under Eleusine aristata).

**Locality**: Sind: Karachi, (Burns !), seeds grown, taken from a bird’s crop (Ticehurst !); Sanghar (Sabnis B893 !); Indus Delta (Blatter & McCann D602 !); Mirpur Sakro (Blatter & McCann D603 !); Gharo (Blatter & McCann D604 !); Mundigro (Stocks 637). — Gujarat: Ahmedabad (Woodrow), dry open hills (Sedgwick !); Sevalla (Chibber !);—Konkan: Ratnagiri (Woodrow).

**Distribution**: Punjab, Rajputana, W. Peninsula, Baluchistan, Afghanistan, Arabia, Nubia.

92. Eleusine, Gaertn. Fruct., & Sem. i (1788), 7, pl. 1, f. 11; Cke. ii, 1037 (partim).

Annual or perennial; leaves long, flat or folded, flaccid or firm; spikes in interrupted spikes or the upper or all in a terminal umbel, straight, suberect, spreading or deflexed; spikelets glabrous, 3–6-flowered, laterally compressed, densely imbricate, alternately biseriate, unilateral, sessile on a flattened rhachis, the uppermost terminal, perfect; rhachilla disarticulating above the involucral glumes and between the flowering glumes, or tough, produced, sometimes terminating with a rudimentary glume. Flowers bisexual. Involucral glumes 2, subequal, persistent, obtuse or obscurely mucronate, membranous, strongly keeled, 3–5 nerved, the lateral nerves close to the keel, the lower shorter, with the keel crested. Flowering glumes very similar, 3-nerved near the base; lateral nerves submarginal above, with 1–2 short additional nerves close to the keel. Pales slightly shorter than the glumes, 2-keeled, keels winged. Lodicles 2, minute, cuneate. Stamens 3. Ovary glabrous; styles slender from a broadened base, distinct; stigmas plumose, laterally exserted. Grain broadly oblong to globose, broadly grooved; pericarp loose, delicate, breaking up irregularly or almost circumcissile; seed finely striate; embryo suborbicular, basal; hilum punctiform, basal.

Species 6. In the warm regions of the E. hemisphere, 1 widely spread through the tropics.

Of the 5 species mentioned by Cook, 2 have been transferred to Dactyloctenium above, viz. E. aegyptiaca and E. aristata. We add 2 species new to the Presidency: E. verticillata and E. brevifolia.

**A. Erect.**

1. Spikes digitate

I. Spikes slender, nearly glabrous at base

| Seed oblong, obtusely trigonous | 1. E. indica. |

2. Spikes stout, often incurved pubescent at base, seed globose

| 2. E. coracana |

II. Spikes scattered or whorled

| 3. E. verticillata. |

B. Prostrate or creeping and rooting

I. Ligule hairy. Spikes digitate

| 4. E. flagellifera. |

II. Ligule obsolete. Heads of spikes globose

| 5. E. brevifolia |

**Description**

Cke. ii, 1037.

**Locality:** Gujarat: Bhnj Hill, Cutch (Blatter 8549!).—Khandesh: Umalla, Tapti bank (Blatter & Hallberg 5231!); N. slope of Chanseli (McCann A202!).—Konkan: Bycula (McCann A207!); very common in Bombay and Salsette Isls. (McCann!); Alibag (Ezekiel!); Vetora (Sabinis 33505!); Bassein (McCann 4478!).—Bedcan: Khandala, very common (McCann 9407!); Khandala to Karjat (Blatter & Hallberg 5323!); Igatpuri (Blatter & Hallberg 5199!); Poona (Woodrow).—S. M. Country: Dharwar, 2,400 ft., rainfall 34 inches (Sedgwick & Bell 4986!).—Kanara: Yellapole (Talbot 1523!); Halyal (Talbot 2103!); Nencholi, near banks (Talbot 954!).

**Distribution**: Throughout the plains of India, tropics of the Old World.


**Vern. Names**: Nachni, Nagli, Rag, Makra, Nanguli.

**Description**: Very like *Eleusine indica*, but stoutier, up to 1.5 m. high. Leaves often far overtopping the stem, 5-6 mm. broad; sheaths compressed, loose; ligule of hairs. Spikes 4-7, suberect, with their ends or whole spike frequently incurved, rachis of spikes often pubescent at base, somewhat 3-gonous or back flattened. Spikelets much congested, awnless, 3-6-fld. Flowering glumes more broadly ovate than *E. indica*, and often with 1-2 nerves in the sides, variable in size, up to 5 mm. long. Seed globose, dark brown, smooth in some varieties, in other cases somewhat rugose, with a depressed black hilum and slightly flattened on one side.—A cultivated form of *E. indica*.

**Locality**: Extensively grown in the hilly districts of the Presidency.

**Distribution**: Cultivated in the tropics of the Old World for its seed.

**Uses**: 'It is often said to be a good fodder. This is not my experience, the leaves though soft have very tenacious vascular strands and I have noticed animals frequently reject them after chewing a few times.' (Haines).


[10]
Description: An annual grass. Stems 30–90 cm. high, erect, stout or slender, simple or branched, soft. Leaves flat, rather broad, flaccid, acuminate, glabrous; sheath compressed; ligule a few hairs. Spikes few or many, scattered or whorled, or opposite or alternate, suberect, 2–7.5 cm. long, very many-flowered. Spikelets 4–6 mm. long, 8–12 flowered, shining; glumes small, acute, glabrous. Involucral glumes broadly ovate, finely acuminate or aristulate. Flowering glumes 2 mm. long, very broadly ovate, 3-nerved, keel excurrent, lateral nerves ending in small teeth. Grain rugose, pericarp caducous.

Locality: Gujarat: Ahmedabad, compounds, lanes and banks, common (Saxton and Sedgwick!)

Distribution: Tropics of the Old World.


Description: Cke. ii, 1038.

Locality: Sind: Jacobabad (Bhide!); Mirpurkhas (Jhaveri!); Sanghar (Sabnis B889, A236!); Umerkot, sand hills (Sabnis B1002, B1017!); Sehwan to Laki, foot hills (Sabnis B616!); Pad-Iadan (Sabnis B511!); Gharo (Blatter & McCann D605!).—Khandesh: (Lisboa).—Gujarat: Bhuj Hill, Cutch (Blatter 3746!). Deccan: Poona (Lisboa).

Distribution: Punjab, W. Peninsula, Afghanistan, N. Africa.


Description: An annual grass. Stems creeping and spreading from the root, ascending from a decumbent base, generally slender and small. Sometimes large and proliferously branched, leafy, 7–18 cm. long. Leaf-blade linear, acute, with a sub-cordate or rounded base, 2–5 cm. long, 3–4 mm. broad; sheath compressed and glabrous; ligule a very short membrane, ciliate at the margin or obsolete. Spikes usually many, sessile and crowded in globose heads, varying in diameter from 8–16 mm. Spikelets sessile, biseriate, ovate-oblong, 3–4 mm. long, 4–10–flowered. Involucral glumes membranous, ovate-oblong, acuminate, shortly awned, glabrous, the lower shorter than the upper, 1–3-nerved, the upper 3–5-nerved, and the nerves very close to the middle one in the keel. Lower floral glume and the succeeding ones ovate, cuspidately acuminate, 3-nerved, nerves villous below the middle and paleate. Palea oblong, lanceolate, truncate and minutely 2-toothed, keels villous below the middle. Anthers small. Lodicules small and cuneate. Styles long and slender. Grain orbicular to ovate, concavo-convex, red-brown, and transversely rugose.

Locality: S. M. Country: Ranibennur (Bhide!).

Distribution: Coromandel and Carnatic coasts.

93. Dinebra, Jacq. Fragm. (1809), 77, t. 121, f. 1; Cke. ii, 1039.

Species about 10.—India. Ceylon, Afghanistan, westwards to the Mediterranean and tropical Africa.

Cooke describes one species: Dinebra arabica, which name has to cede to Dinebra retroflexa, Panzer.


Vern. Names: Kali Kauli (Sind); Kharia (Broach); Lona (Poona, Sholapur); Halligyan hullu (Bijapur); Halgyan hullu, Ululgyan hullu, Nari baluda hullu (Karnatkh).

Description: Cke. ii, 1039.—A more complete description in Achariyar 279.

Locality: Gujarat; Banks of the Tapti above Surat (Dalzell & Gibson); Surat (Woodrow); Morvi, Kathiawar (Woodrow).—Khandesh: Dadgaum (McCann A37 !); Dhulia, Moti Tank (Chibber !); Antab, Bori River (Blatter & Hallberg 5147 !); Bor, Tapti River (Blatter & Hallberg 5490 !); Bor, Tapti River (Blatter & Hallberg 5469 !); Tapti River, Bhussawal (Blatter & Hallberg 5157 !).—Konkan: Bandra, damp fields at Khar (Vakil A35 !); Sion (McCann 5242 !); Parel (McCann 5104 !); Byculla (McCann A39 !).—Deccan: Deolali (Blatter A34 !); Sholapur (D’Almeida B36 !); along the river, Dhand (Bhide 1346 !); Bairawadi, Purandhar (McCann 5505 !); Poona (Woodrow), Agricultural College Farm (Ezekiel !).—S. M. Country: Dharwar Dist. (Sedgwick 2101 !); Kelgerry (Talbot 2623 !); Haveri (Talbot 2184 !).—Kanara: Yellapore (Talbot !).

Distribution: India, Ceylon, Afghanistan, westward to Egypt and Senegal.

94. TRIPOGON, Roth Nov. Sp. (1821), 79; Cke. ii, 1035.

Species about 13.—Tropical and subtropical Asia and Africa, one in America.

To the 4 species given by Cooke we add 3 others: T. bromoides, Roth, T. filiformis, Nees, and T. Roxburghianum, Bhide.

Key:

A. Flowering glumes simply bifid with an interposed awn, the lobes awned or not

I. Awn as long or longer than its glume

1. Under 8 cm. high. Leaves 2-5 cm. long... 1. T. paucerculus.

2. 15-45 cm. high. Cauline leaves 15-20 cm. long. Ligule a ridge... 2. T. capillatus.

II. Awn shorter than its glume

1. Lateral lobes of floral glume not awned

a. Leaves 30-60 cm. long. Spikelets 5-12-flowered. Lower involucral glume 2 mm. long, lanceolate...

3. T. Lisboa.

b. Leaves 5-20 cm. long. Spikelets 10-20-flowered. Lower involucral glume 3 mm. long with a projecting lobe at one side

4. T. Jacquemontii.

5. T. Roxburghianum.

B. Flowering glumes 4-fid, outer lobes awned or not, inner membranous, sometimes very short or truncate

I. Upper involucral glume deeply notched or bifid at the apex...

6. T. bromoides.

II. Upper involucral glume minutely 2-toothed below the tip...

7. T. filiformis.


Description: Cke. l. c.

Locality: Konkan: Matheran (Woodrow !).—Deccan: Mahabaleshwar, rocky summit of Sindola plateau (Sedgwick & Bell 4845 !); Panchgani (McCann !); on the crest of the Western Ghats (1890 ft.) 8 miles south of Lonavla on Ficus glomerata, in company with mosses and Utricularia orbiculata (Woodrow 25);

[12]
Khandala, common on rocks (McCann A66!); near Karli on rocks (Woodrow!).—S. M. Country: Daud-sagar (Talbot 2568); Castle Rock, on rocks (Bhide!); Poondra (Talbot 4306!).—Kanara: On rocks on a hill near Nagangari, 2,600 ft., rainfall 100 inches (Sedgwick 2895!).—This grass usually grows on rocks together with mosses and other small plants during the rainy season.

**Distribution:** Endemic in the W. Peninsula.


**Description:** Cke. 1. c.  
**Locality:** Khandesh: Toranmal, edge of plateau, 3,000 ft. (McCann A66!).—Konkan: On trees, Matheran (Woodrow!, Lisboa).—Deccan: Panchgani (Blatter & Hallberg B1247!, B1288!); on trees about Poona (Jacquemont 580); Khandala, common on trees and rocks (McCann A61!, Garade!).—S. M. Country: Castle Rock, 1,500 ft., rainfall 300 inches (Sedgwick & Bell 4332!); Belgum, on trees on Samboti Hill (Ritchie 866!); Ammod, on trees (Talbot 7621!).—Kanara: Sumphkund to Sirsi, on trees (McCann!).

**Distribution:** Bihar, W. Peninsula, Mt. Abu.


**Description:** Cke. 1. c.  
**Locality:** Konkan: Parsik Hill (McCann A337!).—Deccan: Purandhar (McCann 5009!); Khandala, common, on rocks (McCann A334!, Bhide!); Karli, between Poona and Lonavla (Jacquemont 581); Panchgani, on Tableland (Blatter A338!). Generally forming large tufts and growing on rocks overhanging water-courses.

**Distribution:** Mt. Abu, W. Peninsula.


**Description:** Cke. 1. c.  
**Locality:** Gujar: Lasundra (Chibber!).—Khandesh: N. slope of Chanseli (McCann A335!).—Konkan: Bombay district, without precise locality (Lisboa); Matheran (Woodrow).—Deccan: Devlali (Blatter & Hallberg 4468!); Sholapur (Pinwill); near Ahmednagar (Miss Shatuck); Gangapur (Blatter & Hallberg A339!); Khandala (Blatter & McCann 3599!); Poona (Jacquemont 353, Woodrow); Agricultural College compound, Kirkee (Bhide!). Purandhar (McCann 5573!); Mahableshwar. W. side of plateau (Sedgwick!).—S. M. Country: Belgum (Talbot!); Dharwar (Talbot 2301!); dry hill sides near Dharwar (Sedgwick 2896!).

**Distribution:** Bengal, Bihar, Central India, W. Peninsula.


**Description:** 10-18 cm. high. Stems tufted. Leaves filiform, scarcely longer than 2.5 cm., ciliate with long hairs on the margin and at the ligule; sheaths glabrous, margins hyaline; ligule an oblong lacerated membrane. Spike solitary, 5-6 cm. long. Spikelets 3 mm. long, 1-2 flowered, with the rhachilla jointed and produced beyond the upper flower and thorne on a flattened rhachis, the internodes of which are alternately concave and convex. Lower involucral glume hyaline, very oblique or slightly lobed on one side, broadly 1-nerved, remaining attached to the hollow in the rhachis when the spikelet is removed. Upper involucral glume very coriaceous and thick, broadly 3-nerved, about 2½ times as long as the lower. Lower flowering glume a little shorter than the upper involucral, dorsally hairy in the lower part, membranous, 3-nerved, 2 toothed with a short macro between, teeth also shortly
mucronate. Callus bearded. Pale nearly as long as the glume, 2-keeled, keels minutely scabrid. Stamens 3. Styles 2, distinct, stigmas plumose. Grain terete. Lodicules 2, cuneate. Upper flower also bisexual or imperfect or 0. When complete it is like the lower.

Locality: **Deccan**: Chhattarshinji Hill, Poona (Bhide!, Ezekiel!). — **S.M. Country**: Badami Fort (Bhide!); Dharwar, dry barren uplands, 2,400 ft. (Sedwick!).

**Distribution**: So far endemic.


Description: Stems 15–45 cm. high, stout or slender. Leaves usually short, but sometimes as long as the stem, flat or convolute, and filiform. Spike long or short, 7–20 cm. long. Spikelets very variable, 4–12 mm. long, few- or many-flowered, close or distant. Lower involucral glume ovate or lanceolate, deeply notched on one side, membranous, nerve stout; upper oblong-lanceolate, deeply bifid, with a short awn in the cleft, membranous or coriaceous, with broad membranous margins. Lower floral glume and following bearded at the base, broadly ovate, strongly 3-nerved, 4-fid, outer lobes small, placed low down and margined with their awns half as long as the glume or longer, inner lobes often half as long as the glume, much larger than in any other species, awn rare as long as its glume.

Locality: **Deccan**: Poona, Agricultural College Farm (Chirka!); Katraj Ghat (Gammine!) ; Mahabaleshwar, 4,500 ft., rainfall 270 inches (Sedwick & Bell 4567!), summit of Sindola plateau (Sedwick & Bell 4841!).— **S.M. Country**: Belgaum Fort, walls, 2,600 ft., rainfall 50 inches (Sedwick 2950); from Belgaum southwards (teste Hook. f.); Dharwar (Talbot 2301!); Bijapur Dist. (Talbot 2929!); Badami (Bhide!).

**Distribution**: W. Peninsula, Ceylon.


Description: Stem 10–40 cm. high, very slender. Leaves filiform, as long as the stem. Spikes 4–25 cm. long. Spikelets crowded, 4–10-flowered, 3–8 mm. long. Lower involucral glume ovate, broadly lobed on one side; upper narrowly lanceolate, sharply toothed on one or both margins near the tip. Flowering glumes 2-toothed at the tip, teeth acute or jagged, a long awn inserted in the cleft and a shorter awn on the outer side of each tooth, the glume thus being 3-awned, middle awn twice as long as the glume or longer.

Locality: **Deccan**: Wai (Talbot 4485!).— **S.M. Country**: Belgaum (Talbot!).

**Distribution**: Temperate Himalaya, Khasia Hills, W. Peninsula.

**TRIBE XIII. PAPPOPHOREÆ**


Species about 6, in the dry warm regions of the Old World and in Australia; 1 species in Western N. America.

There is only one species in the Bombay Presidency.


Description: Cke. ii., 1040.

Locality: **Sind**: Laki (Bhide!); Karachi District (Woodrow).

**Distribution**: Peshawar, W. Peninsula, Burma.
TRIBE XIV. ORYZAE

96. ORYZA, Linn. (Cke. ii, 1042).

The spikelet of *Oryza* has been variously interpreted. Hook. f. has the following description: 'Glumes 2-3, i and ii much the smallest, empty, scale or bristle-like, rarely 0; iii chartaceous, obtuse, acut-e or awned, strongly 3-5-nerved; palea as long as the glume.'

Cooke speaks of 5 glumes, the 2 lower involucral glumes below the articulation of the spikelet minute, scale-like (rarely absent); the 2 next involucral glumes, above the articulation of the spikelet subulate; floral glume solitary, dimidiate-oblong, coriaceous or chartaceous, 5-9-nerved, awless or with a short or long straight terminal awn; palea linear or lanceolate, as long as the glume, 3-5-nerved.'

Stapf thinks that the usual 2 outer empty involucral glumes are absent, that the next 2 (scales or bristles) are empty florets (valves). He also takes the 5th-glume to be a pale.

Species about 17.—Tropical.—2 species in the Bombay Presidency.

1. Ligule very short, scarcely longer than broad, fringed with short hairs...

2. The lower ligules very long, up to 4 cm., always much longer than broad...


**Description**: Cke. ii, 1042.

**Locality**: Sind: Karachi, in Herb. Kew without collector's name; covering large flats at the mouth of the Indus River (Blatter & McCann!); Shikarpur (Dr. King's collector); Keti (Blatter & McCann D666!); after Keti (Blatter & McCann D665).—*Kanara*: Sulgeri (Sedgwick & Bell 4241!). Forming dense mats and covering miles of flat land at the mouth of the Indus river within tidal influence, being covered at high tide.

**Distribution**: Sundarbans, W. Peninsula.


**Description**: Annual. Stems creeping or floating, 60 cm. to 3 m. high. Leaves 30–60 cm. by 6–8 mm. or more, striate, scaberulous, 1-nerved; sheaths smooth; ligule long 2-partite. Spikelets loosely panicled, not imbricating, awn 7–13 cm. long, yellow or reddish, shining. Involucral glumes 1–4 the length of the floral glume, lanceolate; floral glume hispid above, dorsally spinescently ciliate, awn very long.

This is Hook. f.'s description prepared from the plant which Roxburgh and other Indian writers consider to be the indigenous Rice.

Much interesting information on *Oryza sativa* can be had in Watt, G.: Dictionary of Economic Products of India v (1931).

Watt, G.: Commercial Products of India (1908).


Mollison: Textb. Ind. Agric. iii (1901), 32-44.


Copeland, E. B.: Rice (1924).


Wild Rice: We possess little reliable information regarding the Wild Rices of the Presidency. S. G. Bhalerao (in Agric. Coll. Mag. xx (1928), 45) has published a paper on 'The Wild Rice (*Oryza sativa*) of the Bombay Presidency', which contains a number of interesting observations.

According to him the wild type of Rice occurs abundantly on the Western Ghats and occupies the zone where the rainfall is over 30-35 inches. As an annual aquatic, it occurs in marshy areas, in small pools and ponds and on the margin of the big tanks. It is rarely found in more than 3 feet depth of water and on land without any standing water as well.

We have found a Wild Rice in pools on Tableland at Panchgani (rainfall 60 in.).


Description: Cke. ii, 1041 (Leersea).

We follow O. Kuntze (Rev. Gen.) and Hitchcock (Genera of Grass. Unit. St. in U.S. Dept. of Agric. Bull. 772 (1920), 285) in going back to the genus *Homalocenchrus*. Hitchcock says that one species is referred to the genus with certainty, another being doubtfully referred to it. No specific names are used, but under the first there are two citations which appear in the Species Plantarum under *Phalaris oryzaoides*, Linn. which Hitchcock considers as type species.

Species 14.—Tropical and temperate regions.

Only one species in the Presidency.

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(1856), 345.—L. capensis, C. Mill. l.c. 345.—L. Gouini, Fourn. ex Hemsl. Biol. Centr.—Am. Bot. iii (1885), 514 (nomen).—Homoalacnus Gouini, O. Kuntze Rev. Gen. (1891), 777.—Leersia agyptiaca, Fig. & De Not. in Mem. Ac. Torin. ser. ii, xiv, (1853), 317.—L. ferox, Fig. & De Not. l. c. 319.

Description: Cke. ii, 1042, under Leersia hexandra.

Locality: S. M. Country: Devarajji (Sedgwick & Bell 4463!); Sadambi Tank, Tadas (Sedgwick 2052!); Sluavar, in tanks (Sedgwick 2289!); Castle Rock, in rice field (Bhide!); Kunnur, margin of tank (Sedgwick 4930!); Londa (Woodrow).—Kanara: (McCann!); Halyal Tank (Talbot 1345!, 2147!).

Distribution: More or less throughout India, Ceylon, Africa, America, Australia.

98. Hygroryza, Nees in Edinb. N. Phil. Journ. xv (1833), 380;
Cke. ii, 1041.

Species 1.—India, Ceylon, Tonkin.


Description: Cke. ii, 1041.

Locality: Gujarat: Chikli (Woodrow).—Konkan: Bhiwandi, near Kalyan (Chibber!); Nagotna (Gammie 16063!); Kurnur, pond (Ezekiel!); bank of Vihar Lake (McCann!).—Deccan: Poona, Agricultural College Garden (Bhide!, McCann!).

Distribution: Of genus.

TRIBE XV. FESTUCÆ


Species 1.—Tropical Asia, Africa and Australia.

1. Elytrorphorus articulatus, Beauv. Agrost. (1812), 67; Cke. ii, 1044.—For synonyms see Hook. f. in F.B.I. vii, 1044.

Description: Cke. l. c.

Locality: Gujarat: Godri (Woodrow).—Konkan: Alibag, rice field near water works (Ezekiel!); Penn (McCann 5504!, 5509!); Condita (McCann 4242!); Bhandup, in damp rice field (Nana A46!); Kalyan (Woodrow).—

Deccan: Khandala, Bushy Lake, in dry bed (McCann 9392!); Matheran (Gammie 1654!); Karjat, Honad Taluka (Bhonsle!); Igatpuri (Blatter & Hallberg 5144!, 5194!).—S. M. Country: Chabbi, rice field, 2,000 ft., rainfall 30 inches (Sedgwick 3705!); Londa (Woodrow).—Kanara: Halyal (Talbot 1370!).

Distribution: Of the genus.


Species few.—From the Mediterranean and Caspian regions to the Punjab, Sind, and S. India.—Only 1 species in the Bombay Presidency.


Description: Cke. l. c.

Locality: Sind: Near salt creeks in Sind (Stocks 506!); Gharo (Blatter & McCann D659!, D660!); Mirpur Sakro (Blatter & McCann D658!); Karachi (Bhide!, Woodrow); Laki (Bhide!); Kotri, banks of Indus (Sabnis B370!); Sehwan, clayey plains (Sabnis B606!); Sehwan to Laki, foot of hills (Sabnis B108!); Sanghar (Sabnis B891!).—Gujarat: Surat, mud-flats, mouth of
Tapti River (Hallberg A29 !); Porbandar (Bhide !); Dharasna (Chibber !); road to Gola (Chibber !); Karj Roa, Cutch (Blatter 3770 !, 3773 !); Kala, Pachan Isl., Cutch (Blatter 3739 !); (Runn of Cutch Blatter 3730 !, 3731 !).—

Kokkan : On the salt ground near the sea (Graham, Lisboa); Bandra, salt marsh (Vakil A28 !); Penn (McCann A31 !); Bassein Creek (Chibber !); Nagon, Sion, salt marsh (McCann 5240 !); Saisette (Wight 53).

Distribution : Punjab, Sind, W. Peninsula, in salt ground, Ceylon, Afghanistan, Persia, Caspian region, Arabia, Mediterranean region.

101. CENTOTHeca, Desv. ; Cke. ii, 1043.

Species doubtfully 3.—Tropical Africa, Asia, Australia.—One species in the Presidency.


Description : Cke. i. c.

Locality : Konkan : Vetora (Sabnis 33564 !, 33727 !).—Kanara : Castle Rock, evergreen forests, 1,600 ft., rainfall 250 inches (Sedgwick 2714 !; Gammie 15993 !); Guddhalli, Karwar (Hallberg & McCann A25 !); Katgal (Hallberg & McCann A26 !); Devimani Ghat (Hallberg & McCann A27 !); on a fern stem (Woodrow 1).

Distribution : Himalayas, Khasia Hills, Central India, Burma, W. Peninsula, Ceylon, Malay, China, Polynesia, tropical Africa.

TRIBE XVI. HORDEÆ

102. LEPTURUS, Br. ; Hook. f. in F.B.I. vii, 365.

Small, slender grasses. Leaves flat or convolute. Spikelets 1–2-flowered, sessile, solitary, half-immersed in hollows of the rachis of a simple, terminal, articulate or not-straight or incurred spike with the back of the lowest floral glume opposite the rachis; rachilla jointed. Glumes 3 or 4. Lower involucral glume minute or 0, upper longer than the flowering glumes, linear, rigid, acute, 5-nerved, erect or at length deflexed; flowering glumes much shorter than the upper involucral glume, hyaline; pale 2-keeled. Lodices 2, cuneate, or lobed. Stamens 1–3. Ovary glabrous; styles short, distant. Grain narrow or oblong, glabrous, free.

Species 6.—The Old World.—One species in the Presidency, new to it.


Description : A perennial grass. Stem elongate, woody, branched and widely creeping below. Leaves 7 to 15 cm. long, 3–6 mm. broad, spreading or erect, acuminate, glaucous; sheaths glabrous or mouth ciliate; ligule inconspicuous. Spikes shortly peduncled, fragile. Spikelets 2–fid; rachilla elongate, bearing an upper imperfect flower. Involucral glumes 1 (or 2 in the uppermost spikelet) flat, rigid, 6–12 mm. long, closely appressed to the rachis; flowering glume, much shorter than the involucral, elliptic, concave, 3-nerved. Pale 2–keeled. Lodices fleshy, obliquely truncate or 2-lobed, glabrous. Grain oblong.

Locality : Kanara : 4 miles from Halyal (Bhide).

Distribution : N. Kanara, Ceylon, Malay and Pacific Islands, Australia.

103. TRITICUM, LINN.

* 1. Triticum sativum, Lam. Fl. Fr. ed. 1, iii (1778), 625.

We are not in a position to discuss the many varieties or forms that are cultivated in the Presidency. We refer to some literature which may help those who wish to make further inquiries into this very complicated question.

Hackel in Engler & Prantl. Pflanzenfam. ii, 80.
Murray in Watt Dictionary of Economic Prod. vi, pt. 4, 89.
Koernick & Werner, Handbuch der Getreide Arten.
Howard, A. and Howard, G. L. C. The varietal characters of Indian wheats. Mem. Dept. Agr. Ind. (Bot. ser.) ii (1908), and many other papers on wheat which were mostly published by the Department of Agriculture in India.
Huber, J. A. Uebcr Abstammung und Systematik des Weizens. in Naturforscher iii, (1927), 577-582.
Cooke mentions 2 varieties which are chiefly grown in the Presidency:
(a) Var. spelta. This is Linné's Triticum Spelta.
(b) Var. pilosa. This is Triticum pilosum, Dalz. & Gibbs.

104. Hordeum, Linn.
The following three varieties are grown in the Bombay Presidency.
(a) Var. hexastichon - Hordeum hexastichon, Linn. Sp. Pl. (1753), 85.
(b) Var. distichon - H. distichon, Linn. l.c.
(c) Var. nudum - H. nudum, Ardulini ex Schult. Mant. ii. (1824), 437.
We refer to:

TRIBE XVII. BAMBUSEÆ

Species 73.—Eastern Asia, Australia.—One species indigenous in the Presidency, and 2 commonly cultivated.
I. Stem and branches unarmed
1. Spikelet subcylindric; fertile flowers 5-9 ...
   1. B. nana.
2. Spikelet compressed, flattened, distichous; fertile flowers 5-6 ...
   2. B. vulgaris.
II. Stem and branches armed ...
   3. B. arundinacea.

Description: Stems densely tufted, 2-3 m. high, rarely more, 3 cm. in diam., glabrous, green when young, then yellow, unarmed, hollow, much branched from the base; branches fascicled, semiverticillate, often dichotomous. Sheaths of young shoots glabrous, striate, very long, attenuate, apiculate, lanceolate, truncate at the apex, surmounted by an imperfect limb rather long-acuminatc and decurrent into 2 ciliate auricles. Leaves often small, 2:5-7.5 cm. long, the larger ones often attaining 14 cm. by 5-7 mm., rounded at the base, long-acuminatc, smooth or pubescent below, scabrous on the margins, glaucous-blusb; secondary nerves 5-7 pairs, not tessellate, but provided with pellucid glands. Spikelets 12-45 mm. long, few clustered or solitary on the branches of short diffuse panicles, straw-coloured, shining,
5-9-flowered; sometimes with bractiform subfoliaceous scales at their bases; rhachilla glabrous, flattened. Glumes all flowering or rarely the lowest empty, ovate, acute, many-nerved. Pale shorter than the glumes, keels minutely ciliate at or near the tip only. Stamens long-exserted, pendulous; anthers obtuse or finely apiculate, yellow. Ovary obvoid, pubescent at the apex. Style very short, divided from almost the base into 3 long and hairy stigmas.

Grain elliptic, furrowed, shortly beaked, top hairy.

**Distribution**: China, Japan.—Cultivated in Manila, Luzon, Java, Malay Peninsula, India, Europe.


**Description**: Stems unarméd, 6-15 m., 5-10 cm. in diam., first green, then yellow, or striped, polished; nodes hardly raised, with usually a ring of brown hairs; internodes 25-45 cm. long, walls rather thin. Stem-sheaths 15-25 cm. by 17-23 cm., often streaked with yellow, thickly hairy above, top rounded, retuse; blade 5-15 cm., appressed hairy on both surfaces, base rounded, decurrent with rounded, falcate, fimbriate auricles; ligule broad, toothed or fimbriate. Leaves linear-lanceolate, 15-25 cm. by 18-40 cm., pale, petaioed, glabrous, tessellate by pellucid glands, tip twisted, scabrid, nerves 6-8; sheath laxly hairy; ligule short, ciliate, auricle rounded. Panicle large, leafy. Spikelets 15-20 mm., in bracteate clusters of 3-10 oblong, acute, bladé, empty glumes, 1-2 ovate, many-nerved with the tip ciliate; flowering glumes 6-10, larger. Pale as long as the glume, keels white, ciliate. Lodicules 3, winged, ciliate. Anthers obtuse, hairy, apiculate, purple. Ovary narrow, hairy; style long.

**Distribution**: Mauritius, Bourbon, Madagascar, Hawaii, Java.—Cultivated in other countries. A handsome variety is grown in Indian gardens.

**Var. striata**, Auct. mult.—Bambusa striata, Loddd. ex Lindl. in Penny Cyclop. iii (1835), 357; Munro Monograph 121; Curtis Bot. Mag. xxx (1874) t. 6079.—Var. mellata, A. & C. Rivière l. c.—B. vulgaris vel culmis variegal, Hort. Gall.—B. variegata, Hort.—Var. aureo-variegata, Hort.

Rather smaller in size. The stems are striped with yellow and green, the stripes alternating at every node; the branchlets are yellow and the leaves the somewhat smaller and paler. On drying the stripes disappear.

**Distribution**: Probably the result of cultivation in China and Japan.


**Description**: Cke. ii, 1046.

**Locality**: Gujrat: (Gamble); Dansg (Woodrow).—Konzan: Kanary Caves (McCann A215!, A216!); Wada Range (Ryan 494!); Vetora (Sabinis 33282!); Western Ghats (Gamble).—Deccan: Igatpuri (McCann A218!); Karli (Gammie 16169!); Khandala, S Xavier’s Villa (McCann A224!, A225!).—Kanara: Karwar (Hallberg & McCann A217!); 3 miles from Mirjan (Hallberg & McCann A220!).

**Distribution**: India, Burma, Ceylon.—Often cultivated.
106. OXYTENANTHERA, Munro; Cke. ii, 1047.

Species 16.—Malay Peninsula, Siam, India, tropical Africa.—2 in the Bombay Presidency.

1. Spikelets 1-flowered; style glabrous
   2. Spikelets 2-flowered; style hairy

1. OXYTENANTHERA RITCHEI, nov. comb.—Bambusa RITCHEI, Munro in Trans. Linn. Soc. 26 (1868), 113.—OXYTENANTHERA monostigma, Bedd. For. Man. in Fl. Sylv. (1873) ccxxxiil, et Ic. Pl. Ind. Or. (1874), 56, t. 234; Gamble Ind. Bambus (1896), 74, t. 65; Brandis Ind. Trees (1911), 674; Talbot For. Fl. Bombay ii (1911), 571; Camus Bambuses (1913), 148; Troup Silv. Ind. Trees iii (1921), 1006.—Schizostachyum hindustanicum, Kurz in Proc. As. Soc. Beng. 52, ii (1873), 252.

Why we made the change from O. monostigma to O. RITCHEI is evident from the synonymy.

Description: Cke. ii, 1048.

Locality: Konkan: Ghats (Talbot, Woodrow).—Deccan: Sakhar-Pathar Hill near Lonavla (Woodrow); Satara Ghats (Brandis); Mahableshwar (Fagan); Poona District (Wroughton); Ahmednagar (Wilkins).—S. M. Country: (Ritchie 820).—Kanara: N. Kanara (Woodrow); Wuddermon (Talbot 905 !, 252 !); Arball Ghat (Talbot 906 !); Arball (Talbot 251 !, 857 !); Godhuli (Talbot 583 !); Supa (Talbot !).

Distribution: W. Peninsula.


Description: Cke. ii, 1048.

Locality: Konkan: (Stocks).—Deccan: Panchgani, planted (Woodrow).—Kanara: Kumpta, cultivated (Talbot 269 !, 3601 !); Karwar (Talbot 856 !); commonly cultivated along the coast: rare in the Ghat forests of N. Kanara (Talbot).

Distribution: W. Peninsula, Indo-China.

107. DENDROCALAMUS, Nees; Cke. ii, 1049.

Species 24.—Africa, Indo-Malaya, Philippines, China.

1. Stem-sheaths 7–30 cm. long; leaves up to 25 by 3 cm.

2. Stem-sheaths 50 cm. long, as broad at the base; leaves up to 50 by 10 cm.

1. DENDROCALAMUS STRICTUS, Nees in Linnaea 9 (1834), 476; Miq. Fl. Ind. Bat. ii, 421; Munro Monogr. 147; Bedd. Fl. Sylv. t. ccxxvi; Brandis Ind. Trees 675; Duthie Fodd. Grass. N. Ind. 71; Gamble Bamb. Brit. Ind. 78, t. 68, 69 et in Hook. f. F.B.I. vii, 404; Cke. ii, 1049; Camus Les Bambuses (1913), 152 pl. 87, f. B.—For synonyms see F.B.I. vii, 404.

Description: Cke. ii, 1049.

Locality: Sind: Junnar Hill (Burns !).—Gujarat: Junagad, Datar Hill, Kathiawar (Chibber !); Panch Mahals (Woodrow).—Khandesh: To Toronmal (McCann 9791 !); base of Toranmal (McCann A2211).—Konkan: Planted (Woodrow).—Deccan: Rocky hills (Gamble); Karli (Gamble 16167 !); Ganeshkhind Botanic Gardens (Patwardhan !).—S. M. Country: Byadgi, Dharwar Dist. (Talbot !).—Kanara: Karwar (Talbot !); Ambgaum (Talbot 1788 !); Dongi Nallah (Talbot 959 !).

Distribution: India, Java.

**Description:** Stems 20–30 m. by 20–25 cm. in diam., branched above; nodes hairy, internodes rather short, grey-green, young with waxy scurf; walls thin. Stem-sheaths 50 cm. long, as broad at the base, deciduous, thinly strigose with golden hairs, top depressed; blade 12–40 by 9 cm., decurrent into glabrous, stiff, brown wavy auricles, narrowed above into a short point; ligule 5–12 cm., stiff, black, margin serrate. Leaves up to 50 by 10 cm., oblong, cuspidately acuminate, tips twisted, young hairy beneath, midrib strong, nerves 12–16 pairs, with pellucid cross bars. Panicle very large, branchlets slender, curved; heads up to 2.5 cm. diam., 1.2–2.5 cm. apart. Spikelets 12 mm. long, ovoid, acute, spinose, puberulous, sometimes all flowering; rhachilla produced with an imperfect glume. Involutcular glumes ovate, mucronate, striate; flowering glumes 3–6, thin, mucronate, many-nerved. Anthers acuminate. Ovary ovoid and long style hairy; stigma simple. Grain oblong, obtuse, hairy above.

**Distribution:** India (Tenasserim, Malay Peninsula, Penang, Malacca, Pera, Cochin-China. Cultivated in gardens of India, Ceylon and Europe.

108. **Teinostachyum, Munro.**


Species 5.—India, Ceylon. One species in the Bombay Presidency; not mentioned by Cooke.


**Description:** Stem 3–8 m. by 2.5–3 cm., semi-scandent; branches pendulous; nodes narrowly ringed; internodes bright green, rough above; walls thin. Stem-sheaths 25–30 by 2.5–3 cm., papery, hirsute with black-brown hairs, top truncate, not auricled; blade subulate, 12–17 cm., decurrent on the sheath; ligule 2.5 mm. Leaves 15–40 cm. by 2.5–5 cm., oblong-lanceolate, acuminate, tip scabrous, twisted, whitish and sparsely hairy beneath, midrib broad, yellowish, nerves 6–7 pair, tessellate by glands; sheath glabrous; ligule narrow. Panicle large, with spiciform drooping branchlets; rhachis smooth, slender; rhachilla of spikelets slender, flattened and concave below, thickened and ciliate above. Spikelets 12–25 mm. Involutcular glume 1, ovate, mucronate, 5–7-nerved, dorsally hirsute; flowering glumes 1 or 2, mucronate, nerved transversely. Lodicules ovate, short-ciliate, 3–5-nerved. Ovary stalked, depressed-globose, smooth, style included in the long beak of the ovary. Grain stoutly stalked, ovoid, beaked, glabrous.

**Locality:** Ghats of N. Kanara.

**Distribution:** Nilgiris, Anamalais, about 3,300–5,000 ft. altitude.

109. **Ochlandra, Thw.**; Cke. ii, 1050.

Species 11.—India, Ceylon, Malay Peninsula, Java, Madagascar.—Only one species in the Bombay Presidency.


**Ochlandra Rheedi var. Sivagiriana,** Gamble which Talbot (1. c.) identifies with Ochlandra Talboti, has been described as a distinct species by Camus under the name: Ochlandra Sivagiriana in Les Bambusées (1913), 181.

**Description:** Cke. ii, 1050.

[22]
Locality: Kanara: Gersoppa Falls (Talbot 3628!, McCann !); Katgal (Talbot 3506!, McCann !); Yellapore (Bell !); near Sulgeri (Bell 3357 !); Dadmune (Talbot !); common throughout the Kanara forests (McCann !); Honavar, at Alanki (McCann!).

Distribution: Endemic in N. Kanara.

A Correction.

In vol. 32 (1927), 27 we made a new combination Hemarthria glabra. Mr. Hubbard of Kew informs us that this combination is invalid and gives the following explanation:—

R. Brown described the genus Hemarthria in his Prod. Fl. Nov. Holl. 207 (1812). He had two species H. compressa and H. uncinata. The first, H. compressa, is accompanied by a descriptive phrase of three words, then the letter J denoting one of his specimens from Port Jackson or that neighbourhood (in Australia), followed by Rottboellia compressa, Linn. f. Suppl. 114; thus Hemarthria compressa was really based on Rottboellia compressa, Linn. f. The Australian plant which R. Brown cited, was incorrectly identified by him with R. compressa, Linn. f.; that together with all the Australian material is referable to his Hemarthria uncinata. Rottboellia compressa, Linn. f. was based on a plant collected in India; our Indian specimens all agree with this specimen and are all Hemarthria compressa, (Linn. f.) R. Br. We have no Indian material of Hemarthria fasciculata, (Lam.) Kunth and those specimens identified by Hooker in Flora of British India and by others as Rottboellia compressa var. fasciculata, (Lam.) Hack., are all typical Hemarthria compressa. H. fasciculata, Kunth is based on Rottboellia fasciculata, Lam., a species originally described from North Africa and now known to occur throughout Africa, in the Mediterranean region and in America.'

Our Hemarthria glabra, therefore, must be called Hemarthria compressa, (Linn. f.) R. Br.

The species is known from Afghanistan, India, China and Indo-China.

The other species, Hemarthria fasciculata, Kunth (xxii (1927), 28 of this series) for which we had no locality, but which we included on the authority of others, must be excluded, as it has not been observed in India.

(To be continued.)
REVISION OF THE FLORA OF THE BOMBAY PRESIDENCY. Part XI.
By Rev. E. Blatter, S.J., Ph.D., F.L.S.

IX 1930

Gramineae. Blatter
Key to Genera.
REVISION OF
THE FLORA OF THE BOMBAY PRESIDENCY

BY

E. Blatter, S.J., PH.D., f.l.s.

PART XI

GRAMINEÆ

BY

E. Blatter, S.J., PH.D., F.L.S., and C. McCann

(Continued from page 775 of Volume XXXIII)

KEY TO THE GENERA

We follow, where possible, the systematic arrangement given by Stapf in the Flora of Tropical Africa. We add in brackets the reference to the genera in our series.

SUB-FAMILY I: Panicoideæ.—Mature spikelets falling entire from their pedicels or with them, all alike or differing in sex and structure; perfect spikelets with two heteromorphous florets, the upper hermaphrodite, the lower male or barren; rhachilla not continued beyond the upper floret (Genera 1-61).

TRIBE I: Maydeæ.—Sexes in different inflorescences on the same plant, or the female spikelets at the base of the inflorescence, the male above them; spikelets never awned, the male and female very dissimilar (Genera 1-4).

1. Male and female spikelets in separate inflorescences; male spikelets in a large terminal panicle; the female spikelets in the axils of the leaves.
   A. Female spikes distinct, articulated (vol. 32, 15) ... ... ...
   B. Female spikelets grown together into a spongy more or less cylindrical body (vol. 32, 15) ... ... ...

2. Male and female spikelets in separate portions of the same spike, the female below.
   A. Grain enclosed in the usually globose or ovoid ivory-like capsuliform supporting sheath (vol. 32, 17) ... ...
   B. Grain enclosed in the hardened outer glumes (vol. 32, 17) ... ...

TRIBE II: Andropogoneæ.—Spikelets usually in pairs, one sessile, the other pedicelled, very rarely both pedicelled, those of each pair alike as to sex (homogamous) or different (heterogamous), rarely 3-nate or solitary on the axis of a usually spike-like raceme. Involucral glume more or less rigid and firmer than the floral glumes, the lower always

1. Euchlaena.
2. Zea.
3. Coix.
4. Polytoca.
longer than the florets; floral glumes membranous, often hyaline, that of the upper floret usually awned or reduced to an awn (Genera 5-41).

1. **Sub-tribe: Dimerina.**—Spikelets homogamous, second on a slender inarticulate rachis, 1-flowered, diandrous (vol. 32, 18) ... ... ... ...

2. **Sub-tribe: Ischæminæ.**—Fertile spikelets 2-flowered; fertile floret awned from the sinus of the bifid or bidentate upper floral glume, sometimes awnless in *Appluda* (Genera 6-13).

   **A. Group Ischæmastræ.**—Racemes several-to many-noded, espatheate; spikelets of each pair homogamous or more often heterogamous, usually similar in shape and nervation, rarely distinctly heteromorphous; fertile spikelets awned (Genera 6-12).

   i. Margins of lower involucral glume of sessile spikelet inflexed.
      a. Stem not woolly below; joints and pedicels stout; spikelets heterogamous (Genera 6-8).
      (1) Spikes clustered; lower involucral glume not channelled (vol. 32, 19) ...
      (2) Spikes solitary; lower involucral glume usually channelled (vol. 32, 22) ... ... ...
      b. Rootstock and base of stem clothed with woolly sheaths; spikelets similar and homogamous (vol. 32, 25) ...

   ii. Margins of lower involucral glume of sessile spikelet not inflexed.
      a. Spikes solitary; spikelets 2-nate, 1-2-flowered, 2-awned (vol. 32, 289) ...
      b. Spikes solitary or 2-nate; spikelets 2-flowered, diandrous; lower involucral glume very broad truncate (vol. 32, 25) ...
      c. Spikes digitate; spikelets 2-flowered; lower involucral glume tubercled (vol. 32, 22) ... ... ...
      d. Spikes 2-∞-nate; spikelets 2-nate, upper alone awned (vol. 32, 25) ...

   **B. Group Apludastræ.**—Racemes 1-noded, reduced to 3 heteromorphous spikelets, the sessile with a male and a hermaphrodite floret and an inflated callus, one pedicelled with 2 male florets, the other rudimentary on a glume-like pedicel; fertile florets awned or awnless (vol. 32, 26) ...

3. **Sub-tribe: Rotboellina.**—Fertile spikelets 1- or 2-flowered; fertile florets awnless (Genera 14-21).

   **Group Rotboellistrae.**—Racemes at the ends of the culms and their branches in a false (rarely true) espatheate panicle or solitary and terminal on simple or sparingly branched culms.

   **A. Spikelets all alike, also as to sex; racemes tough or tardily disarticulating, much compressed, joints and pedicels fused (vol. 32, 26) ... ... ... ...

5. *Dimeria.*

6. *Ischænum.*

7. *Sehima.*

8. *Pollinidium.*


10. *Apocopis.*

11. *Thelepogon.*


13. *Appluda.*

B. Spikelets of each pair more or less dissimilar, at least as to sex, the pedicelled male, neuter or suppressed (Genera 15-21).

i. Sessile spikelets small, globose, foveolate, 1-flowered, pedicelled very dissimilar; joints and pedicels fused (vol. 32, 28) ...

ii. Sessile spikelets not globose (Genera 16-21).

a. Sessile spikelets winged from the transversely rugose or muricate lower involucral glumes, 1-flowered, pedicelled very dissimilar; joints and pedicels fused (vol. 32, 29) ...

b. Sessile spikelets not winged (Genera 17-21).

(1) Racemes usually more or less villous, very rarely glabrous, never cylindrical, joints and pedicels moderately stout, gaping.

i. Spikelets 2-flowered, very villous all over, the sessile sometimes 2 at a node and sub-opposite (vol. 32, 30)

ii. Spikelets 1-flowered; racemes more or less villous from the joints and pedicels or the edges of the spikelets, rarely glabrous; lower involucral glume with a transparent oil-duct inside each keel or a fringe of penicillate warts (vol. 32, 30) ...

(2) Racemes glabrous, cylindrical, particularly when the spikelets are closed (Genera 19-21).

i. Pedicels and joints fused.

(a) Racemes stout, few from each culm; sessile spikelets 2-flowered, pedicelled male or neuter (vol. 32, 31) ...

(b) Racemes slender in amplespathate panicles; sessile spikelets 1-flowered (vol. 32, 31) ...

ii. Pedicels free from the joints; racemes usually in terminal and lateral spatheate fascicles or fasiculate panicles; coarse tall grasses (vol. 32, 32) ...

4. Sub-tribe: Saccharines.—All spikelets alike in shape and sex, or if different in sex, then the pedicelled female (Genera 22-25).

A. Group Saccharastrae.—Racemes in more or less compound panicles or racemously arranged on an elongated common axis; spikelets 1-flowered; awn from the sinus of the 2-dentate floral glume or from the tip of the entire valve or of (Genera 22-24).

i. Rhachis quite tough; racemes in spike-like or thyrsoide solitary panicles; all spikelets pedicelled, muticous (vol. 32, 281) ...

ii. Rhachis of racemes readily disarticulating.

a. Spikelets in a wide, often thyrsoid, more or less plumose and silvery panicle, 2-flowered, usually awned, rarely mucronate or awnless (vol. 32, 283) ...

22. Imperata.

23. Saccharum.
b. Spikelets in panicked racemes, 2-flowered, awned (vol. 32, 288) ... 24. Spodiopogon.

B. Group Polliniae.—Racemes digitate, rarely solitary; spikelets 1-2-flowered; awn from the sinus of the 2-fid or 2-dentate floral glume; spikelets dorsally compressed; callus short, obtuse (vol. 32, 289) ... ...

5. Sub-tribe: Andropogoninae.—Spikelets of each pair different in sex and frequently also in shape and size, or if those of some pairs of a raceme are alike in sex, then both male or neuter; fertile spikelets 1-flowered (Genera 26-41).

A. Racemes in more or less compound espatheate panicles; pedicels without a translucent middle line (Genera 26-29).

Group Sorghastrae.—Pedicelled spikelets male, neuter or suppressed (including the pedicel in Cleistachne); awn from the sinus of the 2-fid floral glume.

i. Spikelets dorsally compressed, at least when in flower; lower involucral glume of the fertile spikelets firmly chartaceous to coriaceous.

a. Spikelets in threes, one of them fertile, or in racemes of 2-8 pairs; the pedicelled male, neuter, or if quite suppressed, then at least the pedicels present (vol. 32, 290) ... 26. Sorghastrum.

b. Spikelets solitary (vol. 32, 408) ... 27. Cleistachne.

ii. Spikelets laterally more or less compressed.

a. Racemes of many pairs of spikelets; primary branches of panicles in whorls of 6-20 (vol. 32, 408) ... 28. Vetiveria.

b. Racemes usually reduced to 1 sessile hermaphrodite and 2 pedicelled male or barren spikelets, rarely of 2 or more but always few pairs (vol. 32, 410) ... 29. Chrysochroa.

B. Racemes not in compound espatheate panicles or if so (Capillipedium), then the pedicels with a translucent middle line (Genera 30-41).

i. Fertile floral glume awned from low down on the back.

Group Arthraxonastre.—Sessile spikelets convex on the back and rounded on the sides, often muricate, particularly along the sides; pedicelled usually rudimentary or 0, rarely male; racemes digitate (vol. 32, 416) ... 30. Arthraxon.

ii. Fertile floral glume awned from the sinus of a 2-fid or 2-dentate valve or continuing the more or less stipitiform floral glume (Genera 31-41).

a.Margins of the lower involucral glume of the fertile spikelet inflexed and the glume therefore sharply 2-keeled more or less all along with a short obtuse callus, rarely the keels rounded off downwards with the margins subinvolute, but then the
Revise the Flora of the Bombay Presidency.

March 1, 1930.]

Revision of the Flora of the Bombay Presidency

back of the glume deeply sunk between the keels and the callus short or long and acute; awn glabrous or scabrid, very rarely hirsute (Andropogon sp.) ; spikelets awned (Genera 31-37).

(1) Awn forming a continuation of the stipitiform fertile floral glume.

Group Amphilophistre.—Racemes digitate or racemosely digitate, and then usually very numerous, all more or less peduncled on simple or almost simple culms, or solitary at the end of the culms and their branches and sometimes gathered into a scanty spathate false panicle, rarely in compound spathate panicles (Capillipedium) (Genera 31-34).

i. Racemes in compound spathate panicles (vol. 32, 419) ...
   31. Capillipedium.

ii. Racemes not in compound spathate panicles (Genera 32-34).

(a) Racemes digitate, or many racemosely arranged on a common axis shorter than the raceme.

A. Sessile spikelets of all pairs hermaphrodite, awned (vol. 32, 420) ...
   32. Amphilophis.

B. Sessile spikelets of the lowest 1-3 or 4 pairs male or neuter and awnless (vol. 32, 424) ...

(b) Racemes solitary at the ends of the culms and branches (vol. 33, 426) ...
   33. Dichanthium.

(2) Awn from the sinus of the 2-fid or 2-dentate fertile floral glume (Genera 35-37).

i. Group Schizachyriastrte.—Racemes solitary at the ends of the culms and their branches, the branches usually gathered into a narrow, lax, spathate, false panicle; joints and pedicels thickened upward; pedicelled spikelets: male, neuter or suppressed (vol. 32, 428) ...
   34. Eremopogon.

ii. Group Andropogonastrae.—Racemes 2-nate at the end of simple or almost simple culms or gathered into spathate false or true panicles.

(a) Racemes 2-nate on a slender peduncle arising from a flattened spathe; sessile spikelets alike in sex and form; joints opaque (vol. 32, 429) ...

(b) Racemes 2-nate, with a spathe supporting or surrounding each pair, gathered into often much decompound spathate panicles; the lowest pair of one of the racemes homogamous, male or neuter; all pairs of the other heterogamous; mostly aromatic grasses (vol. 32, 429) ...
   36. Andropogon.

37. Cymbopogon.
b. Margins of the lower involucral glume of the fertile spikelets involute, inflexed and 2-keeled (if at all) only close to the tips, the spikelets, therefore, with rounded sides or quite terete; callus elongate and acute or pungent; awn more or less hirsute, from the stipitiform floral glume (Genera 38-41).

(1) Group Heteropogonastræ.—Racemes many-noded, solitary; all pairs of spikelets heterogamous and alike or the lowest 1-many homogamous and barren, very different from the fertile, not forming an involucre around them (vol. 32, 622)

(2) Group Themedastræ. — Racemes fasciculiform, solitary at the apex of the stem and branches. Spikelets dimorphic, the 4 lower sessile forming an involucre around the upper.
   i. Rhachis articulate below the involucral spikelets (vol. 32, 626) ...
   ii. Rhachis articulate above the involucral spikelets (vol. 32, 627) ...

(3) Group Pseudothemedastræ.—Like Themedastræ above but without the involucrant spikelets of that group (vol. 32, 631) ...

TRIBE III: PANICÆ.—Spikelets in usually continuous spikes, racemes or panicles Involucral glumes herbaceous or membranous, the lower generally smaller, very small or suppressed. Lower floral glume generally resembling the involucral glumes in structure and nervation, the upper fertile firmer, at length rigid, often chartaceous or crustaceous, awnless, very rarely mucronate (Urochloa) (Genera 42-61).

1. SUB-TRIBE: Panicinae.—Upper floret only fertile; lower floral glume usually resembling the upper involucral glume, not indurated (Genera 42-60).
   A. Undershubs; flowers dioecious.  
      Group Spinificastræ:—Male spikelets 2-flowered, articulate in rigid umbellate spikes; female in large globose heads of stellately spreading quill-like rhachis, one spikelet at the base of each (vol. 33, 21) ... ...
   B. Herbs; flowers not dioecious (Genera 43-60).
      i. Group Digitariastræ:—Inflorescence of usually slender, spiciform, digitate or subdigitate or somewhat distant, very rarely solitary racemes; fruiting floral glume with usually flat, thin to hyaline margins, thinly cartilaginous, often brown or dark, with the usually minute, often microscopic, scale-like pale of the barren floret attached to the base.
         a. Spikelets awnless; lower involucral glume minute, rarely 0; lower floral glume usually with 5-7 close, straight, prominent nerves (vol. 32, 632) ... 43. Digitaria.
b. Spikelets slender awned (vol. 32, 635).

ii. Inflorescence usually different (but see *Axonopus* and *Paspalum*); fruiting floral glume with more or less inrolled margins, usually crustaceous and straw-coloured or whitish; pale of the barren floret, if developed, not attached to the false fruit (Genera 45-60).

a. Spikelet falling entire and singly from the persistent pedicels (Genera 45-58).

(1) **Group Panicastrae** — Spikelets not awned, or if awned, then sub-sessile in false second variously arranged spikes and with the awns from the entire tips of the upper involucral glume and lower floral glume (*Echinochloa* sp.) or from the tips of both involucral glumes or at least the lower (Genera 45-57).

i. Inflorescence of variously arranged (rarely solitary) simple or compound, usually second, spike-like, dense (rarely loose) racemes, not an open or contracted and cylindric panicle; spikelets usually paired or sometimes particularly towards the base of the raceme in fascicles of 3 (rarely more) unequally pedicelled or solitary, alternately to the right and the left of the median line of a usually dorsiventral rhachis; fruit dorsally (very rarely laterally) compressed, its glume and pale crustaceous; racemes usually rather dense (Genera 45-52).

(a) Back of fruit abaxial (Genera 45-47).

A. Spikelets strongly laterally compressed, distant on long slender rhachises; lower involucral glume herbaceous, as long as the spikelet (vol. 33, 7) ...

b. Spikelets more or less dorsally compressed; lower involucral glume never herbaceous.

(i) Lower involucral glume rudimentary with a swollen annular callus at the base of the rhachilla; fruit mucronate (vol. 32, 636) ...

(ii) No swollen annular callus at the base of the spikelet. Lower involucral glume present; racemes racemosely arranged (vol. 32, 636).

(b) Back of the fruit adaxial (Genera 48-52).

A. Lower involucral glume typically absent; spikelets usually conspicuously planoconvex, with the flat side turned away from the rhachis (vol. 32, 639) ...

b. Lower glumes developed; rhachis persisting, not articulate; spikelets falling from the pedicels (Genera 49-52).

(i) Involucral glumes neither awned nor caudate; if shortly cuspidate-acuminate, then the fruiting floral valve obtuse with an imposed
muero and the margins inrolled all along.

* Fruiting flowering glume acute, not mucronate; spikelets solitary, closely biserrate, contiguous with their sides; false spikes rigid, not several times longer than the internodes of the long common axis; their lower parts more or less appressed to the alternately hollowed out flanges of the latter (vol. 32, 641) ...

** Fruiting flowering glume obtuse, abruptly mucronate or aristulate; spikelets solitary or paired, when solitary contiguous with their backs; false spikes often flexuous or curved, usually several times longer than the internodes of the relatively short common axis, spreading from the base (vol. 32, 642) ...

(ii) Glumes caudate-or cuspidate-acuminate or awned.

* Glumes awned from the entire acute or acuminate tip, or caudate or cuspidate-acuminate; margins of the fruiting flowering glume flat upwards, not embracing the tip of the pale; racemes dense, more or less secund, often very numerous (vol. 32, 645) ...

** Glumes awned from the slightly notched tips; racemes elongated or short to very short, secund, compact, spreading from the common axis (vol. 33, 8) ...

(ii) Inflorescence an open panicle, rarely contracted, cylindrical and spike-like (Sacciolepis, Setaria sp.) (Genera 53-57).

(a) Spikelets not supported by bristle-like branches (Genera 53-56).

A. Spikelets not gibbous or, if slightly so, then not in cylindrical false spikes (Genera 53-55).

(i) Branches of panicle not adnate to the main axis.

* Panicle much contracted, dense, very compound, with erect narrowly lanceolate spikelets; lower floral glume beaked, upper floral glume rather thin (vol. 33, 15) ...

** Panicle usually open; lower floral glume not beaked, upper floral glume crustaceous (vol. 33, 9) ...

(ii) Branches of panicles more or less adnate to the main axis so that the pedicels appear to spring more or less directly from the axis (vol. 33, 17) ...

b. Spikelets distinctly gibbous, laterally much compressed (vol. 33, 16) ...

49. Paspalidium.

50. Urochloa.

51. Echinochloa.

52. Oplismenus.

53. Hymenachne.

54. Panicum.

55. Sacciolepis.

56. Cyrtococcum.
(b) All the spikelets or only the upper of each branch supported by bristle-like branches (vol. 33, 19) ...

(2) **Group Meliniastrea.**—Spikelets finely awned or mucronate from the notched tips of the upper involucral glume and barren floral glumes (or if muticous, these at least slightly notched) delicately pedicelled, paniced; lower involucral glume very minute. Upper involucral glume and barren floral glume gibbous at or below the middle, both 5-nerved; nerves hidden by copious and long silky hairs and anastomosing below the obtuse tips (vol. 33, 21) ...

b. Spikelets falling in groups or if singly, then surrounded by an involucral of bristles or at least supported by 1 to several bristles.

**Group Cenchoastrea.**—Spikelets falling by an involucral of bristles or spines or bract-like scales, or at least supported by 1 to several bristles; or with the lower involucral glumes of each group forming a false involucre

(1) Involucre of free naked or plumose bristles (vol. 33, 22) ...

(2) Involucres of spines or rigid bristles united at the base into a hard cup (vol. 33, 229) ...

2. **SUB-TRIBE: Isachninae.**—Both florets fertile, or if the lower male, then its floral glume more or less resembling that of the upper floret and indurated.

**Group Isachnastrea.**—Florets very similar, spikelets more or less panicked (vol. 33, 230).

**SUB-FAMILY II : Pooideae.**—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 Panicoideae (Genera 62-109):

1. Blades not articulated on the sheath, rarely (Centotheca) transversely veined (Genera 62-104)

A. Awn of the fertile floret, if present, knede and twisted below the knee, or straight in reduced forms (Genera 62-78).

i. Florets 2 or more (Genera 62-69).

TRIBE IV: **ARUNDINELLEAE.**—Florets 2, heteromorphous, the lower awnless, or barren. Rhachilla not continued beyond the upper floret. Lower floral glume awnless, rather resembling the involucral glumes; upper generally awned, at length firm or hard: awn from sinus between 2, sometimes minute or bristle-like, lobes, rarely from the entire obtuse tip, usually knede and twisted below the knee.

a. Upper floral glume 2-setose, minutely 2-toothed or entire; awn sometimes reduced (vol. 33, 230) ...

b. Upper floral glume always distinctly 2-toothed or 2-lobed; awn always knede; spikelets in clusters of 3 (vol. 33, 234) ...

TRIBE V: **AVENAE.**—Florets 2-many, all alike, except the uppermost which often are reduced. Floral glumes with hyaline shining margins or...
firm, 5-or more nerved, rarely 3-nerved; awn, if present, from the back or sinus or between bristles,
a. Floral glumes awnless or awned from the back; florets 2 or more, the uppermost reduced.
(1) Spikelets 2- or more-flowered, awned (vol. 33, 234) ... 64. Avena.
(2) Spikelets 2-flowered, awnless (vol. 33, 235) ... 65. Coelachne.
b. Floral glumes awned from the sinus of the bifid tip; florets 3 to many, the uppermost reduced (vol. 33, 236) ... 66. Danthonia.
TRIBE VI: ARUNDINEæ.—Florets 2-many, enveloped in very long hairs, springing either from the callus or from the back or margins of the floral glumes.
a. Hairs springing from the margins of the upper floral glume (vol. 33, 234).
b. Hairs springing from the callus (vol. 33, 236) ... ... ... 67. Thysanolaena.
c. Hairs springing from the involucral glumes (vol. 33, 237) ... ... ... 68. Phragmites.
ii. Florets 1 (Genera 70-78).
TRIBE VII: AGROSTEEæ.—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.
a. Spikelets in cylindric spike-like panicles, not awned (vol. 33, 237) ... 70. Heliochloa.
b. Spikelets in open or contracted many-flowered panicles, awned.
(1) Involutural glumes acuminate or awned (vol. 33, 238) ... 71. Garnotia.
(2) Involutural glumes awned from the notched or lobed tips (vol. 33, 237)...
TRIBE VIII: STIPÆÆ.—Floret 1. Rhachilla not produced beyond the upper floral glume, which is bisexual, hardened when mature, tightly enveloping the fruit; nerves joining or closely approaching at the tip. Awn terminal, rarely absent.
Awns 3, from the entire tip, or 1, simple below and 3-branched above, very rarely quite simple (vol. 33, 238) ... ... ... 72. Polypogon.
TRIBE IX: ZOYSIEæ.—Floret 1. Mature spikelets falling entire and singly, or in clusters. Rhachilla not continued beyond the floret. Involucral glumes equal or the lower much smaller or suppressed. Floral glume small, delicately membranous, 3-nerved; spikelets in slender spikeform panicles or racemes (Genera 74-78).
a. Spikelets falling in clusters of 2-4, fascicled.
(1) Fascicles second on a broad articulate rhachis; glumes 4; upper involucral glume not echinate (vol. 33, 480) ... ... ... 74. Trachys.
(2) Fascicles all round a slender rhachis; glumes 3; upper involucral glume echinate (vol. 33, 480)...
75. Nazia.
b. Spikelets falling singly.
(1) Lower involucral glume with pectinate margins; upper involucral
glume spinulosely tuberculate; glumes 3 (vol. 33, 481) ... 
(2) Involucral glumes neither pectinate nor tuberculate.
   i. Glumes 2; spikelets not awned (vol. 33, 481) ... ... ... 
   ii. Glumes 3; spikelets with a long awn (vol 33, 481) ... ... ... 

B. Awn of the fertile floret, if present, never kneed and twisted below the knee (Genera 79-104).

(i) Floral glumes typically 3-nerved (Genera 79-94).

TRIBE X: Sporoboleae.—Floret 1. Involucral and floral glumes very similar; rachilla not or rarely produced beyond the floret. Upper floral glumes 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 (vol. 33, 482) ... ... 

TRIBE XI: Eragrostide.—Florets usually numerous and far exerted from the glumes. Spikelets variously panicled, sometimes spicate or subspicate; 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; pales often persistent or subpersistent (Genera 80-84).

a. Floral glumes entire (Genera 80-83).
   (1) Upper involucral glume 3-nerved (vol. 33, 486) ... ... ... 
   (2) Upper involucral glume 5-nerved (vol. 33, 495) ... ... ... 
   (3) Upper involucral glume 1-nerved.
      i. Floral glumes ovate subacute or obtuse (vol. 33, 495) ... ... ... 
      ii. Floral glumes acute or acuminate (vol. 33, 496) ... ... ... 

b. Floral glumes toothed (vol. 33, 498) ... ... ... 

TRIBE XII: Chlorideae.—Florets 1 to many. Spikelets usually in 2-ranked secund spikes or spike-like racemes, rarely distinctly pedicellate and paniculate; 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 (Genera 85-94).

a. Floral glumes entire, emarginate or more or less 2-dentate or 2-lobed, muticous or with the middle-nerve running out into an awn or mucro, or reduced in some species of Tri- bagon (Genera 85-93).
   (1) Spikelets 1-flowered (genera 85-88).
      i. Spikes solitary, terminal (see also Chloris) (genera 85-87).
(a) Spikelets minute, more or less sunk in the rachis, 1-3-flowered (vol. 33, 753)...

(b) Spikelets not sunk in the rachis
A. Spikelets awnless, minute, unilaterally on flattened rachis, 1-flowered (vol. 33, 753)...

85. Oropetium.

b. Spikelets awned, 1-2-flowered in deciduous articulate clusters (vol. 33, 754)...

86. Microchloa.

ii. Spikes digitate (vol. 33, 753)...

87. Gracilea.

88. Cynodon.

(2) Spikelets with several florets (Genera 89-93).

i. Spikelets with 1 (rarely 2, Chloris sp.) fertile and 1 or several imperfect florets above or below the fertile (see also Microchloa).

(a) Spikelets in long secund solitary spikes; floral glumes narrow, firm, glabrous or scaberulous, with a short erect awn from the notched or subentire tips (vol. 33, 755)...

(b) Spikelets in digitate, rarely solitary or 2-nate spikes; the florets much widened upwards, or if narrow, then delicate and usually with a fine awn from below the tips, often ciliate; floral glumes or at least some of them awned, very rarely submutinous (vol. 33, 755)...

89. Enteropogon.

ii. Spikelets with 2 or more fertile florets and without imperfections below them (See also Chloris sp.); floral glumes awnless or with a rigid mucro or very short awn from the acuminate tips (Dactyloctenium sp.), entire or subentire (Genera 91-93).

(a) Spikelets in digitate or subdigitate spikes.

A. Spikes terminated by a spikelet; involucral and floral glumes emucronate, or obscurely mucronate (vol. 33, 761)...

90. Chloris.

B. Spikes terminating with a sharp point; upper involucral glume and floral glumes rigidly mucronate or shortly awned (vol. 33, 760)...

91. Eleusine.

(b) Spikelets in racemosely arranged spreading or deflexed, finally deciduous spikes (vol. 33, 763)...

92. Dactyloctenium.

93. Dinebra.

b. Floral glumes variously toothed or lobed with the middle and side-nerves running out into awns or mucros.

Spikelets solitary and terminal on the culms; spikelets mostly olive-green or dark greyish; all 3 nerves or at least the middle-nerve running out into a fine short awn or mucro (vol. 33, 764)...

94. Tripogon.

(ii) Floral glumes 5 to many-nerved, very rarely 3-nerved (genera 95-104).

TRIBE XIII: PAPPOPHOREAE -- 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 (vol. 33, 766) ... ... ... TRIBE XIV: Oryzæ.—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. Involucral
glumes very minute or confluent into an annular
rim or suppressed; pale 3-9-nerved; stamens
usually 6, rarely more, or 1-3.
a. A floating glabrous grass; spikelets
awned (vol. 33, 769) ... ... ... TRIBE XV: Festucae.—Involucral glumes more,
or less resembling the floral ones in general
appearance. Fruiting florets 2 to many, very rarely 1,
or often much exserted from the glumes. Floral
glumes 5-or more-nerved (rarely 1-3-nerved).
Awns, if present, terminal or subterminal, never
geniculate.
b. Leafy tall grasses, not floating; spike-
lets usually awnless.
(1) Keels of floral glume and pale pec-
tinately ciliate; spikelets awnless
(vol. 33, 768) ... ... ... TRIBE XVI: 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.
a. Spikelets solitary at the nodes of the
spike.
(1) Spikelets with their median plane
radial to the rhachis; florets 1-2;
floral glumes membranous to sub-
hyaline, 3-nerved (vol. 33, 770) ... ... ... TRIBE XVII: Bambuseæ.—Shrubs or trees; spike-
lets all of one kind; florets few to many (rarely 1);
lower 2 or more glumes empty, gradually increas-
ing in size up to the flowering, with sometimes small
terminal imperfect ones; floral glumes subherbace-

95. Enneapogon.
96. Hygrorhiza.
97. Homalocenchrus.
98. Oryza.
99. Elytrrophicus.
100. Aeluropus.
101. Centotheca.
102. Lepturus.
103. Triticum.
104. Hordeum.

2. Blades articulate on the sheath and transversely
veined.
ous to subcoriaceous, 5 to many-nerved, usually awnless; lodicules usually 3; stamens 3-6 or more; styles 2 or 3 (genera 105-109).

A. Pericarp thin, adnate to the seed.
   i. Pales all 2 to keeled; stamens 6; filaments free (vol. 33, 771) ... 105. Bambusa.
   ii. Pales of upper flowers 0 or glume-like, not keeled; filaments connate (vol. 33, 773) ... 106. Oxytenanthera.

B. Pericarp fleshy or crustaceous, not adnate to the seed.
   i. Spikelets 2 to many-flowered; pale 2-keeled; lodicules none; stamens 6; pericarp crustaceous (vol. 33, 773) ... 107. Dendrocalamus.
   ii. Spikelets many-flowered; pales 2-keeled; lodicules 3, conspicuous (vol. 33, 774) ... 108. Teinostachyum.
   iii. Spikelets 1-flowered; pale absent or glume-like; stamens 6-120; pericarp fleshy (vol. 33, 774) ... 109. Ochlandra.

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Botanical Survey of India  

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FLORA ARABICA  

BY  
Rev. E. BLATTER, S.J., Ph.D., F.L.S.  

PART V.  
Gnetaceae—Gramineae.  

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XCIX. GNETACEAE.

1. Ephedra Tourn. ex L.

Habitat: I. Arabia Petraea (McDonald!); Oasis Farrun, Wady Shellal, between Ras Abu Zenime and Wady Charandel, and between Wady Charandel and Wady Werdan (ex Kneuck.); Tih Desert (Boiss.); Sinai Valleys (Bové, Auch.).

Habitat: II. Aden (S. 106!, Thomson, Defl.!, Perry!).
Fl.: Apr. 1878 (Perry), May 1886 (Defl.), Dec. 1888 (S.).
Fr.: Feb. 1857 (Thomson), Apr. 1878 (Perry), May 1886 (Defl.), Dec. 1888 (S.).
Distrib.: Punjab, Sind, Persian Baluchistan, Turkestan and westwards to Syria.

Habitat: I. Raphidim (Schimp. 280!); Bestam (Schimp. 316!); Sinai (Auch. 2873!); Mt. Catherine (Drake 21); top of Mt. Sinai (Bové 214!).
Fl.: June 1832 (Bové), July 1835 (Schimp.).
Distrib.: Egypt, Syria, Cyrenaica, Somaliland.
Vern. name: Aeldé-gammel (Bové), Alte (Schimp.).

Habitat: I. Wady Arabah (Hart).
Distrib.: Mediterranean, Arabia.

C. CONIFERAE.

1. Cupressus Tourn. ex L.

Habitat: I. Jebel Musa, ca. 2,100 m., probably cult. (ex Kneuck.); Arabia Petraea (McDonald!) very likely planted.
Distrib.: N.-W. India, planted only. The horizontally branches variety is wild in N. Persia, Syria and Asia Minor.
2. Juniperus Tourn. ex L.

   Habitat: II. Yaman (ex Fiori).
   Distrib.: Tropical Africa.

   Habitat: I. Central Midian (Burton !).
   Distrib.: Mediterranean region.

   Habitat: IV. Maskat, Gebel Akhdar (Auch. 5335).
   Distrib.: Arabia, Persia, Himalayan region.

B. MONOCOTYLEDONEAE.

CI. HYDROCHARITACEAE.


   Habitat: II. Hodeidah (S. 149!).
   Fr.: Sterile in Dec. (S.).
   Distrib.: Indian and Pacific Oceans, on the shores of Asia, Africa, Australia and Melanesia.
   Vern. name: Suram (S.).

2. Halophila Thouars.

   Habitat: I. Gulf of Suez (Frauenfeld, Aschers.).
   II. Hodeidah (S. 150!); Aden (Balfour !); near Jedda (Hildebr. 107).
   Fr.: Dec. 1888 (S.).
   Distrib.: Also known from the Persian Gulf, Indian Ocean, South Seas.
   Vern. name: Suram (S.).

HABITAT: I. Gulf of Suez (Del., Ehrenb.!, Schimp. !); near Tor (Ehrenb.!, Bové !).
DISTRIB.: Red Sea, Indian Ocean, islands of E. Africa.


HABITAT: II. Jeddah (S.).
DISTRIB.: Indian and Pacific Oceans on the shores of Africa and tropical Asia, Indian Archipelago, Melanesia.

**CH. ORCHIDACEAE.**


HABITAT: II. Spring el Mechader, near Menacha (S. 1431 !).
Fr.: Mar. 1889 (S.).
DISTRIB.: Tropical Africa.

2. *Habenaria* Willd.

HABITAT: II. Yaman (Defl. !).

HABITAT: II. At the Shibam near Menacha, 2,600 m. (S. 1768).
Fl.: Mar. 1889 (S.).
DISTRIB.: Abyssinia.

HABITAT: Arabia (non vidi).
DISTRIB.: Arabia.


HABITAT: II. Wolledje at the foot of Jebel Melhan, 700 m. (S. 735 !).
DISTRIB.: Abyssinia.
2. E. Petersii Reichb. f. in Flora XLVIII (1865) 186.
HABITAT: Arabia (ex Herb. Kew).
DISTRIB.: Tropical Africa.

4. Orchis (Tourn.) L.

HABITAT: IV. Hufuf Oasis (Cheeseman).
DISTRIB.: Europe, N. Africa, Orient.

CHI. SCITAMINACEAE.

ZINGIBERACEAE.

1. Zingiber Adans.

HABITAT: II. Jebel Bura, cultivated in coffee plantations, 1,000 m. (S. 1882).
Vern. name: Sengbil (S.).

CANNACEAE.

1. Canna L.

HABITAT: II. Jebel Bura, above Hille, 900 m. (S. 501); near Ussil in Wady Hedjan, 12 m. (S. 1272); Manod near Hodjela, 900 m. (S. 984); wild or run wild.
Vern. name: Jussr (S.), Schenef-el-diq (S.).

MUSACEAE.

1. Musa L.

HABITAT: II. Jebel Bura, cultivated in coffee plantations, 900-
1,000 m. (S. 1819).

CIV. HAEMODORACEAE.

1. Sanseviera Thunb.

1. S. Ehrenbergii Schweinf. in Baker Journ. Linn. Soc. XIV, 549;
Kew Bull. (1892) 129; Oliv. in Bot. Mag. 2269.
HABITAT: II. Outliers W. of Jebel Melhan and in the plain of Tehama, 300-500 m. (S. 696 !); W. of the foot of Jebel Bura, near Chalife, 400 m. (S. 190 !).
DISTRIB.: Abyssinia.
Habitat: II. Yaman (ex Fiori); Jebel Melhan near Wolladje, 600 m. (S. 696a!); Jebel Bura, above Hille, 800 m. (S. 378).
Fr.: Feb.-Jan. 1889 (S.).
Distrib.: Tropical Africa.
Vern. name: Dermeg, hharag (S.).

CV. IRIDACEAE.

1. Iris Tourn. ex L.

Habitat: II. Top of Shibam, below the old castle; S. W. slope of the hill between el-Hausan and Hayjera, 2,850-2,200 m. (S. 1663).
Distrib.: Mediterranean.

Habitat: IV. From the neighb. of Koweit and here and there in hollows in the neighb. of Regat (Felly!).
Distrib.: Mediterranean, Orient, Afghanistan, Baluchistan.

Habitat: I. Desert between Egypt and Palestine near El-Arish (Barbey).
Fl.: Mar. (Barbey).

Habitat: 1. Tel Abou Hereireh to Gaza (Hart).
Fl.: Last week of Dec. (Hart).
Distrib.: Palestine, Syria, Mesopotamia.

2. Gladiolus L.

Habitat: I. Arabia Petraea (ex Muschler).
Distrib.: Mediterranean to Persia and Turkestan.

Habitat: I. Arabia Petraea (ex Muschler).
Distrib.: Mediterranean.

Cvit. Amaryllidaceae.

I. Pancratium Dill. ex L.

Habitat: I. Arabia Petraea (ex Muschler).

Habitat: II. Jedd (Zohrab 101!, Fischer 94!, Schimp. 876!); Aden (Thomson!).
III. Dhofar Mts. (Bent 153).
Fl.: Feb. (Fischer), Apr. 1861 (Thomson), Dec. 1835 (Schimp.).
Distrib.: Arabia, Egypt, Nubia.

Habitat: II. Haifa, Wady Moadan (Defl.).
Distrib.: Tropical Africa, Arabia.

Habitat: I. Wady es Sheikh, Wady Barak and Wady Lebwel (Hart!); from Akaba to Ain Abon Weirideh (Hart); between Suez and Mt. Sinai (Boiss.); Bir el Fachme (Sickenb.); Bir Abu Elfein (Barbey).
Fl.: Nov. and Dec. (Hart).
Distrib.: Egypt, Sinai.
Vern. name: Aissalan (ex Boiss.).

Habitat: II. Jebel Melhan, near Wolledje, 600 m. (S. 699!); Jebel Bura, above Hille, 900 m. (S. 352!); Aden (S. 109!); near Taes (Nichbur).
Fl.: Dec. 1888 (S.).
Distrib.: S. Arabia, Nubia.
Observ.: Flowered at Aden on the 6th day after heavy rain (S.).
Vern. name: Bassal er robach (=bulb of the baboon) (S.).
2. Crinum L.


HABITAT: II. Haifa (Defl.).
DISTRIB.: Arabia.

3. Ixiolirion Fisch.


HABITAT: I. Gaza (Boiss.!, Barbey).
DISTRIB.: Syria, Palestine, Mesopotamia, Persia.

4. Haemanthus L.


HABITAT: II. Hadie (Forsk.); Lokkeme Jebel Harassa, 2,000 m. (S. 1971 !); Jebel Bura, 900 m. (S. 1841); Kahil near Menacha, 2,500 m. (S. 1441, 1701); Jebel Melhan, 900 m. (S. 756).

DISTRIB.: Arabia.
Vern. name: Bassal el hannesch (S.) (means Snake-bulb).


HABITAT: II. Haifa, Serrya (Defl.).
DISTRIB.: S. Africa, Arabia.

5. Polianthes L.


HABITAT: II. Jebel Bura, above Hille, cultivated, 1,000 m. (S. 1821).

FL.: Jan. 1889.
DISTRIB.: Mexico.
Vern. name: Sambag; rengess (S.).


HABITAT: II. Jebel Bura, above Hille, 1,000 m. (S. 1872).
Vern. name: Thalliq (S.).

**Habitat:** III. Under the edges of rocks at Dobaibah, alt. 1,200 m. (Lunt 205!)

**Fl.:** Feb. 1894 (Lunt).

**Distrib.:** Arabia.

7. Sternbergia Waldst. & Kit.


**Habitat:** I. Mount Hor, especially about the summit (Hart!).

**Fl.:** Early in Dec. (Hart).

**Distrib.:** S. Europe, Syria, Palestine, Persia.

CVII. COLCHICACEAE.

1. Androcybium Willd.


**Habitat:** I. Wady Arabah (Hart).

**Distrib.:** Sinai, Palestine.

2. Colchicum L.


**Habitat:** I. Sinai (Holland!).

**Distrib.:** S. Europe.

2. C. Steveni Kunth Enum. Pl. IV, 144.

**Habitat:** I. Jebel Catherine (Hart!); Mt. Hor and Petra (Hart!).

**Fl.:** Second week of Dec.

**Distrib.:** Arabia, Syria.


**Habitat:** I. Sinai.

**Distrib.:** S. Europe.


**Habitat:** I. Jebel Catherine, ca. 2,450 m. (ex Kneuck.).

**Distrib.:** Sinai.
CVIII. LILIACEAE.

1. **Littonia** Hook.
   1. **L. obscura** Baker Ic. Plant. 2365.
      **Habitat:** III. Near Cosair, nearly sea level (Lunt 280 l).
      **Fl.:** Mar. 1894 (Lunt).
      **Distrib.:** Endemic.

   **Habitat:** II. Little Aden (Defl. 517 l); Wady el’anterich (Defl. 541 l).
   **Fl.:** Apr. 1890 (Defl.).
   **Fr.:** Apr. 1890 (Defl.).
   **Distrib.:** Arabia.

2. **Merendera** Ram.
      **Habitat:** II. Neighb. of Aden (Hunter 57 l).
      **Distrib.:** Abyssinia, Arabia.
      **Vern. name:** *Shagorat-al-tair* (Hunter).

3. **Gagea** Salisb.
      **Habitat:** I. Towards top of Mt. Catherine (Schimp. 404 l); N. Midian (Burton l).
      **Fl.:** Apr. 1835 (Schimp.).
      **Vern. name:** *Betet hakjel* (Schimp.).

4. **Tulipa** L.
   1. **T. montana** Lindl. in Bot. Regist. XIII (1827) t. 1106; Boiss. Fl. Or. V, 192; Baker in Journ. Linn. Soc. XIV (1873) 279.
      **Habitat:** I. Sinai.
      **Distrib.:** Egypt, Sinai, Armenia, Persia, Kurdistan, Afghanistan.

5. **Hyacinthus** (Tourn.) L.
      **Habitat:** I. N. Midian (Burton l).
      **Distrib.:** Egypt, Sinai, Midian, Syria.

2. **H. colchicoides** Delile in Laborde Voy. Arab. Petr. 32.
   **Habitat:** I. Arabia Petraea (Herb. Kew l).
   **Distrib.:** Arabia.


Habitat: I. Sinai (Herb. Kew!).
Distrib.: Middle and south Europe and the other parts of the Mediterranean region, Egypt, Sinai.

7. Urginea Steinh.


Habitat: I. Sinai (Herb. Kew!).
Distrib.: Egypt. All other parts of the Mediterranean region.

8. Albuca L.


Habitat: II. Aden (Yerburyi!, Birdwood 126! Beevor!).
Distrib.: Aden.


Habitat: II. Near Menacha, 2,900 m. (S. 1664); near Kahil above Menacha, 2,500 m. (S. 1439! 1753!); Jebel Bura above Hille, 1,000 m. (S.).
Distrib.: S. Africa, Abyssinia, Eritrea.


Habitat: I. Desert, between Suez and El Tor (Schimp. 406!); N. Midian (Burton!).

II. Jedda (Fischer 96!).

IV. Found sprinkled all over the plain from Koweit to Regat (Pelly).

Fl.: Feb. (Fischer), Mar. 1835 (Schimp.).

Fr.: Mar. 1835 (Schimp.).

Distrib.: Egypt, Syria, Arabia.


Habitat: II. Yaman (Herb. Kew!).
Distrib.: Arabia, Eritrea.
10. **Allium** (Tourn.) L.

1. **A. ascalonicum** L. Amoen. Acad. IV, 454.
   - **Habitat:** III. Cultivated at Shibam, 600 m. (Lunt 172!).
   - **Fl.:** Jan. 1894 (Lunt).
   - **Fr.** Jan. 1894 (Lunt).
   - **Distrib.**: Cultivated everywhere.
   - **Vern. name:** *Busl* (Lunt).

   - **Habitat:** III. Cultivated at Al Ghatan, 345 m. (Lunt 179!).
   - **Distrib.**: Europe.

   - **Habitat:** I. Sinai (Herb. Kew!).
   - II. Yaman (Herb. Kew!).
   - **Distrib.**: A cosmopolitan pot-herb.

4. **A. neapolitanum** Cirillo. Plant. rar. regn. Neap. I (1788) 13, t. IV.
   - **Habitat:** I. Sinai (Herb. Kew!).
   - **Distrib.**: Throughout the Mediterranean region.

   - **Fl.** Or. V (1884) 260.
   - **Habitat:** I. Sinai (Herb. Kew!).
   - **Distrib.**: Mediterranean region.

   - **Habitat:** I. Sinai (Herb. Kew!).
   - **Distrib.**: Europe, Orient.

   - **Habitat:** I. Between Mt. Sinai and Nuckl (Boiss.).
   - **Distrib.**: Arabia.

   - **Habitat:** I. Sinai and Mt. St. Catherine (Schimp. 258).
   - **Distrib.**: Mediterranean, Orient.

11. **Bulbine** L.

1. **B. asphodeloides** Spreng. Syst. II, 85.
   - **Habitat:** II. Yaman (Herb. Kew!).
   - **Distrib.**: Abyssinia, South Africa.

12. **Asphodeline** Reichb.

   - **Habitat:** Arabia (ex Baker).
   - **Distrib.**: Mediterranean region, Caucasus, Asia Minor.
13. Asphodelus (Tourn.) L.

   **Habitat:** I. Arabia Petraea (Schimp. 237!); sandy plain of Ramleh between Sinai and Jebel Tih (Boiss.!).
   Fl.: Mar. 1835 (Schimp.), Mar. 1846 (Boiss.).
   **Distrib.:** Egypt, Arabia, Syria.

   **Habitat:** II. Jedda (Zohrab!); Taifa (Botta!).
   **Distrib.:** Mediterranean region, Orient, India.

   **Habitat:** I. Wady Hamme (Schimp. 206!); N. Midian (Burton!); Wady Nasb (Lord!); Desert of Sinai (Bové 505!); Arabia Petraea (McDonald!); Sinai, near Senned (Drake 85!).
   IV. Neighbourhood of Koweit (Pelly!).
   Fl.: Apr. 1868 (Lord).
   Fr.: Mar. 1835 (Schimp.), Apr. 1868 (Lord), June 1832 (Bové).
   Vern. name: Baruak (Schimp.), Barwry (Drake).

   **Habitat:** III. Weed in cultivated crop near Shibam, 600 m. (Lunt 170!).
   Fl.: Jan. 1894 (Lunt).
   Fr.: Jan. 1894 (Lunt).
   **Distrib.:** Dhofar.

   **Habitat:** I. Arabia Petraea: Wady Mokateb (Boiss.!); Arabia Petraea (McDonald!).
   Fr.: Mar. 1846 (Boiss.).
   **Distrib.:** Algeria, Arabia.

   **Habitat:** I. Arabia Petraea (Boiss.!).
   **Distrib.:** Mediterranean region, Arabia, Syria, Palestine, Nubia.

7. A. microcarpus Viv. in Linnaea I (1826) 500.
   **Habitat:** I. Beersheba (Lowne 306!).
   **Distrib.:** Mediterranean, Canaries.

   **Habitat**: III. On hills near Dobaibah, about 1,200 m. (Lunt 206 l).
   **Distrib.**: Arabia.

15. Scilla L.

   **Habitat**: II. Yaman (Defl.).
   **Distrib.**: Arabia.

16. Aloe Tourn. ex L.

   **Habitat**: II. Yaman (ex Fiori).
   **Distrib.**: Eritrea, Yaman.

   **Habitat**: II. Neighb. of Taez (Forsk.).
   III. Hills near Dobaibah, 900 m. (Lunt 225 l).
   **Fl.**: Feb. 1894 (Lunt).
   **Distrib.**: Arabia.

   **Habitat**: II. Near Menacha, 2,200 m. (S. 1685 l).
   **Fl.**: Mar. 1889 (S.).
   **Distrib.**: Arabia.

   **Habitat**: II. Ussil, 1,400 m. (S. 1350); near Menacha, 2,300 m.
   (S. 1497, 1623).
   **Fr.**: Feb. 1889 (S.).
   **Distrib.**: Arabia.
   **Vern. name**: Cher (S.).

   **Habitat** : II. Wady Madfar near Hodjela, 700 m. (S. 941 l); Aggara near Hodjela, 600 m. (S. 1010 l); Ussil, 1,400 m. (S. 1344 l).
   **Fr.**: Jan. 1889 (S.), Feb. 1889 (S.).
   **Distrib.**: Arabia.
   **Vern. name**: Geschb. (S.).
Habitat: II. Top of Shibam near Menacha, 2,900 m. (S. 1658!).
Fl.: Mar. 1889 (S.).
Fr.: Mar. 1889 (S.).
Vern. name: Ssabr (S.).

7 A. pendens Forsk. Fl. Aeg.-Arab. 74; Bot. Mag. t. 7827.
Habitat: II. Above Ussil, 1,500 m. (S. 1222!); in Wady Nahemi above Attara, 2,000 m. (S. 1751); Jebel Bura, 900 m. (S. 363, 1845).
Fl.: Feb. 1889 (S.).
Distrib.: Arabia.
Vern. name: Arrar (S.).

8. A. tomentosa Defl. Voy. Yemen (1884) 211.
Habitat: II. Yaman (Defl.!).
Distrib.: Arabia.

Habitat: II. Badjil, 200 m. (S. 531); foot of Jebel Bura near Hille, 600 m. (S. 360); at Chalife, 300 m. (S. 182); at the foot of Jebel Melhan, 600 m. (S. 658).
Distrib.: Arabia.

Habitat: II. Jebel Bura near Hille, 600 m. (S. 305).
Distrib.: Yaman.

17. Kniphofia Moench.

Habitat: II. Yaman (Defl.!).
Distrib.: Arabia.

18. Asparagus Tourn.

Habitat: II. Jebel Bura, 900-1,200 m. (S. 487).
III. Dhofar Mts., 480 m. (Bent 189!).
Distrib.: India, Orient, tropical Africa, Australia.

Habitat: II. Jedda (Schimp. 914!); Ussil, 1,400 m. (S. 1164); Menacha, 2,000-2,400 m. (S. 1613; 1505); western slope of Jebel Bura above Hille, 900 m. (S. 423).
   **HABITAT**: I. Sinai (Holland 111a); Arabia Petraea (McDonald!).
   **DISTRIBUTION**: Mediterranean region, Canary Islands.

   **HABITAT**: III. Hills near Dobaibah, 1,200 m. (Lunt 217!); South coast, el-Hami (S. 190).
   **DISTRIBUTION**: Arabia, S. Africa.

   **HABITAT**: II. Jebel Bura, cultivated in the coffee region, 1,000 m. (S. 488); Jebel Melhan, 1,000 m. (S. 864).
   **DISTRIBUTION**: Europe, Caucasus, Siberia, Arabia.
   Vern. name: *Stifel harr* (S.) *Cat's hair*.

   **HABITAT**: II. Yaman.
   **DISTRIBUTION**: Arabia, Abyssinia.

### CIX. Commelinaceae.

1. **Cyanotis** D. Don.

1. **C. foecunda** DC. ex Hassk. Commel. Ind. 110.
   **HABITAT**: II. Arabia (Botta!).
   **DISTRIBUTION**: Arabia, Abyssinia.

   **HABITAT**: II. Yaman Haifan (Defl.).
   **DISTRIBUTION**: Arabia.

2. **Aneilema** R. Br.

   — *A. tacazzeanum* Hochst. in Clarke, DC. Mon. III, 222.
   **HABITAT**: II. Jebel Bura, 600-900 m. (S. 289); foot of Jebel Melhan, 600 m. (S. 698); Regma near Hodjela, 900 m. (S. 944); Aggara near Hodjela, 600 m. (S. 1055).
   **FLOWERING**: Jan.-Feb. 1889 (S.).
   **DISTRIBUTION**: Yaman, Eritrea.
Habitat: II. Yaman (Botta!).
Distrib.: Tropical Africa, Arabia.

Habitat: II. Yaman (Botta!).
Distrib.: Arabia.

3. *Commelina* L.

Habitat: II. Aggara near Hodjela, 600 m. (S. 1073); near Badjil, 250 m. (S. 1783); S. of Jebel el Areys, 200-300 m. (Defl. 411!); neighb. of Aden (Hunter 169!).

III. Dhofar Mts. (Bent 123a!).
Fl.: Mar. 1890 (Defl.).
Fr.: Mar. 1890 (Defl.).
Distrib.: Tropical Africa, Arabia.

Habitat: II. Ussil, 1,200 m. (S. 1110, 1056); foot of Jebel Bura, 600 m. (S. 230); near Saiman and Wady Fatimah (Schimp. 763!); Wady Fatimah (Fischer 93!).

III. Stream, foot of Dhofar Mts. (Bent 123!).
Fl.: Feb. (Fischer), Nov. 1835 and Feb. 1836 (Schimp.).
Fr.: Feb. (Fischer), Dec. 1888 (S.).
Vern. name: *Uélán, uоздán* (Ussil), *gельf* (Hille).

Habitat: II. Ravine near Hille, Jebel Bura, 700 m. (S. 283, 364); Aggara near Hodjela, 600 m. (S. 902).
Fr.: Jan. 1889 (S.).
Distrib.: Arabia.

Habitat: II. Foot of Jebel Melhan, 600 m. (S. 753); Regma near Hodjela, 900 m. (S. 780).
Fl.: Jan. 1889.
Fr.: Jan. 1889.
Distrib.: Yaman, Eritrea.

Habitat: II. Aggara near Hodjela, 600 m. (S. 1045).
Fr.: Feb. 1889 (S.).
Distrib.: Arabia, Eritrea.
Habitat: II. Above Menacha, Wady Schurfa, 2,500 m. (S. 1758); in the north-west below Menacha, 2,000 m. (S. 1544).
Distrib.: Arabia, Eritrea.

2. C. Petersii Hassk. in Peters Mossamb. II, 522.
Habitat: II. Ussil, 1,400 m. (S. 1259!).
Distrib.: Tropical Africa, Arabia.

Habitat: II. Ussil, 1,800 m. (S. 1258!).
Fl.: Feb. 1889 (S.).
Distrib.: Arabia.

CX. JUNCACEAE.

1. Juncus (Tourn.) L.

Habitat: I. Damp places of Sinai (Bové 31!).
Fr.: Nov. 1832 (Bové).
Distrib.: Cosmopolitan.
Vern. name: Kerbel (Bové).

Habitat: I. Oasis Firan (ex Kneuck.).
Distrib.: Arabia.

Habitat: I. Arabia Petraea (ex Muschler).
Distrib.: Cosmopolitan.

Habitat: I. Arabia Petraea (ex Muschler).
II. Menacha, 2,300 m. (S. 1577!).
Fl.: Feb. 1889 (S.).

Habitat: I. Arabia Petraea (ex Muschler).
Distrib.: Morocco to Syria.
   HABITAT: I. Raphidim (Schimp. 287!).
   Fr.: July 1835 (Schimp.).

   HABITAT: IV. Maskat (Auch. 5475!); Hufuf Oasis (Cheeseman).
   DISTRIBUT.: Temperate region.

   HABITAT: I. Near Tor (Bové 29!); Wady Farran (Lord!); Wadies Sudr, Ghurundel and Elain, Akaba; in the Arabah and Ghor es Safieh; S. Midian (Burton!).
   Fr.: Apr. 1878 (Burton), May 1868 (Lord), June 1832 (Bové).
   DISTRIBUT.: Egypt, also known from Sinai, Palestine and Afghanistan.

   HABITAT: I. Mt. Sinai to Tor (Lord!).
   Fr.: May 1868 (Lord).

10. J. punctatus L. f. var. mauritanicus Buchenau et Trabut in Monogr. Juncac. (1890) 278.
    HABITAT: I. Arabia Petraea (ex Buchenau).
    DISTRIBUT.: S. Africa, Somaliland, Eritrea, Abyssinia, Sinai, Baluchistan.

    HABITAT: I. Arabia Petraea, near Raphidim (Schimp.).
    DISTRIBUT.: Europe, Siberia, Japan, India, N. America, Australia.

CXI. PALMAE.

1. Phoenix L.

   HABITAT: Cultivated all over Arabia.

   HABITAT: II. Aggara near Hodjela, 600 m. (S. 1037); Wady Madfar near Hodjela, 700 m. (S. 993); foot of Jebel Bura, 600 m. (S. 341).
   DISTRIBUT.: Tropical Africa.
   Vern. name: Schottob (Hodjela), Schegja (Ussil).
2. Hyphaene Gaertn.

   **Habitat:** II. Rare and only in the lowland, here and there cultivated. At Hodeidah in the sand of the coast region successfully cultivated.
   **Distrib.:** Along the valley of the Nile in middle and upper Egypt; Shaikh Othman near Aden.

3. Cocos L.

   **Habitat:** II. Lahej (Defl.) cultivated.
   III. South coast, near el-Hami, east of Schehr, planted in great quantities.
   **Fr.:** Feb. 1881 (S.).
   **Distrib.:** Cosmopolitan in the tropics.

4. Areca L.

   **Habitat:** II. Yaman.
   **Distrib.:** Exact native country of the Betel-nut Palm is uncertain.

CXII. PANDANACEAE.

1. Pandanus Rumph. ex L. f.

   **Habitat:** II. In the ravine Offer, Jebel Bura near Hille, 600 m. (S. 314); Wady Chuoiet, 1,200 m. (S. 1181); Aggara near Hodjela, 600 m.
   **Fl.:** Female flowers Feb. 1889 (S.).
   **Distrib.:** India, Arabia.
   **Vern. name:** Kadi (S.).

CXIII. TYPHACEAE.

1. Typha L.

   **Habitat:** II. Bahr-es-Sahan near Ammerieh, in the low country of the Tehama (S. 474); Spring near Bet-el-Mograb, not far from Menacha, 2,400 m. (S. 1707).
   III. Stream of valley leading to Dhofar Mts. (Bent 94!).
   **Distrib.:** Europe, N. America, Asia, also in tropical America.
   **Vern. name:** Hafe, haffa (S.).
   HABITAT: I. Between Tor and Sinai (Bové 36 l); Jebel Catherine (Drake 36 l); Wady Hebran (Schimp. 366 l); Arabia Petraea McDonald l).
   Fl.: June 1832 (Bové).
   Fr.: June 1832 (Bové), June 1835 (Schimp.).
   DISTRIB.: Also found in the Mediterranean region, Orient, northern India, Nubia and Abyssinia.
   Vern. name: *Haifa* (Drake).

   HABITAT: I. Arabia Petraea (ex Muschler).
   DISTRIB.: Almost cosmopolitan.

CXIV. **LEMNAEAE.**

1. **Lemna** L.

   HABITAT: I. Arabia Petraea (ex Muschler).
   DISTRIB.: Widely distributed in most warm and temperate regions.

   HABITAT: I. Arabia Petraea (ex Muschler).
   DISTRIB.: Widely distributed through the warm and temperate regions of the earth.

3. **L. paucicostata** Hegelmaier in Monogr. Lemnac. (1863) 139, t. VIII.
   HABITAT: I. Arabia Petraea (ex Muschler).
   DISTRIB.: Widely distributed through the warmer parts of the earth.

   HABITAT: I. Arabia Petraea (ex Muschler).
   II. Wady Nahemi above Attara, 2,100 m. (S. 1744);
   near Menacha, 2,850 m. (S. 1662 l).
   DISTRIB.: Tropical Africa, widely distributed in Europe, Asia and America.
   Vern. name: *Bellessinan* (Menacha) (S.).

CXV. **ALISMATACEAE.**

1. **Damasonium** Mill.

1. **D. alisma** Mill., var. **compactum** Micheli in DC. Monogr. Phanerog. III (1881) 42.
Habitat: I. Arabia Petraea (ex Muschler).
Distrib.: Egypt, also common in the Mediterranean and Atlantic region.

CXVI. ARACEAE.

1. Arisaema Mart.

Habitat: II. Yaman at the tops of Jebel Shibam near Menacha, 2,800 m. (Defl. 347); on the way from Shibam to the castle Kaukaban, 2,600-2,800 m. (Defl. 621); Wady Suleymen, 2,400 m. (Defl. 574); top of Jebel-el-Sumara, on the way from Yerim to Ibb, 2,800 m. (Defl.).
Distrib.: N. African Steppen Province, Abyssinia, Yaman.

2. A. Bottae Schott Prodr. (1860) 42; Engl. in DC. Mon. Phan. II (1879) 551.
Habitat: II. Yaman, Ahl el caf (Botta!); Haifan (Defl.); Mt. Sabor (Botta!).
Distrib.: Abyssinia, Eritrea, Yaman.

Habitat: II. Neighb. of Aden (Hunter 268!); near Taaes (Forsk. in Herb. Univers. Kiel.).
Distrib.: Abyssinia, Eritrea, Yaman, Afghanistan, Kurram Valley, subtropical western Himalaya, Garhwal.

2. Colocasia Schott.

Habitat: II. Yaman Manod near Hodjela, 900 m. (S. 946!); foot of Jebel Bura near Hille, 600 m. (S. 334).
Distrib.: Cultivated in all hot countries.
Vern. name: Kurcum (Hills); ssandj (Ussil).

CXVII. NAIADACEAE.

1. Cymodocea Kôn.

Habitat: II. Hodeidah (S. 147!); Aden (Defl. 317!).
Distrib.: Red Sea, Indian and Pacific Ocean between the tropics.
   HABITAT: I. Hamah Island (Slade !); Red Sea (Bové 540 !); near Suez (Schimp. 961 !).
   II. Aden (Thomson !); Hodeidah (S. 787 !).
   DISTRIBUT.: Widely distributed in the Red Sea and the Indian Ocean to N.-E. Australia.
   Vern. name: Suram (S.).

   HABITAT: II. Hodeidah (S. 148 !).
   DISTRIBUT.: Mediterranean Sea, African Atlantic coast from Tanger to Senegambia.

   HABITAT: II. Hodeidah (S. 146 !).
   DISTRIBUT.: Red Sea coasts and also known from Australian coasts.

   HABITAT: II. Hodeidah (S. 158a !); Aden (Balfour !).
   DISTRIBUT.: Widely distributed in the Red Sea.

   HABITAT: II. Aden (Balfour !); Aden Bir Ahmed (Defl.).

2. Dianthera Thou.

   HABITAT: I. Tor (Ehrenb. !); II. Hodeidah (S. 148); Aden (Balfour !).
   DISTRIBUT.: Common in the Red Sea and in the Indian and Pacific Oceans.

3. Naias L.

1. N. graminea Del. Descr. Egypte Hist. Nat. II. (1813) 282, t. 50, fig. 3.
   HABITAT: III. Dhofar Mts., river mouth, coast (Bent 217 !).
   DISTRIBUT.: Generally distributed throughout the warmer parts of the Old World.

2. N. minor Ail. Fl. pedemont. II (1785) 221.
   HABITAT: I. Arabia Petraea (ex Muschler).
Distrib.: Also found in Europe, Asia Minor, Syria, Kurdistan, Persia, Afghanistan, India, Burma, Malacca and Manchuria.

   
   **Habitat:** II. Yaman (ex Rendle).
   
   **Distrib.** : Arabia, Tunis, Socotra.

4. **Zannichellia** Mich. ex L.

   
   **Habitat:** I. Arabia Petraea.
   
   **Distrib.** : Cosmopolitan species wanting only in Australia but found in New Zealand.

5. **Ruppia** L.

   
   **Habitat:** I. Tor *ex aqua subulci thermarum* (Ehrenb. !).
   
   **Distrib.** : Common in brackish waters. In almost all temperate and subtropical countries.

   
   **Habitat:** I. Near el Tor (Schimp. 219 !).
   
   **Fr.** : March 1835 (Schimp.).
   
   **Distrib.** of type: Temperate and tropical regions.

6. **Potamogeton** (Tourn.) L.

   
   **Habitat:** III. Dhofar Mts., Derbat Lake, 240 m. (Bent 211 !).
   
   **Distrib.** : A widely dispersed plant, found in nearly all temperate climates.

   
   **Habitat:** I. Arabia Petraea (ex Muschler).
   
   **Distrib.** : Distribution of type.

   
   **Habitat:** II. Northern slopes of Jebel Shibam, above Menacha 2,500-2,600 m. (S. 1674 ! 1963).
   
   **Distrib.** : Almost cosmopolitan.

   
   **Habitat:** II. Arabia, Yaman (Defl.).
   
   **Distrib.** : Tropical Africa, Arabia.
5. *P. coloratus* Hornem. in Fl. Dan. t. 1449.
Habitat: Arabia (Schimp. 893!).
Distrib.: Europe.

**CXVIII. CYPERACEAE.**

1. *Cyperus* L.

Habitat: II. Wady Fatimah (Fischer 119!).
III. Dhofar Mts. (Bent 134!).
Fl.: Feb. (Fischer).
Distrib.: Tropical Africa, Arabia.

Habitat: I. Ghor es Safieh (Hart).
II. Jedda (Schimp. 916!, Zohrab 3!); Yaman (S. 897! partim); foot of Jebel Bura near Hille, 600 m. (S. 351); at the river of Aggara near Hodjela, 600 m. (S. 1060); Wady Fatimah (Fischer 119!).
III. Dhofar Mts.: Hafu (Bent 41!).
Fl.: Feb. 1837 (Fischer); Jan.-Feb. 1889 (S.).
Fr.: Jan.-Feb. 1889 (S.).
Distrib.: Cosmopolitan.

Habitat: I. Arabia Petraea (Boiss.!).
Distrib. of type: Cosmopolitan.

Habitat: II. Aden (S. 14).
III. El Hami, east of Schehr (S. 210).
Fr.: Mar. & Apr. 1881 (S.).

Habitat: III. El. Hami, east of Schehr (S.).
Fl.: Apr. 1881 (S.).
Distrib.: Arabia.

5. *C. articulatus* L. Sp. Pl. 44.
Habitat: II. Aggara, Hodjela (S. 1036!); Wady Garu (Ehrenb.!).
Fl.: Feb. 1889 (S.), Feb. 1823 (Ehrenb.).
Fr.: Feb. 1889 (S.), Feb. 1823 (Ehrenb.).
Distrib.: Tropics.
Vern. name: *Chasegj* (S.).
Habitat: II. Hodjela, Manod (S. 978); Jebel Bura, 900 m. (S. 513); Wady Chuoiyet, 1,200 m. (S. 1168).
Fr.: Jan. 1889 (S.)
Distrib.: Arabia, Abyssinia.

Habitat: II. Jedda (Zohrab 23 !, Fischer 54 !, Schimp. 809 !); Wady Adab near Shukra (Defl. 471 !).
Fl.: Jan. 1837 (Fischer), Jan. 1836 (Schimp.), Mar. 1890 (Defl.).
Distrib.: Arabia, Africa, India orientalis.

Habitat: I. N. Midian (Burton !); Wady Ghurundel and Ramleh (Lord !); Desert of Tor (Bové 28 !).
II. Jedda (Schimp. 1042 !); Aden (Thomson !, Defl. 37 ! Perry !, S. !); Is. of Ketumbal (Ehrenb. !).
IV. Oman (Pilgrim !); Maskat (bornm. 684 !); Central Arabia (Pelly !).
Fr.: Jan. 1893 (bornm.), Apr. 1868 (Lord), June 1832 (Bové), Nov.-Dec. 1888 (S.), Mar. 1881 (S.).
Distrib.: Generally in the tropics.

Habitat: II. Near Dahab (Schimp. 301 !); near Noweba (Schimp. 733 !); Hanish Island (Slade !); Jedda (Fischer 55 !, Zohrab 13 ! 22 !, Schimp. 810 !); Aden (S. 15 !, Thomson !, Beevor 50 !).
III. El Hami (S. 210 !).
Fl.: Oct.-Feb. (Fischer), July 1835 (Schimp.), Nov. 1888 (S.).
Fr.: Oct.-Feb. (Fischer), Nov. 1888 (S.).
Distrib.: Of type.

10. C. conglomeratus Rottb., var. pumilus.
Habitat: II. Jedda (Zohrab 13a in H. K. !); Aden (Hook. 105 !).
III. Dhofar Mts.: Hafu (Bent 28 !).
IV. Oman (Pilgrim !).
Distrib.: Of type.

Habitat.: II. Neighb. of Aden (Hunter 113 !).
Distrib.: Tropical Asia.

Habitat: II. Wady Hedjan, 1,200 m. (S. 1962 !).
Distrib. : Generally in the tropics.

Habitat : II. Aggara near Hodjela, 600 m. (S. 897 !); Neighb. of Aden (Hunter 67 !); S.-W. of Jebel Nakhai, 800 m. (Defl. 490 !); foot of Jebel Bura, 600 m. (S. 386).
Fl. : Jan.-Feb. 1889 (S.).
Fr. : Jan. 1889 (S.), Feb. 1889 (S.), Mar. 1890 (Defl.).
Distrib. : India, tropical Africa, Arabia.

Habitat : I. Arabia Petraea (ex Muschler); Ghor es Safieh (Hart). 
Distrib. : Europe, Orient.

Habitat : I. Wady es-Sle, Oasis Firan (ex Kneuck.).
II. Zeyda (Defl.).
Distrib. : Cosmopolitan in the warmer regions.

16. C. laevigatus L. var. distachyus Coss. et D. R.
Habitat : I. Arabia Petraea; Oasis Firan, Wady Ghurundel (ex Kneuck. sub Acorello).
Distrib. : Of type.

17. C. atronitens Höchst. in Flora, XXIV (1841) 1.
Habitat : II. Jebel Shibam, above Menacha, 2,700 m. (S. 1679 !).
Fr. : Mar. 1889 (S.).
Distrib. : Arabia, tropical Africa.

Habitat : II. Western slopes of Jebel Bura, 900 m. (S. 387 !); Wady Hedjan, 1,200 m. (S. 1089); Shukra (Defl.).
Distrib. : Tropical Africa, Arabia.
Vern. name : Schile (Ussil).

Habitat : II. Yaman (Herb. Kew).
Distrib. : S. Africa, Madagascar, Arabia.

Habitat : II. Yaman (Herb. Kew).
Distrib. : Everywhere in the tropics.
2. Scirpus (Tourn.) L.

   **Habitat**: II. At Menacha, source Mechander, 2,300 m. (S. 1428!).
   **Fl.**: Feb. 1889 (S.).
   **Distrib.**: Australia, Asia, Europe.

2. *S. corymbosus* Heyne in Roth Nov. Pl. Sp. 28, var. *brachyceros*
   **Habitat**: II. At Jebel Shibam, above Menacha, 2,500 m. (S. 1767!).
   **Fl.**: Mar. 1889 (S.).
   **Distrib.** of type: Africa, India.

   **Habitat**: I. Arabia Petraea.
   **Distrib.**: Cosmopolitan.

   **Habitat**: I. Ghor es Safieh (Hart!).
   **Distrib.**: Cosmopolitan.

   **Habitat**: I. S. Midian (Burton!); Arabia Petraea (McDonald!);
   foot of Mt. Sinai (Schimp. 108!); Mt. Sinai (Lord, Bové 21! 32! 33!);
   Sinai, near Senned (Drake 86!); Jebel Musa; Wady el Tihyeh to Jebel
   Herti (Hart).
   **Fl.**: Mar.-Apr. 1878 (Burton), May 1835 (Schimp.).
   **Fr.**: Mar.-Apr. 1878 (Burton), May 1835 (Schimp.), June 1832 (Bové).
   **Distrib.**: Cosmopolitan.
   **Vern. name**: *Deess* (Drake).

   **Habitat**: III. Brackish pool at Ghafyt, 180 m. (Lunt 91); Dhofar
   Mts., in streams near coast (Bent).
   **Distrib.**: Europe, Asia, Egypt.

3. Fimbristylis Vahl.

   **Habitat**: II. S.-W. Arabia (Ehrenb.!).
   III. Near the hot springs of el Hami (S. 158!).
   **Fl.**: Apr. 1881 (S.).
   **Fr.**: Apr. 1881 (S.).
   **Distrib.**: Warm regions.

   **Habitat**: II. Above Menacha, 2,500 m. (S. 1709); Wady et-Tehm,
   1,500 m. (S. 1245); Wady Shaari, foot of Jebel Melhan, 700 m. (S. 677);
Aggara near Hodjela, 600 m. (S. 1075); Zeyda (Defl.).
III. Near the hot springs of el Hami (S. 184199!)
IV. Maskat (Auch. 5480!).
Distrib.: All warm regions.

Habitat: IV. Hufuf Oasis (Cheeseman).

Habitat: I. Ghor es Safieh (Hart).
Distrib.: S. Europe, N. Africa.

4. Schoenus L.
Habitat: I. Arabia Petraea (Bové! Schimp.!).
Distrib.: Cosmopolitan.

5. Carex (Dill.) L.
Habitat: I. Foot of Mt. Sinai, Gauaje el Leestan (Schimp. 176!).
Fl.: Apr. 1835 (Schimp.).
Distrib.: Southern Europe, temperate Asia.
Vern. name: Dié el Muje (Schimp.).

Habitat: I. Mt. Sinai, Arabia Petraea (Figari!); Sinai (Botta 3!);
   damp places of Sinai (Bové 23!).
Fl.: June-July (Figari).
Fr.: June-July (Figari); June 1832 (Bové).
Distrib.: Of type.

3. C. Burchelliana Böckl. in Linnaea XLI (1877) 234., var. leiocarpa
Habitat: II. At Menacha, source Machader, 2,300 m. (S. 1424).
Fl.: Feb. 1889 (S.).
Fr.: Feb. 1889 (S.).
Distrib. of type: South Africa.

Habitat: I. Ghor es Safieh (Hart).
Distrib.: North temperate regions.

Habitat: I. Summit of Mt. Hor (Hart); from Wady Zewerah to Bir es Seba and Tel Abou Hereirch (Hart).
Distrib. of type: North temperate region.

Habitat: I. Arabia Petraea.
Distrib.: Western Asia, N. America.

CXIX. GRAMINEAE.

1. Imperata Cyrill.

Habitat: I. Desert of Sinai (Bové 16!); Sinai (Holland!); Wadies Zelegah and Elain: Ghor es Safich (Hart).
Fr.: June 1832 (Bové).
Distrib.: The hotter parts of the Old World.
Vern. name: Halfeh (Bové).

2. Saccharum L.

1. S. biflorum Forsk. Fl. Aeg.-Arab. 16.
Habitat: I. Sinai (Herb. Kew!).
Distrib.: Egypt, Syria, Sinai, Palestine.

2. S. spontaneum L. Mant. (1771) 183.
Habitat: II. Oasis of Lahadj (Defl. 147).
Fr.: Dec. 1889 (Defl.).
Distrib.: Tropics of the Old World.

Habitat: II. Yaman (Herb. Kew!).
Distrib.: Cultivated in warm regions.

Agrost. 162.
Habitat: I. Ghor es Safich (Hart).
Distrib.: Western Himalaya, Punjab, Upper Gangetic Plain, Sind, extending westwards to the Mediterranean.

3. Rottboellia L. f.

Habitat: I. Desert of Sinai (Bové 18); Sinai (Bové!).
II. Perim Island (H. K.!); near Jedda (Schimp. 791!);
2. R. exaltata L. f. Suppl. 114, var. genuina Hack. in DC. Monogr. VI, 294.
   **Habitat**: II. Aggara, near Hodjela, in maize fields, 600 m. (S. 1070!).
   **Fr.**: Feb. 1889 (S.).
   **Distrib.**: Tropics.
   **Vern. name**: Qoren (S.).

4. Apluda L.

1. A. varia Hack. in DC. Monogr. VI, 196, var. aristata Hack. l. c. 199.
   **Habitat**: II. Tropical Arabia (ex Stapf).
   **Distrib.**: Tropical Asia to New Caledonia, tropical Arabia and Socotra.

5. Ischaemum L.

   **Habitat**: II. Foot of Jebel Bura, 600 m. (S. 300).
   **Fl.**: Jan. 1889 (S.).
   **Fr.**: Jan. 1889 (S.).
   **Distrib.**: Tropics of the Old World.


1. E. hirsutus (Forsk.) Munro ex Benth. in Journ. Linn. Soc. XIX (1881) 68.—Saccharum hirsutum Forsk. Fl. Aeg.-Arab. 16.
   **Habitat**: I. Sinai (Herb. Kew l); Arabia Petraea (Bové 18).
   II. Yaman (ex Boiss.).
   IV. Maskat (Auch. 5460).
   **Distrib.**: Northern Punjab, Rajputana, westwards to Northern Africa.

   **Habitat**: II. Mt. Sidr (Fischer 118 l); Wady Djara (Ehrenb. l).
   **Fl.**: Feb. (Fischer).
   **Distrib.**: India, Arabia, tropical Africa.

7. Arthraxon Beauv.

1. A. iaucolatus Hochst. in Flora XXXIX (1856) 188., var. serrulatus Hack. in DC. Monogr. VI, 348.
HABITAT: II. Regma, near Hodjela, 800 m. (S. 951); Ussil, 1,400 m. (S. 1953); Menacha, 2,300 m. (S. 1580); Hille, Jebel Bura (S. 3611).
Fl.: Feb. 1889 (S.).
Fr.: Jan.-Feb. 1889 (S.).
Distrib. of type: India, Abyssinia, Arabia, Japan.

8. Andropogon L.

HABITAT: II. Hodjela, 600 m. (S. 88); Ussil, 1,000-1,200 m. (S.).
Vern. name: Kubri (S.).

HABITAT: II. Shukra, cultivated (S.).

HABITAT: II. Above Menacha, 2,600 m., cultivated in the rainy season (S.); east of Marraua (S. 162, 164).
Vern. name: Gjendab ahmar (S.).

4. A. sorghum Brot. var. yemensis Keke.
HABITAT: II. East of Marraua (S. 162); Shukra (S. 60).

5. A. sorghum Brot. var. niger Ard. in Saggi Sc. I, 134; Hack. in DC. Monogr. VI, 514.
HABITAT: II. At the foot of Jebel Bura (S.).

6. A. sorghum Brot. var. albida Keke.
HABITAT: II. Ussil, 1,000-1,300 m., cultivated in the rainy season (S.).
Vern. name: Ahnessi (S.).

7. A. sorghum Brot. var. bicolor L. Mant. 2, 301.
HABITAT: II. Aden, cultivated as cattle fodder at Shaikh Othman (S.); east of Marraua (S. 163).
Vern. name: Gherb (S.).

HABITAT: II. In the lowland of the Tehama (S.).

9. A. sorghum Brot. var. arabicus Keke.
HABITAT: II. Above Menacha, 2,600 m. cultivated in the rainy season (S.).
Vern. name: Gia'aidi (S.).

Habitat: II. Oasis of Lahadj (Defl. 123 l).
Fl.: Dec. 1889 (Defl.).
Fr.: Dec. 1889 (Defl.).

Habitat: II. Yaman (S.).
Observ.: Lunt's 159 collected at Al Hawi in Hadramaut alt. 660 m. is aff. to this var.

Habitat: I. Arabia Petraea (Herb. Kew !); Ghor es Safieh, cultivated (Hart).
Distrib.: Throughout the tropics.

Habitat: II. Yaman (Defl.).
Distrib.: India, tropical Africa, Arabia.

Habitat: II. Badjil, 200 m. (S. 529); Taifa (Botta!).
III. El Hami (S. 203 l).
Fl.: 10th Jan. 1889 (S.).
Fr.: 10th Jan. 1889 (S.), Apr. 1881 (S.).

Habitat: I. Wady Zewerah (Lowne); summit of Mt. Hor (Hart).
IV. Maskat, Mt. Chebeck (Auch. 5462).
Distrib.: Tropics.

Habitat: I. Arabia Petraea (McDonald !); Wady Farrun and neighb. (Lord !); Sinai (S. 114 !); Desert of Sinai (Bové 15 !); foot of Mt. Sinai (Schimp. 101 !); Mt. Sinai (H. K. !).
II. Jebel Bura, 600 m. (S. 278); Regma near Hodjela, 800 m. (S. 973); foot of Jebel Melhan, 600 m. (S. 654); Ussil, 1,400 m. (S. 1347); Menacha, 2,00-2,500 m. (S. 1538, 1708).
Fl.: May 1835 (Schimp.).
Fr.: Mar. 1886 (S.), May 1868 (Lord), May 1835 (Schimp.), June 1832 (Bové).
Vern. name: *Hammara* (Bové), *hamra* (Schimp.).

**Habitat:** II. Wolledje (S. 627).
**Fl.:** Jan. 1889 (S.).
**Fr.:** Jan. 1889 (S.).

**Distrib.:** Tropical Africa, Arabia, southern India.

**Vern. name:** Qusseba (S.).


**Habitat:** I. Sinai (Auch. 2954!).
II. Above Menacha, 2,500 m. (S. 1435!).

**Fr.:** Feb. 1889 (S.).

**Distrib.:** Mediterranean.


**Habitat:** I. Akaba (Hart); desert of Sinai (very rare) (Bové!).
II. Aden, Shukra, Serrya (Defl.); Aden (Birdwood 131!, S. 79!, Lunt 337!); desert near Jedda (Schimp. 790!); Jedda (Zohrab 216!); El Gidam (Ehrenb.!).

III. El Hami (S. 173).
IV. Maskat (Auch. 5461!).

**Fr.:** Jan. 1825 (Ehrenb.), Apr. 1894 (Lunt), June 1832 (Bové), Nov. 1835 (Schimp.).

**Distrib.:** Africa and tropical Asia.


**Habitat:** II. Foot of Jebel Bura, 600 m. (S. 478); Aggara near Hodjela, 600 m. (S. 393); Menacha, 2,500 m. (S. 1959).

**Fr.:** Jan., Feb., Mar. (S.).

**Distrib.:** Sicily, tropical Asia, tropical Africa, Australia.


**Habitat:** II. Badjil, 190 m. (S. 1960); Aggara near Hodjela, 600 m. (S. 900).

IV. From the valley on the 3rd Mar. (Pelly!).

**Fl.:** Jan. 1889 (S.).
**Fr.:** Jan. 1889 (S.), Mar. (Pelly).

**Distrib.:** Northern Africa, Arabia, India, Australia.


**Habitat:** II. Little Aden, Beyt-el-Amir, Massana (Defl.); Jedda (Schimp. 789!); neighb. of Jedda (Fischer 132!); Wady Saylet near Beyt-el-Amir (Defl. 241!).

IV. Maskat (Bornm. 704!, Auch. 5462!).

**Fl.:** Jan. & Feb. (Fischer), Jan. 1893 (Bornm.), Jan. 1890 (Defl.).

C 2
Fr.: Jan. 1836 (Schimp.), Jan. & Feb. (Fischer), Jan. 1893 (Bornm.), Jan. 1890 (Defl.).
Distrib.: Orient, India, N. Africa.

Habitat: II. Jebel Bura, 600-800 m. (S. 908); Wolledje (S. 760 !).
Fr.: Jan. 1889 (S.).
Distrib.: Mediterranean region and tropics and sub-tropics generally.

Habitat: Arabia (Herb. Kew !).
Distrib.: India, tropical Africa.

Habitat: Yaman (ex Stapf).
Distrib.: Tropical Africa, Yaman, tropical Arabia, Deccan Peninsula.

9. Themeda Forsk.

1. T. triandra Forsk. Fl. Aeg.-Arab. CXXIII et 178, var. glauca Hack. in DC. Monogr. VI, 663.
Habitat: II. Menacha, 2,200 m. (S. 1499 !).
Fl.: Feb. 1889 (S.).
Fr.: Jan. 1889 (S.).
Distrib.: Yaman.

10. Tragus Hall.

Habitat: II. Yaman (Schimp. 792 !); desert near Jedda (Schimp. 793 !, Fischer 138 !, Zohrab 36 !); Aggara near Hodjela, 600 m. (S. 1050 !); Wady Bahara (Schimp. 792 !); Menacha, 2,200 m. (S. 1594).
Fl.: Feb. (Fischer).
Fr.: Jan. 1836 (Schimp.), Feb. 1889 (S.), Feb. 1837 (Schimp.).
Distrib.: Mediterranean region, Afghanistan.

Habitat: II. Ussil, 1,400 m. (S. 1049a).
Distrib.: Mediterranean.

Habitat: II. Yaman (Boiss.).
Distrib.: Persia, Arabia.
11. **Latipes** Kunth.

   
   **Habitat**: II. Yaman (Ehrenb. 232!); Shukra (S. 139!).
   
   III. Dhofar Mts.: Coasts Dhofar (Bent 52!).
   
   Fr.: Mar. 1881 (S.).
   
   **Distrib.**: Tropical Africa, Arabia.

12. **Eriochloa** H. B. & K.

   
   **Habitat**: II. Shaikh Othman (S. 123); Aggara near Hodjela, 600 m. (S. 1058).
   
   
   **Distrib.**: Mexico.

   
   **Habitat**: II. Tropical Arabia (ex Stapf).
   
   **Distrib.**: Tropical Africa, tropical Arabia, occasionally in India.

13. **Panicum** L.

   
   **Habitat**: II. Aggara near Hodjela in maize fields, 700 m. (S. 1058!); Unsert, near Mecca (Schimp. 806!); Wady Fatimah (Fischer 174!); Jeddah (Zohrab 241, 316!).
   
   Fl.: Feb. (Fischer).
   
   Fr.: Feb. 1889 (S.).
   
   **Distrib.**: India, Arabia.

   
   **Habitat**: II. Wady Fatimah, near Mecca (Schimp. 803!); Wady Fatimah (Fischer 120!).
   
   IV. Near Maskat (Last!).
   
   Fl.: Feb. (Fischer).
   
   Fr.: Feb. 1836 (Schimp.).
   
   **Distrib.**: Cosmopolitan.

   
   **Habitat**: II. Foot of Jebel Melhan, 600 m. (S. 626); Aggara near Hodjela, 600 m. (S. 1049); Regma near Hodjela, 900 m. (S. 949).
   
   
   
   **Distrib.**: Arabia, Eritrea.

**Habitat**: II. Jebel Bura, 600 m. (S. 1330); Aggara, 600 m. (S. 1081); Menacha, 2,200 m. (S. 1595).

**Fl.**: Jan. and Feb. 1889 (S.).

**Fr.**: Jan. and Feb. 1889 (S.).

**Distrib.**: Yaman.

5. *P. leersioides* Hochst. in Flora XXXVIII (1855) 196.

**Habitat**: II. Foot of Jebel Melhan, 600 m. (S. 762); Ussil, 1,200-1,800 m. (S. 1133, 1196); Regma near Hodjela, 900 m. (S. 985); Aggara, 600 m. (S. 895); Hille, Jebel Bura (S. 322!).

**Fl.**: Jan. and Feb. 1889 (S.).

**Fr.**: Jan. and Feb. 1889 (S.).

**Distrib.**: Abyssinia, Arabia.


**Habitat**: II. Shaikh Othman (S. 122!).

**Fl.**: Dec. 1888 (S.).

**Fr.**: Dec. 1888 (S.).

**Distrib.**: Generally in warm regions.


**Habitat**: II. Foot of Jebel Melhan, 600 m. (S. 769); Ussil, 1,200 m. (S. 1306).

**Fl.**: Feb. 1889 (S.).

**Fr.**: Feb. 1889 (S.).

**Distrib.**: Abyssinia, Arabia.


**Habitat**: I. Ghor es Safieh (Hart).

II. Shukra (S. 75!); Unsert near Mecca (Schimp. 804! 963!); Jedda (Zohrab 218! 220! 315!); Aggara near Hodjela, in maize fields (S. 906!); Yaman, W. Fatimah (Fischer 176!); Shaikh Othman, Lahej (S.); foot of Jebel Melhan, 600 m. (S. 759); Ussil, 1,100 m. (S. 1025).

IV. Near Maskat (Last!).

**Fl.**: Jan.-Mar. (S.).

**Fr.**: Jan. 1889 (S.), Feb. 1836 (Schimp.), Mar. 1881 (S.), Jan.-Mar. (S).

**Distrib.**: Warm regions.


**Habitat**: II. Aggara, near Hodjela, 600 m. (S. 949).
FLORA ARABICA.

Fl.: Feb. 1889 (S.).
Fr.: Feb. 1889 (S.).
Distrib.: N. Africa, Arabia.

10. P. commutatum Nees in Linnaea VII (1832) 274.
Habitat: II. Jebel Bura, above Hille, 800 m. (S. 396).
Fr.: Jan. 1889 (S.).

Habitat: II. Tropical Arabia (ex Stapf).
Distrib.: Tropical Africa, Algeria, tropical Arabia, Afghanistan, Punjab.

Habitat: II. Aggara, near Hodjela, 600 m. (S. 895a).
Fr.: Jan. 1889 (S.).
Distrib.: Abyssinia, Arabia.

Habitat: II. Ussil, Wady Hedjan, 1,200 m. (S. 1278 !).
IV. Maskat (Auch. 5437 !).
Fl.: Feb. 1889 (S.).
Fr.: Feb. 1889 (S.).
Distrib.: Mediterranean region, India.

Habitat: II. Chalife, 200 m. (S. 210) ; Wady Fatimah (Fischer 191 !); Aggara near Hodjela (S. 893 !); near Unsert in Wady Fatimah (Schimp. 807 !).
III. Dhofar Mts.: Coasts (Bent 26 !).
Fl.: Feb. 1837 (Fischer).
Fr.: Feb. 1889 (S.), Feb. 1836 (Schimp.), Feb. 1837 (Fischer).
Distrib.: Tropical regions.
Vern. name: Thalig (S.).

Habitat: II. Regma, near Hodjela, 850 m. (S. 950 !).
Fr.: Jan. 1889 (S.).
Distrib.: Warm regions.

Habitat: II. Aden (Ellenbeek).
Distrib.: Yaman, Eritrea, Abyssinia.
   **Habitat**: II. Foot of Jebel Bura, 600 m. (S. 362, 274); Aggara near Hodjela, 600 m. (S. 911); Menacha, Wady Ssarif, 1,800 m. (S. 1698!); Ussil, 1,400 m. (S. 1166).
   **Fr.**: Mar. 1889 (S.).
   **Distrib.**: Tropical America.

   **Habitat**: II. Aggara near Hodjela, in rivulets (S. 899!).
   **Fl.**: Jan. 1889 (S.).
   **Fr.**: Jan. 1889 (S.).
   **Distrib.**: S. Africa, Arabia.

   **Habitat**: II. Shukra, cultivated (S. 87! Defl.).
   **Distrib.**: Warm regions.

20. **P. pennatum** Hochst. in Flora XXXVIII (1855) 197 (Paspati* sp.*).
   **Habitat**: II. Aden (Lunt 306!); Ussil, Wady Chuoiet, 950 m. (S. 1193!).
   **Fl.**: Feb. 1889 (S.), Apr. 1894 (Lunt).
   **Fr.**: Feb. 1889 (S.), Apr. 1894 (Lunt).
   **Distrib.**: N. Africa, Arabia, W. Asia.

21. **P. plicatile** Hochst. in Flora XXXVIII (1855) 198.
   **Habitat**: II. Jebel Bura, 900 m. (S. 458); Ussil, 1,200 m. (S. 1329).
   **Fl.**: Jan. and Feb. 1889 (S.).
   **Fr.**: Jan. and Feb. 1889 (S.).
   **Distrib.**: Tropical Africa, Arabia.

22. **P. prostratum** Lam. Ill. I, 171.
   **Habitat**: II. Near Unsart in Wady Fatimah (Schimp. 805!); Wady Fatimah (Fischer 130!); Wady Fatimah, near Mecca (Schimp. 805!), Aggara, near Hodjela in maize fields (S. 1034!); foot of Jebel Bura, Hille, 600 m. (S. 273).
   **Fl.**: Feb. 1889 (S.), Dec. 1888 (S.).
   **Fr.**: Feb. 1836 (Schimp.), Feb. 1889 (S.), Dec. 1888 (S.).
   **Distrib.**: Tropics.

   **Habitat**: II. Aggara near Hodjela, in maize fields (S. 2007!); Jebel Bura, 600 m. (S. 397); foot of Jebel Melhan, 600 m. (S. 932); Regma near Hodjela, 900 m. (S. 966).
   **Fl.**: Jan. and Feb. 1889 (S.).
   **Fr.**: Jan. and Feb. 1889 (S.).
   **Distrib.**: Arabia, Aethiopia, India.
   **Habitat**: II. Aggara, near Hodjela, 600 m. (S. 1039).
   **Fl.**: Feb. 1888 (S.).
   **Fr.**: Feb. 1888 (S.).
   **Distrib.**: Abyssinia, Arabia.

   **Habitat**: II. Menacha in Lucerne, 2,400 m. (S. 1472 !); Taifa (Schimp. 895!).
   **Fl.**: Mar. 1889 (S.).
   **Fr.**: Mar. 1889 (S.).
   **Distrib.**: Tropical Africa and tropical Arabia.

   **Habitat**: I. Wady Elain, and in the Arabah; Wady Zaleghah; Akaba (Hart); Wady Zewerah (Lowne 149 !); N. & S. Midian (Burton !); Wady Gennah and neighb. (Lord !); Arabia Petraea (McDonald !); Wady Hebran (Schimp. 152 !); Wady Sewook and neighb. (Lord !).
   II. Jedda (Zohrab 35 !); coast line near Hodeida (S.); Shukra (S. 106); Lahej, Shukra, Jebel Nakhai (Defl.); Little Aden (S.).
   **Fr.**: Apr.-May 1868 (Lord), Apr. 1835 (Schimp.).
   **Distrib.**: N. Africa, Arabia, Orient.
   **Vern. name**: Zaram (Burton).

27. **P. Crus Galli** L. Sp. Pl. 56.
   **Habitat**: IV. Maskat (ex Boiss.).
   **Distrib.**: The whole world except the Arctic regions.

   **Habitat**: I. Wadies Elain, Elihyeh and Arabah; Akaba (Hart); Arabia Petraea (Bové, Auch.); Wady Shaikh (Boiss.).
   II. Aden, Shukra (Defl.).
   IV. Maskat (Auch. 5447).
   **Distrib.**: Mediterranean, Orient, Arabia, India.

   **Habitat**: II. Shukra, Serrya (Defl.).
   **Distrib.**: Arabia, India.

   **Habitat**: II. Tropical Arabia (Fischer 191, Schimp. 807, S. 893).
   **Distrib.**: Tropical Africa, tropical Arabia.

   **Habitat**: II. Tropical Arabia (S. 895).
   **Distrib.**: Tropical Africa, tropical Arabia.
14. Cenchrus L.

   Habitat: II. Jedd (Zohrab 37! 217!); in desert, near Jedd (Schimp. 796! 797!, Ehrenb. 235!); Gumfuda (Ehrenb. 235!); cult. ground near Shukra (Defl. 348!).
   Fr.: Feb. 1825 (Ehrenb.), Mar. 1890 (Defl.), Dec. 1835 (Schimp.). *
   Distrib.: Asia and tropical Africa.


   Habitat: I. Wady Haroun, and the others leading into the Arabah from Edom; Wady Arabah and Ghor es Safieh (Hart); Wady Zewerah (Lowne!); Mt. Horeb (Auch. 2998!); Wady Arabah (Hart!); Wady Hebran (Schimp. 153!).
   II. Jedd (Fischer 126!, Zohrab 19! 20! 29!); Wady Fatimah (Fischer 126!); Aden (Hook. 110!, Thomson!, Perry!); Menacha, 2,200 m. (S. 1951); Hodjela, 600 m. (S. 894); Moglai, 300 m. (S. 605); foot of Jebel Bura, 600 m. (S. 392); Aden, Shaikh Othman (S. 1950); Shukra (S. 95, 938); Gumfuda (Ehrenb. 233!); Mor (Ehrenb. 234!); Aggara near Hodjela, 600 m. (S. 894!); neighb. of Shukra (Defl. 349! 409!); Jedd (Schimp. 973!).
   III. Dhofar Mts., Hafa (Bent 45!); El Hami (S. 189, 172).
   IV. Near Maskat (Last!).
   Distrib.: Tropical regions.
   Vern. name: Ihbett (Hille) (S.).

   Habitat: II. Kahil above Menacha, 2,500 m. (S. 1471!).
   Fr.: Feb. 1889 (S.).
   Distrib.: Arabia.

3. P. dichotomum (Forsk.) Del. Fl. Eg. 159, t. 8, fig. 1.—Panicum dichotomum Forsk. Fl. Aeg.-Arab. p. 19.
   Habitat: I. Wadies Nasb and Elain; Debbet er Ramleh; frequent in the Arabah (Hart); Arabia Petraea (Bové); Mt. Horeb (Auch. 2999!); Wady Sewook (Lord!); Sinai (Figari!); Wady Nasb (Hart!); Sinai desert (Auch. 3000!); Wady Hebran (Schimp. 151!); Nakkeb (Schimp. 308!); Wady Farrun (Lord!).
   II. Shukra (S. 62!); Oasis of Lahadj (Defl. 141!).
   III. Sibeh, 240 m. (Lunt 11 !).
   IV. Maskat (Auch. 5432!).
Fr.: Apr. 1835 (Schimp.), Apr. 1868 (Lord), Apr. and May (Figari), Mar. 1881 (S.), Dec. 1889 (Defl.).
Distrib.: Egypt, Arabia, India.

Habitat: II. Above Menacha, 2,700 m. (S. 1949).
Fr.: Mar. 1889 (S.).
Distrib.: Abyssinia, Arabia.

Habitat: I. Neighb. of Sinai (Bové 7, 19!, Figari!, Drake 83!); Abu Maurad and Mt. Sinai (Schimp. 115!); Wady Hebran (Schimp. 100!).

II. Menacha, 2,200 m. (S. 1502!).
Fl.: Feb. 1889 (S.).
Fr.: Feb. 1889 (S.), June 1832 (Bové).
Distrib.: Algeria, Arabia, Orient, India.
Vern. name: *Haussefe* (S.), *naseje* or *neseje* (Bové), *sabote* (Drake), *hagheni* (Schimp.).

Habitat: II. Menacha, 2,200-2,500 m. (S. 1699)
Fl.: Mar. 1889 (S.).
Fr.: Mar. 1889 (S.).
Distrib.: Abyssinia, Arabia.

7. **P. spicatum** Körnicke und Werner, Getr. I, 284.
Habitat: II. In the lowland of the Tehama, generally cultivated (S. 174, 1071, 1952); Shukra (S.).

III. El Hami (S.).
Vern. name: *Dochn* (S).

Habitat: II. Lahadj (Defl. 183!), Shukra, Kamfer, Massana, Wady Moaden (cult.) (Defl.).
IV. Zor Hills (Cox and Knox).
Fr.: Dec. 1889 (Defl.).
Distrib.: Tropics.
Vern. name: *Ilm* (Arabic, in Zor Hills).

Habitat: II. Northern slope of the Shibam, 2,600 m. (S. 1648); neigh. of Aden (Hunter 54!); Menacha, 2,300 m. (S. 1582!).
Fr.: Feb. 1889 (S.).
Distrib.: Abyssinia, Arabia.

Habitat: II. Yaman (Defl.).
Distrib.: Yaman.

Habitat: II. Haifan (Defl.); Jebel Bura, 600 m. (S. 247); foot of Jebel Melhan, 600 m. (S. 778); Menacha, 2,000-2,200 m. (S. 1502).
Distrib.: Abyssinia, Arabia.
Vern. name: Ghorizzi (J. Bura); haussefe (J. Melhan): silet-aregi (Menacha) (S).

Habitat: II. Serrya (Defl.).
Distrib.: Tropical Africa, Arabia, India.

16. Tricholaena Schrad.

Habitat: II. Ussil, 1,300 m. (S.).
Distrib.: Abyssinia, Arabia.

Habitat: II. Below Ussil, 1,100 m. (S. 1283); foot of Jebel Melhan, 600 m. (S. 792); foot of Jebel Bura, 600 m. (S. 399).
Distrib.: Abyssinia, Arabia.

Habitat: II. Jebel Bura, Coffee region (S. 425).
Distrib.: Abyssinia, Arabia.
Vern. name: Hammere (Hille) (S.).

Habitat: I. Wady Zeverah (Lowne 230!); Wady Hebran (Schimp. 150! 990!); Wady Gennah (Lord!); Sinai (Auch. 3811!); Arabia Petraea (McDonald!); Central and S. Midian (Burton!).
II. Island of Ketumbae ( Ehrenb. !); Aden (Thomson, Hook. 109!, Perry!, S. 13!); Mt. Sidr, (Fischer 123!); Wady Hedjan, near Ussil (S. 1283!); Aden (Defl. 56! S. 13!).
IV. Maskat (Auch. 5447!).
Fr.: Feb. 1889 (S.), Apr. 1835 (Schimp.), Nov. 1888 (S.).
Distrib.: Mediterranean, Orient.

Habitat: II. Ussil, Wady Hedjan (S. 1340!).
Fr.: Feb. 1889 (S.).
Distrib.: India, Arabia.

17. Setaria Beauv.

Habitat: I. Near monastery of Mt. Sinai, cult. ground (Schimp. 300).
II. Regma near Hodjela, 900 m. (S. 980); Ussil, 1,400 m. (S. 1947); below Menacha, 2,000 m. (S. 1592); Wady Fatimah (Schimp. 997!); Jedda (Zohrab 235!); Serrya (Defl.).
Fr.: Feb. 1836 (Schimp.), July 1835 (Schimp.), Jan. and Feb. (S.).
Distrib.: Cosmopolitan.

Habitat: I. Sinai (Holland!).
IV. Maskat (Auch. 5434).
Distrib.: Cosmopolitan.

18. Ehrharta Thunb.

1. E. abyssinica Hochst. in Flora XXXVIII (1855) 193.
Habitat: II. Menacha, 2,500 m. (S. 1705!).
Fl.: Mar. 1889 (S.).
Fr.: Mar. 1889 (S.).
Distrib.: Tropical Africa, Arabia.

19. Oryza L.

Habitat: II. Yaman.
Distrib.: Cultivated.

Habitat: I. Arabia Petraea (ex Muschler).
Distrib.: Tropical and subtropical regions.
20. Lygeum L.

   
   **Habitat**: I. Arabia Petraea (ex Muschler).
   
   **Distrib.**: Mediterranean.

21. Phalaris L.

1. **P. canariensis** L. Sp. Pl. 54.
   
   **Habitat**: I. Arabia Petraea (Herb. Kew!).
   
   **Distrib.**: Warm and temperate regions of Europe, N. Africa, W. Asia and America.

   
   **Habitat**: I. Arabia Petraea (Herb. Kew!).
   
   **Distrib.**: Greece, Orient, S. Africa.

   
   **Habitat**: I. Wady Hamme (Schimp. 247 !, Boiss.).
   
   **Distrib.**: Native of the Mediterranean countries; introduced in many other parts of the World.
   
   Vern. name: **Chappa** (Schimp.).

   
   **Habitat**: I. Arabia Petraea (Herb. Kew!).
   
   **Distrib.**: Mediterranean, Orient.

22. Aristida L.

   
   **Habitat**: II. Aden (Birdwood 102a !, Hook. 112 !).
   
   **Fr.**: Dec. 1847 (Hook.).
   
   **Distrib.**: Senegal, Kordofan, Egypt, Arabia, Punjab, Rajputana, Jodhpur, Southern India.

2. **A. mutabilis** Trin. & Rupr. var. **meccana** Fenzl. in Kotschy Pl. Aeth. n. 103.
   
   **Habitat**: II. Mecca.
   
   **Distrib.**: Yaman.

   
   **Habitat**: I. Wady Hebran (Schimp. 159 !); neighb. of Mt. Sinai (Bové 12 !, Schimp. 368 !).
   
   II. Aden ; Beyt el-Amir ; Shukra ; Serrya (Def.).
   
   IV. Maskat (Auch. 5446 !).
   
   **Fr.**: Apr. 1835 (Schimp.), May 1835 (Schimp.), June 1832 (Bové).
   
   **Distrib.**: Cosmopolitan.
**Habitat**: I. Sinai desert (Auch. 2993!); W. Sewook (Lord!); Wady Zewerah (Lowne!); foot of Jebel Musa, 1,500 m. (Kneuck. 2al!); N. & Central Midian (Burton!).
II. Aden (Perry, Thomson, Hook. 112!); Yaman (Ehrenb. ! Traill. !); Jedda (Zohrab 26!).
**Fr.**: Feb. 1837 (Thomson), Mar. 1878 (Perry), Apr. 1868 (Lord), Apr. 1902 (Kneuck.), Dec. 1847 (Hook.).
**Distrib.**: Common in most dry and hot countries.

**Habitat**: I. Arabia Petraea (Bové).
**Distrib.**: Egypt, Arabia.

**Habitat**: I. Wady Hebron (Schimp. 164!); Mt. Sinai (Schimp. 161!); Wady Farran (Boiss. !); Arabia Petraea (McDonald !); Wady Zewerah (Lowne 221!); Wady Gennah & Sewook (Lord!).
**Fr.**: Apr. 1868 (Lord), Apr. 1835 (Schimp.), May 1835 (Schimp.).
**Distrib.**: Egypt, Syria, Arabia.

7. A. brachypoda Tausch in Flora XIX (1836) 506.
**Habitat**: I. Sinai (Herb. Kew!).
**Distrib.**: Egypt, Arabia.

**Habitat**: I. Arabia Petraea (Boiss. !, McDonald !); Wady Ghurundel & Ramleh (Lord !); El Tor (Schimp. 174!); Ras Mohamemed, 60-80 m. (Kneuck. 487); Debet er Ramleh; Wady el Tihyeh; Akaba, and along the Arabah to the Ghor (Hart).
**Fr.**: Mar. 1846 (Boiss.), Apr. 1904 (Kneuck.).
**Distrib.**: Mediterranean region, Persia, Arabia.

**Habitat**: I. Sinai (Herb. Kew!).
**Distrib.**: Egypt, Sinai, Syria.

**Habitat**: II. Shukra (Defl.); El Gidan (Ehrenb. !); Jedda (Zohrab 164!).
**Distrib.**: N. Africa, Arabia, Baluchistan.

**Habitat**: I. Wadies Ghurundel and Arabah; Ghor es Safieh (Hart); foot of Jebel Musa (Kneuck. 249!); Jebel Musa, 1,500 m. (Kneuck.); Wady Hebran (S. 165!); Mt. Horeb (Auch. 2989!); Mt. Sinai (Schimp. 161!); Wady Sewook (Lord!); Wady Mokateb (Boiss. !); Arabia Petraea (McDonald !); neighb. of Sinai (Bové 20!).

II. Aden, Khamfer (Defl.).

**Fr.**: Mar. 1846 (Boiss.), Apr. 1868 (Lord), Apr. 1835 (Schimp.), Apr. 1902 (Kneuck.), May 1835 (Schimp.), June 1832 (Bove).

**Distrib.**: N. Africa, S. Africa, Arabia.

**Vern. name**: Massje (Bove).

12. **A. obtusa** Del. Fl. Aeg. 175, t. 13, fig. 2.

**Habitat**: I. Wadies Nasb, Sudr, and Ghurundel (Elain); Debbet er Ramleh (Hart); Wady Ghurundel (Post 49!); Wady Hebran (Schimp. 163!); Arabia Petraea (Figari!); Ramleh (Hart!).

II. Yaman (ex Boiss.).

IV. Central Arabia (Pelly!).

**Fr.**: Mar. 1882 (Post), Apr. 1835 (Schimp.).

**Distrib.**: N. Africa, S. Africa, Arabia.

**Observ.**: Grows in tufts and forms the principal part of the grass of the desert (Pelly).


**Habitat**: I. Jebel Musa, 1,500 m. (Kneuck.); Arabia Petraea (McDonald !); Sinai Peninsula (Holland!).


III. Plains of Dhofar (Bent 49!); El Hami (S. 202!).

IV. At the Persian Gulf (Auch. 5445).

**Fr.**: Mar. 1881 (S.), Apr. 1861 (Thomson), Apr. 1881 (S.), Nov. 1888 (S.), Dec. 1847 (Hook.).

**Distrib.**: Persia, Afghanistan, Egypt, Arabia.


**Habitat**: I. Sinai.

**Distrib.**: N. Africa, Arabia, Turkestan, Siberia, Nubia.


**Habitat**: I. Wady el Tihyeh (Hart); Arabia Petraea (Schimp. 368).

**Distrib.**: Mediterranean, Nubia, Abyssinia, Senegal, Cape of Good Hope, India, New Holland.
HABITAT: II. Jebel Bura, 600 m. (S. 323); Ussil (S. 1134); foot of Jebel Melhan, 600 m. (S. 683); Menacha, 2,200 m. (S. 1524); Regma near Hodjela, 900 m. (S. 981); Aden (S. 26).
Fr.: Jan.-Mar. 1889 (S.).
Distrib.: Arabia, Aethiopia.

17. A. coerulescens Desf. var. exilis Schweinf.
HABITAT: II. Menacha, 2,300 m. (S. 1957 !).
OBSERV.: Doubtful species according to Stapf in H. K.

HABITAT: Arabia (ex Muschler).
Distrib.: Arabia, Egypt, Nubia, Abyssinia, Eritrea.

HABITAT: II. Jedda (Zohrab 24, 211 !); Shukra (S. 94 !).
Fr.: Mar. 1881 (S.).
Distrib.: Arabia, Aethiopia.

HABITAT: I. Arabia Petraea, Wady Shaikh (Boiss.); foot of Mt. Sinai (Auch. 2993).
Distrib.: N. Africa, Arabia.

23. Stipa L.

HABITAT: I. Neighb. of Sinai (Bové 13 !); foot of Mt. Sinai (Schimp. 107 !); Arabia Petraea (McDonald !).
Distrib.: Mediterranean, Arabia.
Vern. name: Hammara (Bové).

HABITAT: I. Wady Lebweh (Post 44 !); Arabia Petraea (McDonald !); Wady Hamme (Schimp. 395 !); N., Central and S. Midian (Burton !).
Fr.: Mar. 1882 (Post), Mar. 1835 (Schimp.).
Distrib.: Mediterranean, Orient, S. Africa.

HABITAT: I. Arabia Petraea (McDonald !); Mt. Sinai (Schimp. 102 !, Lord !).
Fr.: May 1835 (Schimp.).
Distrib.: Mediterranean.
Habitat: I. Arabia Petraea.
Distrib.: Southern Europe, Northern Asia.

Habitat: I. Arabia Petraea (Boiss.).
Distrib.: Mediterranean, Orient, Arabia.

24. **Oryzopsis** Michx.

   Habitat: I. Arabia Petraea (McDonald!); Raphidim (Schimp. 309!); damp places of Sinai desert (Bové 14!).
   Fr.: May 1835 (Schimp.), June 1832 (Bové).
   Distrib.: Mediterranean, N. Atlantic Islands.
   Vern. name: *Sab al Abu Hossein* (Schimp.).

2. **O. coerulescens** Hack. in Denkschr. Acad. Wien, I (1885) 75.
Habitat: I. Arabia Petraea.
Distrib.: Asia Minor, Arabia.

Habitat: I. Sinai region (Figari!); Mt. Catherine (Schimp. 312!).
Fr.: Mar. (Figari); May 1835 (Schimp.).
Distrib.: Arabia, Persia.

25. **Piptatherum** Beauv.

1. **P. multiflorum** Beauv. Agrost. 18.
Habitat: I. Wady es Sheikh; wadies on both sides of the Arabah and in the main valley (Hart); Arabia Petraea (Schimp. 309, Boiss.).
Distrib.: Europe, Siberia, Arabia.

26. **Helchocloa** Host.

Habitat: II. Yaman (Traill!).
   III. Dhofar Mts., Hafa (Bent 32!); near El Hami (S. 174!).
Fl.: Apr. 1881 (S.).
Fr.: Apr. 1881 (S.).
Distrib.: Baluchistan, Arabia.

Habitat: I. Sinai (Herb. Kew!).
Distrib.: Mediterranean, Persia.
27. Sporobolus R. Br.

   Habitat: III. El Hami (S. 196).
   Fl.: Apr. (S.).
   Fr.: Apr. (S.).
   Distrib.: Arabia.

   Habitat: II. Aden (Birdwood!).
   Distrib.: Niger, Cape Verde Islands, Gaboon Coast, Abyssinia, Eritrea, Senegambia, Suakim.

   Habitat: II. Plateau of Hagjera, 2,300-2,500 m. (near Menacha) (S. 1739 ! 1704).
   Fr.: Mar. 1889 (S.).
   Distrib.: S. Africa, Arabia.

   Habitat: IV. Near Maskat (Last!).
   Distrib.: India.
   Observ.: Last’s plant is near the above species.

5. S. glaucifolius Hochst. in Flora, XXV, part I (1842), Beibl. 133.
   Habitat: II. Aden (Birdwood!).
   Distrib.: Tropical Africa, Punjab, Sind, W. Peninsula of India.

   Habitat: II. Menacha, 2,300 m. (S. 1739A!).
   Distrib.: All warm countries.

   Habitat: III. El Hami (S. 174!).
   Distrib.: Arabia, Aethiopia.

   Habitat: I. Arabia Petraea (Herb. Kew!).
   IV. Maskat (Auch. 5425).
   Distrib.: Arabia.

   Habitat: I. Ain Musa (Hart).
   II. Aden (Birdwood 130!); Hodeidah (S. 157), Jedda.
(Schimp. 826 l); Yaman (Bové l); El Gidan (Ehrenb. l).
III. At the hot springs of el Hami (S. 159 l); Gharb Bajaba, 70 m. (Lunt 238 l).
IV. Near Maskat (Auch. 5420 l, Bornm. 701 l).
Fr.: Apr. 1881 (S.).
Distrib.: N. Africa, Arabia, India.
Vern. name: Elef (S.).

Habitat: II. Jeddah (Zohrab 209).
Distrib.: Arabia, Aethiopia.

28. Polypogon Desf.

Forsk. Fl. Aeg.-Arab. p. 17.
Habitat: I. Wady Farran (Lord l); Sinai (Auch. 2981 l, Holland l);
Arabia Petraea (McDonald l); S. Midian (Burton l); Wady Elain;
Ghor Es Safieh (Hart).
Fr.: May 1868 (Lord).
Distrib.: Mediterranean, Abyssinia.

2. P. maritimus Willd. in Ges. Naturf. Fr. Neue Schr. III (1801)
442.
Distrib.: Southern Europe, Mediterranean.

29. Agrostis L.

Habitat: I. Neighb. of Sinai (Bové 17 l).
Fr.: June 1932 (Bové).
Distrib.: Northern temperate regions.
Vern. name: Hammara (Bové).

Habitat: II. Above Menacha, 2,500 m. (S. 1413).
Fl.: Feb. 1889 (S.).
Fr.: Feb. 1889 (S.).
Distrib.: Abyssinia, Arabia.

3. A. verticillata Vill. Prosp. 16.
Habitat: I. Arabia Petraea (McDonald l; Schimp. 289).
II. Ussil, 950 m. (S. 1167 l).
Fr.: Feb. 1889 (S.).
Distrib.: Europe, Arabia,
Habitat: II. Above Menacha, 2,500 m. (S. 1413 !).
Distrib.: Abyssinia, Arabia.

**30. Lagurus L.**

Habitat: I. Arabia Petraea (ex Muschler, Herb, Kew !).
Distrib.: Mediterranean.

**31. Crypsis Ait.**

Habitat: I. Arabia Petraea (ex Muschler, Herb. Kew !).
Distrib.: Temperate and tropical countries.

**32. Trisetum Pers.**

Habitat: I. Arabia Petraea (Auch. ex Cosson).
Distrib.: Mediterranean.

2. **T. glumaceum** Boiss. Fl. Or. V (1884) 534.
Habitat: I. Sinai (Boiss. !).
Distrib.: Egypt, Arabia, Syria.

Habitat: I. Arabia Petraea (Herb. Kew !).
Distrib.: Egypt, Arabia, Syria.

**33. Avena L.**

Habitat: II. El Hausan near Menacha, 2,400 m. (S. 1769).
Fl.: Mar. 1889 (S.).
Fr.: Mar. 1889 (S.).
Distrib.: Abyssinia, Arabia.

Habitat: I. Arabia Petraea (Boiss.).
Distrib.: Mediterranean, Orient.

Habitat: I. Arabia Petraea (McDonald ! Schimp. 277); Sinai
   (Holland, Auch. 2924 !).
Distrib.: Mediterranean, Asia Minor, Arabia.
**Habitat**: I. Arabia Petraea (Boiss.).  
**Distrib.**: Mediterranean, Orient.

**Habitat**: I. Arabia Petraea (Auch. 2924).  
**Distrib.**: Central and Southern Europe, N. Africa, Abyssinia, Northern Asia.

**34. Tristachya** Nees.

**Habitat**: II. Yaman, near Ferine (Schimp. 788).  
**Distrib.**: Arabia, Afghanistan.

**35. Danthonia** DC.

**Habitat**: I. Arabia Petraea, Ramla (Boiss.); between Tor and Sinai (Kneuck. 251); Wady Nasb; Debbet er Ramleh; Wady Arabah, near the Ghor (Hart).  
II. Jedda (Zohrab 295!); Wady Fatimah (Schimp. 1038!); near Taifa (Schimp. 787!).  
IV. Central Arabia: From the sand ridges, 27th and 28th Feb. (Pelly!).  
**Fr.**: Feb. 1836 (Schimp.); Feb. (Pelly).  
**Distrib.**: Egypt, Arabia.  
**Vern. name**: Chagaret-el-ghemel (Bové).


**Habitat**: I. Mt. Sinai (Schimp. 311!); Wady Nasb (Drake 70!); Ghor es Safihe (Hart).  
II. Neighb. of Lahadj (Defl. 310!); Jedda (Zohrab 9!); Aggara near Hodjela, 600 m. (S. 1011).  
**Fl.**: Feb. 1889 (S.).  
**Fr.**: Jan. 1890 (Defl.), May 1835 (Schimp.).  
**Distrib.**: Cosmopolitan.  
**Vern. name**: Nilbil (Schimp.), Nejess (Drake), Ohbell (S.).

2. **C. dactylon** Pers. var.  
**Habitat**: I. Wady Ghurundel (Hart).

**37. Schoenefeldia** Kunth.

1. **S. gracilis** Kunth Rév. Gram. 283, t. 53 (1830).  
**Habitat**: II. Badjil, 190 m. (S. 595).  
**Distrib.**: Tropical Africa, Arabia.
38. **Enteropogon** Nees.

   
   **Habitat:** II. Jebel Bura, above Hille, 900 m. (S. 297); Ussil, 1,000 m. (S. 311); Wady Madfar, near Hodjela, 700 m. (S. 983); foot of Jebel Melhan, 600 m. (S. 705).
   
   **Fl.:** Jan. and Feb. 1889 (S.).
   **Fr.:** Jan. and Feb. 1889 (S.).
   **Distrib.** : Abyssinia, Arabia.

39. **Chloris** Sw.

   
   **Habitat:** II. Near Mecca (Schimp. 802!); Wady Fatimah in cult. ground (Fischer 127A!); Jedda (Zohrab 252!); Mt. Kessr (Fischer 129A!).
   
   **Fl.** : Feb. 1837 (Fischer).
   **Fr.** : Feb. 1837 (Fischer), Feb. 1836 (Schimp.).
   **Distrib.** : Arabia, Egypt, S. Africa, S. America.

   
   **Habitat:** II. Regma near Hodjela, 800 m. (S. 959!).
   **Fr.** : Jan. 1889 (S.).
   **Distrib.** : Abyssinia.

   
   **Habitat:** II. Wady Djara (Ehrenb. 236!); Regma near Hodjela 800 m. (S. 967!).
   **Fr.** : Jan. 1889 (S.), Feb. 1825 (Ehrenb.).
   **Distrib.** : Arabia, India.

4. *C. myriostachya* Hochst. in Flora XXXVIII (1855) 204.
   
   **Habitat:** II. Hille, 600 m. (S. 385!).
   **Fr.** : Jan. 1889 (S.).
   **Distrib.** : Arabia, tropical Africa.

40. **Melanocenchris** Nees.

1. *M. plumosa* Hochst. in Flora XXXVIII (1855) 273.
   
   **Habitat:** II. Foot of Mt. Kessr near Harames (Schimp. 794!); foot of Mt. Kessr (Fischer 129!); cult. ground in Wady Fatimah (Fischer 127!).
   
   **Fl.** : Feb. 1837 (Fischer).
   **Fr.** : Feb. 1836 (Schimp.), Feb. 1837 (Fischer).
   **Distrib.** : Abyssinia, Arabia.
41. Lepidopironia A. Rich.

   Habitats: II. Jebel Bura, Hille (S. 385! 391); Aggara, near Hodjela, 600 m. (S. 898).
   Fr.: Jan. 1889 (S.).
   Distrib.: Abyssinia, Arabia.

43. Tetrapogon Desf.

   Habitats: I. Wady Zewerah (Herb. Kew!); Wady Gennah (Lord!); Arabia Petraea (McDonald!); Wady Hebran (Schimp. 155!); Mt. Sinai (Bové 2!; Figari!); Sinai desert (Auch. 3001!); Central Midian (Burton!).
   II. Aden (Thomson, Lunt 349!; Balfour, Perry, Beevor 94!; S. 11); Mt. Sidr (Fischer 122!); Shukra (S. 133).
   Fl.: Feb. (Fischer).
   Fr.: Apr. 1894 (Lunt), Apr. 1835 (Schimp.), May 1868 (Lord), June 1833 (Bové).
   Distrib.: N. Africa, Arabia.
   Vern. name: Kammara (Bové).

   Distrib.: Arabia (ex Index Kew.).

   Habitat: II. Foot of Jebel Bura, 600 m. (S. 297); foot of Jebel Melhan, 600 m. (S. 799); Regma, near Hodjela, 900 m. (S. 967); Aggara near Hodjela, 600 m. (S. 1958).
   Fr.: Jan. 1889 (S.).
   Distrib.: Arabia, Abyssinia, Rajputana, Sind, Khandesh, S. India.

43. Dinebra Jacq.

   Habitat: I. Arabia Petraea (Herb. Kew!).
   Distrib.: Egypt, Arabia, India.

44. Eleusine Gaertn.

   Habitat: II. Regma near Hodjela, 900 m. (S. 979!); at the foot of Jebel Melhan, 600 m. (S. 798).
   Fr.: Jan. 1889 (S.).
   Distrib.: Cosmopolitan.
   Habitats: II. Menacha, 2,300—2,900 m. (S. 1700 !); Jebel Shibam at Menacha, 2,900 m. (S. 1671).
   Fr.: Mar. 1889 (S.).
   Distrib.: Arabia.
   Vern. name: Ghassere (S.).

3. *E. flagellifera* Nees in Linnaea XVI (1842) 220.
   Habitats: II. Jedda (Ehrenb. 230 !, Zohrab 10 !, Fischer 124 !); desert near Jedda (Schimp. 800 !).
   IV. Maskat (Auch. 5468, 5469).
   Fl.: Dec. and Jan. 1837 (Fischer).
   Fr.: Jan. 1836 (Schimp.), Dec. and Jan. 1837 (Fischer).
   Distrib.: W. Asia, tropical Africa.

   Habitats: II. Aggara near Hodjela, 600 m. (S. 1174); foot of Jebel Bura at Hille, 600 m. (S. 477); Aden (Lunt 309 !, Hook. 107 !); Jedda (Fischer 206 !); Yaman (Defl. 521 !); Mor (Ehrenb. 229 !).
   III. Shukra (S. 71a).
   IV. Maskat (Auch. 5468 !).
   Fl.: Jan. 1889 (S.), Mar. 1837 (Fischer).
   Fr.: Jan. 1889 (S.), Apr. 1894 (Lunt), Dec. 1847 (Hook.).
   Distrib.: Tropical Africa, Arabia.

   Habitats: II. Northern slope of Jebel Bura, 900 m. (S.).
   IV. Maskat (Auch. 5466 !).
   Fr.: Jan. 1889 (S.).
   Distrib.: Cosmopolitan in tropics and subtropics.

   Habitats: II. Jedda (Zohrab 314 !); near Shukra (S. 68 !, Defl. 347 !).
   Fr.: Mar. 1881 (S.), Mar. 1890 (Defl.).
   Distrib.: S. America, India, Egypt.
   Vern. name: Keneb (S.).

   Habitats: II. Jebel Bura at Hille, 600 m. (S. 195); Regma at Hodjela, 900 m. (S. 1289); below Ussil, 1,200 m. (S. 1202).
   Fr.: Jan.-Feb. 1889 (S.).
   HABITAT: II. Above Menacha, near Kabil, 2,500 m. (S. 1462 !).
   Fr.: Feb. 1889 (S.).
   Distrib.: Abyssinia, Arabia.

   HABITAT: II. Jedda (Zohrab 166 !); Shukra (S. 71 !); Aggara near Hodjela, 600 m., in maize fields (S. 1174 !).
   Fr.: Jan. 1889 (S.), Mar. 1881 (S.).
   Distrib.: Widely spread along the Red Sea within the tropics.
   Observ.: "Dactyloctenium glaucophyllum, Courbon in Ann. Sc. Nat. ser. 4, v, 18, (1862) p. 133, has the nodes densely and long pilose, its stem 'climbing', etc. and can hardly have been the above species." (C. B. Clarke).

    Habitat: II. Wady Djara (Ehrenb. 227 !).
    III. Lokham near Mokalla, 60 m. (Lunt 78 !).
    Distrib.: Abyssinia, Arabia.
    Observ.: Cultivated as food for cattle (Lunt).
    Vern. name: *Dokhn* (Lunt).

45. *Dactyloctenium* Willd.

   Habitat: II. Liht (Ehrenb. 231 !); Wady Djara (Ehrenb. 228 !); Wolldeje, Jebel Bura (S. 1928 !); Jebel Bura, 600 m. (S. 250); Jedda (Zohrab 219 !); Aggara near Hodjela, 600 m. (S. 1024); Regma near Hodjela, 900 m. (S. 1929); Wady Fatimah near Mecca (Schimp. 801 !); Wady Fatimah (Fischer 130 !).
   Distrib.: Widely spread throughout the tropics.
   Vern. name: *Kerssi* (S).


   Habitat: II. Ussil, 1,400 m. (S. 1348).
   Distrib.: Abyssinia, Arabia.

2. *L. obtusifolia* Hochst. in Flora XXXVIII (1855) 203.
   Habitat: II. Hille, Jebel Bura (S. 495 !).
   Fr.: Jan. 1889 (S.).
   Distrib.: Abyssinia, Arabia.
47. Pappophorum Schreb.

1. P. molle (Lehm.) Kunth Enum. Pl. 1, 255.
   Habitats: II. Jebel Bura, Hille (S. 395!); Ussil, 1,100 m. (S. 1341!);
   Shukra (S. 134).
   Distrib.: S. Africa, Ethiopia, Arabia.
   Observ.: According to Stapf S. 395 is near P. elegans.

2. P. brachystachyum Jaub. & Spach Illust. IV, 34.—Enneapogon
   Habitats: I. S. Midian (Burton!); Sinai (Figari!).
   II. Yaman (ex Boiss.).
   Fr.: Apr. (Figari).
   Distrib.: N. Africa, Arabia.

3. P. cenchróides Lichst. in Roem. & Schult. Syst. II, 616;
   Habitats: II. Below Ussil, 1,100 m. (S. 1341!).
   Distrib.: S. Africa, Arabia.


   Akad. Wiss. Wien (1885) II, 9.—B. bromoides Hochst. ex Steud. in Flora
   (1838) 25.
   Habitats: I. Foot of Mt. Sinai (Schimp. 402!); Arabia Petraea
   (McDonald!); Sinai (Figari!).
   Fr.: Apr. 1835 (Schimp.).
   Distrib.: Egypt, Arabia, Persia, Afghanistan.

49. Arundo Tourn.

   Habitats: II. El Hausan, near Menacha, 2,400 m. (S. 1954).
   Distrib.: Mediterranean, Orient.
   Vern. name: Hallal (S.).

50. Phragmites Trin.

1. P. maxima Blatt. & McCann in Bomb. Grasses (in Press).—
   Habitats: I. Wady el Ain (Hart!); N. Midian (Burton!).
   III. Dhofar Mts: Stream near coast (Bent 204!).
   Distrib.: Cosmopolitan.

2. P. maxima Blatt. & McCann, var. isiaca (Del.) Cosson in Coss.
   Habitats: I. W. es-Sió, W. Tarfa, forming gigantic tufts (ex Kneuck.).
   Distrib.: Cosmopolitan.
Habitat: I. Sinai (ex Muschler).
Distrib.: Cosmopolitan.

51. *Ammochloa* Boiss.

Habitat: I. Sinai (Herb. Kew !).
Distrib.: N. Africa, Sinai, Syria.

52. *Lamarckia* Moench.

Habitat: I. Arabia Petraea (Herb. Kew !).
Distrib.: Mediterranean countries from the Canaries to the Punjab and Abyssinia.


Habitat: I. Arabia Petraea (Haussk.).
Distrib.: Mediterranean.

Habitat: I. Sinai (Auch. 3061 !).
Distrib.: Arabia.

54. *Melica* L.

Habitat: I. Top of Mt. Catherine (Schimp. 104 !).
Fr.: May 1835 (Schimp.).
Distrib. of type: Mediterranean region, Orient, Himalayas.

55. *Sphenopus* Trin.

Habitat: I. Arabia Petraea (Herb. Kew !).
Distrib.: Mediterranean.

56. *Halopyrum* Stapf.

Habitat: II. Eastern shore of the isthmus of Barriere Gate, on small dunes and sandhills forming large bushes with stolons often reaching 90 cm. and more (S. !); Hodeidah (Defl. 31 !); Yaman, in salt marshes (Bové 257 !).
FLORA ARABICA.

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Without locality (Defl. ! Birdwood!).
Fr.: Jan. 1831 (Bové), Mar. 1887 (Defl.).
Distrib.: S. Arabia, N. India.

57. Eragrostis Host.

Habitat: II. Near Jedda (Schimp. 799!); Jedda (Fischer 133!, Zohrab 18! 212!).
Fl.: Jan. 1837 (Fischer).
Fr.: Jan. 1837 (Fischer), Dec. 1835 (Schimp.).
Distrib.: Egypt, Arabia.

Habitat: I. Ghor es Safieh (Hart).
II. Neighb. of Shukra, cult. ground (Defl. 351!).
Fr.: Mar. 1890 (Defl.).
Distrib.: Warm regions.

Habitat: I. Ghor es Safieh (Hart);
II. Near Mecca (Schimp. 266!).
IV. Near Maskat (Last!).
Fr.: Aug. 1835 (Schimp.).
Distrib.: Throughout the Mediterranean region from the Canaries to Persia; also extending to middle Europe.

Habitat: I. Ghor es Safieh (Hart);
II. El-Gelil; Serrya (Defl.); Aden (Birdwood !); Agqara near Hodjela, 600 m. (S. 1029); Regma near Hodjela, 800 m. (S. 955); below Ussil, 950 m. (S. 1204, 1280); Jedda (Zohrab 12! 195! 200! 223!) Shukra (S. 143).
Fr.: Feb. 1889 (S.), Mar. 1881 (S.).
Distrib.: Tropical and subtropical regions.
Vern. name: *Seschegge* (Ussil).

Habitat: I. Wady Arabah (Hart!); Ain Fabal, near El Faba, Ghor es Safieh (Hart).
II. Lahej (Defl.); Aden (Birdwood 133!).
Distrib.: Egypt to India and southwards to E. tropical Africa.

6. E. decidua Hochst. in Flora XXXVIII (1855) 324.
   Habitat: II. Menacha, 2,300 m. (S. 2008).
   Distrib.: Abyssinia, Arabia.

   Habitat: II. Aden (Anders. ! Hildebrandt !, Birdwood !); Jebel Melhan, 600 m. (S. 634); Shukra (S. 144A); Wolledje (S. 634 !); Jedda (Fischer !); Gumfuda (Ehrenb. !).
   Fl.: Jan. 1889 (S.), Feb. (Fischer), Feb. 1825 (Ehrenb.).
   Fr.: Jan. 1889 (S.), Feb. 1825 (Ehrenb.).
   Distrib.: Common throughout tropical Africa and America, and in N. India.

8. E. ciliaris Link var. brachystachya Boiss.
   Habitat: II. Jedda (Zohrab 15 !, Schimp. 798 !); Gumfuda (Ehrenb. !).
   III. El Hami (S. 176 !).
   Fl.: Feb. 1825 (Ehrenb.), Apr. 1881 (S.).
   Fr.: Jan. 1836 (Schimp.), Apr. 1881 (S.).

   Habitat: II. Yaman (ex Boiss.).
   IV. Near Maskat (Last !).
   Distrib.: Tropical Africa and Asia.

    Habitat: II. South western slope of Shibam near Menacha, 2,500 m. (S. 1948).
    Fl.: Mar.
    Distrib.: Yaman, Eritrea.
    Vern. name: Thaf-thafu (Schimp.).

    Habitat: II. Ussil, 1,100 m. (S. 1323); northern slope of Shibam near Menacha, 2,500-2,600 m. (S. 1452, 1654, 1946).
    Fl.: Feb. 1889 (S.).
    Fr.: Feb. 1889 (S.).

    Habitat: II. Below Ussil, 950 m. (S. 1307).
    Fr.: Feb. 1889 (S.).
    Distrib.: Aethiopia, Arabia.
HABITAT: II. Below Ussil, 1,100 m. (S. 1332).
Fl.: Feb. 1889 (S.).
Fr.: Feb. 1889 (S.).
Distrib.: Yaman.

HABITAT: III. El Hami (S. 208).
Fl.: Apr.
Distrib.: Arabia.

HABITAT: II. Jedda (Zohrab !), Aden (Birdwood !).

58. Aeluropus Trin.

HABITAT: I. Sinai (ex Muschler).
II. Aden, Sheikh Othman and Shukra (Defl., S. 127); Aden
(Thomson, Anders., Hook. !, Lunt 343 !); Perim Island (Herb. Kew !);
Hodeidah (S. 156); Shukra (S. 141).
Fl.: Dec. 1888 (S.), Mar. 1881 (S.), Apr. 1894 (Lunt).
Fr.: Dec. 1888 (S.), Mar. 1881 (S.).
Distrib.: Egypt, Abyssinia, Arabia.
Vern. name: Schöchham (Tehama).

HABITAT: I. El Tor (Schimp. 204 !, Bové 9 !); N. Midian (Burton).
II. Yaman (Schimp. 1000 !); Yaman: Salt marshes (Bové
258 !); Jedda (Fischer 134 !, Zohrab 16 ! 210 !); Hodeidah (S. 155 !).
III. Common on salt ground, Ghail-babagir, 70 m. (Lunt
233 !).
Fr.: Feb. (Lunt), Mar. 1835 (Schimp.), June 1832 (Bové), Dec.
1888 (S.).
Distrib.: Mediterranean and Caspian regions, Upper Egypt, Nubia,
Central and S. Arabia, Persia, Afghanistan, Sind, Punjab, W. Peninsula
of India, Ceylon.
Vern. name: Neghil (Bové).

HABITAT: II. Sandy plain between Barriere Gate and Shaikh
Othman (Defl.).
Distrib.: Spain, France, Italy, Greece, Asia Minor, Algeria, Tunis,
Egypt, Arabia (not Sind).

Habitat: I, Arabia Petraea (Bové, Schimp. 204).

59. *Dactylis* L.


Habitat: I, Arabia Petraea (ex Muschler).
Distrib. of type: Europe, Northern Asia.

60. *Schismus* Beauv.


Habitat: I, Wady Sewook (Lord!); Arabia Petraea (McDonald!).
Distrib.: Southern Europe, Central Asia, S. Africa.


Habitat: I, Wady Zewerah (Lowne!); Sinai (Figari!); Wady es-Sle, Oasis Feiran (Kneuek. 267); Arabia Petraea (Schimp. 371).
Fr.: May 1847 (Figari).
Distrib.: Egypt, Sinai, Syria, Palestine.

61. *Poa* L.


Habitat: I, Sinai (Auch. 2944!).
Distrib.: Northern and Arctic regions.


Habitat: I, Sinai (Figari!); Mt. Catherine (Schimp. 326!).
Fr.: May 1835 (Schimp.).
Distrib.: Arabia, Persia.


Habitat: I, Ghor es Safich (Hart).
II, Near Menacha, 2,500 m. (S. 1453!). Taifa (Schimp. 968!); Kahil near Menacha, 2,500 m. (S. 1453!).
Fl.: Feb. 1889 (S.).
Fr.: Feb. 1889 (S.).
Distrib.: Cosmopolitan.


Habitat: II, Above Menacha, near el Ejan, 2,500 m. (S. 1669!).
Fr.: Mar. 1889 (S.).
Distrib.: N. temperate regions.

**Habitat**: North Western slope of Shūbam, near Menacha, 2,000 m. (S. 1720).

Fl.: Mar. 1889 (S.).
Fr.: Mar. 1889 (S.).

**Distrib.**: Arabia.


**Habitat**: Common weed in fields near Shukra (S. 144 !).
Fr.: Mar. 1881 (S.).

**Distrib.**: Abyssinia, Arabia.


**Habitat**: Mt. Sinai (Schimp. 105 !).
Fr.: May 1835 (Schimp.).

**Distrib.**: Arabia, Persia, Caucasus.


**Habitat**: Arabia Petraea (Schimp. 105, Boiss.).

**Distrib.**: Northern Asia, Arabia.

62. *Festuca* (Tourn.) L.


**Habitat**: Mt. Catherine (Schimp. 347 !).
Fr.: May 1835 (Schimp.).

**Distrib.**: Europe, Northern Asia, N. America.


**Habitat**: Arabia Petraea (Herb. Kew !).

**Distrib.**: Egypt.


**Habitat**: Arabia Petraea (Herb. Kew !).

**Distrib.**: Egypt.


**Habitat**: Sinai (ex Muschler, Herb. Kew !).
**Distrib.**: Egypt, Cyrenaica, Syria.

HABITAT: I. Arabia Petraea (Herb. Kew!).

HABITAT: I. Arabia Petraea (Herb. Kew!).
DISTRIB.: Europe, Mediterranean region.

HABITAT: I. Sinai (Herb. Kew!).
DISTRIB.: Egypt, Algeria, Syria, Palestine.

HABITAT: I. Arabia Petraea (Herb. Kew!).
DISTRIB.: Mediterranean region.

63. **Scleropoa** Griseb.

HABITAT: I. Arabia Petraea (Herb. Kew!).
DISTRIB.: Mediterranean region.

HABITAT: I. Arabia Petraea (Auch. 3037).
DISTRIB.: Northern Africa, Syria.

64. **Cutandia** Willk.

HABITAT: I. Arabia Petraea (Pinard, Boiss.); Oasis Firan, 600-650 m. (Kneuck. 259); Sinai (Auch. 3037!).
DISTRIB.: Mediterranean.

65. **Bromus** Dill. ex L.

HABITAT: I. Oasis Firan (ex Kneuck.).
DISTRIB.: Europe, Mediterranean region and Caucasus.

HABITAT: II. Menacha and slopes of Shibam, 2,000-2,500 m. (S. 1459, 1578, 1711, 1714).
DISTRIB.: Abyssinia, Arabia.

Dividitur in varietates 2:

α **Sinaicus genuinus**, panicula contracta, ramis brevibus erecto patulis, etc., l. c.

**Habitat:** I. W. es-Sl, plain of Rāha, W. esch-Sheth (ex Kneuck.).

β **incanus**.

**Habitat:** I. W. Tarfa, plain of Rāha, Oasis Firan (ex Kneuck.).

**Distrib.:** Japan.

4. **B. tectorum** L. × **Japonicus** Thunb.

**Habitat:** I. W. Tarfa, ca. 1,100 m. (ex Kneuck.).


**Habitat:** I. Sinai region (Figari !).

**Fr.:** May 1849 (Figari).

**Distrib.:** Eastern Mediterranean.


**Habitat:** I. Oasis of Firan, 600-650 m. (Kneuck. 291); Arabia Petraea (Boiss.).

**Fr.:** Apr. 1902 (Kneuck.)

**Distrib.:** Mediterranean region.


**Habitat:** I. Arabia Petraea (Neerg.).

**Distrib.:** Europe, N. Africa, Orient.


**Habitat:** I. Foot of Mt. Sinai (Schimp. 1766 !); Arabia Petraea (McDonald !).

**Distrib.:** Europe, Orient, Afghanistan.

9. **B. pulchellus** Fig. & Not. Agr. Fragm. 16.

**Habitat:** I. Sinai (Figari ex Boiss. vol. V, 656).

**Distrib.:** Arabia.


**Habitat:** I. Arabia Petraea (Muschler).

**Distrib.:** Throughout the Mediterranean region,
HABITAT: I. Mt. Sinai (Bové 6!); Wady Nasb (Drake 50!); foot of Mt. Sinai (Schimp. 175!); Wady Farrun and Wady Gennah (Lord!); Arabia Petraea (McDonald!).
IV. Central Arabia (Pelly!).
Flr.: Apr. 1835 (Schimp.), May 1868 (Lord), June 1832 (Bové).
Distrib.: Europe, Orient, Northern Asia.
Vern. name: Sufsouf (Bové).

HABITAT: I. Foot of Jebel Musa, 1,500 m. (Kneuck. 290).

HABITAT: II. Shibam, above Menacha, 2,600 m. (S. 1655).
Fr.: Feb. and Mar. 1889 (S.).
Distrib.: S. Africa, Arabia, Eritrea.

HABITAT: I. Raphidim (Schimp. 252!).
Fr.: July 1835 (Schimp.).
Distrib.: Mediterranean, Orient.

HABITAT: I. Arabia Petraea.
Distrib.: Mediterranean.

67. Lolium L.
1. L. multiflorum Lam. Fl. Fr. III, 621.
HABITAT: I. Arabia Petraea (Boiss.!).
Fr.: Apr. 1846 (Boiss.).
Distrib.: Temperate regions of Europe and Asia.

68. Agropyrum J. Gaertn.
HABITAT: I. Bestam (Schimp. 157!).
Distrib.: Mediterranean.

HABITAT: I. Arabia Petraea (Figari!).
Distrib.: Orient, N. Africa.
69. Triticum L.

   *Habitat:* III. Cult. under date palms (Lunt 148!).
   Vern. name: *Burr* (Lunt).

2. T. vulgare Vill. var. caesium Alef. l. c. 330; Koern.-Werner l. c. I, 47; Schweinf. l. c. 45.
   *Habitat:* II. Menacha (S. 1770b! 1581).
   *Fl.:* Mar. 1889 (S.).
   Vern. name: *Berr maiseni* (S.).

3. T. vulgare Vill. var. ferrugineum Alef. Landw. Flora 330; Koern.-Werner l. c. I, 47; Schweinf. l. c. 45.
   *Habitat:* II. Menacha (S. 1770a!).
   *Fl.:* Mar. 1889 (S.).
   *Observ.:* Winter wheat of four months duration (S.).
   Vern. name: *Berr damdi* (S.).

   *Habitat:* II. Menacha, 2,300 m. (S. 1771!).
   *Fl.:* Mar. 1889 (S.).
   *Distrib.:* Cosmopolitan.
   *Observ.:* Winter wheat of four months duration (S.).
   Vern. name: *Berr halba* (S.).

   *Habitat:* I. Cult. in Oasis Firan (Kneuck.).
   *Observ.:* Not quite sure, as ripe fruit is wanting (Kneuck.).

70. Aegilops L.

1. A. bicornis (Forsk.) Jaub. et Spach Ill. Pl. Orient. IV (1850) t. CCCIX.
   *Habitat:* I. Arabia Petraea (ex Muschler).
   *Distrib.:* Cyrenaica, Marmarica, western Asia eastward to Mesopotamia.

   *Habitat:* I. Arabia Petraea.
   *Distrib.:* Europe, Arabia.
71. Lepturus R. Br.

Habitat: I. Oasis Ain Musa (Kneuck. 528).
Distrib.: Throughout the Mediterranean region.

72. Hordeum (Tourn.) L.

1. H. vulgare L. Sp. Pl. 84.
Habitat: I. Arabia Petraea (McDonald !).
IV. Zor Hills (Cox and Knox).
Distrib.: Cultivated.
Vern. name: Hantah (Arabic in Zor Hills).

2. H. vulgare L. subsp. tetrastichum Keke. et Wern. Getr. I, 156
var. pallidum Al.
Habitat: II. Menacha, 2,400 m. (S. 1568).

3. H. vulgare L. subsp. hexastichum, var. brachynurum.
Habitat: II. Near Menacha, 2,200 m. (S. 1684).
Vern. name: Schair maissani (S.).

4. H. vulgare L. subsp. distichum var. deficiens Steud.
Habitat: II. At Menacha, on terraces, 2,300 m. (S. 1490); at Ejan,
on the northern slope of the Shibam, 2,700 m. (S. 1644).
Fr.: Feb. 1889 (S.).
Vern. name: Schair habhuri (S.).

Habitat: I. Arabia Petraea (ex Muschler).
Distrib.: Everywhere in the Orient from Palestine to Persia.

Habitat: I. Plain of Râha, J. Arribe, Oasis Firan (ex Kneuck.).
Distrib.: Europe, N. Africa, Arabia, Orient.

Habitat: I. Mt. Catherine, cult. ground (Schimp. 383 !); N. Midian
(Burton !).
Fr.: July 1835 (Schimp.).
Distrib.: Europe, N. Africa, Arabia, Orient.

Habitat: I. Arabia Petraea (Boiss.).
Distrib.: Asia Minor, Arabia, Orient.
73. Elymus L.

1. E. Caput-Medusae L. Sp. Pl. 84.
Habitat: I. Desert of Sinai (Bové 101).
Fr.: June 1832 (Bové).
Distrib.: Southern Europe, N. Africa, Orient.

74. Zea L.

Habitat: II. Cultivated at Shaikh Othman (Yerbury ex litt.); Mokha (Yerbury).
Distrib.: Cultivated.
Vern. name: Hind (Yerbury).
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(Synonyms and species incidentally mentioned are printed in italics.)

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